

A Collection of Ecuadorian Artisanal Fishermen's Perspectives on Ocean Conservation

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RESEARCH SUMMARY

A Collection of Ecuadorian Artisanal Fishermen's Perspectives on Ocean Conservation

2021-2022

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Photo by fisherman Don Jhonny



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Notes + Thank Yous

A few notes on the study, generally.

Fisherman/men is used in place of the more neutral term "fishers" because we happened to speak exclusively to fishermen in this study. This study was completed on traditional and current Manteño-Huancavilca coastal lands in Ecuador and traditional and current Anishinaabek lands in Michigan, USA. All photos were taken by me, unless otherwise noted.

A thank you to the artisanal fishing communities of coastal Ecuador.

Thank you for giving us the honor of sharing your stories, your perspectives and your dreams for the future. One hundred and twenty of you gave us your time, your laughter and, devastatingly often, your tears. We do this work for you and for the familial, cultural and economic significance of your livelihood. Your connection to the ocean and her bounty is unparalleled. Thank you for accepting us so willingly. Seguimos adelante.

A thank you to my teams at The Leatherback Project and the University of Michigan.

To the people of The Leatherback Project (TLP), who went from faces on Zoom screens to life-long friends, I quite literally could not have completed this project without your help. Deep thanks to Callie Veelenturf, Francesco Saltos, Luis Paladines, Amanda Rocafuerte, Leo Rodriguez, Samantha Barreiro, Jurgen Flores, Katherine Avila and Valeria Crespo Ochoa for all of your help, support and memories. To all the volunteers of TLP, you all are wonderful people and I am happy to have met so many of you in person. To my University of Michigan School for Environment and Sustainability mentors and friends, your guidance was critical to the success of this project. Special thanks to my advisor Dr. Julia Wondolleck for her guidance and input despite the many pandemic-related curveballs encountered since this project began. A special shout out to Esther Woo and Haley Mullen for helping me navigate IRB and GIS processes, respectively.

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INTRODUCTION + BACKGROUND

An Introduction

Ecuadorian artisanal fisheries comprise **87% of artisanal fisheries bycatch** in the Eastern Tropical Pacific. [1] While there are solutions to diminishing bycatch, **mistrust** has grown between **artisanal fishers and Ecuador's government**. Therefore, government-proposed conservation technologies and policies are often not implemented by fishermen, and thus are largely ineffective. These **conservation techniques** will likely continue to be **ineffective** until fishermen's perspectives and opinions are acknowledged and their priorities integrated into local and national policies.

This study aims to **understand the relationships between the ocean, marine organisms and fishermen** to 1) **improve the livelihood** of artisanal fishermen, 2) help **increase marine wildlife** populations in the area and 3) **foster relationships** between fishermen and government agencies to create bottom-up and top-down conservation policies. Surveys occurred at various points along Ecuador's coast.

This survey is important in designing **effective, collaborative and inclusive solutions** to fisheries bycatch to prevent the extirpation of species like leatherback sea turtles and hammerhead sharks. Our survey contains questions to understand 1) fishermen's **relationships** to the **ocean**, 2) how fishermen **define conservation**, 3) fishermen's **conservation priorities**, 4) the **relationship** between fishermen and **marine animals** and 5) how fishermen feel about **fishing technologies, policies and regulations** in Ecuador.

The results from this study have been **analyzed for patterns** and compiled into this **easy-to-read report**, which also includes recommendations for **future policy proceedings** that are grounded in effective environmental psychology principles. This report is intended to be presented to local and federal Ecuadorian government officials by The Leatherback Project (TLP) team to impact future marine conservation decision-making.



Characteristics of Artisanal Fisheries

According to the Food and Agriculture Organization of the United Nations, **artisanal fishing** is defined as “**traditional** fish[ing] involving fishing households (as opposed to commercial companies), using relatively small amounts of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption.” [2] The 2013 census registered **45,793 artisanal fishing vessels (fibras)** in use, employing approximately 57,150 fishermen. [3] A paper by Martínez-Ortiz et al. from 2015 notes that there are two primary types of artisanal fishing employed in Ecuador: long-line/oceanic-artisanal fishing and gillnet fishing. [3]

Long-line fishing involves trailing a length of fishing line behind a vessel. This primary line has smaller branches of fishing line containing hooks, which are set at even intervals. These lines can be left out for varying amounts of time, from overnight to a few days. Long-line fishing is also referred to as oceanic-artisanal fishing because it predominantly takes place in **pelagic** (open-water) **zones** in the ocean, away from the coast.

Gillnet fishing involves the release of a long wall of netting below the surface of the water designed to capture fish. The netting wall is held up by buoys and is typically released closer to the coastline. Rather than targeting pelagic zones, gillnets target **epipelagic** (i.e. zones in which sunlight is still able to pass through), **mid-water** and **demersal** (i.e. ocean floor) **zones**. [3]

As long-line fishermen typically fish in pelagic waters and gillnet fishermen in shallow coastal waters, the **target species** of these fishermen are often different:

- Long-line fishermen target pelagic species such as tuna, swordfish, dorado fish (also called mahi-mahi or dolphinfish) and, prior to the national ban, sharks. [3]
- Gillnet fishermen target shellfish, mollusks and mid-water to demersal fish species.

Consequently, **bycatch species**, or species caught unintentionally that are not target species, also vary between **fishing type**, **season** and **location**. For example, long-line fishermen may catch more sharks than gillnet fishermen because many shark species are typically pelagic. During the sea turtle breeding season, when female turtles are more likely to stay closer to shore to lay their eggs, gillnet fishermen may find an increase in sea turtle bycatch.





La Ley de Pesca | The Fishing Law

In 2020, the **Ley Orgánica para el Desarrollo de la Acuicultura y Pesca**, commonly known as the Ley de Pesca, or Fishing Law, was revised by the national government of Ecuador.

