

Investing in WECAFC

Considerations for the Development of RFMO Investments

Prepared by: Wilderness Markets
For: Conservation International (CI)

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Executive Summary

This report outlines the findings from efforts to develop a business case for the Western Central Atlantic Fishery Commission (WECAFC) in support of carrying out its future duties as Regional Fisheries Management Organization (RFMO). It is part of a series of reports produced for Conservation International in support of the business case development efforts in the Caribbean led by the Food and Agriculture Organization (FAO).

As part of this report, four regionally important fishery target stocks (shrimp and seabob, dolphinfish, queen conch, and spiny lobster) were assessed for potential business case development. These reports are included in the Appendices of this document.

Although much work has been done over the years in the WECAFC region and there are promising fisheries for impact investing, many regional knowledge gaps still exist that hinder the development of sustainable fisheries. Attracting impact capital, which seeks to realize not only financial, but also social and environmental gains, requires addressing these gaps in a strategic manner in order to accelerate the region towards sustainably managed fisheries that balance livelihoods, well-being and a healthy natural environment. Contextual analysis of four regionally important stocks, the value proposition, proposed ways forward and guidelines are provided herein.

Contextual Analysis

Contextual analysis for the region focused on information needed to evaluate business cases within four economically and socially important fisheries—shrimp and seabob, queen conch, spiny lobster, and dolphinfish. These fisheries are distinct and much about their social and value chain dynamics remains to be quantified. In the analysis descriptions were included of the: fleet; landings trends; infrastructure; management and governance; organizational capacity; market potential; levels of stakeholder engagement; and presence of investable entities. Unfortunately, most of the information collected and analyzed contains major gaps and shows the high variation within the region. This represents a significant barrier to assessing investment risk and, by extension, to attracting investment capital.

The two aspects with meaningful findings were landings and market potential. Landings data for the region reveal an overall decline in fish landings in the region, though market potential for many species in the WECAFC is likely high, as there are numerous important stocks, like shrimp, seabob, conch and lobster as well as nearby end markets able to afford premium products, whether they are Caribbean resorts or U.S. and Canadian markets.

Table 1 Status of key WECAFC stocks

Characteristics are generalized for the region; most vary by country or geography.

Species	Status	Uncertainty	Average annual landings¹	Notes
Northern brown shrimp, northern white shrimp (primarily landed by U.S.); Atlantic seabob	Fully exploited	Low to medium	187,000 mt (all species of shrimp and seabob)	FPI (BR, CO, US) MSC (SU) FIP (GU)
Caribbean spiny lobster	Fully exploited to over exploited; much unknown	High for most areas	35,000 mt	FPI (US) MSC* (BA) FIP (HO, NI)
Dolphinfish (dorado)	Unknown; thought to be stable and not over exploited	High	4,500 mt	None
Yellowfin tuna (YFT) ²	Over exploited	Medium	13,000 mt	FPI (GR)
Queen conch	Over exploited	High	30,000 mt	None

**The Bahamas lobster fishery is in the process of attaining MSC*

FPI=Fishery Progress Indicator

MSC=Marine Stewardship Certification FIP=Fishery Improvement Project

BA-Bahamas BR-Brazil, CO-Colombia, GR-Grenada, GU-Guyana, HO-Honduras, NI-Nicaragua, SU-Suriname, US-United States

Value Proposition and Business Model

Hoydal identified potential economic benefits of \$700 million per year (\$1 billion if IUU is reduced) by managing WECAFC fisheries through an RFMO structure.³ There is significant economic value associated with the fisheries and fisheries reform in the WECAFC; but, the conditions identified in the contextual analysis make it challenging to propose a suitable business case to provide a financial return. Consequentially, no business cases for the WECAFC nor the four regionally important stocks were identified during this review.

While WECAFC is transitioning from a Regional Fishery Body (RFB) into an RFMO, important work can still be done to attract impact investors to sustainable fisheries in the region. A key task would be to identify and to support the design and development of scalable pilot enterprise models for fishery sustainability and to strengthen their investment appeal in order to secure private capital investment within three to five years. Fortunately, some models are being developed in the region and elsewhere that will provide valuable insights to the evolution of this field. These include efforts in Grenada, the Dominican Republic, Seychelles and elsewhere.

To enable the right conditions for private investment in fisheries reform and sustainable enterprise development, efforts should be targeted at attracting impact investors by developing a pipeline of private enterprise models that can meet the basic business investment requirements.

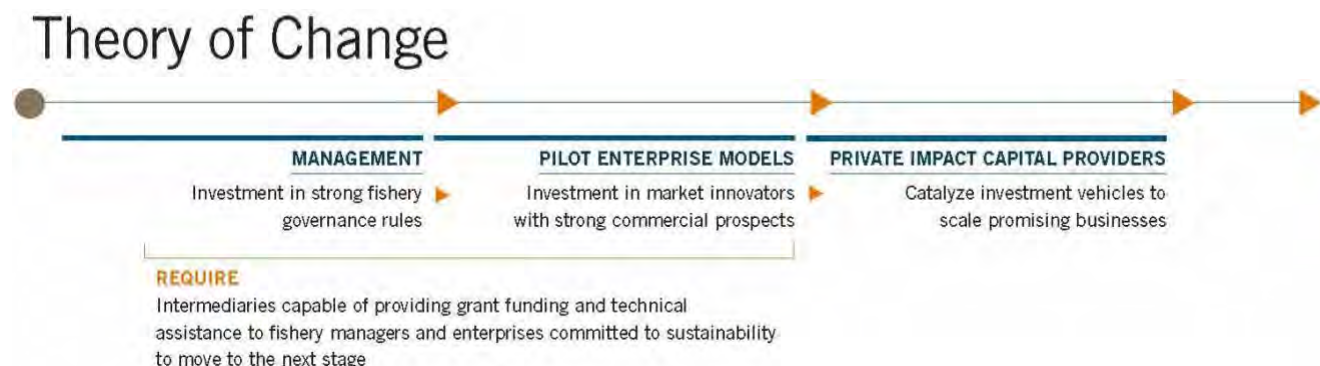
¹ For the time period 2005 through 2014. FAO. 2016. Fishery and Aquaculture Statistics. Global capture production 1950-2014. (FishstatJ). In: FAO Fisheries and Aquaculture Department [online or CD-ROM]. Rome. Updated 2016.

<http://www.fao.org/fishery/statistics/software/fishstatj/en>

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

³ FAO. 2016. "Findings of the independent cost-benefit assessment of the options for strategic re-orientation of WECAFC" by Kjartan Hoydal. FAO Fisheries and Aquaculture Circular. No. 1117. Bridgetown, Barbados.

Figure 1 Theory of change to attract private impact capital⁴



Financial and Risk Analysis

Without existing precedents or business cases, it is challenging to meaningfully conduct a financial or risk analysis associated with a particular approach; however, steps can be taken to improve the likelihood of financial success and reduce risks. Amongst the four stocks assessed in this paper, identifying fisheries with characteristics inherent to successful community managed fisheries increases the likelihood of success.⁵ Documented characteristics of successful sustainable fishery initiatives elsewhere include: high value products with a quick reproduction cycle; access to good infrastructure; a geographically limited and culturally homogenous harvester community; and a short supply chain.

Of the four fisheries reviewed for this paper, the regional shrimp or seabob fisheries may meet these qualifications and would have the added advantage of being a localized stock with a short timeframe for reproduction. This means that local efforts at management would realize benefits in a shorter period of time based on the stock recovery. High variation within the region of infrastructure, harvester communities, and supply chains are expected. Additional assessment, such as FPIs, would be needed to identify fisheries meeting the priority parameters.

Table 2 Attributes of the four reviewed stocks of the WECAFC

Stock	Infrastructure	Homogenous harvester community	Short supply chain	Localized stock	Age at earliest reproduction
<i>Shrimp & seabob</i>	Good	Some	Unknown	Yes	18-24 months
<i>Spiny lobster</i>	Good	Some	Some	No	2 years
<i>Conch</i>	Good	Some	Some	No	3.5-5 years
<i>Dolphinfish</i>	Unknown	Some	Unknown	No	4-5 months

⁴ Inamdar, N., and Tullos Anderson, J. 2016. *CFI Expanded Synthesis Paper and External Stakeholder Consultation*. Unpublished report. World Bank, Washington, DC.

⁵ McCay, B. J., Micheli, F., Ponce-Díaz, G., Murray, G., Shester, G., Ramirez-Sanchez, S., and 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>

The impact of not implementing measures within a broader framework of fisheries reform may be significant, as improvements in operational efficiency and improved market value will likely result in increased mortality, as detailed by Hoydal. Unfortunately, declining catches through continued overfishing and IUU fishing are likely to negatively impact food security and employment, as well as incomes, livelihoods and export earnings.

Like financial and risk analyses, assessing the economic, social and environmental costs and benefits is difficult at this time; but, creating an RFMO structure or tackling any of the proposed interventions at a regional level should have some high level benefits. These may be defined through the lens of the United Nations Sustainable Development Goals (SDGs). The primary relevant goals are SDG 12 – Sustainable Consumption and Production and SDG 14 – Life Below Water.



Recommendation

During the time period that WECAFC is formalizing its role as an RFMO, we propose it coordinates governments, development banks, philanthropies, and nonprofit organizations to help attract investments into the region's fisheries by aligning their work to address identified constraints in fishery data collection; fishery management; fishery infrastructure; pipeline development; and exploring and testing different investment models and approaches.

The gains associated with better management of the fisheries resources should encourage the members of the WECAFC to create a meaningful RFMO structure as soon as possible. To realize these gains it is needed to improve both fisheries conservation and management and to invest in specific value chains. In the interim, there are pilot projects that can be undertaken to continue forward momentum. In addition to the usual fish stock assessments, fisheries data collection and science and fisheries management advice generation, the completion of data-generating assessments, such as FPIs, should be undertaken.⁶

As examples, given the results of the business case in Grenada, it should be possible to implement the proposed business case in a relatively short period of time. Similarly, the Dominican Republic case presents a potential model to engage the recreational fishery to support conservation efforts, and should be tested. Both should be implemented with a plan to capture lessons learned and to feed these experiences back through the WECAFC secretariat and WECAFC members with the intention of

⁶ <http://www.fao.org/3/i8833en/i8833EN.pdf>

replicating the pilot tested models in critical fisheries and geographies in the region.^{7, 8}. Once models have been developed, structured and tested, more informed decisions can be made regarding potential replication and scale.

⁷ Wilderness Markets. *Investing in Grenada's Yellowfin Tuna Exports: A business case to incentivize the reduction in billfish mortality*.

Unpublished report prepared for Conservation International in support of the business case development efforts in the Caribbean led by the Food and Agriculture Organization (FAO). July 2018.

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⁸ Wilderness Markets. *Investing in the Dominican Republic: A business case to incentivize the reduction in billfish mortality*. Unpublished report prepared for Conservation International in support of the business case development efforts in the Caribbean led by the Food and Agriculture Organization (FAO). July 2018.

Table of Contents

EXECUTIVE SUMMARY	I
Contextual Analysis	i
Value Proposition and Business Model	ii
Financial and Risk Analysis	iii
Recommendation	iv
INTRODUCTION	1
CONTEXTUAL ANALYSIS	1
Fishery status	2
Fleet	3
Landings	3
Infrastructure	4
Management and governance.....	4
Organizational capacity	5
Market potential.....	5
Stakeholder engagement and investable entities	6
VALUE PROPOSITION AND BUSINESS MODEL	6
Economic value proposition	6
Investable entity requirements	7
Proposed approach	9
Proposed investments	11
Developing a pipeline of pilot enterprises	16
Financial and risk analyses	17
Economic, social and environmental costs and benefits	19
SDG alignment	19
Recommended timescale	20
Replicability and scalability	21
Conclusion	21

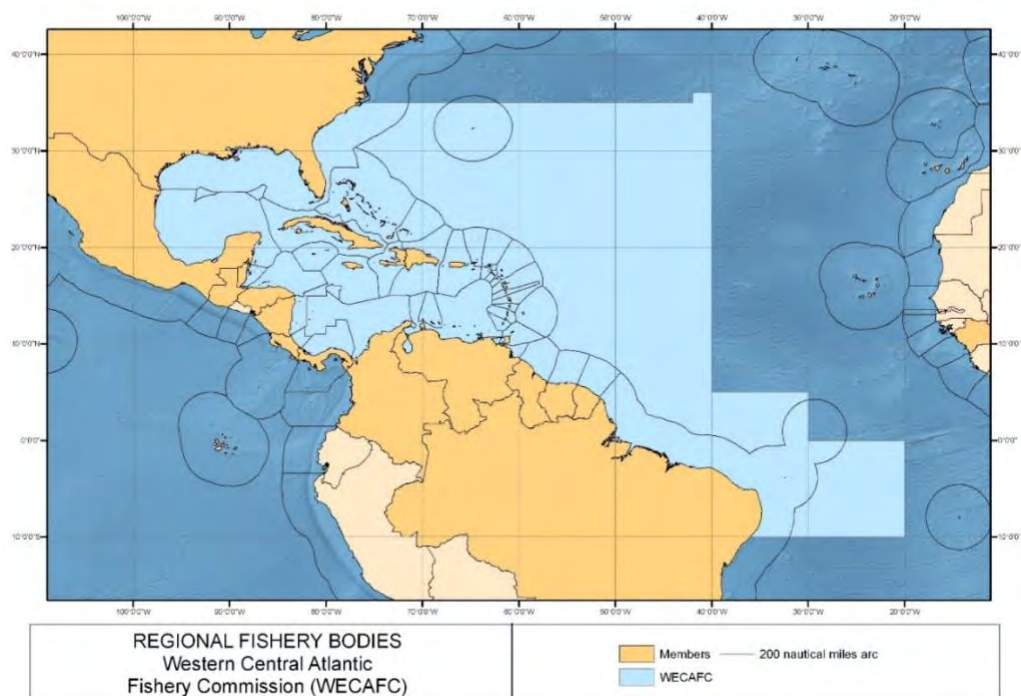
APPENDIX A – SHARED STOCK BRIEF	22
Introduction	22
Queen conch	23
Spiny lobster	26
Shrimp and seabob	31
Dolphinfish	36
Proposed way forward for shared stocks	41
Queen conch	41
Spiny lobster	41
Shrimp and seabob	42
Dolphinfish	43
Financial and risk analysis	43
Queen conch	43
Spiny lobster	43
Shrimp and seabob	44
Dolphinfish	44
Primary potential risks and key assumptions	44
Scalability and replicability potential	45
Attachment 1 - Overview of the queen conch fishery	46
Attachment 2 – Shrimp and groundfish investments by country	47
Attachment 3 – Shrimp and groundfish recommendations and resolutions.....	49
APPENDIX B – DATA POINTS NEEDED FOR INVESTMENT CASES	50
APPENDIX C – FOUR CONSTRAINTS TO SUSTAINABLE FISHERIES IMPACT INVESTING, IN DETAIL.....	51
1. Fishery Data	51
2. Fishery Management.....	52
3. Fishery Infrastructure	53
4. Pipeline.....	54

Introduction

This report outlines the findings from efforts to develop a business case for the WECAFC RFMO structure or shared regional stocks that would ultimately benefit the declining billfish stocks in the region. While there were no business cases identified at this time for the WECAFC or the four shared stocks reviewed herein, there are some strategic investments in data and fisheries management that will make business case development and private investment more likely in the future. The contextual analysis section provides an overview of the WECAFC and four regionally important fisheries. The sections that follow provide an overview of what is needed to support business investments that provide social, economic and environmental returns (known as triple-bottom line returns); how those align with the current state of the regional fisheries; and what steps can be taken to create pathways for investing.

Related work to identify business cases in Grenada and the Dominican Republic was also carried out as part of this consultation. The results of those business cases are referenced in the second half of the paper.^{9, 10}

Figure 2 Map of the WECAFC area and neighboring member countries¹¹



Contextual Analysis

⁹ Wilderness Markets. *Investing in Grenada's Yellowfin Tuna Exports: A business case to incentivize the reduction in billfish mortality*. Unpublished report prepared for Conservation International in support of the business case development efforts in the Caribbean led by the Food and Agriculture Organization (FAO). July 2018.

¹⁰ Wilderness Markets. *Investing in the Dominican Republic: A business case to incentivize the reduction in billfish mortality*. Unpublished report prepared for Conservation International in support of the business case development efforts in the Caribbean led by the Food and Agriculture Organization (FAO). July 2018.

¹¹ http://www.marineplan.es/ES/fichas_kml/mapasfichas/rfb/wecafc.jpg

Contextual analysis for the region focused on information needed to evaluate business cases within four economically and socially important fisheries—shrimp and seabob, queen conch, spiny lobster, and dolphinfish. These fisheries are disparate and much about the social and value chain dynamics remains to be quantified. This section includes an outline of those fisheries and how they challenge an RFMO business case as well as how they may be used to leverage towards progress. Appendix A has a more detailed brief of these shared stocks.

One of the potential challenges of the WECAFC region is the disparity between the levels of fishery management sophistication, which range from catch share and other rights-based management access in the U.S. to essentially open access fisheries in many Caribbean island states. Even comparing landings of stocks is difficult, because distinguishing landings from the member countries with coasts outside the WECAFC area, like the U.S., Mexico, Colombia, and others, is challenging, if possible at all. Because of this, we have focused our analysis on the four higher value stocks that are deemed to be shared by the majority of WECAFC members, which were previously detailed in the April 2016 report, “Assessment of the Recent Achievements and Collaboration of CRFM, OSPESCA and WECAFC, Including Options for a Regional Institutional Collaborative Structure within an RFMO Framework” by Helga Josupeit.

Fishery status

Table 3 Status of key WECAFC stocks

Characteristics are generalized for the region; most vary by country or geography.

Species	Status	Uncertainty	Average annual landings ¹²	Notes
Northern brown shrimp, northern white shrimp (primarily landed by U.S.); Atlantic seabob	Fully exploited	Low to medium	187,000 mt (all species of shrimp and seabob)	FPI (BR, CO, US) MSC (SU) FIP (GU)
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**The Bahamas lobster fishery is in the process of attaining MSC*

FPI=Fishery Progress Indicator MSC=Marine Stewardship Certification FIP=Fishery Improvement Project

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¹² For the time period 2005 through 2014. FAO. 2016. Fishery and Aquaculture Statistics. Global capture production 1950-2014. (FishstatJ). In: FAO Fisheries and Aquaculture Department [online or CD-ROM]. Rome. Updated 2016.

<http://www.fao.org/fishery/statistics/software/fishstatj/en>

¹³ http://www.iccat.int/Documents/SCRS/ExecSum/YFT_ENG.pdf

As referenced in the table above, each of the four groups of stocks, with the exception of dolphinfish, is either overexploited or fully exploited. This represents a significant challenge in building an investment case based on additional exploitation of these stocks. Based on the accepted drivers of value for fisheries reform, there may be opportunities to increase operational efficiency or increase market value in each of these fisheries.¹⁴ However, these interventions will be subject to the risk associated with poor stock health.

