

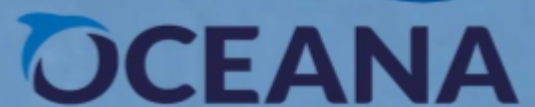


Fish Right, Eat Right Options and Priorities

Market Based Incentives for
Responsible Fishing

Diagnostics Report

Belize



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Forward

We live in a world of uncertainty, now impacting almost every aspect of human life. In the ocean space, particularly those stakeholders who live off of ocean resources, are being threatened by the effects of climate change, ocean pollution, overfishing, lack of adequate conservation policies, mismanagement of ocean resources, inadequate assignments of property rights, and limited results from fragmented interventions. Existing policies, RFP's and programs for artisanal fisheries advocate a series of assumptions that have proven impractical or simply wrong (eg. technical assistance focus, not tied in with market scalability potential). This situation calls for a renewed diagnostic, assessment and approach to fisheries, and for defining new options, priorities, and instruments of interventions.

Shellcatch's experience in developing countries and small island states reveals that a very different paradigm is to emerge. Lessons learned in the recent past provide valuable knowledge and information to carve a new strategic path for artisanal fisheries. In particular, projects and program interventions over the last couple of decades, demonstrate that potential success will happen only if a number of key steps are avoided: (i) dismembered or single-barrel projects, financing only one of the needed component of the fishery—Error by Design; (ii) absence of a clearly defined engine of growth, development and social transformation (e.g., absence of a demand-pull instruments) — Error by Default; (iii) lack of government engagement in all aspects of a given program -- Error by Exclusion and (iv) inadequate human resource development strategies at the individual and community levels, necessary to ensure resiliency and medium-term sustainability—Error by Disempowerment.

Shellcatch is prepared to support and scale OCEANA's "Fish Right, Eat Right Program" (2016) as it provides the needed canvas to save many millions of coastal communities, which depend on fishery development for their livelihood. It is imperative to integrate fisheries management with innovative ways to embrace public and public sector collaboration, to enhance responsible consumption, to comply with regulations and to comprehensively integrate best practices. These must be accompanied by programs aiming at curbing illegal fishing and by properly linking sustainability concerns with marketing opportunities (demand pull), by promoting an effective and beneficial traceability platform, and by minimizing unnecessary risks. It is indeed possible to attain economic, social and environmental sustainability, by empowering all the relevant actors, and finding wealth sharing schemes that are fair and effective.

A Diagnostic Report explaining the prospect, priorities and possible courses of action follows.

I. Strategic Framework

Conventional wisdom says that to improve livelihoods of small scale fishers with environmentally responsible fishing practices you need the most responsible fishers using the best technology available. Leading NGO's, governments and now investment funds have poured millions of dollars into ocean initiatives and shockingly so, artisanal fishers are still selling the same way they have been over the years, through the same channels and barely using any technology.

After well over a decade, Shellcatch together with critical NGO partners has been trying to address artisanal fisheries issues in the midst of increased threats such as negative changes in the productivity of the oceans (pollution, overfishing, global warming), a lack of land use planning in coastal areas (tragedy of the commons, invasion of coastal industries, housing market and uncontrolled tourism), an absence of an integrated approach to the fishery (human, social, institutional, technological), an inability to address important socioeconomic targets (fisherfolk's welfare, nutrition, social integration, poverty alleviation) and much more.

Pilot after pilot Shellcatch knew that the key to success was combining technology with the right fishers and collaborating with supply chain players. Yet, while some business relationships between fishers and buyers flourished, others faltered. Nothing seemed to scale after many difficult interventions.

Shellcatch had to figure out how to create a stable and commercially attractive and scalable value proposition. After 10 years of piloting in over 14 countries we discovered that the most successful small scale market interventions shared 4 ingredients:

- 1. Economic Clarity**
- 2. Dependable Startup Fisherfolks**
- 3. Applicable Small Scale Technology**
- 4. Impactful Operation**

Shellcatch has long begun to develop a very strong and effective scaffold that leads to an integrated and holistic framework for artisanal fishers regardless of their location. This framework is composed mainly of what could be considered "universal components" which, if adequately refined and adapted to respond to a given situation, may indeed prove to become invaluable for the fisherman and all relevant stakeholders.

Today, Shellcatch can quickly and meaningfully identify the most relevant ingredients of success in any given situation. The probability of success is now determined by assembling together a crucial set of interdependent objectives, defined and expressed by various relevant actors and leaders in a given community, region or country. It is essential to understand that a new development and integrated approach has to emerge, and Shellcatch together with Oceana have the joint experience to do so.

Now, more than ever it is technically and financially feasible to onboard a practical and operational framework that can foster and encompass critical objectives such as conservation, economic competitiveness, traceability, ecommerce, social integration, consumer satisfaction, institutional

mobility, governance and disintermediation. We know more about each of them, and how they interact with each other, than ever before. What in the past were seen as competitive trade-offs (economic efficiency versus conservation), today, we know how to create the necessary synergies to attain various objectives and aims simultaneously.

Taking a retrospective view of the evidence in development, the failures in the past, are most often the result of the imposition of a rather fragmented set of interventions. This is to say, one has witnessed various 'silo' propositions within the artisanal fisheries; all with very limited success, as measured in terms of sustainability, human development, technological transformation, and implementation efficiency. Again, a 'siloed approach' to what it is essentially a community-based, institutionally and organizationally complex, and multi-sector-interdependent operation, has given rise to many regrettable programs and has surfaced up a large number of intrinsic complexities which are now to be resolved.

Experience demonstrates that, for example, pursuing the goals of sustainable conservation of the fishery alone, is totally insufficient to generate substantive benefits for the intended beneficiaries, without a start-up embedded in the human and social dynamics of fisherfolk communities. Similarly, we have learned that technology by itself cannot be sought in isolation of the real feasibility and resilience of economic and social opportunities, establishing the grounds to resolve the major operational concerns, creating the space for the formation and nurturing of existing and new social structures at the local level, and the direct participation of government and governance and participatory mechanisms. Therefore, programs that intend to change technology in any given direction, the ultimate aim should not be the enhancement of the extractive nature of the fishery, but the explicit recognition (as we have learned worldwide) that technology has both a "private good" and the "public good" nature and scope.

Furthermore, it is extremely relevant to create the needed conditions 'to connect the dots' at the earliest part of integration cycle, so that any Diagnostic Report is able to contain important value added for those involved: the fishers, the Fish Right, Eat Right program, the Government of Belize, marketplace players, general consumers, and the industry in general. This value added must become the center stage for material and non-material incentives needed to alleviate poverty, to establish a solid road for social integration, and to set a blueprint and a map for new ways to create, share, and conserve the wealth that comes from the country's natural resources. Therefore, our approach is meant to be useful from the very beginning of the diagnostic process.

This approach has proven essential to address more refined goals and objectives. Examples of these are targeting species, locating or creating a niche for domestic consumption or international trade, establishing a business model for intermediation, assessing the goodness of infrastructures for storage and marketing chains, product traceability and labelling, community organization and empowerment, setting the nuts and bolts of a given operation, assisting fishers in implementation, training and skill build up, opening to partnerships, and the like.

Risk assessment and risk analysis is also an intrinsic component of the framework proposed here. In this respect, Shellcatch assists in addressing internal and external risk analysis, and suggests solutions either to minimize or avoid those risks. Examples of internal risks are the lack of trust from fishers to use the technology and participate in the market pilot. External risks may be associated

with price level fluctuations and lack of demand in times of Covid, or a decline in the fishery yields due to global warming and the mismanagement of land use in coastal areas.

The framework offered by Shellcatch establishes a series of instances to make *strategic decisions* about, for example, on the crucial importance of selecting a target market, species selection and operational Implementation schemes. We call it “strategic decisions” because they surface from very fundamental considerations that are geared to create the practical conditions, the necessary balances, and the early material and social sustainability to ensure early success. Many operations advocate strategies to enhance ‘corner solutions’ that demonstrate success for a very short period of time. Therefore, some hierarchy of design and implementation must be adopted, and its rationale must be understood by all the parties concerned.

Sustainable development of the fishery is an essential objective. Many aspects of this program not only mitigate potential environmental problems (e.g., certification of origin, by-catch detection, fisher training, establishing adequate reporting systems, promoting meaningful partnerships), but, it also acts as a future environmental insurance for individual fishers. Insurance in the sense of using the data generated by the technology to give greater fishers access to higher incomes by easing their fishing restrictions. Technology and diagnostic techniques are key instruments.

Intermediation in the fishery has always been a challenge for any project. It is not absent here. There is a clear awareness of the traditions of intermediation of products, supply of cash and the availability of credit. History in the sector shows the inequities associated with traditional intermediation, not only about the external costs imposed on fishers. It goes beyond that. In particular, one of the inequities this pilot project will address has to do with the expansion of fish markets in urban areas, far and beyond the concentrated intermediation that exists today, covering just a few high-end restaurants. The idea is to expand the mapping of beneficiaries till one gives fair access to all possible forms of purchasing power. This scheme has tremendous benefits for society as it rapidly eliminates the regressive patterns imposed by present patterns of marketing, particularly in urban centers. Further, it increases the power of a demand pull model, with the corresponding benefits to fishers; scale expansion with human social integration.

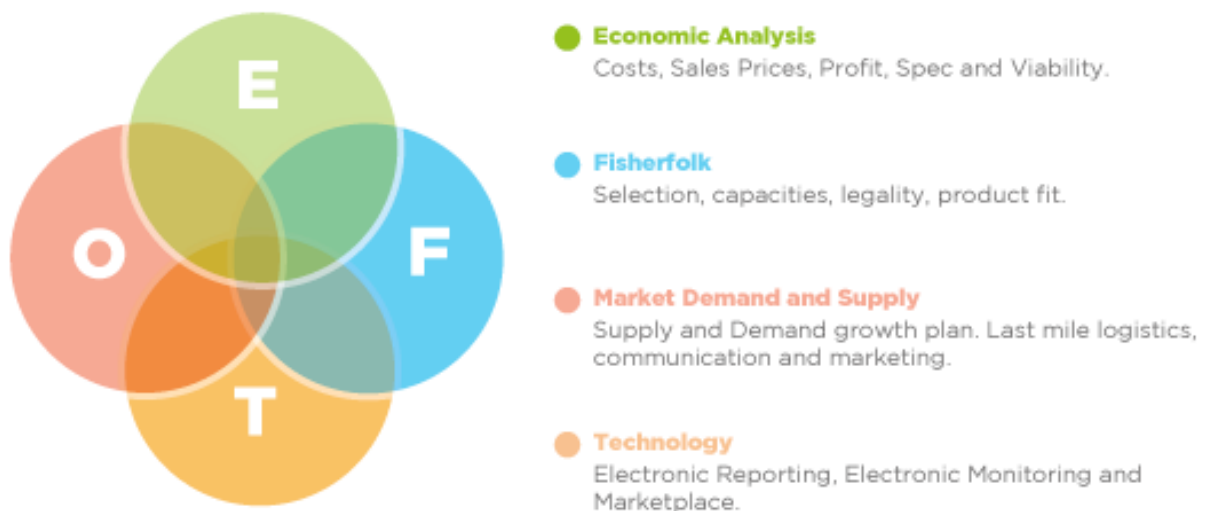
OCEANA plays a fundamental role in the success of this pilot operation. To start, Shellcatch has greatly benefitted from the study conducted by Virginia: “Market study on local consumption of finfish in Caye Caulker and San Pedro” done as a part of the project “Market Based Incentives for Responsible Fishing”. Some of the most important decisions to be made in this diagnostics analysis have to do with the excellent market data sourcing and interviews from that report. What follows in this text is the presentation of the general model, followed by a presentation and discussion of the abovementioned strategic decisions-making options and priorities. The model and these strategic decisions form a holistic totality that will delineate the several options and courses of actions countries and their fishery communities may decide to follow in the future.