According to the government's website, the law's objectives are to "establish the **legal regulation** for the development of **aquaculture and fishing activities** in all their phases of extraction, collection, reproduction, breeding, cultivation, processing, storage, distribution, internal and external commercialization, and related activities such as the promotion of **healthy food production**; the protection, conservation, research, exploitation and use of **hydrobiological resources and their ecosystems** through the application of the fishing ecosystem approach that sustainable development is achieved that guarantees access to food, in **harmony** with the principles and rights established in the Constitution of the Republic [of Ecuador], and **respecting traditional and ancestral knowledge and forms of production.**" [4]

Various groups, from artisanal **fishing communities** to **animal rights organizations**, **have taken issue** with the latest installation of the Fishing Law, stating it opens up artisanal fishing to unfair penalties, **favors industrial/commercial fishing** and contains legal loopholes that allow for detrimental activities, like the sale of shark fins, to continue. [5]

Threats to Ecuador's Artisanal Fisheries

Ecuador's fishermen face a **variety of threats** to their artisanal **livelihoods** and, increasingly, their **safety**. Enumerated below are five known threats, in no particular order of commonality. These themes will be further explored in the discussion section; this section serves as a background primer on the topics.

1 Decreasing fish stocks

The marine waters of the Eastern Tropical Pacific (ETP) are notorious for their **abundance and diversity of fish**. However, like fish stocks in many places around the world, the numbers and species variety of **fish are declining**. Various factors are at play: changes to El Niño/La Niña cycles, **overfishing** and overharvesting, warming ocean temperatures, increased pollution, destruction of coral reefs, deep-sea trawling practices and changing ocean chemistry are some of the major ones. As stock abundance and composition change, **fishermen have to modify their practices**. For example, fishermen report now having to go further offshore to be able to find fish, and even then the quantity and size of various target fish species has diminished. As fish stocks decline, fishermen have to find additional sources of income, or **stop fishing** altogether.

2 Industrial fishing and foreign competition

Multiple countries are fishing and, often, **exploiting** the species-rich waters of Ecuador. In fact, most years Ecuador is on alert as massive fishing fleets, mainly from China, enter Ecuador's waters during fish and shark migrations. [6] Fishermen from other South American countries, like Peru and Colombia, are also threats. It is not just their presence that disrupts and endangers the livelihoods of artisanal Ecuadorian fisherman; these fishermen tend to use industrial **trawlers**, or ships that tow massive nets weighted down to drag along the ocean floor and 1) capture anything they encounter, thus **increasing bycatch**, and 2) **raze the ocean floor** in the process.

Threats to Ecuador's Artisanal Fisheries, cont.

3 Pollution

Both **point-source and nonpoint-source pollution** directly impact fish abundance and health and, consequently, the livelihoods of fishermen. In this case, pollution is defined both as **chemical** (i.e. oil spills) and **physical** (i.e. abandoned/ghost nets, plastic pollution). Interestingly, some fishermen use the increase of physical pollution in the ocean to their advantage. According to a tour guide, some fishermen will **intentionally abandon clumps of trash** in the ocean with hooks attached. The floating plastic acts as a buoy, and curious animals (including fish, mammals, birds and reptiles) will investigate, often getting entangled in the trash or abandoned hooks. This practice was witnessed by the team near the protected marine reserve surrounding the Isla de Plata.

4 Piracy

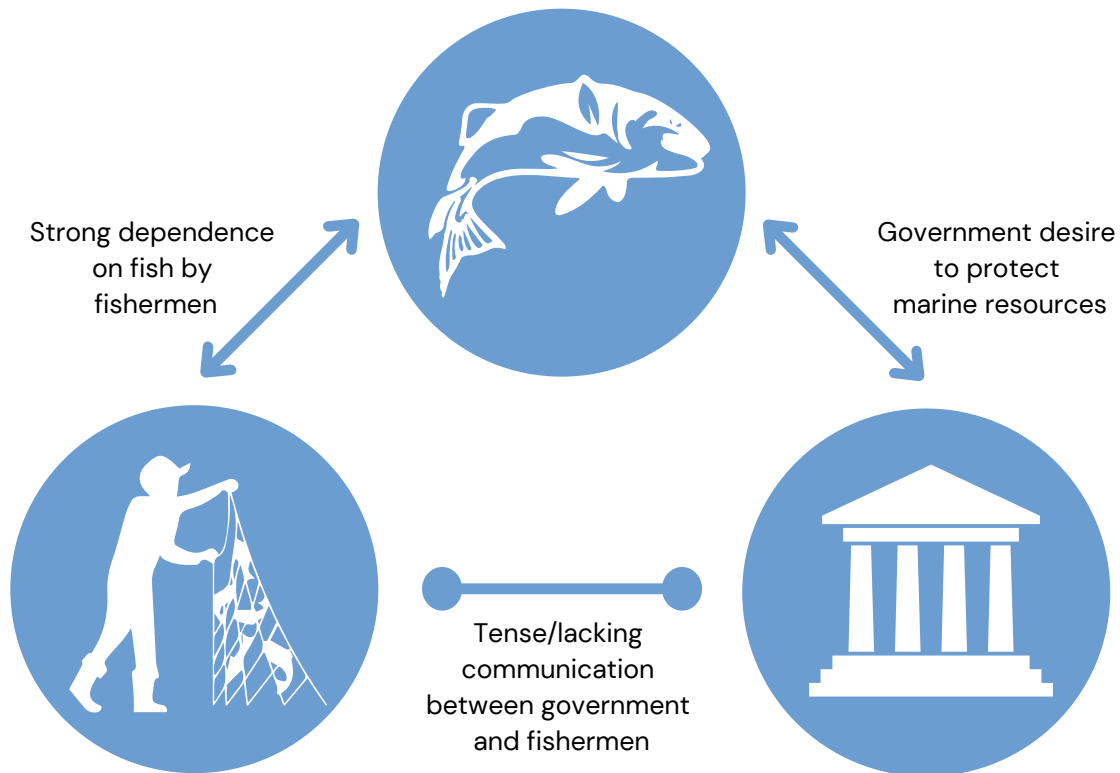
Piracy is having a dramatic impact on artisanal fishermen in Ecuador. This theme came up frequently in interviews and will be discussed in greater detail below. However, it is worth mentioning here that in certain ports, the threat of **theft, injury and death** to artisanal fishermen has been enough of a reason for a number of fishermen to completely **change their fishing practices**. These changes include changing fishing location, fishing in total darkness (which increases chances of collision with larger fishing or transportation vessels) and carrying increased protection on board their boats. In fact, as some fishermen reported to us, not an insignificant number of their peers have decided to **give up fishing** as a career to ensure they are alive and able to care for their families. As this problem has, according to fishermen, grown in frequency and severity rather recently, with **little alleged support from the government**, data are not readily available despite the gravity and prevalence of the issue.