Fishery value chain investment categories:

- 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

Fleet

The density and sophistication of the regional fleet varies from country to country. From Kjartan Hoydal's economic analysis of the WECAFC, the regional fisheries fleet is estimated at some 160,000 fishing vessels in the Western Central Atlantic (FAO fishing area 31) and some 32,000 fishing vessels in the northern part of the Southwest Atlantic (FAO fishing area 41). Of these combined numbers, 152,200 are estimated to be motorized.¹⁵ Hoydal notes that "data from many WECAFC Members are lacking" and that distinguishing between small-scale and industrial fleets is impossible, but that probably close to 90 percent can be characterized as small-scale vessels, which would imply a high level of social and subsistence reliance on these fisheries.

This variability in fleet and fishers carries over to the four stocks. Conch and lobster have similar estimates of fishers – approximately 15,000 to 20,000 – whereas shrimp and seabob are estimated at least 170,000 in the Brazil-Guianas Shelf alone. Dolphinfish does not have an estimated number of fishers, but any estimate would include the tuna longliners in the areas beyond national jurisdiction, where they are a common bycatch; recreational fishermen; and fishers targeting FADs.

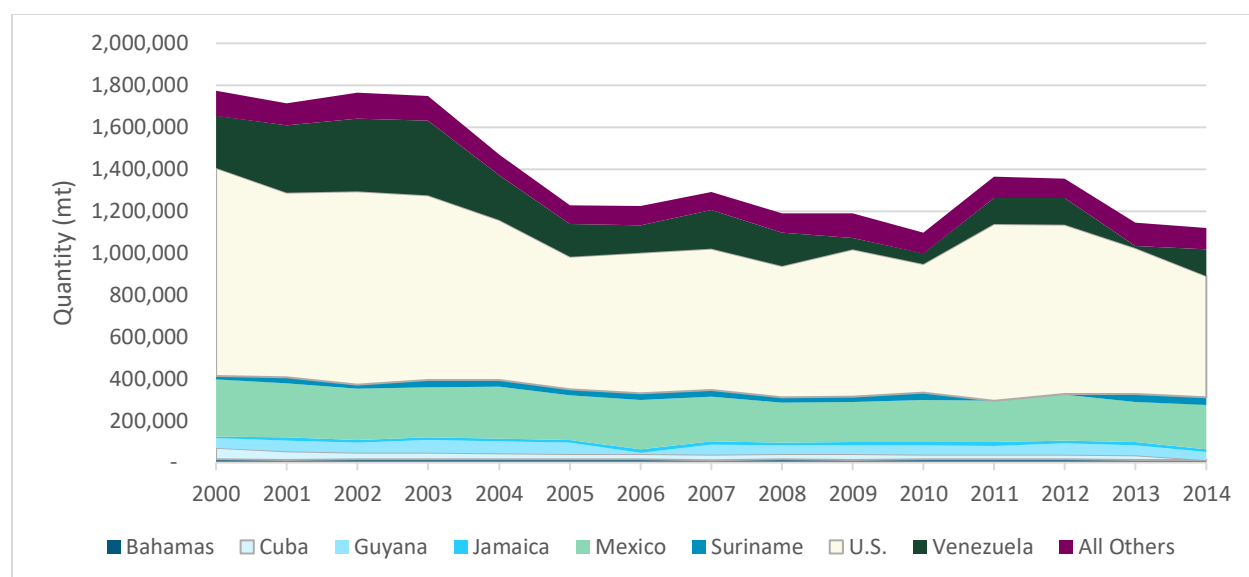
Landings

There is an overall decline in stock landings in the region and landings are generally dominated by the countries with the lengthiest coastlines in the region, i.e., the U.S., Mexico and Venezuela.

¹⁴ Holmes, L, C. Strauss, K., de Vos, K., and Bonzon, K. 2014. "Towards Investment in Sustainable Fisheries: A Framework for Financing the Transition." Discussion document. Environmental Defense Fund, The Prince of Wales's International Sustainability Unit. <https://www.edf.org/sites/default/files/content/towards-investment-in-sustainable-fisheries.pdf>.

¹⁵ FAO. 2016a. "Findings of the independent cost-benefit assessment of the options for strategic re-orientation of WECAFC" by Kjartan Hoydal. FAO Fisheries and Aquaculture Circular. No. 1117. Bridgetown, Barbados.

Figure 3 WECAFC Countries with landings over 1% of total, 2000-2014¹⁶



Infrastructure

Little comprehensive information is available about the availability of infrastructure in the region, or the condition thereof. Mentions of infrastructure in the FAO paper, *Coastal Fisheries of Latin America and the Caribbean*, typically note that infrastructure is underdeveloped, especially landing areas, ice availability, and other shoreside services.¹⁷ As with most topics, the state of the infrastructure seems to vary by country and fishery.

Infrastructure needs vary by fishery, size of vessel and gear, ranging from very simple separation and freezing for lobster tail processing to infinitely varied for value-added shrimp processing. Given the information available, it is reasonable to assume there are additional investment opportunities to upgrade infrastructure. These upgrades could reduce waste, improve operational efficiencies and improve market access and thus capture value by doing so.¹⁸ Considerably more information is required in order to further define these opportunities in the fisheries reviewed.

Management and governance

Management and governance of the fisheries in the WECAFC is also highly variable. The economic upside of better management of the stocks through formalizing the WECAFC into an RFMO was presented in by Hoydal in *Findings of the Independent Cost-Benefit Assessment of the Options for Strategic Re-Oriented of WECAFC*. Regional oversight of the shared stocks of the WECAFC is overdue, especially considering the critical role of the fisheries to the economic and physical well-being of the citizens of the countries in the region.

¹⁶ FAO 2017.

¹⁷ Salas, S.; Chuenpagdee, R.; Charles, A.; Seijo, J.C. (eds). *Coastal fisheries of Latin America and the Caribbean*. FAO Fisheries and Aquaculture Technical Paper. No. 544. Rome, FAO. 2011. 430p.

¹⁸ Holmes et al., 2014.

For the dolphinfish fishery, there is little management of the stocks by individual countries, and there is relatively little known about the health or other characteristics of the stock.

Shrimp and seabob also have little management in the region; WECAFC has been working on shrimp assessment and bio-economic modeling since 1975. Most members have endorsed the Caribbean and North Brazil Shelf Large Marine Ecosystem (CLME+) Strategic Action Programme (SAP), requiring them to strengthen the management of shrimp fisheries and for which dedicated financing is available for implementation.¹⁹ The U.S. has had a shrimp management plan since 1981; Guyana developed a seabob management plan in 2016 for their FIP; and Suriname's MSC certified fishery also has a management plan.^{20, 21, 22}

Conch and lobster are relatively farther along than the other two stocks – more is known about the stocks, there are regional working groups for each, and most countries have some sort of management of the resource. A regional plan for queen conch was adopted in June 2016 by the regional fisheries bodies in the wider Caribbean.²³ This same plan was adopted a few months later at the Conference of the Parties to Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).²⁴ The Bahamas have an MSC certified lobster fishery and both Honduras and Nicaragua have lobster FIPs, indicating that these three countries have at least a base level of management for at least a portion of their fisheries.

Organizational capacity

Like the other areas, organizational capacity – that of enterprises, cooperatives, and other fishing or procession organizations – is largely unknown, but assumed to be highly varied. Organizations that export high value product to end markets like the U.S. and EU must have the capacity to attain HACCP and other necessary permits and certifications. Conversely, little capacity is required for subsistence sales in domestic oriented end markets. Even for countries like Belize with established cooperatives that are able to successfully buy and export lobster and conch, there are questionable levels of organizational capacity, given their debt issues.²⁵

Market potential

Market potential for many species in the WECAFC is likely high, as there are numerous high value stocks, like shrimp, seabob, conch and lobster and access to nearby end markets able to afford premium products, be it Caribbean resorts or U.S. and Canadian markets. For conch and lobster, there are few or limited substitutes, increasing the likelihood of market demand for products from the WECAFC. Whether the fishers are able to realize the full potential value of their landings is dependent on their adoption of best practices regarding handling, and access to the relevant and appropriate infrastructure, such as a

¹⁹ "Recommendations and Resolutions on fisheries management." Report from the 16th session of the WECAFC. June 2016. Guadeloupe.

²⁰ FAO. 2016. "Assessment of the Recent Achievements and Collaboration of CRFM, OSPESCA and WECAFC, Including Options for a Regional Institutional Collaborative Structure within an RFMO Framework" by Helga Josupeit. Presented at the 16th session of the WECAFC. April 2016.

²¹ <http://guyanaseabobfishery.com/Activities.aspx>

²² <https://fisheries.msc.org/en/fisheries/suriname-atlantic-seabob-shrimp/@assessments>

²³ Prada, M. C., Appeldoorn, R. S., Van Eijs, S. & Pérez, M. 2017. Regional Queen Conch Fisheries Management and Conservation Plan. FAO Fisheries and Aquaculture Technical Paper No. 610. Rome, FAO. 70 pp.

²⁴ Reynal, Lionel. Letter to WECAFC Members. July 7, 2017.

²⁵ http://www.turneffeatollmarinereserve.org/app/webroot/userfiles/214/File/Oceanic%20Society/BelizeFisheriesOverview_Oct2008.pdf

cold chain, to maintain product value. An additional factor is their ability to physically access higher paying end markets.

Stakeholder engagement and investable entities

At this time, it was not possible to meaningfully characterize the level of stakeholder engagement or investable entities for the four identified stocks. Completing FPIs for the regionally important stocks (conch, lobster, shrimp/seabob and dolphinfish) may allow identification of these in representative locations in the region, providing insight to the regional levels of engagement and presence and condition of proposed investable entities.

Value Proposition and Business Model

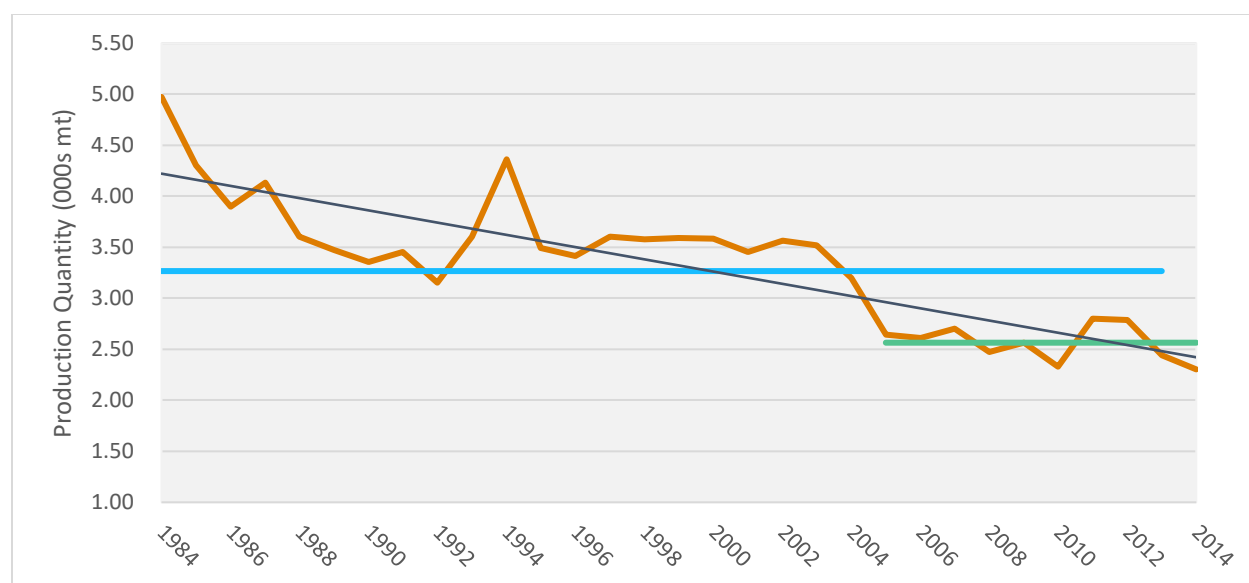
While there is significant economic value associated with the fisheries in the WECAFC, the conditions identified in the previous section make it challenging to propose a suitable business case; consequentially, no business cases for the WECAFC nor the four regionally important stocks were identified during this review. There are however actions that may be taken now to facilitate private investment in fisheries reform and fisheries enterprise development in the region. This section provides findings from others about the value proposition, the requirements for sustainable fisheries business models to support private investment, and recommendations for a way forward.

Economic value proposition

Hoydal identified potential economic benefits of \$700 million per year by managing WECAFC fisheries through an RFMO structure. The increase in economic outcomes hinges on a return to the 30 year average landings (an increase of 300 thousand metric tons from the current ten year average; see figure 4) and the associated increase in activity from sales, processing, shipment, etc. In addition, Hoydal finds that reducing illegal, unreported and unregulated (IUU) fishing by a reasonable 50 % would result in:

- “An increase in the legitimate value generated by the sector in the WECAFC area of some [US] \$350 to 460 million.
- An increased contribution to legitimate jobs in fisheries for more than 100,000 people
- Additional fish supply covered at the current per capita levels for more than 10 million people in the region, reducing reliance on fish and fisheries products imports
- A significant (10 %) increase in the tax incomes from exported fish and fisheries products.”

Figure 4 WECAFC Production, 1984-2014²⁶



These economic benefits would accrue primarily through improvements stock health, as well as increasing operational efficiencies and increasing market value²⁷. However, in each stock assessed, the priority is the stability and recovery of the stock itself.

Investable entity requirements

To enable the right conditions for private investment in fisheries reform and sustainable enterprise development, efforts should be targeted at attracting impact investors. These investors seeking to generate social, environmental, and financial returns, i.e., triple bottom line outcome²⁸s, from capture fisheries, require a strong pool of viable, investment-ready businesses or some type of tradable effort or instrument. Evaluation of investment-readiness encompasses a broad range of issues, including the track record and collateral of recipients, as well as the characteristics of a pool of investments along with the growth potential of both the business model and its leaders. The legal and governance systems in which the investment operates are also critical to assessing the potential success and risk.²⁹

The **triple bottom line** measures not only the financial performance of a company or initiative, but the the social, environmental and economic impacts. The goal is to push towards systemic change that transforms capitalism to account for previously (and currently) unaccounted for externalities.

²⁶ FAO Fisheries and Aquaculture Department, Statistics and Information ServiceFishStatJ: Universal software for fishery statistical time series. Copyright 2017

²⁷ Holmes et al., 2014.

²⁸ <https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it>

²⁹ 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.

In order to build attractive pilot models, enterprises, including cooperatives and public-private partnerships, have to be able to meet the basic business model requirements outlined below.

Table 4 Basic requirements of investable enterprise models

1. Legally recognized by the country where business is occurring
2. Experienced management (at least two years of operations)
3. At least two years of profitable operations
4. Current and viable financial plan --including: annualized investment returns, financing history, financial projections (profit and loss/balance sheet), and collateral
5. 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
6. Activities will have measurable and meaningful environmental and socioeconomic outcomes for the local community
7. Clear opportunities to create value by improving the supply chain
8. Meaningful engagement of local fishers in influencing management and fishery access
9. Strong recognized leader or leaders in the fishing community who influence management and stakeholders
10. Financial model based on the biology and fishing efforts for the fishery that shows returns

In interviews carried out by Wilderness Markets for the World Bank and others, impact investors have reported that it is difficult to find fishing and seafood businesses that have a clear legal structure (1), strong financial track record (3), business-savvy leaders (2, 4, 5, 8, 9), strong potential for growth (7, 10), and triple bottom line outcomes (6,7,10).^{30,31,32} In many countries harvesters are often not considered a legal business entity (1), a condition that effectively excludes them from any economic activity other than as a provider of raw material.

These attributes were found to be equally true in the four fisheries in the WECAFC assessed as part of the preparation of this report. Aside from areas with legally established, functioning cooperatives, this status effectively excludes harvesters in these fisheries from any economic activity other than as a provider of raw material. In addition, there was little evidence of harvesters acting collectively. The

³⁰ Wilderness Markets. 2015. *West Coast Groundfish in California Value Chain Assessment: Summary of Findings and Recommendations*. Wilderness Markets. <http://www.wildernessmarkets.com/wp-content/uploads/2015/12/Wilderness-Markets-West-Coast-Groundfish-in-California-synthesis-Final-Dec-20-2015-Web.pdf>

³¹ Wilderness Markets. 2016. *Connecting the Dots: Linking Sustainable Wild Capture Fisheries Initiatives and Impact Investors*. Wilderness Markets. <http://www.wildernessmarkets.com/our-work/connecting-the-dots/>

³² Inamdar, N., and Tullos Anderson, J. 2016. *CFI Expanded Synthesis Paper and External Stakeholder Consultation*. Unpublished report. World Bank, Washington, DC.

fragmented nature of fishing operations contributes to a “race to fish” and keeps them from achieving economies of scale needed to secure investment.

Securing and providing the data needed to adequately assess conditions and thus financial returns and risk is imperative, as return-seeking investors prefer to invest in businesses and investment vehicles in markets where adequate data on business performance can inform their investment decisions. Ideally, the historical performance of similar commercial investments in the sector, similar businesses, and markets helps investors reliably assess expected levels of risk, return, and variability in the performance of the investment or business they are considering. With this information, they can also develop appropriate business risk mitigation strategies, including identifying the relevant types of capital. While FPIs are an important tool to capture contextual data, a specific subset of data is relevant to building an investment case. A summary of these data points is included in Appendix B.

Unlike other sectors of investment, most commercial banks and financial institutions do not have the resources to integrate fisheries management factors into their risk evaluation metrics and often are unable to secure accurate data on stock health. Consequently, they assume that the historical cash flow, based on past catch levels, will remain constant. This assumption exposes them to significant risk, as it fails to account for the fundamental biology underpinning capture fisheries, the impact of increased fishing effort, overfishing, IUU fishing and the likely effects of climate change. All of these factors can result in depletion of fish stocks and contribute to diminishing landings, potentially bringing at-risk investments into an investor’s portfolio. Thus, few financial institutions invest commercially in fisheries, and those that do often mitigate this risk by only doing so short term and charging higher interest rates, which in turn impedes long term investments in sustainability. In open-access fisheries that tend to operate with small profit margins, this type of commercial investment can push fishing businesses to increase fishing efforts, putting additional pressure on the underlying resource. This is the opposite of the desired outcome and indicates why guided investments focused on long-term triple-bottom line impacts is needed³³.