II. Operational Framework: EFTO

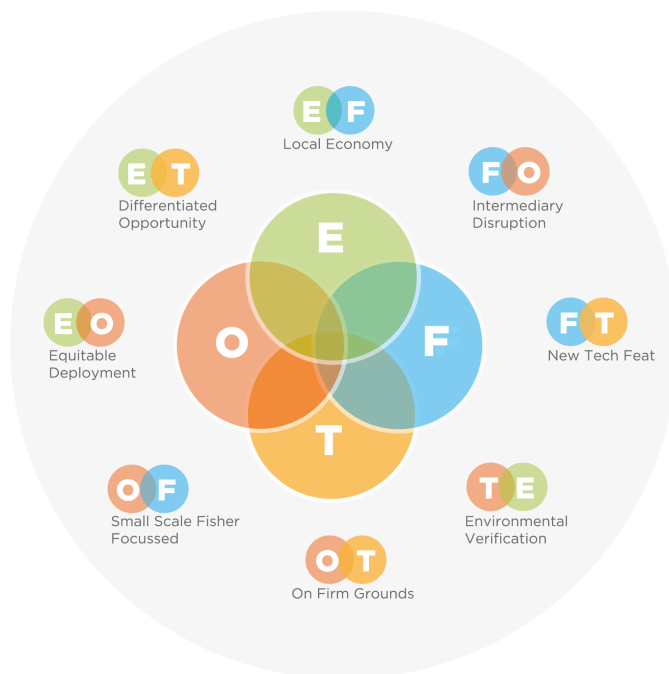
Shellcatch EFTO framework is a 4 stage process for diagnostic analysis: The 4 main steps are:

1. **Economic Analysis.** Assessing the products that are highest in demand and its clusters, in conjunction with a meaningful economic and financial appraisal.
2. **Fisherfolks.** Processing and selection to adequately choose the type of fishers who will engage actively during the whole pilot process.
3. **Technology.** Introducing and assessing the feasibility of proposed technologies, in addition to scoping and practical implementation. Institutional partnerships with relevant actors and accountability are relevant factors to be taken into account.
4. **Operation.** Integrating all aspects of the program which are linked to the everyday activities of a particular fishery. The feasibility of institutional arrangements and governance are carefully taken into account.

The graphic representation of the core of the framework and its 4 major steps are presented below.



As stated before, these 4 core components spur into 8 important strategic aims considered in any fishery development program. These are presented in the figure below. These are:



Benefit The “Local Economy”: **EF**

Enable “Fisherfolk Ownership”: **FO**

Enhance “Social Empowerment”: **FT**

Establish Programs “On Firm Grounds”: **OT**

Attain “Equitable Development”: **EO**

Promote “Enterprise Viability”: **ET**

III. Towards Implementation

Role of Market - the Demand Pull Approach. Shellcatch major expertise is to address all forms of negative externalities that surge from the design and implementation of policies, projects and programs. These externalities are related to imbalances in the choice of project components, in the sequencing of how and when certain objectives will be achieved, and in attaining the most relevant program objectives and targets. This demands a careful attention of the role of market structures and performance –e.g., to choose in the first instance a “demand pull” approach to create the financial incentives, conditions, and benefits to a certain segment of the population (e.g., fisherfolks and restaurants’ consumers) with the view that in a second stage to reach other market segments, like low income household consumers health and nutrition), or both.

We approach the design and selection of project components into a hierarchy, which determines the final economic viability. Thus, in a demand-pull framework, the first step is to target markets, as these markets will be the ones that will energize the sector and create a great deal of value everywhere. To understand the rational and details, please see the section of targeting markets.

Once these markets have been selected and to ensure the flow of capital right from the beginning, the idea is to cater those markets first. Today, this is done randomly and with a great deal of risk taking. Therefore, we enter into the stage of careful species selection. For the design of this project, very few, but clearly in demand, fish species to reach final consumers.

This is followed by selecting the most powerful expression of the human factor located on the supply side of this program. To ensure a safe and sustainable supply of the species selected is of crucial importance. But those persons selected must be open far and beyond just extracting fish; they should be open to the integration of all the necessary ingredients so that the project maximizes the economic, social and environmental impacts: appropriate technology, experience learning, vertical and horizontal integration, and much more.

Finally, the evaluation follows logically the institutional and operational framework. These are two crucial elements to be taken into account, as they embrace institutional arrangements, incentives, profit sharing and net returns of the pilot operation.



As we see below, it is central to address many forms of externalities. If not, experience demonstrates that the risks of failure increase significantly.

This section will specifically address the following strategic considerations: Target Market(TM), Species Selection (SS) and Operational Implementation Schemes (OI).

Target Market. Essential to any marketing strategy is setting very specific and refined priorities, as it might be such a marketing priority as the one which will pull the project from its initial grounds. Whatever is happening in the supply side (e.g., availability of fish stocks, appropriate technologies, community participation, cold storage at the beach level), it may be totally ineffective to a strong take off of the project without a demand pull by a given market.

Past Approaches. Many projects have failed because no due consideration has been given to the perishability of products and the need to have important initial economic gains. Past failures on this account have meant loss in confidence and people's engagement, political and financial support, and tremendous losses of fish and fish products (a major issue in conservation and fishery management).

Leveraging Economies of Scale with Large Market Demand. There are other relevant considerations that justify addressing this Target Mark. In particular, expanded and dynamic markets will be extremely instrumental in attaining several objectives and means of fishery projects and programs: (i) prorate heavy and highly skewed establishment costs; (ii) to take advantage of existing transport and cold storage facilities); (iii) ability to generate cash in the hands of the fishers; (iv) increase more rapidly the scale of the fishery operation into other beneficiaries who are not able to

finance the establishment costs; (v) to bring quick success to the need for traceability and diminish the destruction of ecological reserves by poachers; and (vi) finance the public good nature of such benefits as health, food and nutrition.

Thus, the Shellcatch framework begins addressing this strategic concern. Most often than not, to avoid target marketing is tantamount of failure. This is why, in many situations, the demand-pull effect is created by catering big cities and medium income consumers, that will generate the resources to sustain the programs over space and time.

Species Selection. This is another very relevant strategic decision important to consider. As one targets markets, it logically follows to cater those markets first and, thus, select a specific basket of species. Shellcatch experience clearly shows that imposition of fish species dissociated from marketing prospects' consideration are a great ingredient for failure.

In many of the large cities, as the origin of a demand-pull strategy, the selection of species comes from a thorough survey of restaurants, food industries, and the like. It is much better to establish 'fair trade' schemes under those circumstances than in markets with no traditions in organization, structure, or performance. In some sense, this is a reasonable argument to structure the initial stages of a program as a B2B, to seek later on a B2C approach. Whenever it is possible, and with the aid of government and civil society, one may recommend a combined approach.

In actual fact, these considerations have proven invaluable to attain such non-material objectives as the conservation of the fishery.

Operational Implementation Schemes. This is extremely relevant strategic concern as it embraces the nuts and bolts of program implementation. Numerous decisions are to be made. As presented in the diagram below (page 19), the implementation schemes are rather elaborate.

From the fishers's end to the consumer's end, we often confront a very elaborate set of actors, institutions and incentives. Shellcatch assists fishers, governments, private sector, and community organizations to sort out the most suitable institutional structures and the best business model for such institutional structure (e.g., incentives needed and equity sharing schemes among all the actors involved).

Shellcatch also assists in defining the needs for consultants, legal frameworks, forms of participation by the most relevant actors, and in every aspect of implementation.

IV. Economic Appraisal - Belize Pilot Project

The analysis will be based on the minimal viable pilot process so as to create the least waste, validate operating assumptions, costs, supply chain demand, fisher supply and market response. This will enable a framework for economic projections and further pilot development decision making. All of this within the B2B market framework.

a. Target Market

Chosen Pilot 1 Target Market - San Pedro

A correctly chosen target market will pull the initiative to success regardless of what is happening on the supply side. Many small scale fishery market initiatives fail because no due consideration has been given to balancing initial supply and demand of demanded species, not selecting the right target startup B2B clients or underestimating the logistical needs and capital expenses over the first months of pilot operation. The lessons learned will allow for better predictions on supply and demand, less waste and increased confidence by the potential restaurant customer and greater opportunities to select the right business partners.

The chosen target market for Pilot 1 is San Pedro for the following reasons:

- a. **San Pedro Market Data.** Oceana has provided valuable seafood market purchasing information.
- b. **Faster Deployment.** Valuable buyer contact information including volumes demanded and purchase price information.
- c. **Network.** Initial contacts made with restaurants through the Fish Right Eat Right initiative.
- d. **Potential Seafood Demand.** Tourism industry market is predominant and will be continuously growing post Covid.
- e. **Positive Perception on Traceability.** Oceana study shows that there is value in San Pedro for traceable seafood products.
- f. **Internet Penetration.** 79% of respondents responded with a “Yes” to willingness to using a virtual marketplace application to purchase finfish for their restaurants (Market Study on Local Consumption of Finfish).
- g. **Environmental Awareness.** Fish Right, Eat Right Program has made valuable inroads and fertile grounds to piggyback off of current environmental awareness and initial network building.

Pilot 1 is focussed on testing all of the project's assumptions including whether to expand the current planned target market reach. The specific San Pedro demand data obtained by Oceana will be used in the Economic Analysis section.