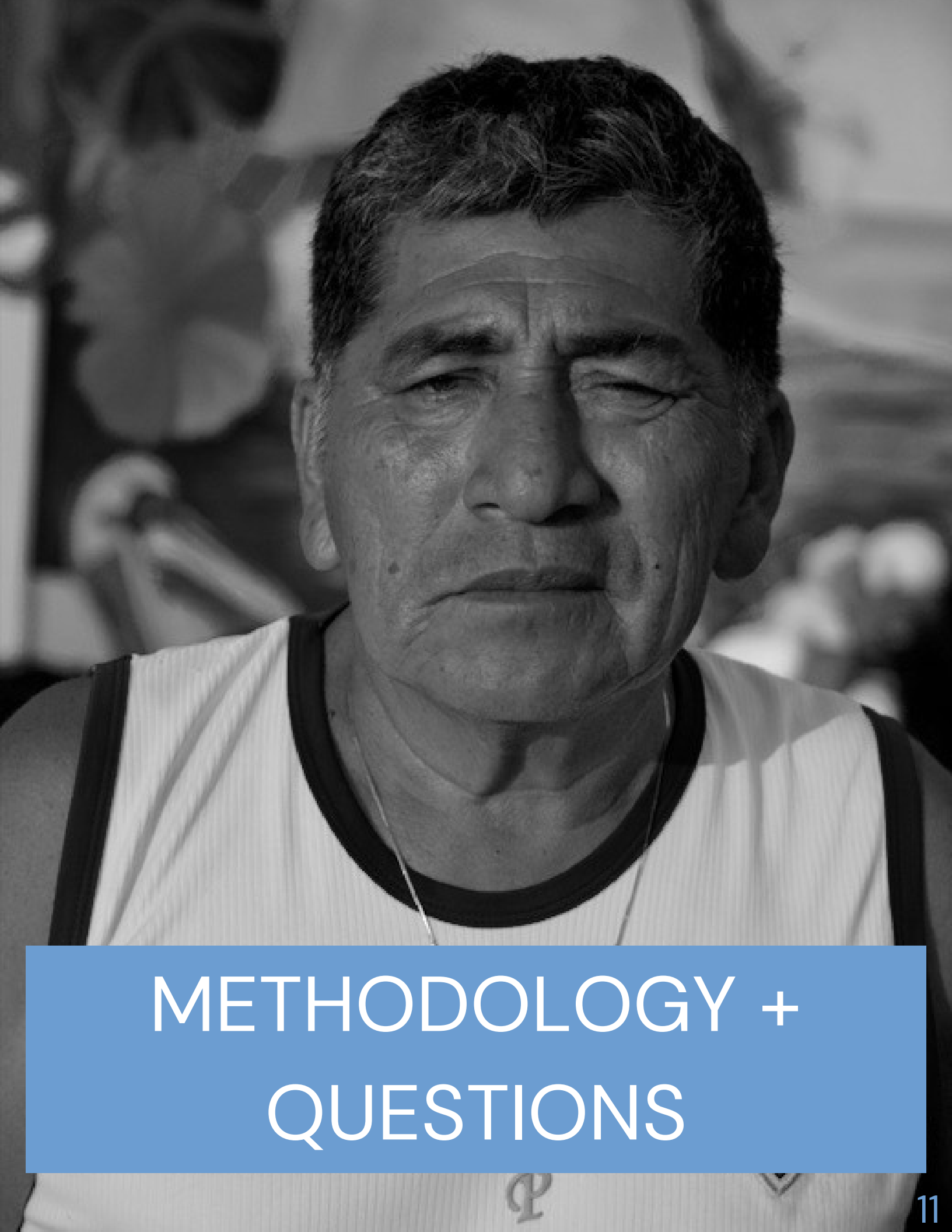


Threats to Ecuador's Artisanal Fisheries, cont.

5 Governmental relations

The **relationship** between a large number of **artisanal fishermen**/artisanal fishing cooperatives and the **national government** is reportedly **tenuous**, at best. In light of recent changes to the Ley de Pesca and the perceived favoritism toward industrial fishermen, the rift between artisanal fishermen and the government has widened. This distrust extends to the Ministry of the Environment. Though Western science has shown the efficacy of many conservation technologies and practices, and the Ecuadorian government seems amenable to instituting these, a **lack of communication and faith** between artisanal fishermen and the national government means that these pro-conservation behaviors are often ignored or improperly employed. Therefore, it is critical to understand what artisanal fishermen see as the biggest obstacles to their livelihoods, as well as how they want to proceed with conservation measures in a way that feasibly fits their worldviews and priorities.