The relatively small number of viable investments with track records in sustainable fishing, combined with investors’ own lack of experience and expertise in the sector, keep many return-seeking investors from feeling confident about investing in fisheries. Therefore, the need for information and creation of sound business models is critical.

Proposed approach

While WECAFC is transitioning to an RFMO, important work can still be done to attract impact investors. The aim of the initiative is to identify and to support scalable pilot enterprise models for fishery sustainability by helping them strengthen their investment appeal and secure private capital investment within three to five years. More specifically, the following desired outcomes are identified and all proposed investments should demonstrate their ability to ensure these outcomes:

³³ Inamdar, N., Band, L., Jorge, M.A., Tullos Anderson, J., and Vakil, R. 2016.

- Fishery
 - o Stable, sustainable management
 - o Healthy fish stocks (fished at maximum sustainable yield (MSY) or below)
 - o High quality employment opportunities (with good working conditions and safe)
- Enterprise
 - o Able to absorb private capital investment within three to five years
 - o Sustainable fishing practices that translate into more profitable businesses at the harvester level of the value chain

Key constraints that keep impact investors from participating in sustainable fisheries fall into four categories:

- Limited availability of reliable fishery **data**
- Inadequate and ineffective fisheries **management**
- Unreliable **infrastructure** systems
- A paucity of investment-ready **enterprises**

For additional discuss of these constraints, please see Appendix C.

As a result of this contextual assessment, we propose the following:

(Problem) Global fisheries are recognized as greatly underperforming when compared to their environmental, social, and economic potentials. Overexploitation, IUU fishing, poor management, and significant supply chain inefficiencies are driving a race to fish in the face of increasing national and global demand for seafood. As a result, many businesses – from individual fishermen, to traders, processors and exporters – face economic uncertainty and diminishing returns.

(Premise) If fisheries were to transition towards a restorative path, returns could increase and there would be opportunities for private capital to support and reinforce this process while obtaining a financial return. In spite of the increasing amounts of impact capital prepared to make socially and environmentally responsible investments in coastal fisheries, there is a prohibitively small pipeline of investment opportunities due to excess risk resulting from various fisheries management factors especially poor governance.

(Solution) WECAFC supports the development of a Sustainable Fisheries Fund (SFF) dedicated to developing a series of pilots to demonstrate the measures and opportunities in a fishery and attract private impact capital. The SFF will provide opportunities to engage private impact capital based on real world precedence; reinforce and help ensure stock recovery; and long-term sustainability (environmental, social and economic).

(Strategy) WECAFC Secretariat, working with membership will support the development, implementation and monitoring of pilots designed to improve the various dimensions of sustainability of fisheries. In doing so, it expects to reduce investment risk and stimulate follow-on impact investments.

The WECAFC recognizes the need for targeted technical assistance in order to pilot the development of investable models in targeted countries. It may also be necessary to identify and involve financial intermediaries capable of and experienced in bridge grants³⁴ and scaling impact investing enterprise models, as depicted in the “Theory of Change” graphic, below. Ideally, and if possible, providing financial support through grants focused on improving fishery sustainability may be a way to accelerate the creation of short and long-term triple-bottom line value in the region based on the Sustainable Development Goals and the three drivers of value.

Figure 5 Theory of change to attract private impact capital³⁵

Theory of Change

If in 3–5 years we want Private Impact Capital Providers comfortable in **sustainable** fisheries, they will require a **seasoned** pipeline of pilots; which in turn depend on a robust and **seasoned** management system.



Proposed investments

During the time period that WECAFC is formalizing its role as an RFMO, we propose it coordinates governments, development banks, philanthropies, and nonprofit organizations to help attract investments into the region’s fisheries by:

1. Aligning their own work to address constraints in fishery data collection, fishery management, fishery infrastructure, and enterprise pipeline development (discussed above) that hold back investment; and,
2. Exploring and testing different investment models and approaches to test the impact and scalability of various models.

Four major constraints have been identified as barriers to the development of impact investment opportunities in sustainable fisheries. These constraints – data, management, infrastructure and entity-related – represent opportunities for strategic investment to promote sustainable fisheries.³⁶ The table

³⁴ Bridge grants provide a “bridge” between short-term grant funding and longer-term private capital investments.

³⁵ Inamdar, N., and Tullos Anderson, J. 2016.

³⁶ Inamdar, N., Band, L., Jorge, M.A., Tullos Anderson, J., and Vakil, R. 2016.

below includes opportunities for different types of capital providers, ranging from philanthropic grant makers to venture capitalists, to participate in developing this market based on their requirements for risk and return.

Table 5 Investment opportunities

	Overview	Examples	Types of capital and typical investors	Opportunities for investment
Data	Typically, government and philanthropic investments in policy (for example, to require data reporting); collection; and support. These investments aim to improve data collection, availability, reliability, and consistency, with the ultimate goal of accurately predicting stock levels, fishing effort, and pricing. This information is needed to inform management and business planning. Regional fishery and stock data and information sharing is key for informed and harmonized decision making processes	<ul style="list-style-type: none"> • Research to develop faster, cost-effective stock assessments • Software and equipment for consistent data collection • Mechanisms for housing and sharing data • Working Group on Fisheries data and information –for sharing of information between WECAFC members 	<p>Types of capital:</p> <ul style="list-style-type: none"> • Public funding • Philanthropic grants <p>Typical investors:</p> <ul style="list-style-type: none"> • Governments • Philanthropies • Nonprofits 	While there are a few companies developing data systems, these represent enterprise-level investments in individual businesses. There are no existing opportunities for return-seeking investments at the larger, comprehensive level most useful for management. Clear policies on data requirements and formats are a prerequisite for broader business development and investment at all levels of the value chain.
Management	Typically, the “soft” investments that help establish an effective management system and provide ongoing monitoring and enforcement of fishery rules and ownership. Effective management includes tenure systems, scientifically determined catch limits and harvest rules, and mechanisms for enforcement. These investments are often embedded in a time-consuming, complex, and often political process whose outcomes are uncertain but create broad benefits for fisheries and sustainable business development if successful.	<ul style="list-style-type: none"> • Management efforts to develop, implement, and enforce access; tenure and/or fishery rights on the water and in courts • Scientific tools and personnel to analyze fishery data, determine sustainable catch levels, and evaluate management efforts • Collaborative meetings and multistakeholder initiatives to develop regulations and to monitor implementation of regionally harmonized management measures • Patrol boats and legal enforcement to combat IUU fishing 	<p>Types of capital:</p> <ul style="list-style-type: none"> • Public funding • Philanthropic grants <p>Typical investors:</p> <ul style="list-style-type: none"> • Governments • Philanthropies • Nonprofits 	Depending on the financial sector sophistication and capacity of a country, mechanisms for return-seeking capital can include sovereign bonds focused on financing improved management.

	Overview	Examples	Types of capital and typical investors	Opportunities for investment
Infrastructure	Investments associated with public infrastructure costs for roads, ports, electricity, and communication	<ul style="list-style-type: none"> • Ocean and/or air shipping services • Port facilities (wharf, unloading, ice, cold storage, and cranes to lift vessels out of the water when storms approach) • Utility access (electricity, water, and sewer) • Technology, including mobile phones networks • High-quality paved roads and extensive highways 	<p>Types of capital:</p> <ul style="list-style-type: none"> • Public funding • Public debt • Private investment (debt and equity) <p>Typical investors:</p> <ul style="list-style-type: none"> • Governments • Development finance institutions • Private investors • Banks and other private financial institutions 	<p>A range of well-defined, legally recognized investment instruments exist in most markets, including the following:</p> <ul style="list-style-type: none"> • Private-public partnerships • Build-operate transfer agreements for infrastructure facilities • Infrastructure bonds • Infrastructure equity investments • Guarantees

	Overview	Examples	Types of capital and typical investors	Opportunities for investment
Pipeline	<p>Investments in businesses to execute firm- and market-level strategies that contribute to sustainable fisheries, including the following:</p> <ul style="list-style-type: none"> • Reducing ecological impacts • Improving harvest efficiency • Improving product quality • Gaining access to new or higher-value markets for sustainable products • Improving the efficiency and reducing waste in supply chains • Tracking and differentiating products (includes traceability investments) 	<ul style="list-style-type: none"> • Firm-level upgrading strategies on the water: Vessel and gear improvements, installation and operation of monitoring equipment, potential fleet capacity reductions through vessel buybacks • Firm-level upgrading strategies on the shore: Improved ice and refrigeration, processing, packaging, transportation, branding, and marketing • Market-level upgrading strategies on the shore: Branding and marketing 	<p>Types of capital:</p> <ul style="list-style-type: none"> • Public debt • Private investment (debt and equity) <p>Typical investors:</p> <ul style="list-style-type: none"> • Private investors • Banks and financial institutions • Governments • Cooperatives 	<p>A range of well-defined, legally recognized instruments exist in most markets, including the following:</p> <ul style="list-style-type: none"> • Stocks • Bonds • Private equity • Loans and other debt instruments • Guarantees

Developing a pipeline of pilot enterprises

The regional nature of the WECAFC, and the stocks in question, present both challenges and opportunities for the successful development of an investment strategy in sustainable fisheries. This is further compounded by the relatively nascent nature of financial models and successful business cases in sustainable fisheries. While there are a small number of models experimenting with improvements in improvements in operational efficiency and market value in select fisheries, e.g., Artesmar; Anova; Smartfish, there are few models that have been successful in improving stock health. Two potential options a) include a debt conversion and associated investment vehicle for marine conservation and climate adaptation developed by The Nature Conservancy with the Seychelles government³⁷; and b) the Vessel Day Scheme adopted by the Parties to the Nauru Agreement³⁸. Unfortunately, these are likely unable to work in this region, because: 1) the first option is aimed at the national level, but change is needed at the regional level; 2) disparities in the sizes of the foreign fleets in the Pacific and the WECAFC region.

A systematic approach to identifying and structuring investment opportunities is recommended to provide a consistent approach to testing the appropriate models. One such framework is included here, and represents the approach being piloted in Grenada and the Dominican Republic.

Framework to Structure Investment Opportunities Based on Conservation Projects³⁹

- **Conservation Project Selection**
 - o Translate conservation objectives to metrics
 - o Identify operational delivery mechanisms, partners and costs
 - o **Goal** – Financing need determined
 - o **Output** – Fishery Performance Indicator; Feasibility report; Impact baseline and M&E framework
- **Investment Opportunity Structuring**
 - o Estimate Financial Returns and consider risk mitigation tools
 - o Determine role of conservation organizations
 - o **Goal** – Attractive risk return profile
 - o **Output** – Business Case; Financial Model; Draft Agreements for Delivery Partners
- **Investor Engagement**
 - o Identify and negotiate with investors and private sector partners
 - o Choose appropriate structures & service providers
 - o **Goal** – Funding secured
 - o **Output** – Investment structure; legal agreements
- **Delivery**
 - o Implement conservation investment
 - o Monitor Performance (including non-financial)

³⁷ <https://convergence.finance/knowledge-detail/3p1S3pSTVKQYYC2ecwaeiK>

³⁸ <https://www.ffa.int/vds>

³⁹ 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.

- **Goal** – Returns and conservation objectives achieved
- **Output** – Financial and non-financial reports

For example, given the results of the business case development in Grenada, it should be possible to complete the structuring, investor engagement and delivery components in order to test and implement that business case in a relatively short period of time. A core component of the Grenada 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 a RFMO and may be linked to 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 species⁴⁰.

In the case of the DR, the possibility exists to engage the recreational fisheries sector in financially supporting conservation initiatives. While the assessment has not provided an attractive risk return profit, project promoters may wish to explore this model due to the significant role tourism plays in the region.

In both cases, should these pilots be initiated, we recommend the adoption of a plan to capture lessons learned and feed this back through the WECAFC secretariat with the intention of replicating the model in critical geographies in the region.^{41, 42}

Financial and risk analyses

It is challenging to meaningfully conduct a financial or risk analysis associated with a particular approach in the absence of precedents or a specific business case. 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. For any potential investment in the WECAFC region, the risk of doing business will vary by country, fish stock and organization of the fisheries, some common risks will remain consistent, including:

- Overfishing
- IUU fishing
- Weak Management
- Water pollution
- Habitat degradation
- Apicomplexa parasite (for conch)
- Ocean acidification
- Increased sea temperatures

⁴⁰ Wilderness Markets. *Investing in Grenada's Yellowfin Tuna Exports.* July 2018.

⁴¹ Ibid.

⁴² Wilderness Markets. *Investing in the Dominican Republic.* July 2018.

- Climate change^{43, 44}

Steps can be taken beforehand to mitigate some of these risks and improve the likelihood of financial success and reducing risks. When selecting fisheries for potential WECAFC supported pilots, identifying fisheries with characteristics inherent in successful community managed fisheries increases the likelihood of success.⁴⁵ **High value products** with a **quick reproduction cycle**, **access to good infrastructure**, a geographically small and **culturally homogenous harvester** community, a **short supply chain** have been documented to be conducive to a successful pilot.

Of the four reviewed fisheries, the regional shrimp (and possibly also seabob) fisheries may meet these qualifications and would have the added advantage of being a localized stock with a short timeframe for reproduction. This means that local efforts at management should have a shorter timeline and more readily visible benefit on the stock productivity. In fisheries like tuna, where stocks are wide ranging, overexploited and have a relatively long window to maturity, efforts may not be realized for years, and may not be realized in the location where the efforts occurred.

Table 6 Attributes of the four reviewed stocks of the WECAFC

Stock	Infrastructure	Homogenous harvester community	Short supply chain	Localized stock	Age at earliest reproduction
<i>Shrimp & seabob</i>	Good	Some	Unknown	Yes	18-24 months
<i>Spiny lobster</i>	Good	Some	Some	No	2 years
<i>Conch</i>	Good	Some	Some	No	3.5-5 years
<i>Dolphinfish</i>	Unknown	Some	Unknown	No	4-5 months

High variation within the region of infrastructure, harvester communities, and supply chains are expected. Additional assessment, such as FPIs, would be needed to identify fisheries meeting the priority parameters. In the absence of potential investment opportunities and an understanding of the underlying nature of the investment, it is not possible to effectively analyze the associated financials nor risks.

The impact of not implementing measures within a broader framework of fisheries reform may be significant, as improvements in operational efficiency and improved market value will likely result in increased mortality, as detailed by Hoydal in the. Declining catches are likely to negatively impact food security and employment, as well as incomes, livelihoods and export earnings.

⁴³ *Queen Conch, Strombus gigas (Linnaeus 1758) Status Report*. National Marine Fisheries Service of the United States (NMFS). 2014. <https://repository.library.noaa.gov/view/noaa/17710>

⁴⁴ Winterbottom, M., Haughton, M., Mutrie, E. and Grieve, K. *Management of the Spiny Lobster Fishery in CARICOM Countries: Status and Recommendations for Conservation*. Printed in the Proceedings of the 64th Gulf and Caribbean Fisheries Institute, October 31-November 5, 2011. Puerto Morelos, Mexico.

⁴⁵ McCay, B. J., Micheli, F., Ponce-Díaz, G., Murray, G., Shester, G., Ramirez-Sanchez, S., and 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>

Economic, social and environmental costs and benefits

Like financial and risk analyses, assessing the economic, social and environmental costs and benefits is difficult at this time; but, creating an RFMO structure or tackling any of the proposed interventions should have some high level benefits. These may be defined through the lens of the United Nations Sustainable Development Goals (SDGs).

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 poverty⁴⁶.

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 production⁴⁷



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 resources⁴⁸.”

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 indicators⁴⁹:



⁴⁶ <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

⁴⁷ <https://www.un.org/development/desa/disabilities/envision2030-goal12.html>

⁴⁸ <http://www.fao.org/sustainable-development-goals/goals/goal-14/en/>

⁴⁹ <http://www.fao.org/sustainable-development-goals/goals/goal-14/en/>

- **Proportion of fish stocks within biologically sustainable levels**
 - Taking proper account of fishing effort and mortality through improved data collection and traceability and then using that to advocate for appropriate fishing effort and methods in all fisheries, would reduce landings of billfish, thus reducing mortality of this depleted stock. In the short-term, this would be an indirect effect. In the long-term, assuming appropriate management and governance, this would be directly affected.
- **Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing**
 - Implementing a data collection and traceability system, would provide a basis to reduce IUU, improve compliance with ICCAT requirements and U.S. and EU seafood import monitoring requirements.
- **Sustainable fisheries as a percentage of GDP in small island developing states (SIDS), least developed countries and all countries**
 - Improving support services (best practices for handling, processing, etc.), leading to overall increased quality of product for domestic consumption and export in the region is expected improve overall economic value of fishery products. In locations like Grenada and the Dominican Republic, fisheries are a small part of national GDP with much room for increase in value without an increase in volume.
- **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 proposed initiatives builds local capacity to recognize and protect access rights for harvesters and for the relevant nations, like Grenada, to comply with ICCAT requirements

Recommended timescale

The gains to be had through better management of the fisheries resources as documented by Hoydal should encourage the members of the WECAFC to create a meaningful RFMO structure as soon as possible. To ensure that the economic upside translates into financial opportunities for supply chain participants, like fishers, the WECAFC should identify and address the barriers to private capital investment in sustainable fisheries and develop, structure and test regionally acceptable pilot initiatives that are capable of attracting impact investment into these markets.

During the time needed to create the governing body, there are pilot projects that can be undertaken to continue forward momentum. In general, completion of data-generating assessments, such as FPIs, and investments in fisheries management improvements identified in this paper in WECAFC geographic areas inclined to be more proactive should be undertaken. More specifically, a structured approach to testing pilots in the region should be undertaken.

Replicability and scalability

Once models have been developed, structured and tested, more informed decisions can be made regarding replication and scale. The overall process proposed in Grenada, in which FPIs were utilized to provide inputs to business case identification and development provides a robust process for assessing potential fisheries investments. If implemented, the business cases proposed for Grenada and the Dominican Republic would provide valuable lessons in replicability and scalability across the region in some of the most data poor and weakly governed fisheries. Lessons learned from these projects should be used to implement similar projects in other geographies and fisheries in the WECAFC region while simultaneously bringing together the case for an RFMO.

Conclusion

Although much work has been done over the years in the WECAFC region and there are promising fisheries for impact investing, many regional knowledge gaps still exist that hinder the development of sustainable fisheries. These gaps also constrain the effective deployment of investment capital. Pursuing clear business cases with economic, environmental and social returns on investment, including examples such as in Grenada and, potentially, the Dominican Republic, will demonstrate viability of pilot enterprise models that can be replicated and scaled in other fisheries and geographies. Developing a structured approach and pipeline of such pilots for the region would accelerate the development of sustainable fisheries investment opportunities that address the barriers (data collection, fishery management, fishery infrastructure, and pipeline development) preventing the participation of private impact capital in sustainable fisheries more broadly, and the WECAFC region more specifically. This fundamental work can be conducted simultaneously with the formalization of the WECAFC as an RFMO, increasing the opportunities to realize economic gains from fisheries in the entire region.