There other relevant factors to be tested with San Pedro in Pilot 1 are:

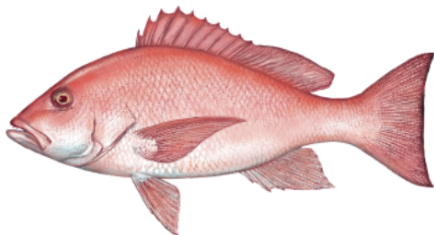
1. initial rollout costs
2. existing transport and cold storage facilities,

3. clear and prospected demand for initial pilot startup results (cash on the hands of fishers),
4. leveraging the popular tourist destination for additional project exposure from both internal stakeholders (restaurants and fishers) and future external stakeholders (government or future project funders).
5. levels of exposure and quick success to the need for traceability, verification and seafood legality.

b. Species Selection

The selected species will be Snapper and Grouper also confirmed by Oceana's Market Study on Local Consumption of Finfish. Though Barracuda comes third this species will not be included in Pilot 1 as we will focus on whole fish for added simplicity. Pilot 1 will not go into a species specific weight sub classification scheme. This will be something to monitor after initial seafood shipments as some restaurants might have strong issues on the size of the proportional size of each finfish. The remaining 2 selected species are Hogfish and Lionfish. These latter species could be included in their whole format if they accompany Snapper and Grouper in the fishing process.

SNAPPER



Red snapper (*Lutjanus jocu*, *Lutjanus cyanopterus*, *Lutjanus analis*), found off both of Florida's coasts, is harvested in waters 60 to 200 feet deep using large electrical or manually powered reels with multiple-hook rigs. Florida's red snapper industry began in 1870 in Pensacola and is still important today. Red snapper is one of Florida's most valuable fish species. Most Gulf red snapper is harvested in Okaloosa and Bay counties, and most Atlantic red snapper is harvested in Volusia and Duval counties.

Adult red snappers are easily distinguished from other red-colored snappers; they are deeper bodied, not as streamlined, and have a bright red iris. The back and upper sides vary from pink to red, and the lower sides and belly are lighter in color.

Red snapper is a bottom dweller whose preferred habitat includes rocky ledges, ridges, and artificial reefs, including oil rigs. Juveniles commonly feed on zooplankton, while adults feed on a variety of small fish and crustaceans. Red snappers can live 50 years or more, and although their growth rate is relatively slow they can eventually weigh up to

30 pounds and reach three feet in length. They reach sexual maturity after age two and spawn between June and October.

Red snapper is a firm-textured fish with mild-tasting moist white flesh. It's very versatile and responds well to a variety of cooking methods, including broiling, baking, steaming, poaching, frying, and grilling. Grilled red snapper is often served with lemon and melted butter, and baked red snapper tastes great with fresh herbs.

Attributes

Firm texture, white meat with mild flavor. Lean fish.

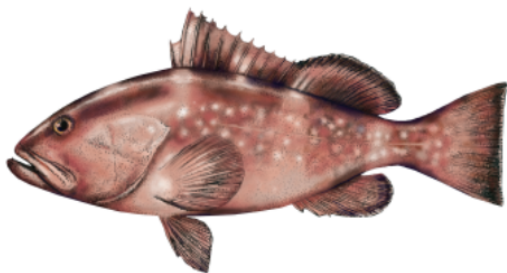
Substitutes

Grouper, swordfish, tilefish, amberjack.

Format: Fresh whole fish (gutted with head and tale) should have:

- A shiny surface with tightly adhering scales.
- Gills that are deep red or pink.
- Clean shiny belly cavity with no cuts or protruding bones.
- A mild aroma, similar to the ocean.

Spec Sheet Grouper



In Belize seafood restaurants, grouper is always on the menu. Though supply peaks in the warm months, from April to October, it's available all year round. The flavor is so mild and subtle, it appeals to just about everybody. All groupers are members of the seabass family, Serranidae, which is made up of more than 400 species. Groupers are found around coral reefs and rock outcroppings in tropical and warm temperate waters worldwide. Two genera of groupers are harvested in Belize: *Mycteroperca bonaci*

and *Epinephelus stiiatus* are the groupers harvested in volume and most readily available in seafood markets. Black grouper (*Mycteroperca bonaci*), scamp (*Mycteroperca phenax*), snowy grouper (*Epinephelus niveatus*), and yellow-edge grouper (*Epinephelus flavolimbatus*) are also available but are harvested in smaller volumes.

Groupers vary in size and weight but are commonly marketed at 5 to 20 pounds.

Because of grouper's relatively high price, it is often a target for substitution. Be wary of grouper prices that are suspiciously low; a low price likely means the fish is not grouper but is instead a less expensive substitute species, most likely Asian catfish. Grouper is a lean, firm, white-fleshed fish with a meaty texture and large flake. The flesh contains no intramuscular bones, and the flavor is almost chicken-like, with very little fishy taste. Versatile grouper lends itself well to any form of cooking, including grilling, baking, poaching, steaming, broiling, sautéing, deep frying, and pan frying. One of the most popular ways to eat grouper is in a sandwich. The fish is typically breaded and fried and served on a bun with lettuce, sliced tomato, and tartar sauce.

Grouper has tough, strong-tasting skin that should be removed during cleaning. Cook grouper at 400 degrees Fahrenheit for 10 minutes per inch of thickness. If the fish is cooked in parchment, foil, or a sauce, add five minutes to the total cooking time. Fish cooks quickly, so be careful not to overcook it. It's done when the flesh becomes opaque and flakes easily when tested with a fork.

Grouper is high in protein and low in fat. A four-ounce serving contains 110 calories, 2 grams of fat, and 23 grams of protein.

Attributes

Firm texture, white meat with large flake and a mild flavor. Extra lean fish.

Substitutes

Amberjack, snapper, mahi-mahi, catfish, tilefish, shark.

Fresh whole fish should have:

- A shiny surface with tightly adhering scales.
- Gills that are deep red or pink and are free of slime, mucus and off-odor.
- Clean shiny belly cavity with no cuts or protruding bones.
- A mild aroma, similar to the ocean.

C. Fisher Selection

1. Fisherfolk Selection Process

The participation of fishers is not a trivial proposition. Experience demonstrates that it is not easy to break up with traditions, nor to select the best leaders of the fishery communities. However, Shellcatch has had a very rich experience to conclude, early in the project cycle, that it is mandatory to have the best leadership possible to launch a pilot operation of this nature. Shellcatch has prepared a selection criteria that leads towards the consideration of such factors and attributes as:

1. Potential Success Story Role Models
2. Consistent Supply of Seafood to the markets
3. Willing to use Technology for Environment and Sustainability
4. Interested in a new Business Proposition – win-win

The aim of Pilot 1 is to create benefits for those selected. This will create a role model effect for others in the community to aspire for in future pilots. The first and most important benefit for the fishers is generating an actual transaction. Fishers will realize there is an opportunity to reach a broader client base while providing a completely differentiated product. The pilot might require better

access to internet and data inputting and as a result providing ethernet modems and smartphones will be considered. Thanks to Oceana, being part of this pilot project has been free of cost to the fisher and hopefully they can realize in the medium term that they will have the added bonus of being insured in the long term from a growing number of environmental regulations and restrictions. This is in addition to having free of cost insurance against commercial and other forms of risks. We will work closely with OCEANA in addressing all aspects of these challenges.

The selection process typically takes into consideration several factors including:

- i. **Logistical considerations.** Measures fisherfolk impact in terms of their logistical and infrastructure for sales infrastructure.
- ii. **Organizational Structure.** Reviews the size and gender makeup of the current organization. Also takes into account past experiences with online market sales platforms or other marketing channels.
- iii. **Administrative Strengths.** Assesses the strengths and weaknesses in terms of administrative capabilities for project execution and cash management. In small scale fisheries sometimes levels of government support are indicative of important organizational leadership skills.

Fishery Selection Process




2. Avatar Fisher Creation


Oceana has done a relentless job of finding these fisherfolk and asking them to participate. This is one of the most challenging tasks given these fishers have not seen the personal benefits of carrying invasive verification and traceability technology. Many perceptions such as conspiracy theories to mandate such technology or peer pressure from other fishers are center stage for creating strong disincentives not to use the technology. It is Shellcatch's experience that once there is a proven business opportunity to be provided in initial pilots then forward looking fishers really open up to broadening their market reach. The differentiation and spotlight arising from the first commercial pilots make a big difference.

Thanks to Oceana we are in a unique position to work with 'Avatar' fishers that represent a broader subset of fisherfolk from mainland Belize and San Pedro. This will give us key insights into their market and logistics asymmetries and how they can benefit from the chosen San Pedro target market.



One of the most important criteria for selection in addition to those stated before are consistent seafood supply of target species. The following table gives greater details on weekly supply, fisher description (to be marketed with the QR label) and the target species beach price range. The beach price is a critical input into the economic viability of the operation, especially for Mainland fishers. In order to scale the impact, experience has shown that a necessary condition is to create a scalable logistics process. The logistics enables product aggregation and greater leeway for marketing campaigns for higher volume purchases.

	Name	Docking	Description	Target Species Beach Price Range	Weekly Supply (lb)
	Mr. Trejo	Corozal	Mr. Trejo is a spare fisher from Sarteneja Village, the largest fishing village in Belize. He has been fishing since the age seventeen – 38 years! Like most Sarteneja fishers, Mr. Trejo uses a sailboat to fish and is out at sea for five to six days a week with his crew. He fishes in Area 2 and Area 3 of Belize. He's proud to have been able to send his kids to school via his income from fishing.	5-7BZD	400
Pending	Ricky Marin	San Pedro	- Ricky is born and raised in San Pedro, Ambergris Caye, which is the largest island in Belize once solely dependent on fishing. It has since become the top tourist destination for travellers visiting Belize. This comes	10--14B ZD	300

			as no surprise since the island is protected by the world's second largest Barrier Reef that can be seen from its beaches on any given day. Ricky's dad is a fisher and so he grew up fishing and tour guiding on the sea. He is a deep sea fisher fishing primarily in Areas 2 and 9 outside of Turneffe Atoll		
	Lorenzo Lopez	San Pedro	Lorenzo was born and raised in San Pedro, Ambergris Caye. He is a spear fisher and has been fishing for the past ten years. While he also works in the tourism industry, his fishing livelihood supports his two daughters and allows him to do what he loves most!	8-10BZD	150

3. Operating Model

This is extremely relevant strategic concern as it embraces the nuts and bolts of program implementation. Numerous decisions are to be made. As presented in the following diagram, the implementation schemes are rather elaborate.



From the fishers end to the consumer's end, we often confront a very elaborate set of actors, institutions and incentives. Shellcatch assists fishers, governments, private sector, and community organizations to sort out the most suitable institutional structures and the best business model for such institutional structure (e.g., incentives needed and equity sharing schemes among all the actors involved).

Shellcatch also assists in defining the needs for consultants, legal frameworks, forms of participation by the most relevant actors, and in every aspect of implementation.