METHODOLOGY + QUESTIONS

Study Sites

Ecuador is divided into provinces, which are further split into cantons and pueblos. Of the country's 24 provinces, five of them are coastal. From north to south, these provinces are: Esmeraldas, Manabí, Santa Elena, Guayas and El Oro (see map on next page). In all, these provinces constitute all ~887 kilometers of Ecuador's mainland coastline (i.e. excluding the Galápagos Islands, which are approximately 1,350 kilometers of Ecuador's total of roughly 2,237 coastal kilometers). [7, 8]

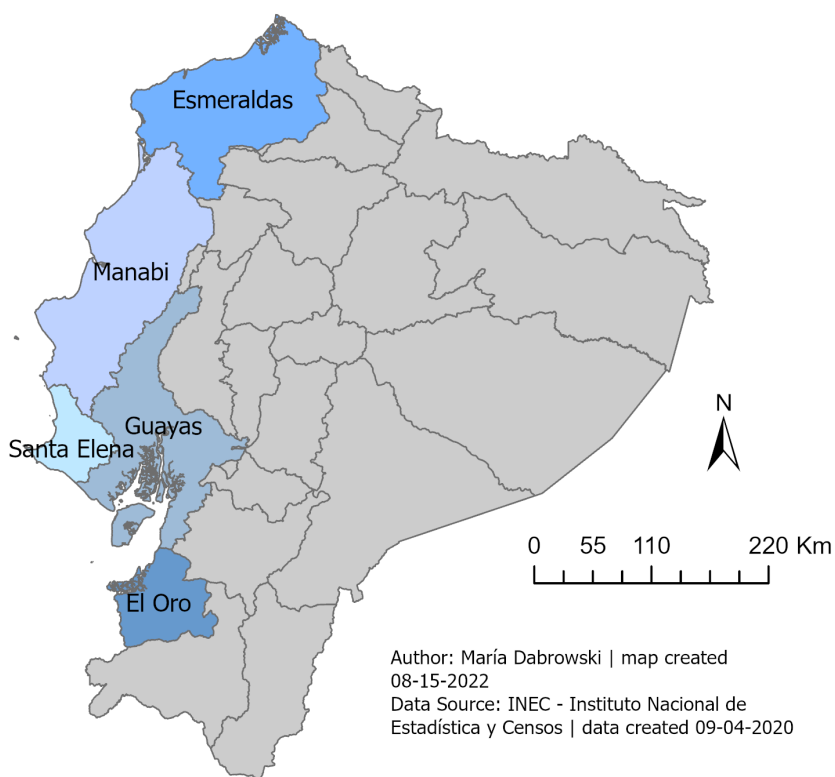
Initially, we planned on surveying each coastal province, visiting multiple ports and fishing villages within. These locations were chosen based on size: the bigger the port or village, the more fishermen would be available to interview. However, our study sites changed once we were in the field. Due to the pandemic, conflicts with surveyor schedules and safety considerations, we amended the surveying plan to the following:

PROVINCE	PORTS/LOCATIONS
Santa Elena (SE)	<ul style="list-style-type: none"> • Santa Rosa • Salinas • Anconcito • San Pablo • Chanduy • Palmar • La Libertad • Colonche
Manabí (MA)	<ul style="list-style-type: none"> • Puerto López • Salango • Machalilla • Ayampe • Ciriales • Puerto Cabuyal • Puerto Jama
Esmeraldas (ES)	<ul style="list-style-type: none"> • Galera San Francisco • Mompiche • Same
El Oro (EO)	<ul style="list-style-type: none"> • Bajoalto
Guayas (GU)	<ul style="list-style-type: none"> • No surveys completed

Map and Participant Selection

Below is a map of Ecuador.

Each of the five coastal provinces are highlighted.



120+

Fishermen interviewed at various ports

3

Provinces adequately interviewed

56

Surveys in this analysis

Participant Selection

Once study sites were determined, the team began site visits. Visits occurred prior to and after the middle of the day (approximately before 11am and after 3pm). This prevented interview time from conflicting with fishermen's lunch and rest. Once a group of fishermen were found, often around their fibras or repairing nets, a team member introduced themselves and explained the purpose of the interview. Often, to establish rapport, discussions were had about the fisherman's life prior to asking for interview recording consent. This practice worked exceptionally well; only a few fishermen approached declined to be interviewed.

Elements of Study

Semi-structured interview

A **semi-structured format** was used to conduct the interviews. This allowed us to collect data in a methodical way while allowing for a **conversation-based**, less restrictive interaction with the fishermen. Advantages of semi-structured interviews are that they are a more "**natural**" **interaction** than formal interviews and allow for an exchange of information; disadvantages include the large amount of time spent interviewing and **sizable quantity of data with which to work**. [9] These interviews were **recorded** on smartphones and given unique identifiers to ensure no names were associated with the data.

Photography – of fishermen

Artisanal fishermen are often seen as a **faceless**, singular group. We took portraits of fishermen to remind readers that this group is full of **unique individuals**, each with stories and opinions. We took photos of fishermen's hands at work to remind readers that this is a **proudly manual labor**, one that requires patience and long hours, and leaves callouses and scars with their own tales to share. Photos of fisherme are shared throughout this report.

Photography – by fishermen

Another aspect of this project was lending **water-submersible cameras** to the fishermen to see, through photos and videos, what a **day in the life** of an Ecuadorian artisanal fisherman looks like. This aspect was inspired by the Fish Forever program at **Rare**, an organization that uses **behavior-centered design** to work at the community level to improve sustainable fishing for oceans and fishermen alike. [10] In community projects, it is integral for **community members** to have the ability to **participate** with ease, as well as having that participation be appreciated. [11] Interspersed throughout this report are photos that fishermen took at sea and from the ports, with credit given, as one way in which the fishermen interviewed were able to contribute to this project.