Appendix A – Shared stock brief

Introduction

This document is a set of combined briefs about four of the shared stocks in the WECAFC region. Each provides a short contextual analysis of the fishery and the concluding sections provide an overview of existing financial and risk information as well as ways to move the fisheries towards the possibility of private investment that will improve the economic, social and environmental outcomes of the fishery.

While the fisheries of the WECAFC do provide significant economic opportunities, for most of them, the disaggregated nature of the fisheries, combined with the constraints identified, make it challenging to identify the types of capital required and the financial structures required to propose a return based investment strategy that may capture any financial upside and repay required investments at a regional level.

Despite this, there are important steps that can be taken, such as improving data collection that will move the fisheries of the WECAFC towards a level of verifiable sustainability that will attract impact investing. Data is essential for determining business cases. Quality data is needed for stock health assessments which are used to gauge market potential and risk.

From the information currently available, we would recommend a series of systematic measures are considered for each shared stock, with the exception of dolphinfish (please see that section for specific recommendations). These steps would include:

- Completion of Fishery Performance Indicators (FPIs), for representative fisheries to better identify risks and inform mitigation strategies. This would preclude and inform an investment strategy that should be scalable and replicable.
- Prioritization of investment requirements based on the completed FPI's (data; management; infrastructure; enterprise). This would inform the types of capital investment required.
- Aggregation and deployment of appropriate types of capital to achieve the desired outcomes in pilot investments

Use of the FPIs identifies social, environmental and economic indicators that can be used to formulate a case for impact investing. This can be done without FPIs, but their completion would allow for a more systematic, replicable approach.

Queen conch

Contextual analysis

Because of the biology and geography, queen conch is one of the truly shared stocks of the WECAFC countries; it is found in the same areas as spiny lobsters and may be targeted by the same fishers. The currents of the Caribbean may carry larvae from a spawning ground in one country to another, and the limited mobility of conchs (less than 0.5 miles) means overfishing will be felt not only in the immediate area, but eventually throughout the region. The species has been important for domestic consumption as well as export.⁵⁰ A “Regional Queen Conch Fisheries Management and Conservation Plan” was adopted in June 2016 by the regional fisheries bodies in the wider Caribbean (WECAFC, CRFM, OSPESCA, CFMC) at the 16th session of WECAFC, which provides a comprehensive overview of the fishery and the measures that are needed to harvest queen conch sustainably.⁵¹ This same plan was adopted a few months later at the 17th meeting of the Conference of the Parties to Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) in September 2016.⁵²

Figure 6 Geographic range of the queen conch.



The 2017 regional fisheries management plan lists the recommended management measures from the queen conch working group. These measures are each important and acting on them, particularly those focused on providing better data, would decrease risk of investment in the fishery. In brief, they include recommendations to:

1. **Short-term measures**, including:
 - a. harmonize and simplify categories of queen conch meat conversion factors;
 - b. improve catch and effort monitoring programs;
 - c. synchronized regional closures;
 - d. non-detriment finding for export of queen conch meat and its by-products
 - e. licensing of fishers, processors and exporters; and
 - f. stricter regulations on scuba and hookah;
 - g. coordinated patrolling;
 - h. VMS for vessels exceeding 10 meters; and
 - i. continuous education and outreach programs for stakeholders.
2. **Mid-term and long-term measures**, including:
 - a. national-level queen conch conservation and management plans;
 - b. value chain traceability;
 - c. generation of habitat maps; and
 - d. adoption of subregional ways to evaluate fishery potential.
 - e. progressive inclusion of co-management strategies

⁵⁰ *Queen Conch, Strombus gigas (Linnaeus 1758) Status Report*. National Marine Fisheries Service of the United States (NMFS). 2014. <https://repository.library.noaa.gov/view/noaa/17710>

⁵¹ Prada, M. C., Appeldoorn, R. S., Van Eijs, S. & Pérez, M. 2017. Regional Queen Conch Fisheries Management and Conservation Plan. FAO Fisheries and Aquaculture Technical Paper No. 610. Rome, FAO. 70 pp.

⁵² Reynal, Lionel. Letter to WECAFC Members. July 7, 2017.

Data

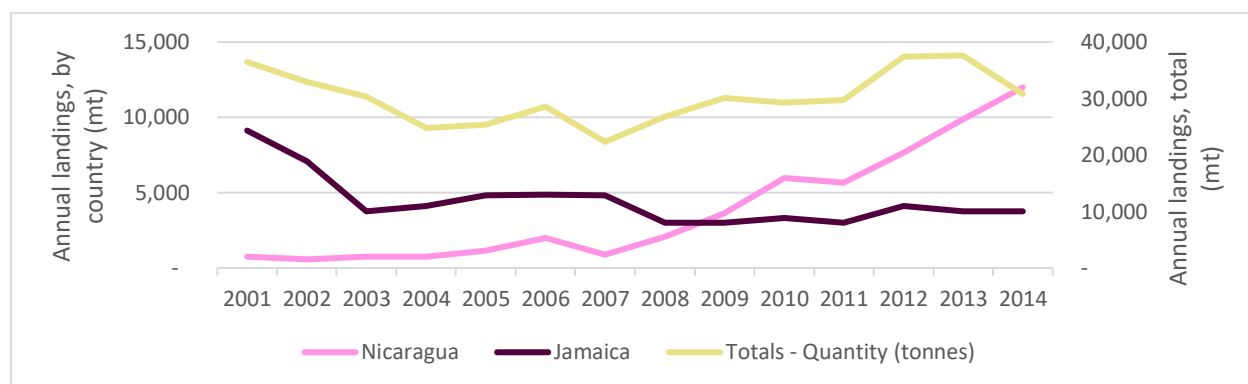
“With few exceptions, the lack of formal fishery statistical systems to collect queen conch data represent the most critical and challenging issue regarding conch stock assessment in the Caribbean region.”⁵³

Overall data for the regional queen conch fishery is poor, though there are pockets of high quality data from localized studies. Stratification of landings makes gathering comprehensive data difficult. Compounding the issue, conversion factors for the “clean” and “dirty” meat plus shell from each conch are not uniform in the region, leading to discrepancies in production data. In 2017 region-wide agreement was reached on the conversion factors for queen conch at the 16th WECAFC session and countries started reporting to FAO on the conversion factors applied. Landings and trade data herein are presented with these caveats.⁵⁴

Landings

Despite numerous measures and regulations, including work initiated in 1986 by FAO/WECAFC, along with other regional groups, and an active regional working group, recovery has been slow though not without some bright spots. Though statistics from FAO indicate a peak in landings of 41,727 mt in 1994 with only a standard deviation of about 5000 mt in the last two decades, looking more closely at the landings data indicates production may be shifting geographically as overfishing occurs—a possible explanation for the reversal in the graph below. Whether caused by inadequate management or illegal, unreported, or unregulated (IUU) fishing, if this is true, the case for a regional body to coordinate the fishery is all the more urgent.

Figure 7 Landings indicating a potential geographic shift of exploitation. Countries are on the left axis, WECAFC on the right.



⁵³ Ibid.

⁵⁴ “Queen Conch Fisheries Status and Management in CRFM Member States.” Presentation by Working Group on Queen Conch to CFMC/WECAFC/CITES/OSPESCA/CRFM Workshop. Panama City, Panama. November 2014.

Fishery status

Table 7 Contextual analysis of queen conch stocks in WECAFC

Characteristics are generalized for the region; most vary by country or geography.

Lifespan	20-30 years, average ⁵⁵
Reproductivity	Viable at 3.5-5 years ⁵⁶ Requires density of ~50-200 adult conchs/ha ⁵⁷
Data quality	Poor (see below for explanation)
Overfishing/Stock abundance	Overfished & overfishing occurring in some locations/Overall declining stock abundance; Stock health is greatly affected by density, nursery and spawning habitats, and water quality. ⁵⁸
Countries and Territories	36
Fleet	Artisanal (nearly 6000 dories; 2-3 fishers per 7-10m vessel) up to industrial (approximately 82; 40 divers per ~35m vessel); majority hand-gathered by divers using scuba or hookah, except where prohibited, otherwise done by free divers; some eastern island states use gill and trammel nets; ⁵⁹ ⁶⁰ number of fishers approximately 19,000 ⁶¹
Annual Landings	25,000 – 35,000 metric tonnes annually, 2004-2014
Infrastructure	Varies by country and end market; Export needs access to cold chain, certified facilities and export facilities, usually air; Processing is straightforward – involves removing meat from shell, removing viscera and undesired tissue; Yields as low as 50% or more of unprocessed meat weight, depending on level of processing; Typically sold as fresh or frozen. ⁶²
Management and governance	Highly varied; some countries (n=34) have fishery management plans (20), and/or size (17), weight (15), seasons (14), gear restrictions (13); 5 countries closed their conch fisheries; 2 have trade suspended by CITES. ⁶³
Organizational capacity	Unknown--likely highly varied, given the variability of end markets.
Market potential	Varied; Export of meat, shells, pearls and opercula; Domestic sales in tourism industry; Domestic consumption of meat by subsistence fishers; Export market is primarily the U.S. and EU (60% ⁶⁴) (2015: 14,000 mt of meat, 68,649 shells or shell products); All trade subject to Appendix II of CITES ⁶⁵

See also Attachment 1 for additional data for the queen conch fisheries in the WECAFC region.

⁵⁵ <http://www.nmfs.noaa.gov/pr/species/invertebrates/queen-conch.html#distribution>

⁵⁶ McDonald, S. "Queen Conch". Seafood Watch. 2016. Retrieved 19 June 2018 from: http://www.seafoodwatch.org/-/m/sfw/pdf/reports/c/mba_seafoodwatch_queenconchreport.pdf

⁵⁷ NMFS, 2014.

⁵⁸ Appeldoorn R.S., Castro Gonzalez, E., Glazer, R. and Prada, M. 2011. Applying EBM to queen conch fisheries in the Caribbean. Pages 177-186 in: L Fanning, R Mahon and P McConney (eds.) Towards Marine Ecosystem-based Management in the Caribbean.

⁵⁹ McDonald, 2014 estimates more than 15,000 fishers for 6 of the 36 countries where conch is found. The Working Group presentation notes that little socio-economic data is collected for queen conch fisheries.

⁶⁰ Prada et al., 2017.

⁶¹ Ibid.

⁶² Theile, S. (2001): Queen Conch fisheries and their management in the Caribbean. TRAFFIC Europe.

⁶³ Appendix I of NMFS Status Report has a chart detailing legislation, seasonal closures, and other measures by country.

⁶⁴ Prada et al., 2017.

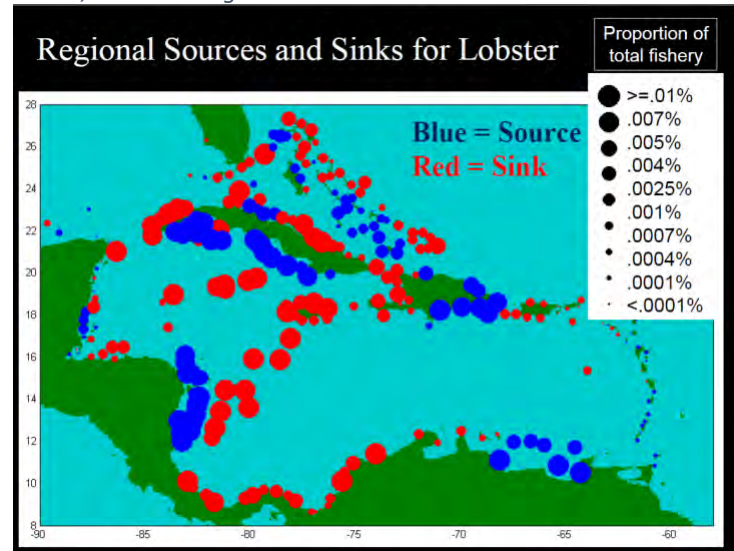
⁶⁵ https://www.cites.org/eng/prog/queen_conch/introduction

Spiny lobster

Contextual Analysis

Because of the biology and geography, Caribbean spiny lobster, *Panulirus argus*, is one of the truly shared stocks of the WECAFC countries; it is found in the same habitats as queen conchs and may be targeted by the same fishers. The currents of the Caribbean may carry larvae from a spawning ground in one country to another before it finds a suitable home, anywhere 5 to 8 months after hatching. Estimates from a 2013 study found that 60% of larval recruitment in Florida came from the wider Caribbean, including coasts as far away as Venezuela (see figure 1 for sources and sinks of larvae⁶⁶). This indicates the imperative of managing the species at a regional level. Spiny lobster is important for export for a range of fishermen, contributing an estimated US\$1 billion to the regional economy from a combined average of 35,000 metric tons (mt) in annual landings.⁶⁷ Lobster accounts for less than 5% of exports by volume, but nearly 30% of value in CARICOM countries.⁶⁸

Figure 8 Caribbean sources and sinks of Caribbean spiny lobster larvae, *Panulirus argus*.



Data

The International Union for Conservation of Nature (IUCN) Red List™ assessed the stock as data deficient as of 2011 though other sources have noted that the stock is likely fully or overexploited.⁶⁹ Stratification of landings across the region, i.e., fishers range from artisanal to industrial, makes gathering comprehensive socio-economic data difficult. Landings and trade data herein are presented with these caveats.

⁶⁶ Butler, M. Toward a Truly Sustainable Caribbean Lobster Fishery: Consideration of the Science on Larval Connectivity, PaV1 Disease, and Maximum Size Limits. Presentation to WECAFC 2014.

⁶⁷ Kough, A. S., Paris, C. B., & Butler, M. J. (2013). Larval Connectivity and the International Management of Fisheries. *PLoS ONE*, 8(6), e64970. <http://doi.org/10.1371/journal.pone.0064970>

⁶⁸ FAO. 2016. "Findings of the independent cost-benefit assessment of the options for strategic re-orientation of WECAFC" by Kjartan Hoydal. FAO Fisheries and Aquaculture Circular. No. 1117. Bridgetown, Barbados.

⁶⁹ Winterbottom et al. 2011.

Fishery status

Table 8 Contextual analysis of spiny lobster stocks in WECAFC

Characteristics are generalized for the region; most vary by country or geography.

Lifespan	12 years, average ⁷⁰
Reproductivity	Viable at 2 years ⁷¹ Larger specimens are important for healthy spawning stock ⁷²
Data quality	Data deficient across the stock as of 2011 ⁷³ ; Brazil: “heavily overexploited” ⁷⁴
Overfishing/Stock abundance	Fully fished/stable: Anguilla, Antigua, Belize, Bahamas, Cuba, Mexico, & Nicaragua. Unknown: Brazil ⁷⁵ , Caribbean Netherlands, Dominican Republic, France, Honduras, Panama, U.S. ⁷⁶
Countries and Territories	44 ⁷⁷
Fleet and fishers	Primarily artisanal (estimated 16,000; 7-10m vessel) up to industrial (estimated 250 or more; 40 divers per 15-28m vessel); -hand-gathered by divers (free, scuba, or hookah) traps and casitas; gillnets and trammel nets used in some countries; ⁷⁸ -number of fishers approximately 60,000 professional and 100,000 recreational ⁷⁹
WECAFC annual landings	Average 35,000 mt, 2005-2014 ⁸⁰ (standard deviation of 3000 mt)
Available and Needed Infrastructure	Varies by country and end market; largely dated. -Export (frozen or fresh) needs access to cold chain, certified facilities and export facilities, usually air; live needs access to recirculating tanks along the entire chain -Processing is straightforward – involves removing meat from tail; ⁸¹ meat yield is usually 30% of body weight ⁸²
Management and governance	Highly varied; some countries (n=18) restrict size and/or weight (18), seasons (12), gear restrictions (8); Size restrictions vary – the U.S. minimum carapace length (76mm) is imposed on all imported spiny lobster. ^{83 84}
Organizational capacity	Unknown--likely highly varied, given the variability of end markets.
Market potential	High; End markets vary widely by country, with some exporting as much as 90% of their landings and others none. ⁸⁵ Regional export market is primarily the U.S. and China (57%) ⁸⁶

⁷⁰ <http://www.iucnredlist.org/details/169976/0>

⁷¹ Ibid.

⁷² Butler. 2014.

⁷³ <http://www.iucnredlist.org/details/169976/0>

⁷⁴ Andrade, H. *Stock assessment of the red spiny lobster (Panulirus argus) caught in the tropical southwestern Atlantic*. Latin American Journal of Aquatic Resources. Pages 201-214. Volume 43. Issue 1. 2015. DOI: 10.3856/vol43-issue1-fulltext-17

⁷⁵ Per the 2014 working group meeting, the status of Brazil’s fishery was unknown. A paper published in 2015 found that it was “heavily exploited” and postulates it may be near collapse.

⁷⁶ FAO. 2015. Report of the first meeting of the OSPESCA/WECAFC/CRFM/CFMC Working Group on Caribbean Spiny Lobster, Panama City, Panama, 21–23 October 2014. Informe de la primera reunión del Grupo de Trabajo de OSPESCA/COPACO/CRFM/CFMC sobre la Langosta Espinosa del Caribe, Ciudad de Panamá, Panamá, 21-23 de octubre de 2014. FAO Fisheries and Aquaculture Report/Informe de Pesca y Acuicultura. No. 1095, Bridgetown, Barbados. 112 pp.

⁷⁷ <http://www.iucnredlist.org/details/169976/0>

⁷⁸ FAO. 2015.

⁷⁹ FAO. January 2017. *The world lobster market*, by Graciela Pereira and Helga Josupeit, FAO Consultants. Globefish Research Programme Volume 123. Rome, Italy.

⁸⁰ FAO. 2016. Fishery and Aquaculture Statistics. Global capture production 1950-2014. (FishstatJ). In: FAO Fisheries and Aquaculture Department [online or CD-ROM]. Rome. Updated 2016. <http://www.fao.org/fishery/statistics/software/fishstatj/en> Filtered for Caribbean spiny lobster.

⁸¹ FAO. 2017.

⁸² <https://www.seriousseats.com/2013/05/the-food-lab-how-to-buy-a-lobster.html>

⁸³ FAO. 2015.

⁸⁴ <https://www.law.cornell.edu/cfr/text/50/622.409>

⁸⁵ Winterbottom, M., Haughton, M., Mutrie, E. and Grieve, K. *Management of the Spiny Lobster Fishery in CARICOM Countries: Status and Recommendations for Conservation*. Printed in the Proceedings of the 64th Gulf and Caribbean Fisheries Institute, October 31-November 5, 2011. Puerto Morelos, Mexico.