Operating Model: Phased Approach

The Frescapesca model operates with three major phases, all are monitored remotely:

1. *Supply*. Fishers implement vessel monitoring, reporting and traceability technology.
2. *Procurement Logistics*. Include Beach to City Transport, Cold storage in San Pedro, Boxes, Ice, Labels, Taxes, Legal Documentation expenses, product inventory.
3. *Last Mile Delivery*

Other Crucial Considerations

The Frescapesca model operates with three major areas, each of which use critical tools to track and monitor progress remotely:

1. Supply and Demand.
2. Prices, Volumes, Input Costs.
3. Input/Output Logistics

The model can be operated successfully in the pilot phase with partnerships in the form of:

- a. **Hired Consultant (hired by Shellcatch)**. Initially this part time job would be in charge of managing and implementing the pilots. Shellcatch would work closely with the candidate in operating the three aforementioned tools and in supervising the tech implementation, assisting in quality control and logistics procurement.
- b. **Legal Entity**. This partner ensures legality, adequate tax payments and facilitates invoicing. This would secure the needed legal seafood shipping/manipulation permits and fishery related paperwork across the supply chain. A plus would be that this partner also provide access to cold storage. If not the consultant would need to obtain the cold storage site independently.

Note. Both the hired consultant and legal entity can eventually become one partner that satisfies all of the required tasks simultaneously.

There are three implementing options:

- i. **Consultant and Legal Entity**. A consultant is Shellcatch direct assistant in pilot implementation and helps source a legal entity.
- ii. **Consultant Set up**. Consultant sets up a legal partner entity.
- iii. **Legal Entity Alone**. Legal entity presents the role of both consultant and company.

Explanation

The costs associated with the choice of institutional framework will depend on the variance one chooses. It is evident that a local partner, including the possibility of a government agency be fully

involved. Partnering locally will greatly ensure project success in the end. This benefit is in addition to the contributions that only a local partner can assume: political commitment, mobilizing local research and monitoring, and much more. Shellcatch should not be responsible for many of the risks involved. A local authority should. The ideal would be to put together a private-public-community partnership so all the principal actors are actively involved.

It is worth noting that in a project of this nature, some of the relevant risks come from price variability. This variability often responds to macroeconomic conditions be it in-country or worldwide. In both cases, the country's policies and incentive structures are of crucial importance and are out of Shellcatch control. However, the presence of this pilot operation and the dialogue it will generate at all levels of decision making, it will generate the space and instances where these macro policies will be discussed, and why not, refined. The presence of Shellcatch will create great awareness about how macro policies are affecting and will affect, the artisanal fishery.

V. Pilot Economic Analysis

Operating Model

The following analysis aims at explaining and confirming the business model financial viability. The viability is determined after breaking-down the Gross Marginal Revenue (GMV) of each fishing operation. GMV breakdown will include the Net Revenue and costs which are attributed to the total logistics costs and the total seafood purchase to fisher. The total seafood-purchase-cost will be then disaggregated in order to simulate a potential price premium benefits to the fisher. In order to create the conditions to establish a fishery with the least waste and to minimize losses, the evaluation exercise also addresses a general 3-month break even cash flow financial analysis. This analysis sheds additional light on all the conditions that conform a minimally viable (MV) Pilot 1 investment and operating assumptions.

The variable costs will be dependent on the location of the fishing communities in question. We have learned from previous experience that the asymmetries of information, intermediary involvement, lack of available logistics for product aggregation, all create the opportunity for new and significant market benefits and establish fisher incentives for project participation. These results also represent an essential component in creating project partners, viable and robust economic incentives that will enable future scalability. Future scalability is an essential aim of this pilot operation. In the case of Belize, we have simplified the analysis by categorizing fishers into 2 groups, mainland fishers and San Pedro fishers.

Tax Revenues. From a social point of view, including fiscal considerations is vital, as fiscal revenues are the ones that end up financing the human services of fishing communities, like health, education, housing and more. Thus, it is extremely relevant to state that this project generates tax revenues for

the government. This fact must be considered to construct a meaningful partnership with local and national government institutions. This is in addition to the benefits that are created from conservation, social capital development, and other public goods derived from a project of this nature.

The nature, scope, and specificity of the relevant cost assumptions will be confirmed during Pilot 1 B2B deployment (Fisher-Restaurant). These data points will be critical in defining the future financial sustainability of the proposed pilot, the benefits to fisher stakeholders and a business proposition for the implementing partner.

We take this opportunity to give a special thanks to the Oceana team for the data obtained to create the following assumptions (a joint effort by Jacinta, Mr. Miguel, Ryan, Shanda and Kleon).

1. Pilot 1 MV Investment

One Time Investment	Item	Number	Cost per Unit	Total
	Ice Boxes	16	200	3200

The cost associated with Ice Boxes is a one-time expense - these boxes ideally carry 50 lb. of fish plus ice. The selection of these boxes will have a direct effect on the per lb. logistic based costs. In this exercise, the size selection was determined by its current frequent use in the Belizean seafood space, and on the portability, both from dock to storage and last mile delivery. The size of the boxes proposed is also consistent with amounts the B2B consumer is willing to purchase.

Another advantage of the use of these boxes is their reusability. Though hopes are high for the use of these boxes, the Pilot 1 rollout will confirm their viability. Other options used in Central and South America, considering a situation with other species, are recyclable cardboard or polystyrene boxes with plastic bags inside. These enclosures are species specific and, sometimes, depend on each country's established buyer preferences. For example, Chilean Pomfret species (Reineta) has a plastic standard box that gets reused just like the ice box proposed for this pilot. Another example can be found in the Costa Rican seafood space, where national level fish is transported in locally manufactured ice boxes (fiberglass material) while internationally they use the cardboard plastic bag combination.

The current proposal for the iceboxes in Belize will be reusable and will aim to create additional marketing benefits by posting project logos. The optimal total amount of Pilot 1 boxes was determined by current potential weekly seafood supplied by surveyed pilot fishers.

2. Monthly Fixed MV Expenses

Monthly Fixed Costs	Item	BZD/Month
	Part Time Operator	1000
	Cold Storage	1000

The best-case scenario would be one such that having a Belizean implementing partner that would have these facilities and the human resources to operate them. For the purposes of this pilot operation we have assumed a less than optimal scenario, whereby a part-time operating consultant is hired and we must rent a separate cold storage facility.

3. Geographic Breakdown - Mainland

a. Mainland Fishers

This general category has helped to facilitate the analysis given the current logistical benefits from transporting seafood from around the country through Belize City to the San Pedro target market. Additionally, we have appreciated that, a currently selected Corozal fisher, docks his boat in Belize City after his fishing trip. Further analysis needs to be performed for fisherfolk south of Belize City, but the general logistical gravitation to Belize City is very apparent. The good news is that there is a significant fishing population represented by the following analysis, giving us more insight into the Belize Mainland to San Pedro scalability of this proposed model.

b. Fixed Costs/lb

Monthly Fixed Costs	Item	Cost per lb (BZD)	Notes
	Transport	0.60 lb	Best option is a water taxi from Belize City to San Pedro. Less convenient and threat to freshness is water taxi service from Corozal to San Pedro (one additional day of non cold storage). This option is relatively more expensive and potentially unreliable (40 BZD/50lb ice box).
	Ice	0.10 lb	Standard
	Traceability	1.00	One per Ice Box

Labels		
Last Mile Delivery in San Pedro	2.00	10 Per ride from Water taxi - 5 boxes fitting in a pickup truck (fit 4 to 6 boxes).

c. Supply and Demand Assumptions

Supply Chain Factors	Supply	400 lb/week
	Beach Price	5 BZD
	San Pedro Target Market Price	12 lb

Supply data was sourced with the help of Oceana's team, and the San Pedro Market data confirmed with Virginia's study. The chosen mainland beach related prices and the San Pedro market prices are skewed to incorporate the current downward market pressure from Covid.

d. Gross Marginal Value Breakdown

GMV Breakdown	Item	Monthly BZD
	Gross Revenue	19,200
	Net Revenue	3,600
	Transport Logistics	6,140
	Fisher Revenue	9,200

Beach Price Premium	Fisher Potential Premium	1,200
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e. Corozal Least Waste Pilot 1 Strategy

Assuming that the restaurants we select for pilot 1 will overall commit to a purchase of 1600 lb. a month (Snapper or Grouper), and that there are no additional customer acquisition costs, Pilot 1 breaks even at approximately 400 lb. per week (price being constant). Given the variability of fish catch, it is recommended that Pilot 1 actively incorporates more than one fisher both in Corozal or Belize City. Additionally, once buyers have agreed to purchase 1600 lb. per month, it becomes

critical that the fisherfolks involved will always cover that number of pounds. Otherwise, the purchaser will get easily turned off by the lack of fish supply.

Pilot 1 Clients	Restaurant	Weekly Demand (lb)
	Blue Water Grill	800
	Palapa Bar & Grill	300
	Carambas	250
	Red Ginger	200
	Angler's Restaurant Bar	150

f. Pilot Cash Flow Analysis

The results from running cash flow analysis indicate that the fisher the first month must return with 400lb for at least 2 fishing trips. Months 2 and 3 should have at least 3 fishing trips (400lb catch of Snapper/Grouper).

g. Potential Benefits

The results from this exercise lead us to believe that there is a strong value proposition for mainland fishers, not only from a higher potential price premium but also from piggy backing off a focused technological online market platform which facilitates last mile delivery to a larger better paying market. Leveraging a greater supply from the mainland fishers will be a critical component in providing a greater commercial advantage in procuring fully verified, legal and verified seafood to the San Pedro restaurant B2B target market.

In terms of project scalability there is room to cover traceability labelling, technological running costs and generating a return for a potential project implementing partner.

4. Geographic Breakdown San Pedro

The situation in San Pedro represents a very different scenario because fishers are very advanced in relation to supplying their catch through their already established local market networks. As part of their proximity, available docking facilities, and market heritage, they have very few obstacles to connect supply and demand. Though their logistical procurement process is still artisanal, non traceable from vessel nor verified environmentally or legality, it is sufficient for them to develop and profit from their already established business relationships. Fortunately, access to a greater market demand from interested restaurants can create an additional and crucial opportunity for San Pedro fishers and, thus, provide a verified, full traceable product. The product differentiation will create a significant market advantage for them, in addition to the very necessary positive market exposure for future income returns.

In the case of San Pedro fishers, we would need to set the seafood purchase price close to the current San Pedro restaurant purchase amount. A medium-term marketing strategy is vital for these fishers, if they are to grow in an economically and financially sustainable way. This marketing strategy must be designed so that, over the short term, an additional cost can be built in the end market price from the online platform, which will enable finance the future running costs of the technology adoption and implementation, for these specific fishers. During Pilot 1, special attention must be placed on the potential of creating a marginal platform fee for the online transaction that sustains the proposed fully verified and traceable proposition. It is here that a role for government and the key actors in the NGO Community are vital. Together, we can bridge the institutional and capacity gap that will inevitably confront artisanal fishery in Belize, in a not too distant future. Pilot 1 may be that unique and indispensable testing ground.

VI. Measuring the Environmental and Social Impacts

Given the rather small size of this operation, the environmental and social impacts will be measured discretely via some important and relevant factors; (i) monitoring the rate at which the by-catch will diminish over space and time; (ii) The quality of the technology adoption process, (iii) the response by the non-adopter to the technology and the information generated for business management, and (iv) The learning curve generated within the realm of all the actors involved on such issues and certification of origin, elimination of poaching, demanding labelling, and the like. The social impact is of a very particular nature, as it will focus on the structure, performance and empowerment of those involved and the capacity to establish new forms of revenue and profit sharing all along the pilot program structure.