Data analysis

Interviews were listened to, and each question's response was **entered into Excel**. After rounds of **coding** for words and thoughts, simple averages and counts were taken to determine the percentages of different response types given to the various survey questions.

Survey Questions

OBJECTIVES	QUESTIONS
<p>1: Understand the relationship between fishermen and the ocean</p>	<ul style="list-style-type: none"> • 1.1: In what ways is the ocean important to you? • 1.2: How do you think your fellow fishermen think about the ocean?
<p>2: Understand how fishermen define "conservation"</p>	<ul style="list-style-type: none"> • 2.1: What does the idea of "marine conservation" mean to you?
<p>3: Understand the conservation priorities of fishermen</p>	<ul style="list-style-type: none"> • 3.1: How do you think the ocean of today is different from that of 50 years ago or when your grandparents fished? • 3.2: Why do you think these changes have occurred? • 3.3: How do you want the ocean to be for your children and grandchildren? • 3.4: What needs to happen now to ensure that the ocean is that way in the future? • 3.5: What role could you play to guarantee that those steps occur?
<p>4: Understand the relationships between fishermen and common marine megafauna</p>	<ul style="list-style-type: none"> • 4.1: In what ways, if any, are the animals in the ocean important to you? • 4.2: What is your perspective on sea turtles? Why? • 4.3: What is your perspective on sharks and rays? Why? • 4.4: What is your perspective on dolphins? Why? • 4.5: What is your perspective on seabirds? Why?



Survey Questions, cont.

OBJECTIVES

5: Understand how fishermen feel about fishing technologies and governmental fishing policies and regulations

QUESTIONS

- 5.1: To what extent do you think that bycatch is a problem when you fish? Is it a problem for your fellow fishermen? Is it a problem in Ecuador in general?
- 5.2: To what extent does bycatch impact you financially? How so?
- 5.3: To what extent does bycatch influence where you choose to fish? How so?
- 5.4: To what extent do you think the addition of LED lights to fishing nets would be effective to reduce bycatch? Why?
- 5.5: How likely would you be to use LED lights? Why?
- 5.6: Under what circumstances would you consider using LED lights on your fishing line?
- 5.7: To what extent do you think Marine Protected Areas (MPAs) are an effective conservation tool? Why?
- 5.8: How likely would you be to support an MPA in Ecuador? In your fishing area? Why?
- 5.9: Under what circumstances would you consider supporting an MPA in your fishing area?
- 5.10: To what extent would you like to participate if an MPA were being planned in your fishing area? Why?
- 5.11: To what extent do you think No Take Zones (NTZs) are an effective tool for conservation? Why?
- 5.12: How likely would you be to support an NTZ in Ecuador? In your fishing area? Why?
- 5.13: Under what circumstances would you consider supporting an NTZ in your fishing area?
- 5.14: To what extent would you like to participate if an NTZ were being planned in your fishing area? Why?
- 5.15: To what extent would you be interested in advising a group of scientist and/or government officials about the priorities of fishermen? Why?



Demographics

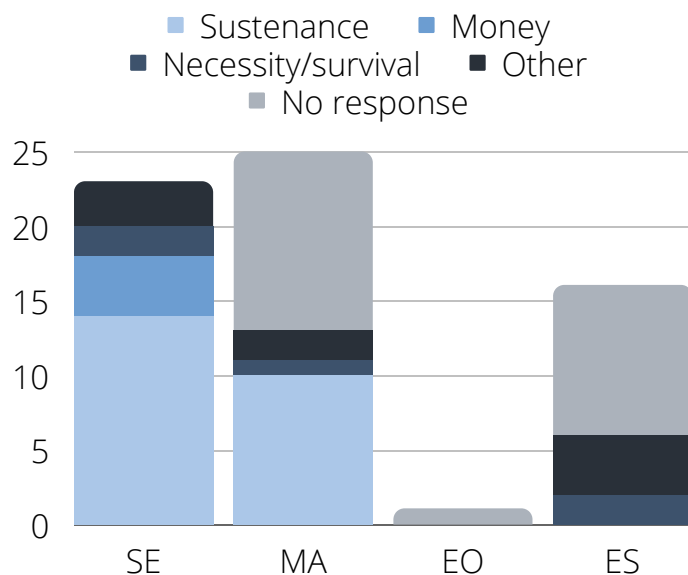
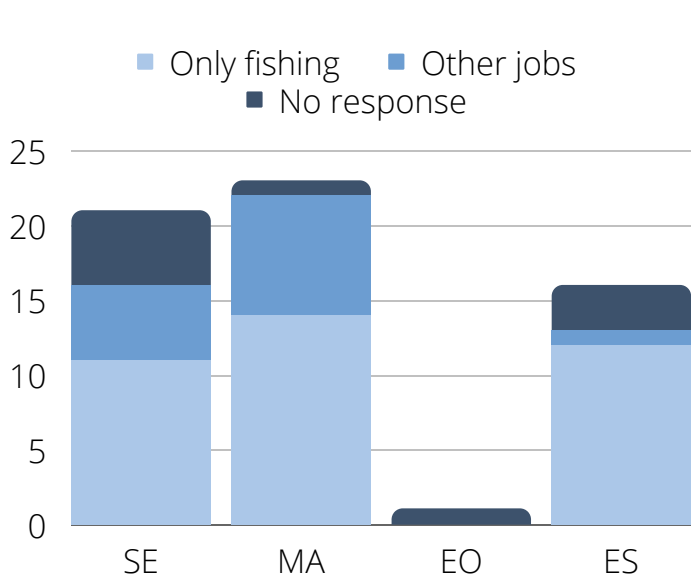
PROVINCE	# OF FISHERMEN SURVEYED	AVERAGE AGE*; AGE RANGE	AVERAGE # OF YEARS OF FISHING*; YEAR RANGE	# OF DEPENDENTS**; NUMBER RANGE
SE	n = 16	52; 20-69	32; 7-55	6; 1-20
MA	n = 23	41; 21-63	24; 4-41	6; 2-30
EO	n = 1	52; 52	40; 40	6; 6
ES	n = 16	41; 28-63	27; 10-50	10; 3-30
All provinces (in this sample):	n = 56	45; 20-69	27; 4-55	7; 1-30