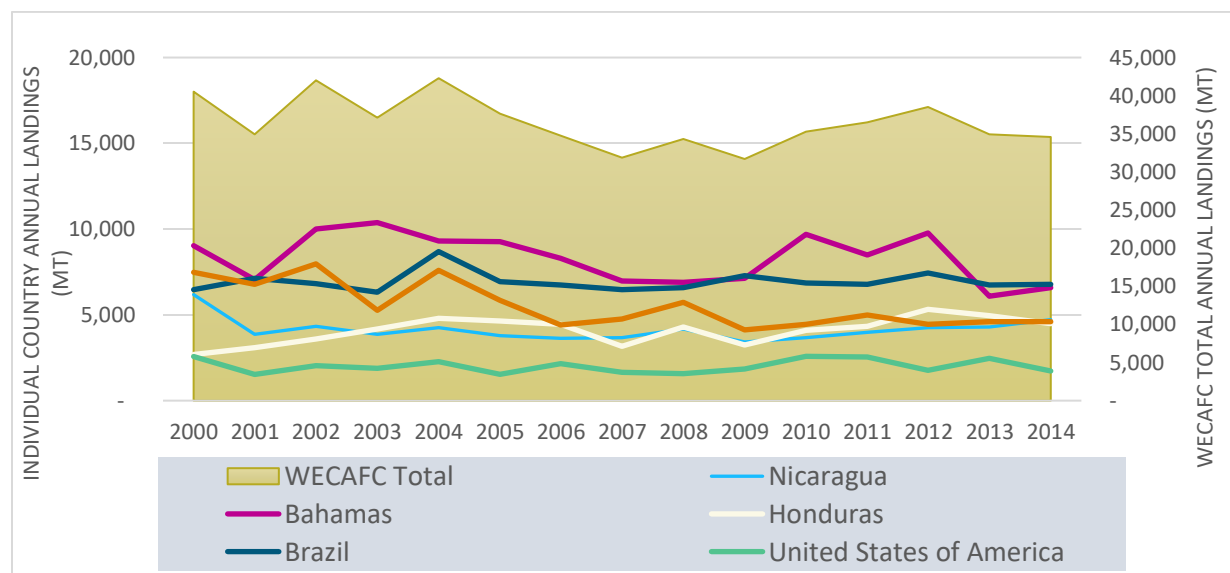
⁸⁶ FAO. 2017.

Lobster market

Lobster is considered a luxury good in most markets – sales and prices are generally higher when the economy is doing well. For context of the world lobster market, the U.S. remains the largest importer as of 2014, when over 61,000 mt were imported, followed by Canada and China with 32,500 mt and 17,800 mt, respectively. As of 2017, “American lobster” (*Homarus americanus*) production is about 140,000 tons annually, about 60% of total world lobster landings; tropical spiny lobster is 73,000 tons, annually (2017). The U.S. not only lands about 70,000 mt annually of both American and spiny lobsters as of 2017, it also imported 45,000 to 60,000 mt annually of lobsters from 2009 to 2014, mainly from Canada (70-80%).

From 2009 to 2014, the lobster from Nicaragua, Brazil, Honduras, and the Bahamas provided the 2nd through 5th highest amounts of lobster to the U.S. market. Prices varied widely based on quality; individually quick frozen (IQF) tails receive a market premium compared to lower quality plate frozen tails. As reported in the FAO lobster value chain report from 2017, lobster from Honduras had a unit value of \$30/kg whereas plate frozen tails from Nicaragua were \$20/kg.⁸⁷

Figure 9 Landings of the top WECAFC Caribbean spiny lobster producing countries and the WECAFC total spiny lobster landings.⁸⁸



Value chain

Organizational capacity in the value chain is likely varied across the region, given that the end markets and level of processing are so varied (see notes in contextual analysis table). As noted in the 2011

⁸⁷ FAO. 2017.

⁸⁸ FAO. 2016.

CARICOM report, fishers generally sell to an intermediary or directly to a processing plant which may be privately or cooperatively owned. The plant processes, weighs, packs and exports the lobster.⁸⁹

Within the region, the value chains in Belize are unique in that cooperatives in Belize hold exclusive export rights for lobster. Lobster tails and meat are primarily sold to two cooperatives in Belize who export 90-95% of the lobster.⁹⁰ Depending on the dynamics within the cooperative, impact investments in the Belizean lobster value chain, if identified, may have a higher likelihood of demonstrating social impact and ensuring fishers realize gains from investments.

Management and governance

The management and governance of the lobster stocks is still handled largely at the country level, but the situation is changing, with important initiatives moving forward at the regional level to harmonize management efforts. OSPESCA member countries now apply the regional plan to the fisheries, with the exception of Honduras and Nicaragua for whom shifting away from current harvest methods will be difficult given the socio-economic dynamic.⁹¹ Without effective regional management and governance, a healthy Caribbean spiny lobster stock is unlikely. The ability of the countries or of any regional body to enforce management measures variable and unknown, respectively.

Concerning management at the regional level, there have been several regional level efforts to systematize and harmonize the fishery, including a regional code for the fishery (OSPECA Reglamento OSP-02-09)⁹², a subsequent regional fishery plan (MARPLESCA)⁹³, and a recently signed regional declaration. The OSPESCA/WECAFC/CRFM/CFMC Working Group for Caribbean spiny lobster met for the first time in 2014 and has made admirable progress, especially considering the dynamics of the lobster fishery. After two decades of meetings of various stakeholders, and numerous scientific studies that elucidated the dependence of local stock health on regional stock health, a Spiny Lobster Declaration was signed in 2015.⁹⁴ The declaration is non-binding, but it, along with the OSPESCA code and MARPLESCA plan, it indicates positive progress toward more cohesive, consistent regional management. An additional recommendation from the Working Group, a joint regional stock assessment, would be valuable for determining risk related to potential impact investments as it would help determine the sustainability of the resource and potentially further delineate areas critical to spawning that need protection.

Eco-labelling and certification

There are numerous certification schemes being used or explored by the fishery participants, but whether this effort is being driven by the market or others is unclear. The FAO value chain assessment notes that while the companies interviewed for their study expressed an interest in working with the

⁸⁹ Monnereau, I., and Helmsing, A.H.J. 2010. *Local Embedding and Economic Crisis: Comparing Lobster Chains in Belize, Jamaica and Nicaragua*. In: A.H.J. Helmsing and S. Vellema (eds.) *Value Chains, Inclusion and Endogenous Development: Contrasting Theories and Realities*. Routledge Publishing Company. Abingdon.

⁹⁰ "Towards Investment in Sustainable Fisheries: Financing the Transition of Lobster and Conch in Belize". Vivid Economics and MRAG. Prepared for ISU-EDF. August 2014.

⁹¹ FAO. 2016. "Assessment of the Recent Achievements and Collaboration of CRFM, OSPESCA and WECAFC, Including Options for a Regional Institutional Collaborative Structure within an RFMO Framework" by Helga Josupeit. Presented at the 16th session of the WECAFC. April 2016.

⁹² <http://guyanaseabobfishery.com/Activities.aspx>

⁹³ OSPESCA. 2009. *Adenda al Reglamento OSP-02-09 para el Ordenamiento Regional de la Pesquería de la Langosta del Caribe (Panulirus argus)*.

⁹⁴ OSPESCA. 2012. *El Plan MARPLESCA. Plan de Manejo Regional de la Pesquería de la Langosta Espinosa del Caribe (Panulirus argus)*.

⁹⁵ <https://caricom.org/communications/view/caribbean-fisheries-ministers-ink-regional-spiny-lobster-declaration>

FAO on risks to fishers related to the use of scuba, they did not express an interest in funding programs that avoid the use of scuba or paying a premium for ecolabelled products.⁹⁵

Lobster fisheries in Honduras and the Bahamas underwent an MSC pre-assessment in 2010-2011 and 2008, respectively, each performed by MRAG Americas.⁹⁶ In the Bahamas, World Wildlife Fund and The Nature Conservancy worked with fishery stakeholders, including the Bahamas Department of Marine Resources, the Bahamas Marine Exporters Association, Friends of the Environment and fishers on a comprehensive fishery improvement project (FIP) which attained FIP level 5 and is currently undergoing Marine Stewardship Certification (MSC).⁹⁷ This fishery accounts for 25% of the Caribbean spiny lobster supply, and is rated yellow, or “good alternative” by Monterey Bay Aquarium Seafood Watch.

There are currently FIPs in place for Honduras and Nicaragua, which represent about 10% of 2017 global landings. There is also a prospective FIP in Mexico.⁹⁸

⁹⁵ FAO. 2017.

⁹⁶ <https://mrag.co.uk/experience/bahamas-iiu-risk-assessment>

⁹⁷ <https://fisheryprogress.org/fip-profile/bahamas-spiny-lobster-trapcasita>

⁹⁸ [https://fishchoice.com/buying-guide/spiny-lobster-caribbean 1/](https://fishchoice.com/buying-guide/spiny-lobster-caribbean-1/)

Shrimp and seabob

Contextual Analysis

The interaction and co-dependencies of the WECAFC shrimp and seabob stocks are not yet fully understood.⁹⁹ The Western Central Atlantic and Southwest Atlantic ranked six and eleven by landings amongst the FAO fishing areas, as of 2005.¹⁰⁰ The capture fishery, or at least studies thereof, seem to be largely bifurcated into the Guianas-Brazil Shelf, which produces 45% of the shrimp in the Western Central Atlantic, and the U.S. and Mexico (which includes fisheries off the eastern coast of the U.S., Florida and the Gulf of Mexico).^{101, 102} The region also produces shrimp using aquaculture, potentially muddling export statistics from the region. In addition, foreign fleets also participate in the shrimp fishery.^{103, 104}

Data

Stocks assessment indicate the stocks in the WECAFC are likely fully or overexploited, with a range of uncertainty.¹⁰⁵ Stratification of landings across the region, i.e., fishers range from artisanal to industrial, makes gathering comprehensive socio-economic data difficult. Landings and trade data herein are presented with these caveats.

Fishery status

Table 9 Contextual analysis of shrimp and seabob stocks in WECAFC

Characteristics are generalized for the region; most vary by country or geography.

Lifespan	18-24 months, average ¹⁰⁶
Reproductivity	Majority of regional shrimp can reproduce at 12 months ¹⁰⁷
Data quality	Variable. Lack comprehensive data for the region. ¹⁰⁸
Overfishing/Stock abundance	Fully exploited for the majority of landings (by volume; primarily northern brown shrimp) ¹⁰⁹ ; Other stocks are overexploited.
Countries and Territories	Landings of 9 species in the WECAFC region are reported by 21 countries; by volume, the largest shares are the U.S. (54%), Mexico (10%), Guyana (10%), and Brazil (12%) ¹¹⁰
Fleet and fishers	Ranges from completely artisanal (Venezuela) to primarily industrial (U.S.) Vessel numbers are difficult to estimate, but are declining; ¹¹¹ limited trawler

⁹⁹ FAO. 2017. *Background documents for the Workshop on investing in ecosystem-based shrimp and groundfish fisheries management of the Guianas – Brazil shelf*. Barbados. 7–8 September 2015. FAO Fisheries and Aquaculture Circular No. 1120. Rome, Italy.

¹⁰⁰ Gillett, R. *Global study of shrimp fisheries*. FAO Fisheries Technical Paper. No. 475. Rome, FAO. 2008. 331p.

¹⁰¹ <http://www.fao.org/americas/noticias/ver/en/c/328412/>

¹⁰² Interestingly, the Brazil-Guianas shelf fishery was first located and then developed by teams from the Caribbean Commission, Suriname, and the U.S. government in the 1940s and 1950s. See: Dragovich, A. *Guianas-Brazil Shrimp Fishery and Related U.S. Research Activity*. National Marine Fisheries Services, National Oceanic and Atmospheric Administration. No. 81-03 M. 1981.

¹⁰³ FAO. 2016. *Fishery and Aquaculture Statistics. Global capture production 1950–2014*. (FishstatJ). In: FAO Fisheries and Aquaculture Department [online or CD-ROM]. Rome. Updated 2016. <http://www.fao.org/fishery/statistics/software/fishstati/en>

¹⁰⁴ Cato, J., Otwell, W., Coze, A. *Nicaragua's Shrimp Subsector: Developing a Production Capacity and Export Market during Rapidly Changing Worldwide Safety and Quality Regulations*. Agriculture and Rural Development Discussion Paper. The World Bank. 2004.

¹⁰⁵ WECAFC. "Review of the State of Fisheries in FAO Area 31." Report from the Eighth Session of the SAG. November 2017.

¹⁰⁶ Gillett. 2008.

¹⁰⁷ https://tpwd.texas.gov/publications/pwdpubs/media/pwd_br_v3400_046_shrimp.pdf

¹⁰⁸ FAO. 2017.

¹⁰⁹ WECAFC. 2017.

¹¹⁰ FAO. 2016.

¹¹¹ FAO. 2015. *Report of the workshop on investing in ecosystem-based shrimp and groundfish fisheries management of the Guianas – Brazil shelf*. FAO Fisheries and Aquaculture Circular No. 1125. Barbados. 2015.

	estimates include: U.S. Gulf of Mexico, 1100; ¹¹² north of Brazil 60; Suriname 23; Guyana 30; French Guyana 12; Trinidad and Tobago 27; ¹¹³ Nicaragua 93; some trawlers are foreign-owned ¹¹⁴
	At least 170,000 people are employed in shrimp and groundfish fisheries of the Guianas-Brazil shelf; ¹¹⁵
	Gear ranges from seine nets, otter trawls with turtle excluders (TEDs), manual trawl, cast nets and other types of net gear.
<i>WECAFC annual landings</i>	Average ~187,000 mt, 2005-2014 (standard deviation of ~21,000 mt) ¹¹⁶
<i>Available and Needed Infrastructure</i>	Largely unknown. Investment needs include improved landing and infrastructure, habitat restoration and capacity building for fishery governance. ¹¹⁷
<i>Management and governance</i>	Processed infrastructure for market is highly varied ¹¹⁸
	Generally low; the U.S. has had a specific fishery management plan in place since 1981. ¹¹⁹ Seabob in Suriname has attained MSC certification and uses harvest control rules (HCR) ¹²⁰ ; Guyana is in FIP stage 5 and adopted HCR in 2014. ¹²¹
<i>Organizational capacity</i>	Highly varied, given the range of countries, vessels and end markets. There is a range of in-country alliances in the U.S. and in other countries, including amongst and between shrimpers, processors and buyers. There is some information on fisherfolk organizations available for individual countries; overall information is scarce. ¹²²
<i>Market potential</i>	High; Although small compared to regional landings, exports by individual countries may comprise a significant amount of the value of exports, e.g., Nicaraguan shrimp exports were 50% of the value of all seafood exports and about 8% of all exports from the country. ¹²³ U.S. and EU are primary destinations for worldwide shrimp production ¹²⁴

Detailed stock status

Fishery stock status varies from fully to overexploited with low, medium and high levels of uncertainty across the variety of species found in the WECAFC region. Four of the main stocks, by volume, are part

¹¹² <http://gulfcouncil.org/fishery-management/implemented-plans/shrimp/>

¹¹³ FAO. 2013. *Case study on shared stocks of the shrimp and groundfish fishery of the Guianas-Brazil shelf*. Assessment studies. CLME Case Study on Shrimp and Groundfish - Report. No. 9 -, Rome, FAO. 2013. 99 p.

¹¹⁴ Cato. 2004.

¹¹⁵ <http://www.fao.org/americas/noticias/ver/en/c/328412/>

¹¹⁶ FAO. 2016. Fishery and Aquaculture Statistics. Global capture production 1950-2014. (FishstatJ). In: FAO Fisheries and Aquaculture Department [online or CD-ROM]. Rome. Updated 2016. <http://www.fao.org/fishery/statistics/software/fishstati/en> Filtered for all shrimp and seabob, WECAFC countries, WCA and SWA fishery areas.

¹¹⁷ FAO. 2017.

¹¹⁸ Gillett. 2008.

¹¹⁹ FAO. 2015.

¹²⁰ <https://fisheries.msc.org/en/fisheries/suriname-atlantic-seabob-shrimp/about/>

¹²¹ https://www.fishsourcefisheries.msc.org/stock_page/695en/fisheries/suriname-atlantic-seabob-shrimp/@@view

¹²² FAO. 2013. *Case Study On The Shared Stocks Of The Shrimp And Groundfish Fishery Of The Guianas-Brazil Shelf: Stakeholder and institutional analysis*. CLME Case Study on shrimp and groundfish. Report No.3, Rome, FAO. 2013. 74p.

¹²³ Cato. 2004.

¹²⁴ <https://www.undercurrentnews.com/2018/03/28/trade-analysis-where-did-all-the-shrimp-go/>

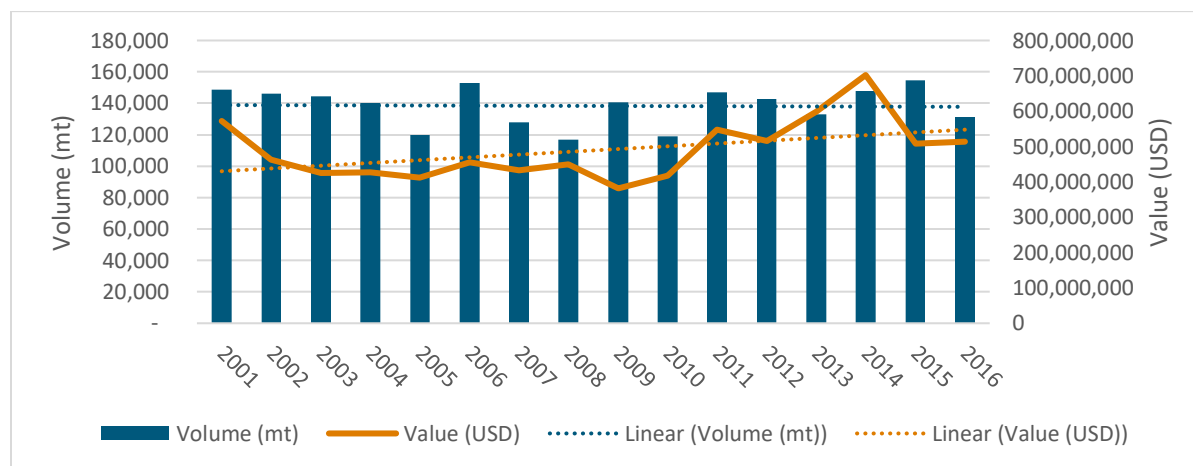
of the *Penaeus* species group (each of the northern species and Redspotted shrimp) and data by species is available, but some data is aggregated for the group as *Penaeus shrimps nei*. Status by species, per the 2017 Scientific Advisory Group (SAG) for data as of 2015:¹²⁵

- Fully fished, low or medium uncertainty:
 - northern brown shrimp (primarily landed by Mexico and U.S.);
 - northern white shrimp (primarily U.S.);
 - Atlantic seabob (primarily landed in Guyana, Suriname, and Mexico)
- Fully/Overexploited, medium to high uncertainty:
 - northern pink shrimp (primarily landed in Mexico, U.S.)
 - *penaeus shrimps nei* (primarily landed in Mexico, Nicaragua, Venezuela)
- Fully exploited, high uncertainty:
 - royal red shrimp (primarily landed in the U.S.)
 - other shrimps, prawns
- Overexploited, high uncertainty:
 - redspotted shrimp
 - rock shrimp (primarily landed in the U.S.)