VII. Risks and Mitigants

The main risk that artisanal fisheries often faces is the breakdown of the model... Even if everything is perfect at the individual component level EFOT - it does not ensure success for the fisherfolk. In this section we will illustrate the risks embodied in each of the components to avoid the breakdown of the program.

The following risks and mitigants have been identified:

Risk Category	Description	Mitigants
Excess Supply	Inventory risk resulting from periods of excess supply to meet anticipated demand.	<ul style="list-style-type: none"> Developed model to accurately predict B2B Demand Backup by utilizing excess supply as free samples for new and existing customers. Freeze excess supply as last resort and sell wholesale to B2B consumers.

Demand Shortage	Demand from B2B customers relies on larger volume orders and can be unpredictable.	<ul style="list-style-type: none"> • Establish consistent purchases with B2B consumers to develop a revenue baseline.
COVID-19	Continued disruptions from COVID-19 may interrupt supply chains and affect supply/demand patterns.	<ul style="list-style-type: none"> • Platform allows for almost seamless transition of products through the supply chain. • Platform allows for increase and decrease to scale with changing supply /demand patterns.
Fisherman Training	Artisanal fishers live rurally using traditional methods and minimal access to advanced technologies.	<ul style="list-style-type: none"> • Provide fisherman-to-fisherman training to help platform transition. • Provide cloud-based technology so fishers can use their own devices. • Have had years of experience training fishers in tech transfer and commercialization. • Provide GSM internet access and smart phones where needed.
Government	Belizean government delays participating in pilot.	<ul style="list-style-type: none"> • Form partnerships with Belize Fisheries department to provide data to improve fishery stewardship and maintenance. • Shellcatch has a history in forming partnerships.
Project Partner	Lack of interested partners for pilot execution.	<ul style="list-style-type: none"> • Currently establishing requirements for partner selection • Currently have a ERP system for checks and balances and manager sign offs with our staff.

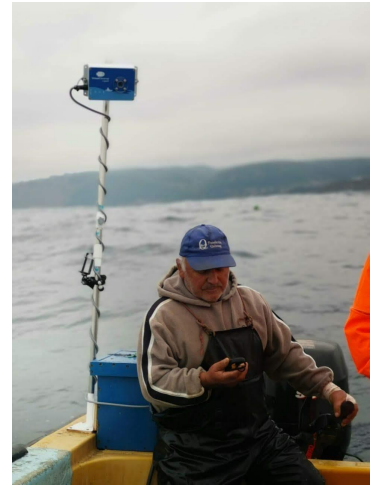
VIII. Technology Implementation

The Government of Belize does not have a national electronic reporting system, nor does it have any nationally mandated electronic reporting. For the pilot Shellcatch has developed a first customized iteration of electronic reporting technology for the Government of Belize. Shellcatch has also installed 5 units of its electronic monitoring solution called Virtual Observer (install described below). The deployment of the technology has only been possible due to the proactive and professional support by the local Oceana staff. For electronic reporting Shellcatch has strongly

recommended the government establishes an API system so that it can work with more than one technology provider. Oceana has established the initial dialogue so as to customize the technology, further refine and implement during pilot 1.

a. Video and GPS Monitoring

The online marketplace conducts Video and GPS Monitoring using Virtual Observer systems that curate the fishing process and allow



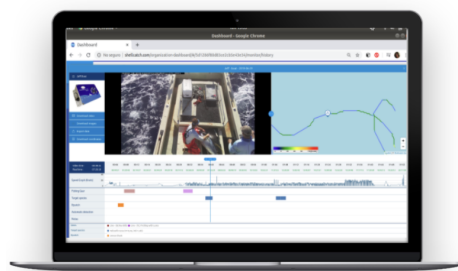
automatic and accurate verification of

responsible fishing. The Virtual Observer system is a first mover and pioneer in the small-scale vessel space. The video management platform is cloud-enabled and capable of scaling to thousands of daily fishing trips, vessels and platform users. The data is held securely using the highest standards enabling full confidentiality and simple reporting. The system consists of a water-resistant camera and a rechargeable battery for self-enclosed device autonomy. These tools capture video, track GPS coordinates by time, and utilize artificial intelligence (AI) to detect certain relevant events (excessive bycatch, illegal fishing, product for sale, etc.).

The Camera can be easily installed and connected directly to the boat's energy source. An automatic data capture device is delivered with the camera and allows data to be uploaded to the mobile platform using an available wireless network or a generated Shellcatch network. All information is uploaded to the cloud for management, handling and review. This allows for improved review times and facilitates the delivery of information to other stakeholders.

All data is uploaded to the Shellcatch application which is intuitive and becomes an additional tool to facilitate the work and customization of the system. With the mobile App, fisherfolk can check the status of the camera and manage data.

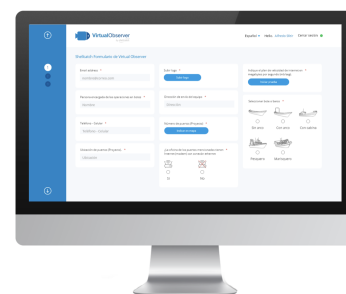
- **Review and Registration Area:** The system allows to review and record events, fishing gear, target fishing and by-catch. This GPS and Video system lowers the review time.
- **Graphics:** The graphics contain the results of the information generated from the videos to be able to make reports.
- **Artificial Intelligence:** The automatic detection of certain events relevant to the fishing in question can be implemented.
- **Download:** All videos and coordinates are downloadable.
- **Search:** The system is designed to upload a high number of videos. This requires a search mechanism to go directly to the specific vessel.
- **Users invitation:** When more support in the revision is required, the system allows inviting more users.



With over 40,000 fishing trips on the platform and interested vessels from around the globe Frescapesca benefits from a very streamlined onboarding process. Each client inputs their vessel type, fishing gear, energy requirements, internet access, landing ports and other deployment information. Another section deals with mounting brackets and client specific requests.



The Virtual Observer system is offered as a Hardware-as-a-Solution offering that has an upfront hardware fee for installation and a monthly fee for maintenance. In addition to vessels, these hardware units are installed on scales to monitor total catch remotely and on logistical transport services to monitor total catch when brought to land. These units can also be used to monitor aquaculture activities and ensure a consistent video feed of protected areas and heavily



fished waters. These devices help deter any illegal or excessive fishing in areas designated by the

Government. The technology is improving with AI to automatically detect and log important fishing events as the product is brought on the boat. This device helps verify adequate fishing processes and helps secure a bycatch friendly high-quality product to end consumers.

While on-board observers have played an important role in the monitoring and reduction of bycatch on larger scale vessels. Smaller vessels present a greater challenge to monitor and track, particularly in rural areas. In these places, new technologies have not been accepted and are difficult to implement. The Virtual Observer system has been implemented on more than 400 boats. Small-scale fisheries around the world are increasing their fishing effort to achieve higher incomes and meet a growing demand for products. A significant proportion of these fisheries, particularly those located in emerging and developing countries, use nets that are responsible for high volumes of unwanted fishing for species of high conservation value such as marine mammals and turtles.

The Belize Install



Camera Install

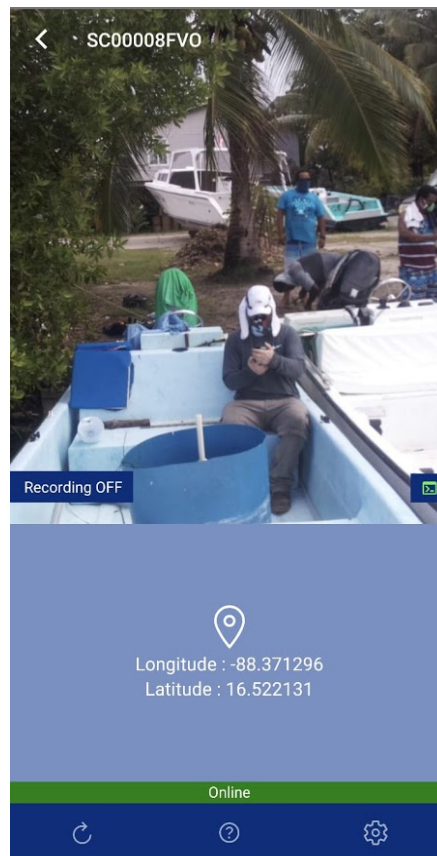
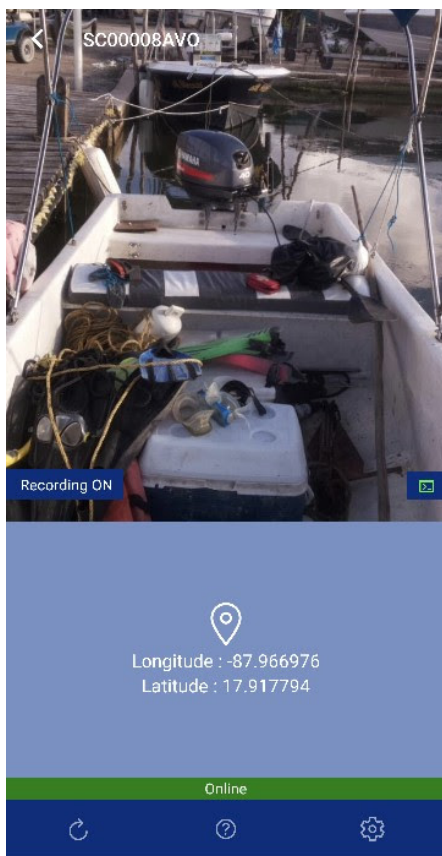
The collaboration between Oceana and Shellcatch in a pilot stage included the online Shellcatch monitoring system, mounting brackets, connection cables, chargers, and uploader devices, access to the Virtual Observer web analytics platform; delivery and field installation of monitoring systems.

Zach Miltenger, Shellcatch's field engineer, performed the install on the designated boats. The cameras were located in a high position, with marine grade stainless steel post mounting brackets. The system captures good images

without affecting routinary work. The collection process of the footage is through the camera and the uploader. A simple methodology that consists of bringing the camera close to the location of an uploader with ethernet internet access.



The stakeholders of the project were inducted for the use of the application, camera, indicators and good practices.









Onboarding

The Onboarding process was carried out on a regular basis. The onboarding form was extended to determine the ideal conditions for the installation of the service. Additionally, information regarding fishing seasons, fishing gear, species and boats was collected.

The installation was planned to be held in a port located in San Pedro Town. With an ethernet internet of 120 MBPS. The boats are fiberglass and do not have a battery. The boats arrive at a distance between 1 and 2 km from the nearest internet point. That the boats are small, without a cabin or energy source, so pole mounting is used and an 8 hour charging cycle prior to each daily trip is advised.