*Rounded to nearest whole number

**Dependents could be family or community members; could be dependent on food or money

In total, 120 fishermen were interviewed for this study. As this study is ongoing, this research summary looks at a subset of 56 of those fishermen's interviews. The 56 were chosen randomly with a random number generator. The **average age** of fishermen in this sample was **45**, with a range of 20 to 69 years of age (four people did not provide their age). The **average number of years spent fishing artisanally was 27**, with a range of 4 to 55 years spent fishing (3 fishermen did not provide the number of years for which they have been fishing). The **average number of dependents for a single fisherman was 7**, with a range of 1-30 (6 fishermen did not provide this information; two said "community," and this was interpreted as at least 10 dependents for the analysis). Refer to the above table for a breakdown of age, average number of years fishing and number of dependents of each fisherman per province.

Demographics, cont.



In SE, the majority of fishermen reported that their **main reason for fishing is for sustenance**. Other reasons included to make money and that it is the only option. In MA, the majority did not respond to the question, but of those who did, sustenance was the prevailing motivation. In EO, the question was not answered. In ES, the majority did not answer. Those who did reported fishing for survival and because they are a community of fishermen.

69% of fishermen in SE, 61% in MA and 75% in ES reported **fishing being their only form of work**. In total, 2/3 of the fishermen in this sample depend only on fishing as their main source of income and/or food. Other jobs fishermen stated they do across the provinces included being an NGO leader, fixing boats, masonry, storekeeping, construction, tourism, agriculture and taxi driving. Ten people did not respond, including the one EO fisherman.

68%

of the sample of fishermen come from families with at least one other member who fishes. 20% come from non-fishing families, and 12% chose not to respond.



FINDINGS +
DISCUSSION

Objective 1: Understand the relationship between fishermen and the ocean

Question 1.1: In what ways is the ocean important to you?

Provisioning Ecosystem Services

77% of fishermen reported that the ocean is important because it provides **resources** and **sustenance** for them and their communities, impacting financial and food security and their local economy.

Some quotes:

"We are, because of the ocean."

"[The ocean] is important because that is where the resources for each day and each human come from."

Cultural Ecosystem Services

36% of fishermen reported that the ocean is **culturally** important to them for **religious**, spiritual and **generational** reasons. Some reported that the sea provides them **entertainment** and joy.

Some quotes:

"The sea is like family."

"The sea was created by the Lord Jesus Christ, and we were also created by the Lord Jesus Christ."

Inherent Value and Beauty

23% of fishermen stated the ocean is **inherently** beautiful and **valuable**, especially to the **species** within the ocean. This value is non-financial and often specific to the individual, separate from cultural norms.

Some quotes:

"The sea is a god; it is something religious, something good, something cool."

"I have loved the ocean since I was a child."

Question 1.2: How do you think your fellow fishermen think about the ocean?

52%

of the sample of fishermen believe their fellow fishermen think about the ocean similarly; 25% believe their colleagues think differently; the remainder were unsure or did not answer.

Objective 2: Understand how fishermen define “conservation”

Question 2.1: What does the idea of marine conservation mean to you?

MARINE CONVERSATION MEANS...	HOW MANY FISHERMEN SHARED THIS ANSWER?	EXAMPLE ANSWERS:
Focusing specifically on preserving and protecting species.	Total: 44% (24/56) SE: 50% (8/16) MA: 57% (13/23) ES: 19% (3/16)	<ul style="list-style-type: none"> • Not fishing protected species • Protecting the ocean • Having off-seasons for species reproduction
Fishermen taking individual measures to protect the ocean and its resources.	Total: 41% (23/56) SE: 38% (6/16) MA: 52% (12/23) ES: 31% (5/16)	<ul style="list-style-type: none"> • Not polluting • Not fishing small-sized organisms • Reducing bycatch
Fishing communities taking measures together to protect the ocean and its resources.	Total: 32% (18/56) SE: 56% (9/16) MA: 17% (4/23) ES: 31% (5/16)	<ul style="list-style-type: none"> • Helping with research studies • Cleaning up/not littering • Teaching/learning from each other
The government and authorities taking measures to protect the ocean and fishermen and enforce existing laws.	Total: 41% (23/56) SE: 64% (10/16) MA: 39% (9/23) ES: 25% (4/16)	<ul style="list-style-type: none"> • Regulating industrial fishermen • Protecting artisanal fishermen • Creating marine reserves

Objective 3:

Understand the conservation priorities of fishermen

Question 3.1: How do you think the ocean of today is different from that of 50 years ago or when your grandparents fished?

When asked this question, fishermen gave answers that fit within five general categories (with many fishermen giving more than one answer):

1. **86%** said there are **fewer target fish**.
2. **46%** said fishing as a livelihood is more **challenging and dangerous**.
3. **41%** said there are more **threats** to the greater **ocean ecosystem**.
4. **21%** said the attitudes and actions of some **fishermen** are **not respectful** of marine resources.
5. **9%** said that **technologies** and **conservation** measures have **improved** both resource abundance and fishing practices.



Question 3.2: Why do you think these changes have occurred?