The relationship of the stocks within the WECAFC is unclear. Some stocks are thought to share neighboring EEZs,¹²⁶ but the regional connectivity, or lack thereof, is largely unknown.

Bycatch is a problem for all shrimp fisheries, but in particular in the developing countries between artisanal and industrial fisheries. Artisanal fishers, in their smaller vessels, typically fish shrimp in the inland and near shore waters, which are the nurseries for not only the juvenile shrimp, but also many other near shore stocks, like snappers.¹²⁷

Figure 10 U.S. Shrimp landings and value, 2001-2016



Shrimp market

For context of the world shrimp market, the U.S. is the largest importing country as of 2017, when over 664,000 mt were imported per the National Oceanic and Atmospheric Administration (NOAA). Domestic

¹²⁵ WECAFC. 2017.

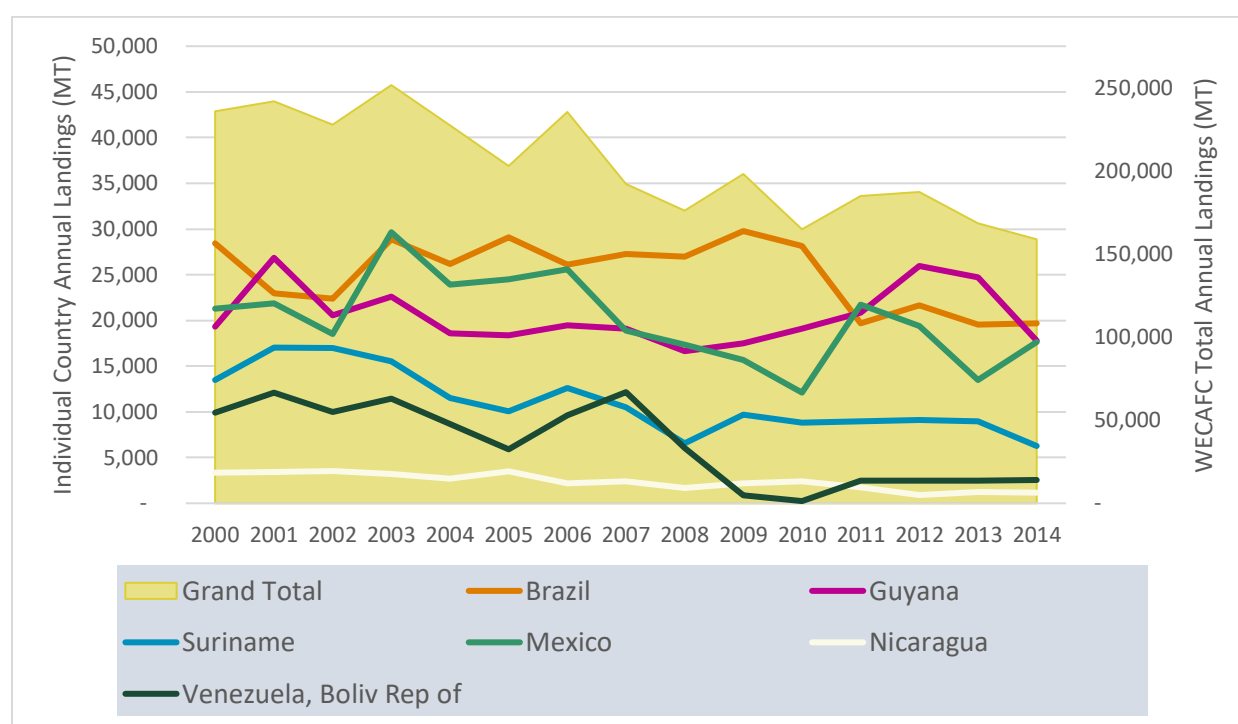
¹²⁶ FAO. 2016a. *Report of the Workshop on Investing in Ecosystem-based shrimp and groundfish fisheries management of the Guianas –Brazil shelf, Barbados, 7–8 September 2015*. FAO Fisheries and Aquaculture Report/FAO Informe de Pesca y Acuicultura. No. 1125, Bridgetown, Barbados.

¹²⁷ Gillett. 2008.

landings are declining. Prices for domestically landed shrimp in the U.S. have been variable, but with an overall increasing trend from 2001 through 2016, increasing from U.S. \$400 million to \$550 million, with domestic landings fairly steady at approximately 140,000 mt and values for the same time period.¹²⁸

The EU and Japan are the other two key markets (over 540,000 and 156,000 mt in 2017, respectively), with China and other countries importing less than half of what Japan does.¹²⁹ Shrimp remains one of, if not the most, heavily traded seafood commodity in the world; within the WECAFC, over US \$850 million was contributed by shrimp and groundfish sectors in the six countries on the Brazil-Guianas shelf.¹³⁰ China, heretofore primarily an exporter of shrimp, is starting to retain more of their shrimp for domestic consumption; by 2020 domestic Chinese demand is predicted to be 2.04 million mt, which would exceed the U.S. and EU combined.¹³¹

Figure 11 Wild capture landings of the top WECAFC shrimp and seabob producing countries and the WECAFC total shrimp and seabob landings.¹³²



Value chain

Little information was available about the value chain, e.g., number of shrimp fishers, vessel owners, co-operatives, etc.; however, there seems to be a fair amount of vertical integration in the shrimp and seabob value chain in the region. Since many exports are likely bound for the two largest markets, the U.S. and the EU, one would expect fair levels of health and hygiene for exporters. Indeed, the MSC certified fishery in Suriname, which as of 2017 included 27 trawlers, was initiated by the largest shrimp

¹²⁸<https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200:::NO::>

¹²⁹ <https://www.undercurrentnews.com/2018/03/28/trade-analysis-where-did-all-the-shrimp-go/>

¹³⁰ <http://www.fao.org/americas/noticias/ver/en/c/328412/>

¹³¹ <https://www.undercurrentnews.com/2018/04/03/china-shrimp-consumption-to-hit-2m-metric-tons-by-2020-says-guolian/>

¹³² FAO. 2016a.

processor in Europe.¹³³ In Guyana, the FIP lists 100 trawlers licensed catch seabob offshore, and over 1000 inshore artisanal vessels using seine nets. (Note, this is 70 more trawlers than listed in the 2013 CLME report, perhaps reflecting active versus licensed vessels.)

Management and governance

WECAFC has been working on shrimp assessment and bio-economic modeling since 1975. Most members have endorsed the Caribbean and North Brazil Shelf Large Marine Ecosystem (CLME+) Strategic Action Programme (SAP), requiring them to strengthen the management of shrimp fisheries and for which dedicated financing is available for implementation.¹³⁴ The U.S. has had a shrimp management plan since 1981; Guyana developed a seabob management plan in 2016 for their FIP; and Suriname has a plan for their MSC certified seabob fishery. Both of the latter countries use HCR though monitoring, enforcement, and compliance are noted to be historically poor in Guyana.^{135, 136, 137}

Eco-labelling and certification

The Suriname seabob shrimp fishery was the first tropical shrimp fishery in the world to obtain MSC certification in 2011; the initiative came from a European shrimp processor, Heiploeg Group. Annual landings by the twenty trawlers in the fishery ranged from a collective 8,000 to 12,000 mt between 2001 and 2010.¹³⁸

The Guyanese seabob shrimp fishery is in a FIP, led by the Guyana Association of Private Trawler Owners and Seafood Processors, with expectations to become MSC certified by 2020. According to the FIP website, there are approximately 100 trawlers licensed to catch seabob and over 1,000 artisanal vessels.¹³⁹ The CLME Case Study of Shrimp and Groundfish, published in 2013, listed the number of active vessels for Guyana at approximately 30. The difference in numbers may be in licensed versus active vessels.

¹³³ <https://fisheries.msc.org/en/fisheries/suriname-atlantic-seabob-shrimp/about/>

¹³⁴ "Recommendations and Resolutions on fisheries management." Report from the 16th session of the WECAFC. June 2016. Guadeloupe.

¹³⁵ FAO. 2016. "Assessment of the Recent Achievements and Collaboration of CRFM, OSPESCA and WECAFC, Including Options for a Regional Institutional Collaborative Structure within an RFMO Framework" by Helga Josupeit. Presented at the 16th session of the WECAFC. April 2016.

¹³⁶ <http://guyanaseabobfishery.com/Activities.aspx>

¹³⁷ <https://fisheries.msc.org/en/fisheries/suriname-atlantic-seabob-shrimp/@assessments>

¹³⁸ <http://seabob.sr/msc-certification/suriname-atlantic-seabob-shrimp/>

¹³⁹ https://www.fishsource.org/fishery_page/1505

Dolphinfish

Overview

From the information currently available, we would recommend a series of systematic measures are considered. These steps would include:

- Completion of regional stock assessment(s) and compilation to determine stock structure
- Improved and harmonized data collection efforts in the region
- Completion of value chain and/or socio-economic assessments to determine the value of the fishery, including level of use for subsistence, direct contribution to livelihoods, and contribution of the recreational sector to regional economies
- Prioritization of investment requirements based on the completed assessments (data; management; infrastructure; enterprise). This would inform the types of capital investment required.
- Aggregation and deployment of appropriate types of capital to achieve the desired outcomes in pilot investments

Considering that relatively little disaggregated data has been produced in the past two decades for this fishery, Fishery Performance Indicators (FPIs) may be of limited utility as they rely on having some data available, to an extent. With such little data available, meaningful identification of opportunities to improve the social, environmental and economic aspects of the fishery will be limited. Gathering general data for the regional fishery will be more valuable to the region than attempting to gather greatly detailed information for one area.

Contextual Analysis

Atlantic dolphinfish is thought to all be part of one coastal pelagic dolphinfish stock in the region, though the dynamics are not yet completely understood.^{140, 141} Dolphinfish is also commonly known as mahi mahi and dorado. The majority of the global production (more than 50%) is landed in Peru.¹⁴² In the Western Central Atlantic, the landed volumes are thought to be primarily a bycatch species in the longline fishery, but it is also important commercial and recreational fishery for the countries in the region.

As yet, there is no complete stock assessment for the fishery nor is there a regional fishery management plan. The MSY has been assessed at 12,200 mt with an 80 percent confidence interval.¹⁴³ The only dolphinfish-specific plan in the region seems to be the fishery management plan for the stock in the U.S. in the South Atlantic Fishery Management Council (Florida, Georgia, South Carolina, and North Carolina).¹⁴⁴

The regional management organization for tuna and tuna-like species, the International Commission for the Conservation of Atlantic Tuna (ICCAT), does not actively manage dolphinfish. A regional assessment

¹⁴⁰ https://www.fishsource.org/fishery_page/2264

¹⁴¹ Merten, W., Schizas, N., Craig, M., Appeldoorn, R., Hammond, D. "Genetic structure and dispersal capabilities of dolphinfish (*Coryphaena hippurus*) in the western central Atlantic". Fisheries Bulletin 113:419-429 (2015). Doi: 10.7755/FB.113.4.5

¹⁴² <https://fishchoice.com/buying-guide/mahi-mahi>

¹⁴³ Mahon, R.; McConney, P.A. (eds.) *Management of large pelagic fisheries in CARICOM countries*. FAO Fisheries Technical Paper. No. 464. Rome, FAO. 2004. 149p.

¹⁴⁴ Monterey Bay Aquarium Seafood Watch. Report for Blue shark, Dolphinfish, Porbeagle shark, Shortfin mako shark, and Wahoo in the U.S. Atlantic and Gulf of Mexico, Canada North Atlantic for Pelagic longline, Troll/Pole, Handline. July 2016.

of governance, intended to contribute to the regional governance framework and Strategic Action Programme (SAP) of the Caribbean Large Marine Ecosystem and Adjacent Areas (CLME) project was carried out in 2013. They noted that the governance of coastal large pelagics, which includes dolphinfish, is not well developed within the CLME area and that there is “no integrated set of arrangements” for management of such. They recommended increasing the transparency of governance work and making it more participatory.¹⁴⁵

Data

Stratification of landings makes gathering comprehensive data difficult and overall data for the regional dolphinfish fishery is poor, though there are pockets of high quality data from localized studies like those carried out in the U.S. and Venezuela.¹⁴⁶

As noted by Josupeit, the catch is not well known, in part because commercial dolphinfish landings may be aggregated with other marine fish, and also because it is a target of recreational sport fishers. (Unlike other sportfish, like billfish, it is generally not subject to catch-and-release guidelines.¹⁴⁷) Because of the Caribbean Regional Fisheries Mechanism (CRFM, formerly known as the CARICOM Fisheries Resource Assessment and Management Programme or CFRAMP), some length and weight data for dolphinfish, amongst other stocks, has been collected.¹⁴⁸ However, the gaps in regional data for landings and, indeed, for scientific information about the fishery, make a comprehensive assessment of impact investing opportunities challenging to complete.

Landings

Because of the noted uncertainty in dolphinfish landings (as discussed in the section on data), the numbers presented below should be considered a rough guide and not a conclusive dataset. U.S. data for imports of dolphinfish indicate that among the countries in the Caribbean, Panama and Costa Rica have typically accounted for the largest volume of exports to the U.S. These imports to the U.S. may include dolphinfish landed in waters other than those of the WECAFC. Within the region, France, Barbados, the U.S., Saint Lucia and the Dominican Republic have been responsible for the majority of reported commercial landings. The total amount of landings in recent years peaked in 2006 at nearly 6,000 mt, which is half of the calculated MSY for the stock. The landings numbers do not include recreational landings of dolphinfish.

¹⁴⁵ CERMES and CRFM. 2013. *CRFM/CLME Large Pelagic Fishery Case Study –Governance Assessment*. Centre for Resource Management and Environmental Studies (CERMES) University Of the West Indies, Cave Hill Campus, Barbados. CERMES Technical Report No 58 (Rev. 1). 29pp

¹⁴⁶ Venezuela carried out a National Observer Program in 2013 on industrial and artisanal fleets. See: ICCAT Report 2014-2015. Section 8.12 SMT-Small Tunas. https://www.iccat.int/Documents/SCRS/ExecSum/SMT_ENG.pdf

¹⁴⁷ FAO. 2016. “Assessment of the Recent Achievements and Collaboration of CRFM, OSPESCA and WECAFC, Including Options for a Regional Institutional Collaborative Structure within an RFMO Framework” by Helga Josupeit. Presented at the 16th session of the WECAFC. April 2016.

¹⁴⁸ Mahon, R. 2004.

Figure 12 Exports of dolphinfish to the U.S. from WECAFC countries. Note that these landings may have originated in fishing areas other than the Western Central Atlantic or the Southwest Atlantic, i.e., outside the WECAFC region.¹⁴⁹

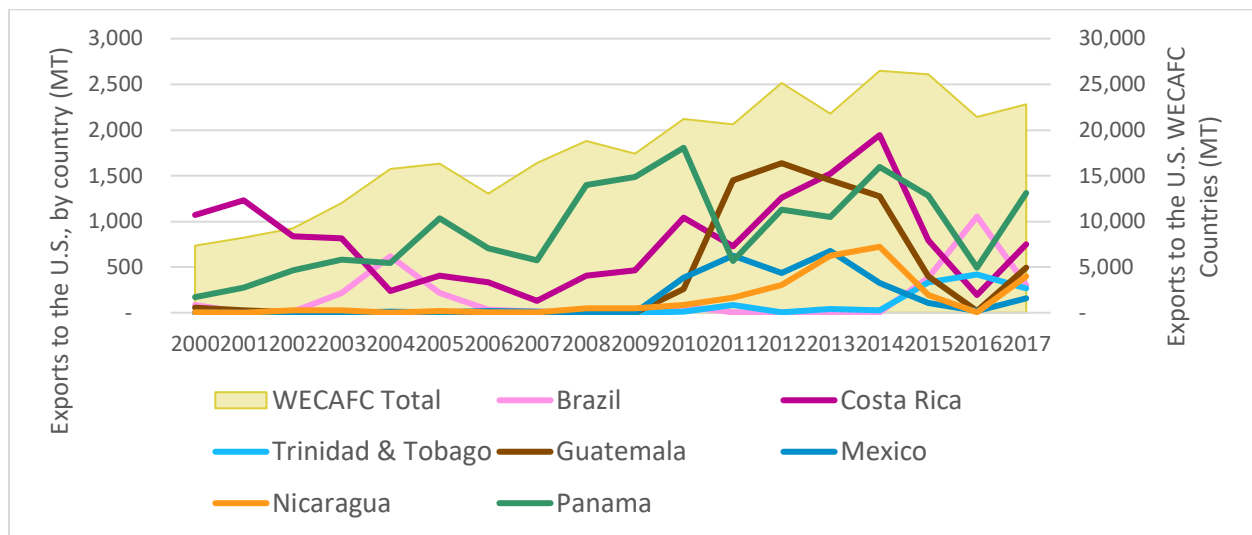
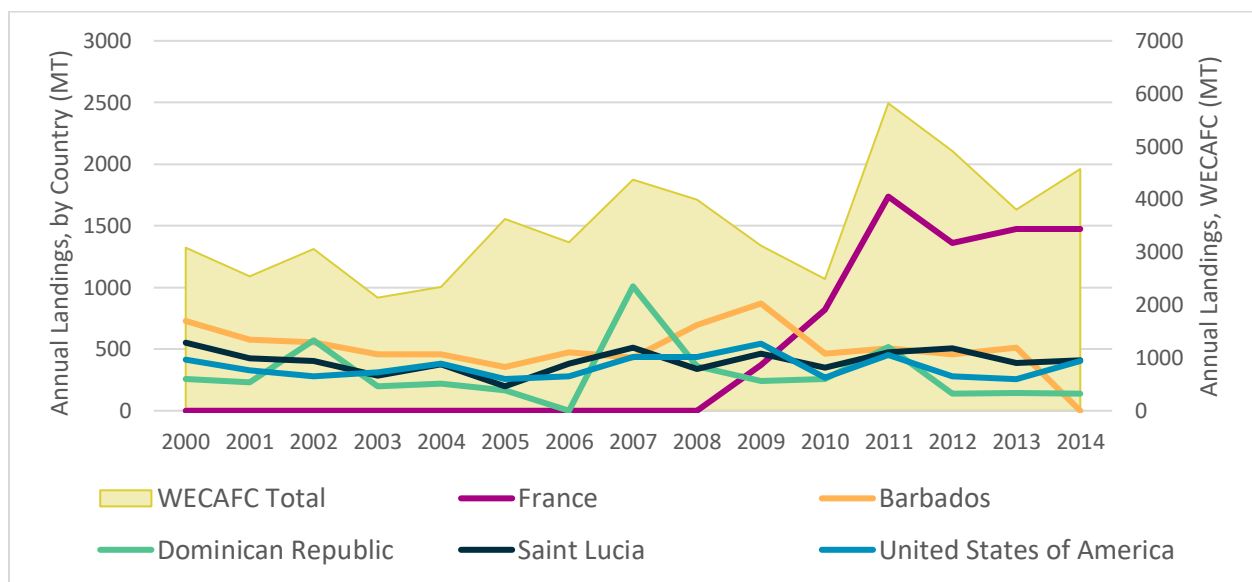


Figure 13 Landings in the WECAFC. Countries are on the left axis, WECAFC on the right.¹⁵⁰



¹⁴⁹ Commercial Fisheries Statistics. National Marine Fisheries Service, Fisheries Statistics Division. <https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/index>. Retrieved on July 11, 2018.