Training

During the visit of Shellcatch personnel, a training session was held on December 16, 2020. This meeting was attended by Mr. Miguel Alamilla with Zack Miltenberger in Belize and remotely with Alfredo Sfeir, Cesar Valdivia and Diana Patiño. In which the registration of one of the cameras was made, to be a guide of how to do it with the rest of the team.

A second on January 13, 2021, and was attended by Ryan Rivera, Kleon Coleman, Shanda Sainsbury, Kyle Montero, Joshua Borland, Miguel Alamilla from Oceana and Cesar Valdivia and Diana Patiño from Shellcatch. At the end of the meeting, the user's manual was sent to all attendees so that it can be consulted at any time.

In both meetings, the User's Manual was used as a guide and was sent to everyone. Explaining page by page the operation of the technology, explaining the creation of users and the correct connection of the equipment, starting with the Uploader and its characteristics. It was explained how to verify the status of the uploader, the LED lights guide that help in its diagnosis.

The technical and connectivity characteristics of the camera and the LED light guide that the camera has for better diagnosis were also explained, as well as how to perform these verifications from the mobile app. In addition, it was shown how to configure the equipment from the mobile app. The ability to delimit areas where you do not want to record and the use of the dashboard was explained. A sample dashboard was shown using the demo access available.

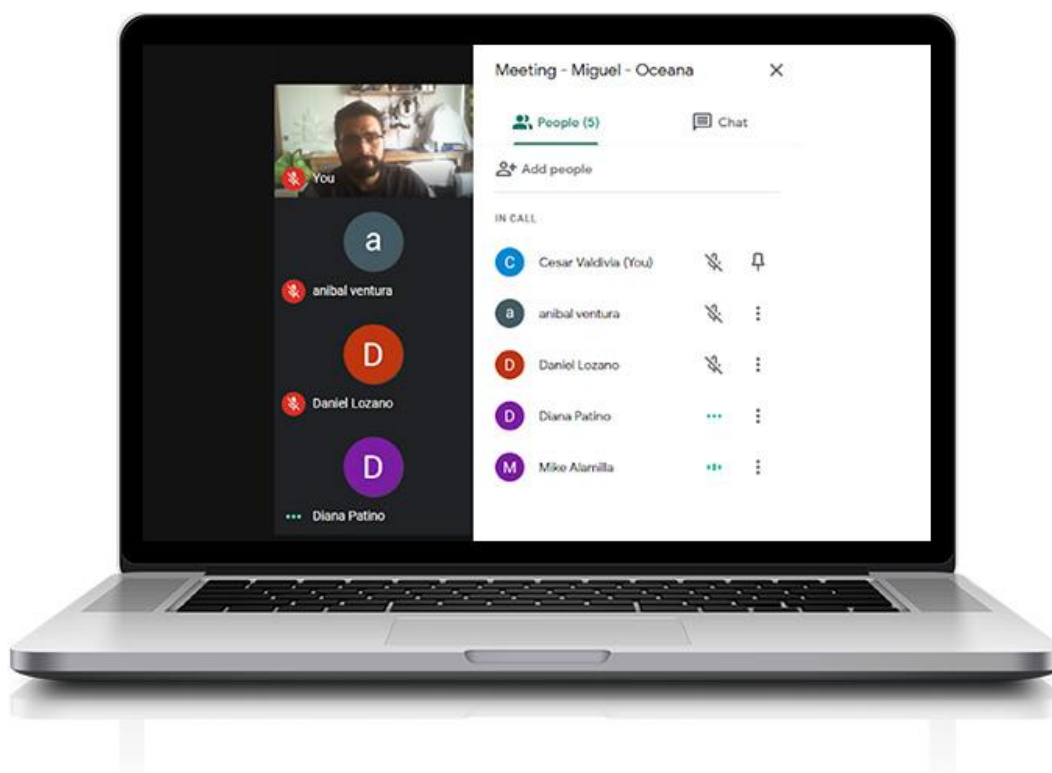
Additional training sessions are suggested with the people who will use the devices, in order to accompany their use.

Installation issues

There were some issues when starting to use the devices with incidence report and ticket number 499. At the beginning there were problems with the registration of the cameras, for which remote help was provided for both remote and user registration. Finally 4 of the 5 cameras have been registered, the 5th one is at its final destination.

There were also problems with the creation of user accounts that were solved in a video call. Additional checks were made on all 4 cameras to ensure that they are working properly. The last remaining step is to pair each camera with its corresponding uploader, this process is done with the app, for which help and guidance is offered at all times to the people who will be in charge of the cameras.

Connectivity issues were found in the areas where the cameras were installed, for this we are studying the feasibility of putting wifi connection points for the devices. To address these issues, 2 video calls were made on January 29.



Supply, Legality and Traceability

Electronic Reporting (eReporting) is a mobile app that consolidates the characteristics of an electronic logbook in a user friendly interface. It has been implemented in over 5 countries and has proven to be an instrumental piece in helping Frescapesca verify compliance with local regulations, compatibility with government mandated reporting formats and information, as well as support real time interactions with the supply portion of the Frescapesca platform. Upon commercial deployment in any jurisdiction, the eReporting App must fully interact with the Government's fishing license databases to ensure the proper registration of fisherfolk and full compliance under the applicable local legal framework. This provides Governments with additional fisheries management information and provides valuable data for decision and policy making. For example, in Chile, the app is used as an additional source of information for fisheries management in tandem with the National Fisheries authority's web platform. Whereas, in Puerto Rico it is the sole source of information for fisheries management.



Once compliance has been established, artisanal fisherfolk can offer their products to the marketplace through the eReporting App. These requests are managed by Frescapesca which then offers the fisherfolk with a premium over market price.. If prices and volumes are accepted by the fisherfolk, the product gets uploaded to the marketplace.

With over 800 fisher users, the main goals and benefits of the eReporting Platform are:

Efficiency	Data Quality	Improve the quality, quantity and efficiency of fishery information and catch accountability to improve ocean information to support decision-making for marine fisheries management.
	Better Management	Increase the technical capabilities in relation to data management and decision support tools that improve the ability of governments to monitor, forecast, and manage commercial marine fisheries.
	Catch Limits Monitoring	Improve annual catch limits tracking for enhanced fisheries monitoring.
	Near Real Time Information	Complete the transition from paper fisheries landing reports to an electronic platform.

Species Management	Fishing Restrictions Scheduling	Set all the species restrictions needed and communicate them to fishers using the mobile app.
	Favorite Species	For fishers, the system automates favorite species to make the data inputting process quicker.
	Fishing Gear Autofill	App seeks to make the data inputting process as efficient as possible when fishing more than one species with the same fishing gear.
	Species Quick Search	Find any species in seconds by searching category or key words.

fishers and Vessel Management	Fisher Management	Track all the fishers that are part of your data collection program.
	Fisher License Management	Allows integration of different licenses for different fishers. Sends alerts when fishers licenses are about to expire.
	Link Fishers to Vessels	Easily associate boats with fishers in each fishing trip. Boats can be owned by the fisher or temporary.
	Roles and Permissions	Every eReporting account comes with unlimited users and flexible permissions.
	Fisher Profiles	Store comprehensive information, stats and photos for fisher users.

Collaboration and Traceability	Permissions	Empower every fishery stakeholder to contribute to its success with unlimited users and flexible permissions.
	Coordination	Real time Government-Fisher communications for catch and landing co-operation and coordination.
	Traceability	Completely compatible with traceability label scanning with both Government specific coding and end-user scanning.

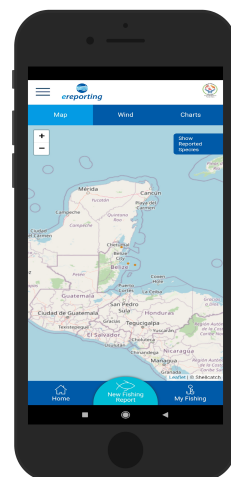
Fisheries	Location History	Find the last known location of fishing activities per fisher per species.
	Negative 'No Fishing' Forms	Enable fishers to declare non-fishing activities avoiding paperwork or extensive travel to the fisheries department.
	Fishing Effort	Fisher data logging can automatically calculate fishing effort in specific areas.
	Data Export	Export fisheries data in multiple formats or directly to other databases as needed.
	Cell Tower Independence	Increase versatility by allowing for off the grid fleets to input data for a timely upload once back in cell phone coverage.

b. Ereporting App

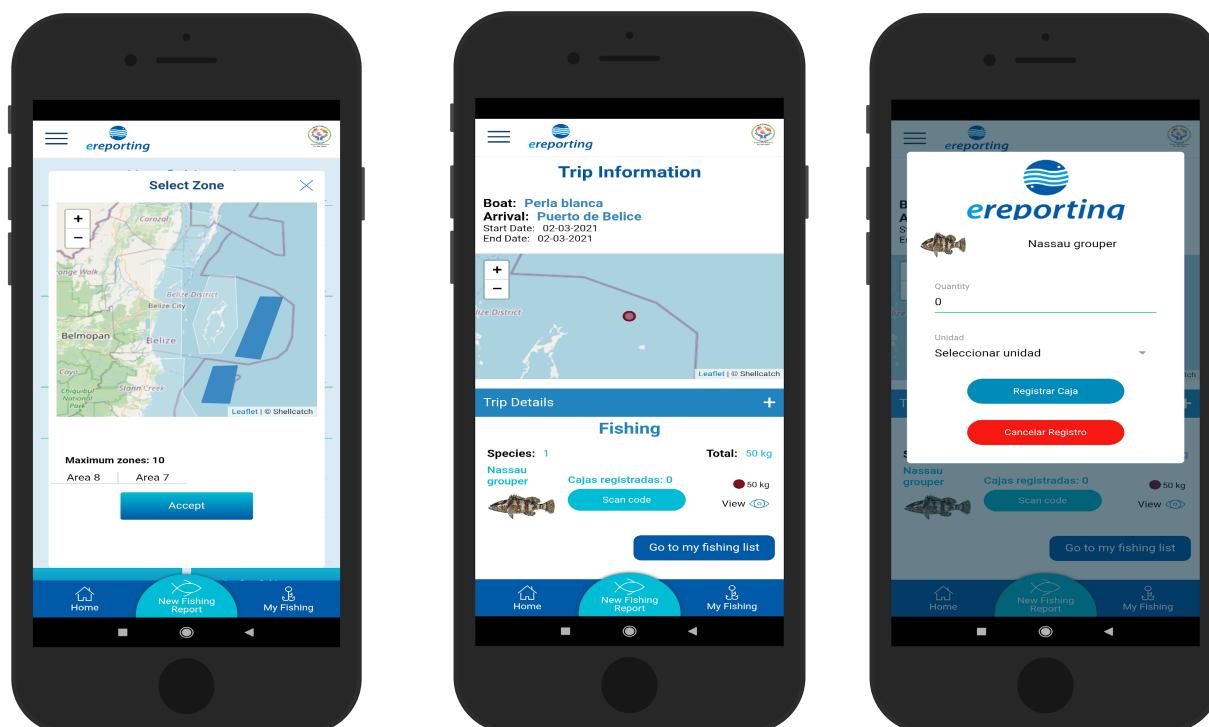
The app is designed to facilitate User Experience with a friendly intuitive environment with tools that support the fisher's activity such as wind data, lunar phases and fishing stats.