88% say these changes are due to **anthropogenic ocean degradation**



38% say these changes are due to **inadequate government/authority/scientist** protection



14% say these changes are **natural or climate phenomena**

It is critical to note here that 45% of all answers commented on **exploitation of marine resources by industrial fishermen**. As one fisherman stated, "We cannot compete between the artisans and the industrials because a[n industrial] boat in one night can capture what an artisan catches in a decade."

Objective 3:

Understand the conservation priorities of fishermen (cont.)

Question 3.3: How do you want the ocean to be for your children and grandchildren?

46% (26/56) of fishermen across the provinces want the **ocean to be better, generally**. For those who gave more specific answers:

- 30% (17/56) want an ocean **healthy** and full of fish and **resources**.
- 7% (4/56) want the government and authorities to create a **safe fishing** environment for artisanal fishermen.
- 4% (2/56) want for greater **artisanal fishermen autonomy** and voice, from designing policies to determining tourist sites.

It is worth noting that 11% (6/56) of fishermen responded that they **do not want their future generations to be fishermen** (SE, MA and ES provinces).



Question 3.4: What needs to happen now to ensure that the ocean is that way in the future?

- 61% (34/56) answered that **new policies must be created** and enforced to protect both artisanal fishermen and the ocean.
- 59% (33/56) stated that **existing policies and laws need to be enforced** to increase safety for artisanal fishermen and marine species.
- 11% (6/56) of fishermen think that **scientists need to work more closely** with fishing communities to **educate** and **engage**
- 38% (21/56) think communities (more broadly) need to come together to take **communal action**

Objective 3:

Understand the conservation priorities of fishermen (cont.)

Question 3.5: What role could you play to guarantee that those steps occur?

WHAT ROLE(S) COULD YOU PLAY?	HOW MANY FISHERMEN SHARED THIS ANSWER?	EXAMPLE ANSWERS:
Take individual actions while fishing to keep local ecosystems healthy.	Total: 64% (36/56) SE: 44% (7/16) MA: 91% (21/23) ES: 50% (8/16)	<ul style="list-style-type: none"> Collecting trash from the ocean and rivers Respecting the off-season Being an example Voting
Take actions within the fishing community to hold each other accountable for ocean protection.	Total: 20% (11/56) SE: 25% (4/16) MA: 26% (6/23) ES: 6% (1/16)	<ul style="list-style-type: none"> Helping create an MPA Unifying boat captains Actively preserving the local fishing areas
Take actions within the broader community to share knowledge, experiences and thoughts on preserving local resources.	Total: 13% (7/56) SE: 19% (3/16) MA: 13% (3/23) ES: 6% (1/16)	<ul style="list-style-type: none"> Talking to family and friends Teaching children not to litter Helping to create more trash receptacles
Could not play any role; it is up to the government, or nothing can be done.	Total: 4% (2/56) SE: 13% (2/16) MA: 0% (0/23) ES: 0% (0/16)	<ul style="list-style-type: none"> Nothing - it won't get better Government has to protect fishermen

Objective 4:

Understand the relationships between fishermen and common marine megafauna

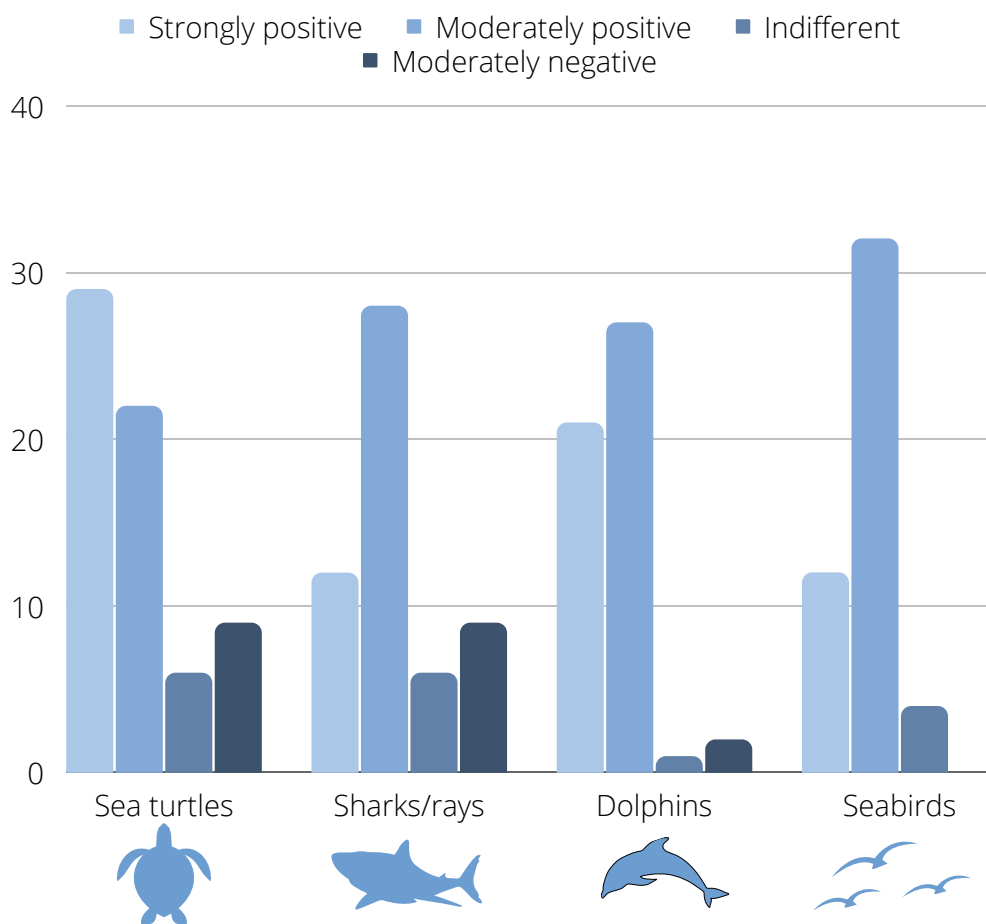
Question 4.1: In what ways, if any, are the animals in the ocean important to you?