¹⁵⁰ FAO. 2016a. Fishery and Aquaculture Statistics. Global capture production 1950-2014. (FishstatJ). In: FAO Fisheries and Aquaculture Department [online or CD-ROM]. Rome. Updated 2016. <http://www.fao.org/fishery/statistics/software/fishstatj/en> Filtered for all shrimp and seabob, WECAFC countries, WCA and SWA fishery areas.

Fishery status

Table 10 Contextual analysis of dolphinfish stocks in WECAFC

Characteristics are generalized for the region; most vary by country or geography.

Lifespan	2-5 years, average ¹⁵¹
Reproductivity	Viable at 4-5 months; Reproduce early and often. ¹⁵²
Data quality	Poor (see below for explanation)
Overfishing/Stock abundance	Unknown. Due to landings rates and reproduction characteristics, it is not thought to be overfished, but no stock assessment has been completed; IUCN lists it as a species of “least concern”. ^{153, 154}
Countries and Territories	Dolphinfish are captured worldwide.
Fleet	Artisanal (unknown number of dories; 2-3 fishers per 7-10m vessel) up to industrial, as well as sportfishing; majority of volume landed as bycatch by industrial tuna longliners; gear includes longliners, trolling lines, gillnets, entangling nets, rod and reel number of fishers unclear. ^{155, 156, 157}
WECAFC Annual Landings	3,000 – 6,000 metric tonnes annually, 2005-2014 ¹⁵⁸
Infrastructure	Unknown. Typically sold in the global market as headed and gutted or frozen fillets. ¹⁵⁹
Management and governance	Low management and governance of this stock in the region. ¹⁶⁰ Observer coverage of longliners in the Atlantic is less than 5% ¹⁶¹
Organizational capacity	Unknown.
Market potential	Likely high—both for consumption, sport and with possibly secondary applications for the skin as a leather product; ¹⁶² Consumed domestically as well as exported from some WECAFC countries. In 2017, 13 WECAFC countries exported ~4,000 mt to the U.S., though part of these exports originated from the Pacific. ^{163, 164}

¹⁵¹ http://animaldiversity.org/accounts/Coryphaena_hippurus/

¹⁵² <https://www.fisheries.noaa.gov/species/atlantic-mahimahi>

¹⁵³ Ibid.

¹⁵⁴ The IUCN Red List of Threatened Species: *Coryphaena hippurus* – published in 2011. <http://dx.doi.org/10.2305/IUCN.UK.2011-2.RLTS.T154712A4614989.en>

¹⁵⁵ <http://firms.fao.org/firms/fishery/974/en>

¹⁵⁶ <http://firms.fao.org/firms/fishery/982/en>

¹⁵⁷ Mahon, R. 2004

¹⁵⁸ FAO. 2016a.

¹⁵⁹ Anhalzer, G. and Nanninga, R. *Application Of Global Value Chains to Seafood Sustainability: Lessons from the mahi mahi industries of Ecuador and Peru*. Completed as partial fulfillment for a Master’s of Environmental Management degree, Duke University. 2014.

¹⁶⁰ FAO. 2016.

¹⁶¹ https://www.fishsource.org/fishery_page/2264

¹⁶² Like salmon, another potential application, besides as a sportfish or for consumption, is the use of the skin as a leather substitute. This was done in Barbados in the 1980s but was discontinued. Van Anrooy, R. Personal Communication. August 2018.

¹⁶³ Commercial Fisheries Statistics. 2018.

¹⁶⁴ Mahon, R. 2004

Proposed way forward for shared stocks

To increase the likelihood of investments that will maximize economic, social and environmental benefits, measures that can align with providing better data to potential investors should be prioritized. This will not only allow fishery managers to better monitor and manage the fishery, but would also elucidate potential investment opportunities to improve value. Please see Appendix B for examples of specific fishery level investment case data needs.

Based on the information currently available and as mentioned in the introduction, we would recommend that FPIs are completed for fisheries that represent promising cases for investment. Completing the FPIs for country-level fisheries would provide the level of detail needed to identify investment needs and potential strategies. Use of the FPIs identifies social, environmental and economic indicators that can be used to formulate a case for impact investing. This can be done without FPIs, but their completion would allow for a more systematic, replicable approach that identifies potential impact measurement benchmarks.

In addition to improving data and management capacity—typically a public good financed with public capital—priority should also be given to addressing access to infrastructure, which are opportunities for public private partnerships, and strengthening investable entities. Investments that strengthen investable entities through improved harvester organizational capacity has the twin benefit of improving resource co-management and develops the absorptive capacity to realize the financial upside of improved fisheries management. This in turn will permit the deployment of impact investment capital.¹⁶⁵

Specific recommendations for each stock are provided in the following brief paragraphs.

Queen conch

From the information currently available, we recommend that FPIs are completed for fisheries where fishery governance is relatively well-developed as these represent promising cases for investment. Much of this information for conch could be found in the Non-Detriment Findings prepared by the countries for CITES, for which a standard format was proposed at the 2014 queen conch working group meeting.¹⁶⁶

Spiny lobster

We recommend that FPIs are completed for fisheries that represent promising cases for investment, particularly the Bahamas, Nicaragua and Honduras, where the fishery stakeholders have already taken a pro-active approach to management, as evidenced by their participation in FIPs.

In addition, we placed a subset of the recommendations for lobster along a continuum based on their magnitude of impact and ease of implementation. These are in the table below. We recommend prioritizing implementation and enforcement of length limits (both maximum and minimum), closed seasons, landing requirements.

¹⁶⁵ Inamdar, Neel, Larry Band, Miguel Angel Jorge, Jada Tullios Anderson, and Roya Vakili. (2016). *Developing Impact Investment Opportunities for Return-Seeking Capital in Sustainable Marine Capture Fisheries*. Washington, DC: World Bank.

¹⁶⁶ *Report of the Second Meeting of the CFMC/OSPESCA/WECAFC/CRFM Working Group on Queen Conch*. FAO Fisheries and Aquaculture Report No. 1097 SLC/FIPS/SLM R1097. Panama City, Panama. November 18-20, 2014. 444pp.

Table 11 Potential management measures and their generalized likelihood of positive impact on the stocks versus monitoring and enforcement needs (top left is high impact, low need)¹⁶⁷

Magnitude of Positive Impact ↑	Length limits (both maximum and minimum) Closed seasons Landing requirements	Gear and method restrictions Closed areas Harvest restrictions Sale, market & trade restrictions
	Lobster holding restrictions*	Effort restrictions Licenses or Permits Eco-labelling/certification Lobster holding restrictions*
Monitoring and Enforcement Needs, including Financial Costs and Political Will →		

*Difficulty and success of monitoring is unclear.

Shrimp and seabob

Attachment 2 lists the investment needs of the six countries on the Brazil-Guianas shelf as prioritized during the 2015 FAO/WECAFC Workshop on Investing in Ecosystem-based shrimp and Groundfish Fisheries. Attachment 3 lists the recommendations from the 2016 WECAFC Commission meeting.

There may be opportunities to realize environmental and/or economic returns through modernization or renewal of the fleet and processing improvements, but without proper management plans in place, this could have the unintended consequence of increasing fishing to unsustainable levels.

Though they may not generate financial returns within the next five years, there are additional developments that could move the shrimp and seabob industry towards sustainability. These include establishment of a region-wide industry working group and/or participation in the IUU and data and statistics working group to develop better monitoring and enforcement and appropriate data collection systems. If formed, this group should also participate in efforts to influence decision makers on the issuance and renewal of bilateral fishing agreements between the countries of China and Taiwan and the countries of Suriname, Trinidad and Tobago, and Guyana as well as between the US and Mexico. Finally, this group may be able to pave the way for participation in stock assessments, more inclusive resource management, i.e., community-oriented management, and public-private partnerships for investment in infrastructure.

Bycatch reduction work being undertaken by groups like the Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fisheries (REBYC-II LAC) is a good step towards generating

¹⁶⁷ FAO. 2015.

environmental and social returns. The collaboration could also be the building block of additional development work. Whether this group and others could turn their work into an endeavor that generates financial returns would need additional assessment.

Dolphinfish

Because of the short lifespan, fecundity and presence throughout the region, dolphinfish fishery investments could have high social and economic returns. From the information currently available, we would recommend that regional stock, value chain and socio-economic assessments are completed to delineate the fishery and its role within the region.

Financial and risk analysis

Completing a full financial analysis for this work was not possible due to the lack of authoritative market information, country level value chain analyses or FPIs for this fishery. An economic analysis of the case for an RFMO was calculated in Hoydal, 2016.¹⁶⁸ While this document and other economic analyses demonstrates the economic upside well, it does not address the nature of the capital required to achieve the desired outcomes (i.e. grants, equity or debt), nor does it address the relevant and appropriate financial mechanisms or structures for deploying capital in this disaggregated value chain. As a consequence, it is challenging to document how best to capture investment returns, if any.

Queen conch

The economics analysis for Belizean lobster and conch by Vivid Economics and MRAG in 2014 indicate that US\$12 million and a time period of seven years would allow stocks in Belize to attain MSY and management to become self-funding, if the right policy and other risk mitigation efforts are in place.¹⁶⁹,
¹⁷⁰

We are not aware of financial analyses for the queen conch fishery. Given the estimates of the number of fishers (nearly 20,000) and of processing workers (seasonally, 3000 in Jamaica and 9800 in the Bahamas alone) and that conchs are also used for subsistence, there is a strong case to be made for improved management of the fishery. With the lack of clarity regarding the financial flows, we would recommend this data gap is addressed to determine how to link the financial upside to improved fishery management.

Spiny lobster

Work has been done in Belize by the NGOs Rare, EDF, and others to explore the economic value added by increased management in the queen conch and lobster fisheries. The economic analysis carried out by Vivid Economics and MRAG on behalf of the International Sustainability Unit of the Prince's Trust and EDF indicate that US\$12 million and a time period of seven years would allow stocks in Belize to attain MSY and management to become self-funding, if the right policy and other risk mitigation efforts are in place.¹⁷¹

We are not aware of detailed financial analyses for the spiny lobster fishery; however, broad analysis carried out in support of the Blue Growth Investment opportunity identified that the losses associated

¹⁶⁸ FAO. 2016. "Findings of the independent cost-benefit assessment of the options for strategic re-orientation of WECAFC" by Kjartan Hoydal. FAO Fisheries and Aquaculture Circular. No. 1117. Bridgetown, Barbados.

¹⁶⁹ FAO. 2016.

¹⁷⁰ Vivid Economics and MRAG, 2014.

¹⁷¹ Ibid.

with the decline in landings from the 1990s—approximately 5000 mt, with an economic value of US \$100 million—could be realized within 8 years, if appropriate management is in place.¹⁷² Given the estimates of the number of fishers (up to 60,000 professional), processing workers (up to 250,000) and the potential economic upside, there is a strong case to be made for improved management of the fishery.¹⁷³

Shrimp and seabob

We are not aware of financial analyses for the shrimp and/or seabob fisheries. Given the estimates of the number of fishers (at least 170,000) there is a strong case to be made for improved management of the fishery.¹⁷⁴ Given the lack of clarity regarding the financial flows, we would recommend this data gap is addressed to determine how to link the financial upside to improved fishery management.

Dolphinfish

Similar to the other species, we are not aware of financial analyses for the dolphinfish fishery. Given the estimated off-vessel value of approximately US \$20 million and the use as a subsistence fishery, there is a strong case to be made for improved management of the fishery. With the lack of clarity regarding the financial flows, we would recommend this data gap is addressed to determine how to link the financial upside to improved fishery management.

Primary potential risks and key 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. For any potential investment in the fisheries of the WECAFC region, risk of doing business will vary by fishery and enterprise, but some general risks will remain consistent. These are listed in the table below as a specific risks to species. Specific risks, such as sargassum influx, may have a more direct and immediate effect on some fisheries. Similarly, some species are highly sensitive to conditions that are generally detrimental but not especially dangerous to populations of other species, like shrimp reproduction and growth can be affected by salinity, but dolphinfish populations do not show immediate effect. These are identified by stock in the table, but because the ocean is a biodynamic ecosystem, anything that harms one species will likely have an eventual effect on others.

¹⁷² “Blue Growth Opportunity”. Unpublished and undated document. Western Central Atlantic Fishery Commission.

¹⁷³ FAO. 2015.

¹⁷⁴ <http://www.fao.org/americas/noticias/ver/en/c/328412/>

Table 12 Table of imperative general and specific risks to regional stocks

<i>Queen conch</i> ¹⁷⁵	<i>Spiny lobster</i>	<i>Shrimp and Seabob</i>	<i>Dolphinfish</i>
Overharvesting and IUU fishing			
Increased water temperatures			
Water pollution			
Habitat degradation			
Ocean acidification			
Increased sea temperatures			
Changes in salinity			
Apicomplexa parasite			
			Sargassum influx related uncertainty of fishing season

Queen conch and spiny lobster

The “Regional Queen Conch Fisheries Management and Conservation Plan” lists proposed activities, indicators, means of verification, risks, and assumptions at the end of Table 7, beginning on page 22.¹⁷⁶ Unwillingness to collaborate and lack of interest from multiple stakeholders are some of the expected risks.

In the Belizean spiny lobster and conch value chains, specifically, a potential risk is the organizational capacity and business practices of the cooperatives. As noted by EDF in a 2008 report about the fisheries sector in Belize, the cooperatives were taking on unsustainable amounts of debt, through lending, to continue to incentivize fishing.¹⁷⁷ Cooperative debt in Belize was also a noted weakness of the sector in a 2015 of business course project.¹⁷⁸ Audits, capacity-building and ongoing monitoring and evaluation, in addition to financing, would be needed to mitigate the risk of financial collapse of these organizations.

Scalability and replicability potential

In general, where there is an overlap of fishery characteristics, there is a greater potential for replication and scaling. Because queen conchs have geographic and harvester overlap with the spiny lobster fishery, investment strategies identified may be potentially scaled in both fisheries in the region. While still at an early stage, the work in the Belize conch fishery should be considered as a potential framework to be applied across the region. With the similarities in shrimping operations and end markets, investment strategies identified may be potentially be replicated in other countries within the region with similar value chain characteristics. For dolphinfish, their geographic and harvester overlap with the tuna fisheries means that investment strategies for tuna or tuna-like species may overlap with dolphinfish populations. We recommend that all investments explorations consider scalability and replicability from inception.

¹⁷⁵ NMFS, 2014.

¹⁷⁶ Prada et al., 2017.

¹⁷⁷ http://www.turneffeatollmarinereserve.org/app/webroot/userfiles/214/File/Oceanic%20Society/BelizeFisheriesOverview_Oct2008.pdf

¹⁷⁸ http://mitsloan.mit.edu/actionlearning/media/documents/s-lab-projects/EDF_Oceans-Report-2015.pdf

Attachment 1 - Overview of the queen conch fishery

From the 2017 “Regional Queen Conch Fisheries and Management Conservation Plan”

TABLE 1

Overview of the queen conch fishery

Source: National Reports presented at First and Second Meeting of CFMC/WECAFC/OSPESCA/CRFM (Panama, 2012 and 2014, resp.) Country / Territory	Approx. No. fishers	No. small boats (dories)	No. industrial boats	Only free diving	Compressor	Average trip duration (days)	Approx. annual production (Mt)*	USD annual production (millions)	% export
Antigua and Barbuda	65–76	17–21				1	582 (2012) (50% clean)	4.1 (2012)	
Bahamas	9300	4000					5 613 (2013)	3.18 (2013)	31
Barbados	25						8-13 (2008)		
Belize	2 759–2 000	800		yes			439 (2013) (85% clean)	5.47 (2013)	98
Cayman Islands	100								
Colombia	90	15		yes			16 (2013)		0
Cuba				yes			295 (2012)		
the Dominican Republic	1 680–2 018	247	40		yes	2–3	355 (2011)		0
Grenada						1	28 (2012) (dirty)	2.03 (2012)	20–30
Guadeloupe		126		yes			30		
Martinique		27					3		
Guatemala**							42 (2007)		
Haiti	626	300–400		yes			200 (2012)		0
Honduras	2000		13			22	210		90
Jamaica			6–7		yes	6–12	400–500 (2012)		90
Nicaragua	1650	70	22		yes	5–22	640 (2013)	9 (2013)	90
Saint Kitts and Nevis	30	10				1	148 (2012) (dirty)		
Saint Lucia***	40	20				1	30–40 (2008) (dirty)	1.5(2008)	
Saint Vincent and The Grenadines	45	17				1	22 (2012) (dirty)		oct-20
Turks and Caicos Islands	253	146				3–4	261 (2013)	3.8(2013)	46–51
Puerto Rico	128 (2008)					1	120(2011)		
United States Virgin Islands**						1	99(2009)		

* = If not stated, assumed to be clean conch meat. ** = Source: CCAD-USDOJ (2010). *** = Additional data taken from King et al. (2008). **** = Source: Gordon (2010).

Attachment 2 – Shrimp and groundfish investments by country

From: FAO. 2017. Background documents for the Workshop on investing in ecosystem-based shrimp and groundfish fisheries management of the Guianas – Brazil shelf. Barbados. 7–8 September 2015. FAO Fisheries and Aquaculture Circular No. 1120. Rome, Italy.

Note that the letters reference a categorized list of all possible investments, including:

- A. Investments to achieve Ecosystem Quality Objectives (EcoQOs)*
- B. Investments to achieve Societal Benefit Objectives*
- C. Investments in regional cooperation, management and capacity building*

Venezuela

- 1. B.1 Investments in support of livelihoods and basic needs.
- 2. C.2 Investments in national capacity building including research and modernization of fisheries acts and regulations.
- 3. C.4 Investment in the collection, analysis and sharing of data on groundfish and shrimp fisheries and resources, through regional data bases and capacity building.