With Ereporting, fishermen can personalize the information to program a single vessel or a fleet with information that ranges from location to fishing schedules for each vessel as well as visualize Government mandated fisheries restrictions , bans or no take zones

Ereporting also offers the option of adding fishing companions as an additional verification mechanism and full coverage of the fishing activity.

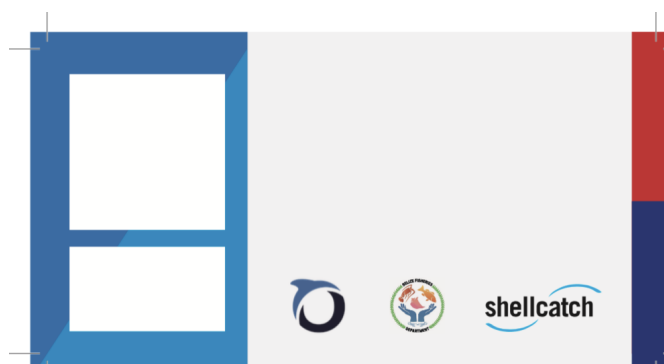


Ereporting can also set and delimitate fishing zones, and add special markers or buoys to, a fisherman can quickly locate their fishing area.



At the end of the fishing trip, fishermen will be able to see the summary of their report, along with the QR code scan option, which will be used for the traceability of the product, as well as visualize and navigate through his full history of reports.

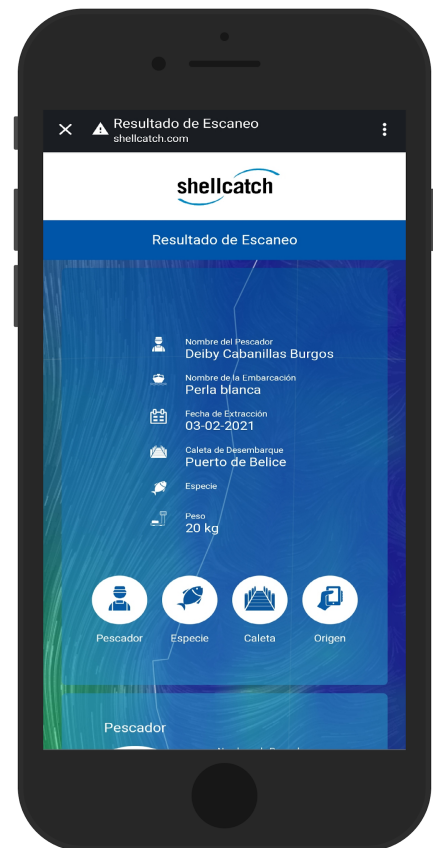
Packaging in the Belize B2B Pilot 1 requires 50lb ice boxes. Shellcatch traceability labels are attached to the product once brought to shore and allows the product to be tracked while processed. Shellcatch has proposed a design that leverages previous work done by Oceana in the Fish Right Eat Right Fish Right program. The QR code would go on the top left box. The middle white portion allows for the fisher to add additional handwritten data on the catch.



QR Example:



QR Code

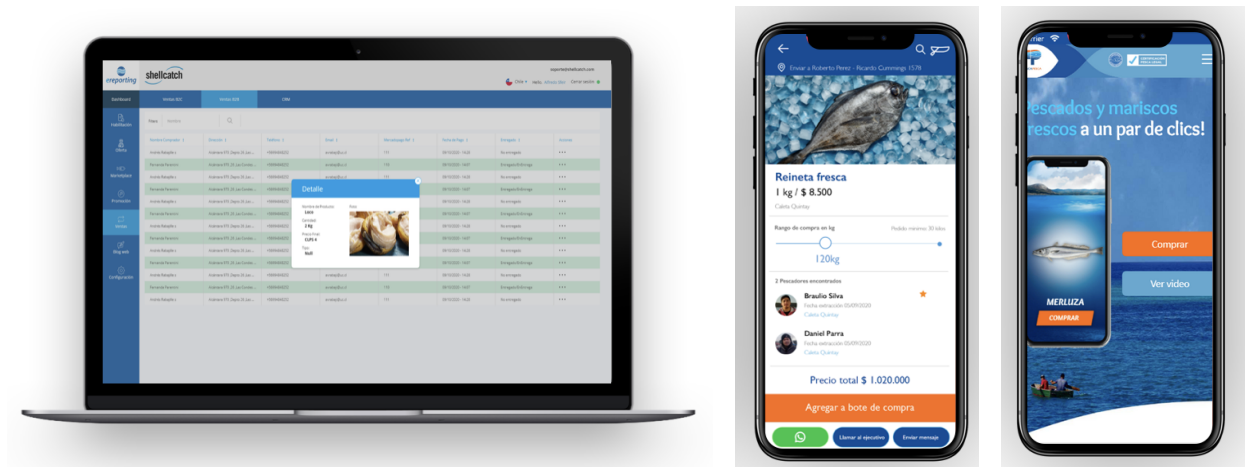


Scan Result

By scanning the QR code, it redirects us to a web page, where we can see summarized information of the fishing trip, guaranteeing the traceability of the product.

End to End Solution

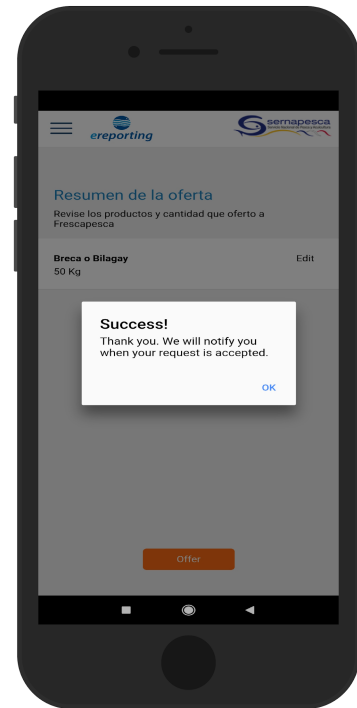
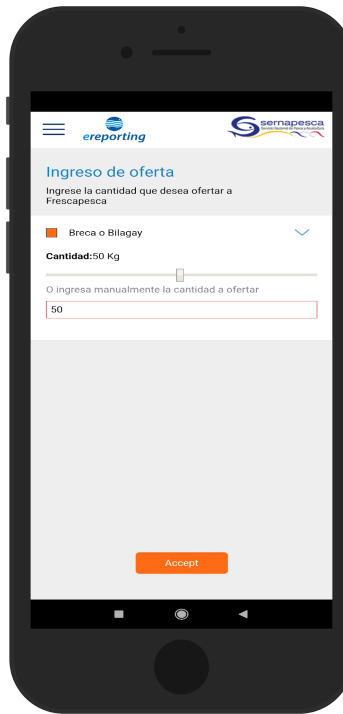
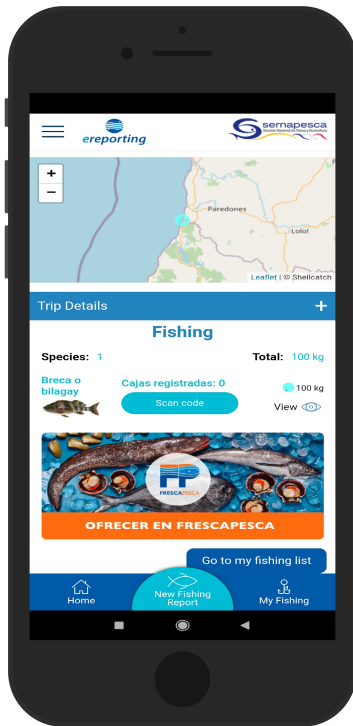
Shellcatch has an end to end solution that manages onboarding of new fishers, seafood species, countries, prices, special offers for both B2B and B2C. Current one size fits all platforms cannot manage all of the aspects needed to bring seafood from vessel to B2B or B2C consumers. To create maximum market fit, efficient supply side adoption fishers, B2B clients and B2C end consumers each have their customized applications. Frescapescas B2B clients have a mobile app platform that allows for them to get a first glance at what is being fished near real time. B2B clients need hand holding during first engagements and after the third sale begin to use the app.



In addition to this proprietary marketplace, Frescapescas provides an integrated solution that ensures a curated supply chain with fresh seafood products that can be monitored, controlled, and sold from artisanal fishers to the end consumer. Frescapescas's verification and traceability technology provides video and GPS monitoring, app legality, labeling, weighing and packaging, transportation, reception and processing, and final customer delivery to ensure transparency and accountability within the commercial fishing industry.



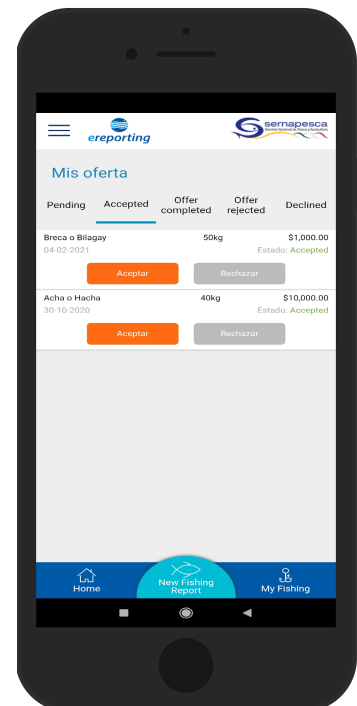
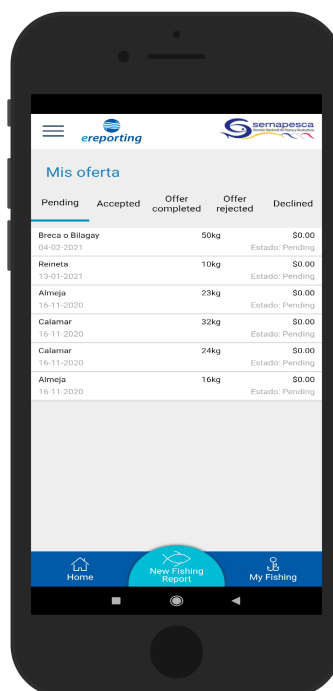
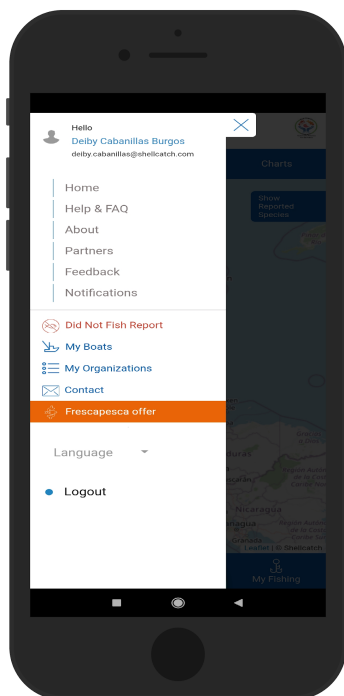
At the end of the electronic reporting fishing report, at the bottom of the trip information, the fisherman will have the option to "offer in Frescapescas", he will be able to offer pounds or units of his fish product.



From the back-office, a person in charge will be the one who reviews these sales requests, and will be able to accept or reject them.

Fisher Seafood Sale Acceptance:

In the side menu, the fisherman has the option of reviewing the offer requests that he made, here he has several sections, where he can see his requests that are pending (from the back-office they are being reviewed)

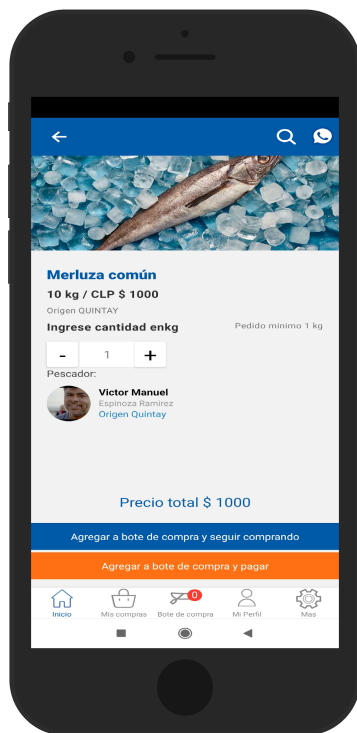
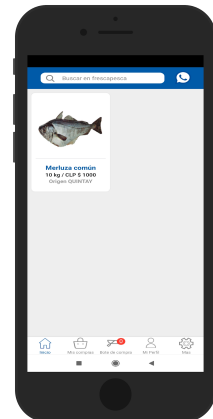


The fisherman, once his offer has been accepted, is sent a counter offer, indicating the price that the back-office wants to buy his product, if he agrees, he accepts the counter offer, and his product will be reflected in the B2B app, otherwise you have the possibility to reject this counter offer.

The Buyer Side - The B2B app:

In the B2B app, buyers will be able to see the products that were offered by the fishers, in the Ereporting app, here they will be able to choose between the products that they like and they will be able to buy them quickly and easily.

When making a purchase, the B2B app offers extra information, such as which fisherman was the one who extracted this product, likewise the buyer for a next purchase, knows that this product has a very guarantee from the fishers.



IX. Conclusions and Next Steps

Meeting the market needs of small scale fishers while achieving the highest standards of environmental monitoring and traceability is a complex task. How well the online market will work depends on factors such as meeting demand and supply in a timely manner and having the trust required by start up fishers to show tangible results. The diagnostics process of selected species and fishers is fundamental to generate access to larger higher paying markets which in some cases could provide a premium return.

Unless a key logistics partner takes care of logistical and legal aspects, future scalability post pilot testing will become limited. Pilot 2 and 3 should serve as a screening process for potential candidates. Shellcatch will provide an ERP to monitor each process to make sure supply and demand is met with highest returns possible.

In summary, Oceana and Shellcatch can use the diagnostic study as a benchmark to assess:

1. Target Market Potential
2. Fisher Selection
3. Species Selection
4. Logistics Execution and Partner Selection
5. GMV and Cash Flow Referencing.

This report builds on “Market study on local consumption of finfish in Caye Caulker and San Pedro” done as a part of the project “Market Based Incentives for Responsible Fishing” published in 2021. This report shows that there is an economic opportunity for Mainland fishers selling towards the San Pedro market. While the San Pedro fishers enjoy a close market connection and are sophisticated in terms of reaching their sales targets, restaurant buyers could benefit from the traceability and sourcing information provided by the Shellcatch online market platform.

While the Belizean Government has shown interest in the pilots, having greater support in validating the use of technology and creating benefits for fisher users will be very beneficial. The aim of this report is to help lay the groundwork for a successful pilot one implementation. This will create easier conditions for new fisher incorporation and San Pedro restaurant buy in.

At the core of this proposal is the need for a fully integrated approach. Siloed approaches have been unsuccessful as they try single technical assistance interventions: subsidizing engines, financing for boats and sporadic marketing incentives. Time and time again, experience demonstrates that this single barrel approach has led to major failures. This program wants to achieve greater benefits for fishers so that they can be environmental champions and gain market returns with differentiated verified products.

Next steps include sourcing pilot partners and implementing pilot 1 as suggested by this report. Pilot 2 would include more fishers and more buying restaurants. Shellcatch is prepared to work closely with OCEANA and other relevant partners for the benefit of all those concerned.

ANNEX A

the

CUSTOMER SERVICE INCIDENT REPORT

customer and incident reporter. The information that is included in the report can be useful in the future. To maintain a safe and healthy relationship with the client, a thorough investigation should be undertaken following an incident in order to initiate corrective actions.

CUSTOMER DETAILS

Organization: Oceana
Name: Jacinta Gomez
Email address: jgomez@oceana.org
Ticket number: 499

DESCRIPTION OF INCIDENT

Location: Belize
Date: 27/01/21
TIME: 17:00 (GMT-5)

Incident Details

How the incident happened, factors leading to the event, and what took place. Be as specific as possible.

1. Jacinta Gomez is not able to log into the web dashboard. Her mobile application does not allow her to visualize the registered hardware.
2. Miguel Alamilla can't register the hardware through the mobile app.
3. Cameras and Uploaders are found in areas with limited internet access, making the registration and video uploading process complicated.

Incident Causes

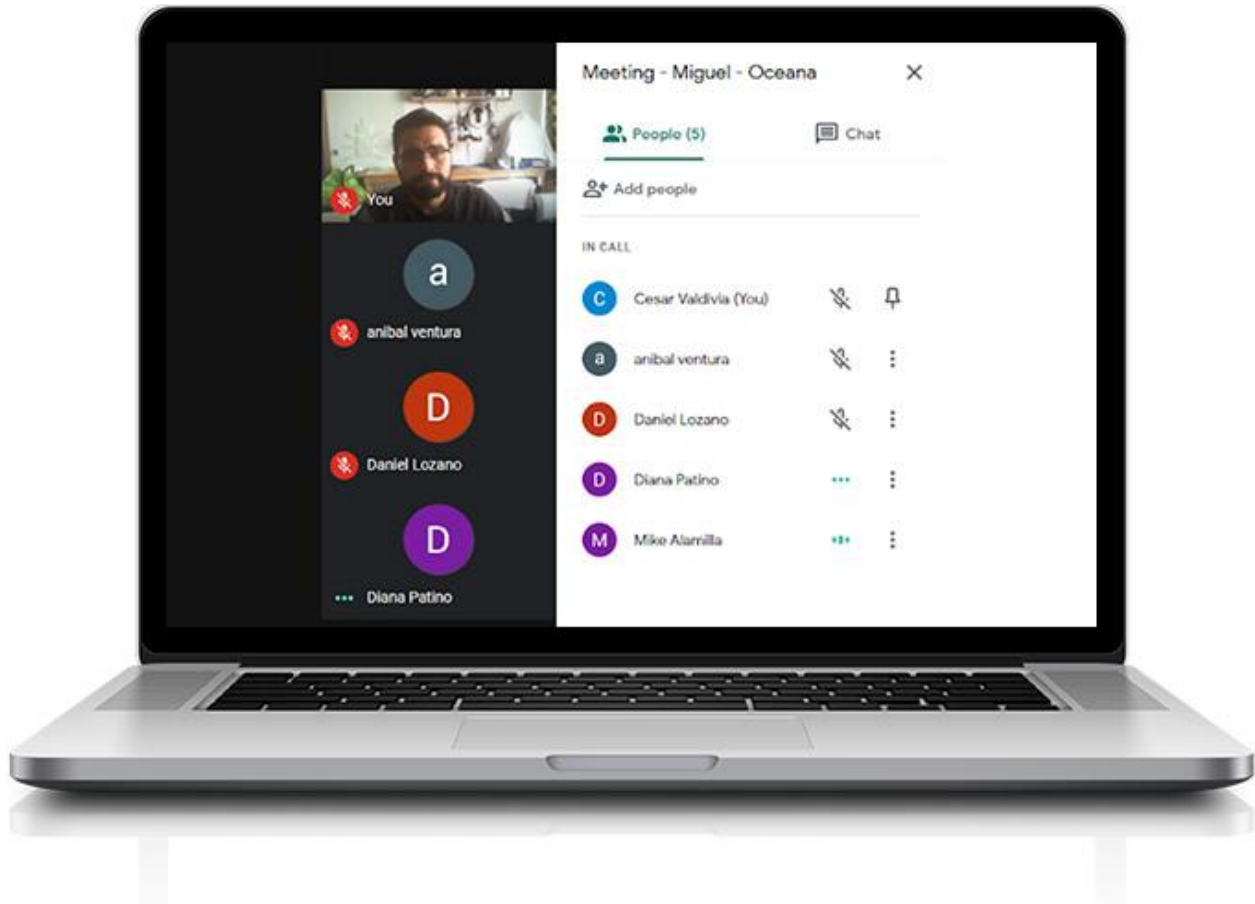
1. Web services access login process unclear. Multiple accounts were created.
2. Mobile Application permissions not granted (Android; Samsung S9+).
3. Abnormal behavior in Mobile Application (Android; Samsung A 10S). Cámara V3M4.1R08.

Recommendations

1. Use <https://www.shellcatch.com> to log into the organization dashboard.
2. Gather the cameras to perform a Direct Registration.
3. Schedule Dx meetings with the Stakeholders to assist with the mobile app.
4. Locate the Uploader in an area with internet access through an ethernet cable.

Follow Up actions

1. Dx meeting with Jacinta Gomez (28/01/21)
2. Dx meeting with Miguel Alamilla (29/01/21)



3. High Priority Bugsnap in current development Sprint. (29/01/21)
4. Customer Success status revision of all Oceana's cameras and uploaders (29/01/21)
5. Miguel Alamilla will try on his own to perform the registration of the camera. The team will perform a Direct Registration of Oceana's Cameras if needed.
6. Modify internal onboarding processes to emphasize the internet connection availability in areas with limited access. Propose mobile GSM hardware alternatives based on the local market availability.

FINAL NOTES

- 29/01/21 Jacinta Gomez is now able to log into the dashboard and mobile app.
- 29/01/21 Miguel Alamilla is now able to log into the mobile app and visualize the cameras.

- 29/01/21 Expected follow up meeting with Miguel Alamilla to verify the current state of the other cameras.
- 29/01/21 Engineering team is bug snapping the abnormal behaviour of the mobile app.
- 29-02/02/21 Performance will be monitored to avoid problems.

REPORTED BY

Name: Cesar Valdivia

Position: VO Development and Operations Manager

Unit: Virtual Observer

Department: Management

 **OCEANA**

 **shellcatch**