French Guyana (Guyane)

- 1. B.2.1 Investments in rehabilitation/construction of landing sites.
- 2. B.4.2 Investment for establishment/expansion of fisheries cooperatives and associations.
- 3. C.4 Investment in collection, analysis and sharing of data on groundfish and shrimp fisheries and resources, through regional data bases and capacity building.

Trinidad and Tobago

- 1. B.1.1 Investments in identification and promotion of alternative livelihoods for small-scale fisherfolk with a focus on women in fishing communities, combined with B.3.2, i.e. investment in fishing vessel buy-back and compensation schemes, which are both considered as ways of reducing capacity in the fishery. It was noted that B.2.1 was important in the context of empowering fisherfolk.
- 2. C.2 Investments in national fisheries institutional capacity building including research and modernization of fisheries acts and regulations. Modernization of the structure of the Fisheries Division to more efficiently deal with fisheries management in the current global environment is required as well.
- 3. B.4.2. Investments for establishment/expansion of cooperatives/associations that would facilitate the participation of fisherfolk in fisheries management as well as economically empower them by providing services to their members. This would include investments in capacity building and training, including in the context of empowering fisherfolk to undertake the maintenance and management of infrastructure and facilities at landing sites, as mentioned in B.2.1.

4. B 4.1 Investments in the establishment of local financial intermediaries and/or expansion of existing financial services to rural fishing communities and tailoring these to their needs including the encouragement of savings. Also considered important here is the issue of insurance for fishers.

Guyana

1. A.2 Investments in research projects on gathering of data on fisheries ecosystem and subsequent analysis. Capacity building on Ecosystem management

2. B.2 Investments in the development and better management of landing sites and accompanying infrastructure i.e. ice facilities, marketing structures, fuel and other resource availability to improve self-sufficiency.

3. B.3.1 Investments in small scale aquaculture.

4. B.3.3 Investments in gathering of sufficient data to assess artisanal fishery, e.g. Chinese seine fishery. It was further noted that investments in cost effective communication systems for artisanal fisheries to address issues of piracy and improve MCS are required.

Suriname

1. B2 Investments in fishing Community Infrastructure, particularly storage, jetty and Ice production facilities.

2. A 2.1 Investments in monitoring facilities of protected areas and no fishing zones.

3. A 3.1 Investments in regional coordination of reef fishery, specifically the snapper fisheries in the region, operating from Venezuela

4. B 1.1 Investments in the identification and promotion of alternative livelihoods for small small-scale fisherfolk in three fishing communities

Brazil

1. A.2 Investment in environmental protection and restoration of habitat including spawning and nursery grounds. Also, A.2.2 was considered important, in view of the need to implement a project on mangrove rehabilitation.

2. C.1 and C.2 Investment in fisheries institutional capacity, national and regional fisheries management planning and implementation; MCS and enforcement programmes.

3. B.2.1 Investments in the rehabilitation and construction of fisheries landing site infrastructure.¹⁷⁹

¹⁷⁹ FAO. 2015.

Attachment 3 – Shrimp and groundfish recommendations and resolutions

From: “Recommendations and Resolutions on fisheries management.” Report from the 16th session of the WECAFC. June 2016. Guadeloupe.

1. Members of WECAFC prepare (if relevant) national level shrimp and groundfish fishery management plans, and put in place appropriate legislation in support of a sustainable shrimp and groundfish fishery.
2. WECAFC, in close coordination with CRFM, IFREMER and the Secretariat of the Cartagena Convention, develop a sub-regional shrimp and groundfish fishery management plan for the Northern Brazil-Guianas Shelf countries, in accordance with the best available scientific evidence to be presented to WECAFC 17 for final review and adoption.
3. WECAFC, in close collaboration with FAO, CRFM, IFREMER and NOAA develops appropriate methodologies for shrimp and groundfish data collection, management and use, including the sharing of the relevant information on catch, catch composition (i.e species and sizes) and fishing effort (fleet specific, gear specific), for initial implementation by the members from 2018 onwards.
4. WECAFC, in close collaboration with FAO, CRFM, IFREMER and NOAA develops also a common methodology for multispecies shrimp and groundfish stock assessments in the sub-region taking in consideration environmental variables, for initial implementation by the members from 2018 onwards.
5. WECAFC, in close coordination with CRFM, IFREMER, CLME+, FAO, the FIRMS Partnership, and as required with the support of the iMarine/BlueBridge project, establishes a shared regional database matching confidentiality and security requirements⁴.
6. WECAFC, in close collaboration with FAO, CRFM and NOAA and IFREMER build capacity in the Brazil-Guianas region for periodic bioeconomic analysis of fisheries⁵.
7. The Working Group on Shrimp and Groundfish to assist the Regional Working Group on IUU to develop a regional plan of action to combat Illegal, Unreported and Unregulated (IUU) fishing (RPOA-IUU).
8. The Working Group on Shrimp and Groundfish assists the REBYC-II LAC project countries with the development of a regional trawl fisheries bycatch strategy, for review and endorsement by CRFM, OSPESCA and WECAFC in 2018.
9. WECAFC members promote the shrimp and groundfish fisheries general investment plan for the Brazil-Guianas shelf countries at the national and sub-regional levels.
10. WECAFC, IADB and CRFM to further facilitate the member countries (as needed) in conducting the necessary feasibility studies for the preparation of full-fledged, location-specific investment proposals.

Appendix B – Data points needed for investment cases

Some of the priority data requirements are summarized below. Much of this information can be gathered through FPIs and/or value chain assessments.

Data Points Needed for Investment Cases

1. Domestic consumption
2. Domestic consumption by species and product type
3. Domestic consumption by high, medium and low quality
4. Value of exports by species
5. Value of species by size/quality
6. Numbers of full-time artisanal fishers or vessels
7. Numbers of part-time artisanal fishers or vessels
8. Location of catch
9. Volume of landings by gear type and species
10. Value of landings by gear type and species
11. Discards
12. Bycatch rate by species
13. Waste and spoilage due to poor onboard conditions
14. Waste and spoilage due to poor shore-based infrastructure
15. Numbers of shore-based aggregators
16. Number of plants, services provided, locations, volumes processed, etc.

Appendix C – Four constraints to sustainable fisheries impact investing, in detail¹⁸⁰

1. Fishery Data

Constraint: A lack of reliable data on stock health, fishing effort, and pricing

Effect: Investors cannot adequately assess and mitigate risk

What is it? Fishery data include information related to fish stock abundance, the level of fishing effort, and the volume of fish being caught and landed. The data help scientists model likely trends in stock status and thus the biological and ecological health of the fishery. These models can be used to estimate how different levels of fishing effort and catch will affect the future health of target fish stocks (as well as non-target species or bycatch) and thus the investment risk associated with a particular species.

Why does it matter to investors? Investors need to be able to realistically assess risk and return. For example, many fisheries in WECAFC are not monitored—investors have no way to predict how close to collapse a fishery might be, how many boats will enter the fishery, or how much these fish will be worth in the marketplace from year to year. Without clear information, it is difficult for commercial investors to assess and mitigate risks, evaluate business plans, or structure investments to account for potential fluctuations in fish populations.

What is the current context? Traditional stock assessments are costly and require significant amounts of data that can be difficult to reliably collect. Nearly 80 percent of the world’s fisheries, mostly small-scale fisheries in developing nations, remain unassessed because they lack reliable information and have little funding for scienceⁱ.

Fishery Performance Indicators (FPIs) are one promising mechanism for evaluating and comparing fisheries. Recently developed by a group of 26 biologists, economists, and social scientists, FPIs provide a peer-reviewed tool for rapidly and cost-effectively rating fisheries. They are based on 122 metrics and provide ratings for eight indicators, including stock level, quality and type of management systems, and catch levels; each FPI is rated on a scale from one to five, along with an accompanying letter grade (A, B, C, and so on), for how confident the reviewers are in the accuracy of the underlying data. FPIs can be used to compare fisheries, evaluate relative risk, and identify correlations between environmental and economic success. FPI studies have been conducted in over 100 fisheries in 20 countries. While the fisheries with FPIs represent a cross-section of the world’s fisheries, they are only a fraction of the fisheries worldwide.ⁱⁱ

¹⁸⁰ 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. Fishery Management

Constraint: An absence of fishery policies and management programs to establish, monitor, and enforce sustainable catch levels and tenure rights

Effect: Investors have difficulty realizing triple bottom line returns

What is it?

Effective fisheries management achieves positive environmental, social, and economic outcomes. To achieve all of these goals and be attractive to private investors, effective management generally includes three elements: secure tenure, sustainable catches, and robust monitoring and enforcement.ⁱⁱⁱ All three of these elements are needed to ensure that underlying marine resources are not overexploited and will be caught in a manner that assures their long-term health. Without the health of the underlying asset, a fishery cannot be financially viable in the long term.

No one system of tenure fits all fisheries^{iv}, and access rights can be difficult to establish for a wild resource that is generally considered a public good. Fishery rights currently take various forms in different fisheries, including limited licensing, fishing quotas within an overall catch limit, and access rights to specific fishing grounds. Examples include territorial use rights for fishing (TURFs), concessions, individual transferrable quota (ITQ), individual vessel quota (IVQ), and effort quota management (EQM) systems, such as the Parties to the Naru Agreement Vessel Day Schemes.

Why does it matter to impact investors?

Several recent reports highlight secure tenure as a precursor for return-seeking investment in sustainable fisheries^{v,vi, vii}. Simply put, without secure and enforceable rights to a fishery (by effort, catch volume, or place), commercial investors cannot confidently invest in the catching sector. Consistent with this observation, access rights, fishing rights, and the use of data in management are among the FPIs most strongly associated with good ecological and economic outcomes.

Effective fishery management is also necessary to provide businesses and investors with the confidence to take a long-term view of their business plans and investments. This long-term approach is especially important in fisheries, given how long it takes some fish stocks to recover to a healthy level. Clear and enforceable fishery management policies can not only prevent overfishing but also reduce uncertainty and risks associated with variable future catch levels, creating a more favorable atmosphere for business development. Conversely, the absence of strong management systems has resulted in a comparatively uncertain investment climate focused on the “race to fish.”

While limiting both catch and access are central to positive environmental and economic outcomes, they may cause short-term hardship for fishers. Rebuilding the stock may mean that fishing is no longer economically viable for some fishers and a subset may have to leave the fishery until stocks recover. This period is generally defined by the biological characteristics of the stocks in question and how quickly decision makers wish to rebuild a stock. Investments in alternative and complementary livelihoods along with other types of assistance to address this transition period are important to the ultimate success of management efforts.

What is the current context?

In the absence of comprehensive management, WECAFC area has experienced a decline in landings in the last ten years as compared to the 30 year average^{viii}. In nations such as Iceland, New Zealand, the United States, and Australia—places with the human and financial resources needed for public investments in effective management—many fisheries have seen an increase in abundance.^{ix,x} These areas have also seen the largest number of new businesses developing around sustainable fisheries: in fact, recent analyses of FPIs conducted in 80 fisheries showed that only those fisheries with robust fishery management mechanisms had positive ecological and economic outcomes^{xi}. A separate evaluation of investment opportunities in sustainable fisheries also found the strongest pool of viable investment opportunities in fisheries with strong management^{xii}.

3. Fishery Infrastructure

Constraint: Lack of access to reliable infrastructure and equipment to transport and keep high-value seafood fresh

Effect: Investors have difficulty recovering costs and realizing returns

What is it?

Infrastructure refers to the physical and organizational structures and facilities that allow an enterprise to operate. Bringing sustainable, high-quality fish to market requires access to landing areas, ports, or similar facilities in which to unload fish from boats; ice and cold storage to keep fish fresh; roads or airways to transport product (while maintaining freshness and sanitary standards); clean water; electricity; and communication networks that allow businesses to coordinate the transfer of products and information. These facilities are typically publicly owned but can be privately owned or financed and operated through public-private partnerships.

Why does it matter to impact investors?

Given the highly perishable nature of most fishery catches, the availability of and access to reliable infrastructure and effective cold storage throughout the supply chain are critical to achieving these objectives. Reliable infrastructure allows seafood businesses to address health and sanitation requirements as well as ensure product quality. Lack of access to infrastructure poses a significant investment risk if not adequately addressed in business planning. Poor infrastructure may also result in higher costs of operation, making investments uneconomical.

What is the current context?

Globally, most fishers do not have ready access to basic infrastructure logistics and cold storage^{xiii}. This lack of physical infrastructure destroys the value of their fish (for example, if spoiled or damaged), thus preventing them from selling to markets willing to pay more for high-quality products. The importance of access to infrastructure is particularly evident in developing countries. For example, in Indonesia tuna fishermen with access to ice and a buyer with adequate refrigeration garner US\$4 per kilogram, while those without these services see only US\$1–\$2 per kilogram of tuna^{xiv}. Even in developed nations like the United States, a lack of easy access to cold storage on land often impedes fishers' ability to garner higher prices for their fish^{xv}.

Some commercial investors may see opportunity in this need for better infrastructure in the seafood supply chain and consider investing in businesses or cooperatives that provide infrastructure facilities and/or services to fishers. An important challenge with these investments is to ensure that they achieve triple bottom line outcomes: if advances in infrastructure are not coupled with strong management systems infrastructure investments can result in unchecked expansion of the fishery and accelerate overexploitation of the resource. Investors may see financial returns in the short term, but they will eventually undercut the value of the fishery as a whole if overfishing persists. In addition, if a single private entity controls access to critical infrastructure facilities (for example, all cold storage at a port), fishers may lack negotiating power and end up with lower prices for their fish, despite increases in product quality^{xvi}.

4. Pipeline

Constraint: A paucity of viable, commercial investment-ready businesses and other investment vehicles

Effect: Investors cannot build robust portfolios of sustainable fisheries investments

What is it?

Impact investors seeking to generate sound social, environmental, and financial returns from capture fisheries must have a strong pool of viable, investment-ready businesses or some type of tradable effort or catch quota in which to invest. When evaluating the investment-readiness of a business or investment vehicle from a financial standpoint, commercial investors examine a broad range of issues, including the strength, track record, and collateral of recipients, as well as the characteristics of a pool of investments along with the growth potential of both the business model (or asset, in the case of investment vehicles) and its leaders. The legal and governance systems in which the entity or investment operates are also critical to assessing the potential success and risk associated with a potential business or investment vehicle.

Why does it matter to impact investors?

Return-seeking investors prefer to invest in businesses and investment vehicles in markets where adequate data on business performance can inform their investment decisions. Ideally, the historical performance of similar commercial investments in the sector, similar businesses, and markets helps investors reliably assess expected levels of risk, return, and variability in the performance of the investment or business they are considering. With this information, they can also develop appropriate business risk mitigation strategies. The overall size of the current or potential market is also important—in terms of both understanding potential investment returns and building sector knowledge.

What is the current context?

Impact investors report that it is difficult to find fishing and seafood businesses that have a clear legal structure, strong financial track record, business-savvy leaders, strong potential for growth, and triple bottom line outcomes.^{xvii} This trend is especially true in many developing countries where fishers are not even considered a legal business entity. This status effectively excludes them from any economic activity

other than as a provider of raw material. In addition, fishers across the globe have not typically organized into effective cooperatives or other groups to aggregate product, jointly negotiate fish prices, pursue secure tenure, or distribute costs for cold storage and other critical equipment that could be shared among fishers. The fragmented nature of fishing operations keeps them from achieving economies of scale needed to secure commercial investment.

To date, there are no viable sustainable fisheries investment models in open access systems, but considering the number of open access fisheries, testing models in the absence of management would be valuable. While Fishery Improvement Projects (FIPs) are not a perfect fit for triple bottom line because they currently do not account for social or financial impact, they do provide a clear and transparent framework for environmental improvements by linking markets and supply chain investment to stock recover. Joined with regular FPI score improvement checks, they provide the most appropriate framework to date. Feedback from the proposed Grenada business case will provide valuable answers about assumptions.

ⁱ Costello, Christopher, Daniel Ovando, Ray Hilborn, Steven D. Gaines, Olivier Deschenes, and Sarah E. Lester. 2012.

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ⁱⁱ Anderson, James L., Christopher M. Anderson, Jingjie Chu, Jennifer Meredith, Frank Asche, Gil Sylvia, Martin D. Smith, et al. 2015. “The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes.” *PLOS ONE* 10 (5): e0122809. doi:10.1371/journal.pone.0122809.

ⁱⁱⁱ Holmes, Lucy, C. Kent Strauss, Klaas de Vos, and Kate Bonzon. 2014. “Towards Investment in Sustainable Fisheries: A Framework for Financing the Transition.” Discussion document. Environmental Defense Fund, The Prince of Wales’s International Sustainability Unit. <https://www.edf.org/sites/default/files/content/towards-investment-in-sustainable-fisheries.pdf>.

^{iv} Besley, Timothy J., and Maitreesh Ghatak. 2009. “Property Rights and Economic Development.” LSE STICERD Research Paper No. EOPP006, London School of Economics. <http://ssrn.com/abstract=1546900>.

^v Besley and Ghatak 2009.

^{vi} CEA (California Environmental Associates). 2012. “Charting a Course to Sustainable Fisheries.” CEA. <http://chartingacourse.org/>

^{vii} Holmes et al 2014.

^{viii} FAO. 2016. “Findings of the independent cost-benefit assessment of the options for strategic re-orientation of WECAFC” by Kjartan Hoydal. FAO Fisheries and Aquaculture Circular. No. 1117. Bridgetown, Barbados.

^{ix} CEA 2012.

^x FAO (Food and Agriculture Organization). 2014. *The State of World Fisheries and Aquaculture: Opportunities and Challenges*. Rome: FAO. <http://www.fao.org/3/a-i3720e.pdf>.

^{xi} Anderson et al 2016.

^{xii} Wilderness Markets. 2016. “Connecting the Dots: Linking Sustainable Wild Capture Fisheries Initiatives and Impact Investors.” Wilderness Markets. <http://www.wildernessmarkets.com/our-work/connecting-the-dots/>.

^{xiii} Knútsson, Ögmundur, Daði Már Kristófersson, and Helgi Gestsson. 2015. “The Effects of Fisheries Management on the Icelandic Demersal Fish Value Chain.” *Marine Policy* (April). doi:10.1016/j.marpol.2015.03.015.

^{xiv} Inamdar, N., and Tullos Anderson, J. 2016. “CFI Expanded Synthesis Paper and External Stakeholder Consultation.” Unpublished report. World Bank, Washington, DC.

^{xv} Ibid.

^{xvi} Ibid.

^{xvii} Wilderness Markets 2016.