HOW ARE ANIMALS IN THE OCEAN IMPORTANT TO YOU?	HOW MANY FISHERMEN SHARED THIS ANSWER?
They provide resources, food and financial stability.	Total: 30% (17/56) SE: 25% (4/16) MA: 48 (11/23) ES: 13% (2/16)
They are inherently beautiful/intelligent/good and therefore deserve respect.	Total: 25% (14/56) SE: 25% (4/16) MA: 35% (8/23) ES: 13% (2/16)
They play important roles in their local ecosystems.	Total: 23% (13/56) SE: 25% (4/16) MA: 17% (4/23) ES: 31% (5/16)
They are important to the existence of artisanal fishermen and future generations.	Total: 9% (5/56) SE: 13% (2/16) MA: 9% (2/23) ES: 6% (1/16)

"[Marine animals] are living beings too – they have the right to life."

Objective 4: Understand the relationships between fishermen and common marine megafauna (cont.)

Question 4.2–4.5: What is your perspective on sea turtles (4.2); sharks/rays (4.3); dolphins (4.4); and seabirds (4.5)?



Sea turtles: strongly positive (52%; 29/56), moderately positive (39%; 22/56); indifferent (4%; 2/56); moderately negative (4%; 2/56). **Sharks/rays:** strongly positive (21%; 12/56); moderately positive (50%; 28/56); indifferent (11%; 6/56) moderately negative (16%; 9/56). **Dolphins:** strongly positive (38%; 21/56); moderately positive (48%; 27/56); indifferent (2%; 1/56); moderately negative (4%; 2/56). **Seabirds:** strongly positive (21%; 12/56); moderately positive (57%, 32/56); indifferent (7%; 4/56).

Objective 5:

Understand how fishermen feel about fishing technologies, policies and regulations from the government

Question 5.1: To what extent to you think that bycatch is a problem when you fish? Is it a problem for your fellow fishermen? Is it a problem in Ecuador in general?

BYCATCH IS...	HOW MANY FISHERMEN SHARED THIS ANSWER?
A problem for Ecuadorian fishermen and fishing communities.	Total: 32% (21/56) SE: 75% (12/16) MA: 17% (4/23) ES: 6% (1/16)
Only sometimes a problem, and it depends on fishing location, season, type of animal and type of fishing.	Total: 38% (21/56) SE: 38% (6/16) MA: 22% (5/23) ES: 63% (10/16)
Not a problem in Ecuador.	Total: 38% (21/56) SE: 0% (0/16) MA: 65% (15/23) ES: 38% (6/16)

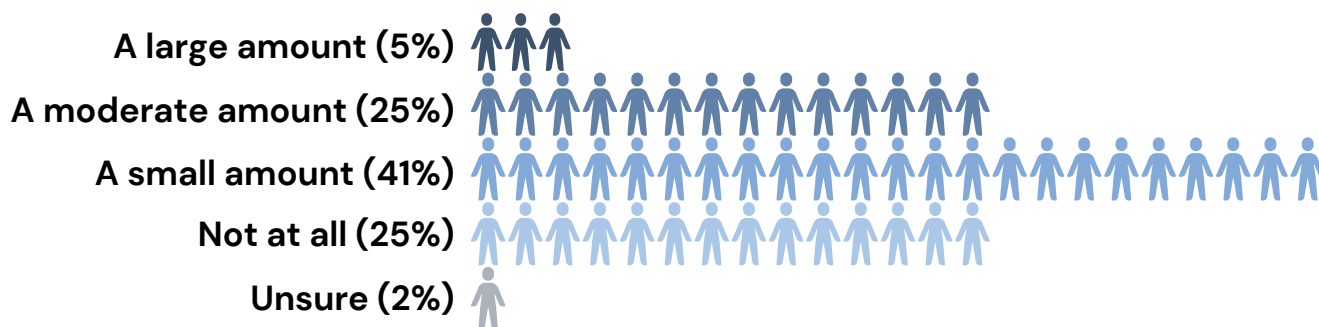


A pelican swims over a gillnet as the fishermen pull in their catch for the day. Seabirds often become entangled in nets.

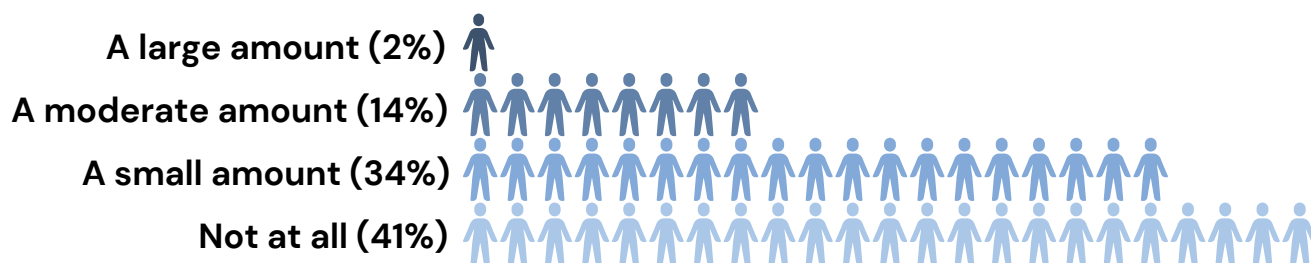
Photo by fishermanDon Jhonny

Objective 5: Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.2: To what extent does bycatch impact you financially?



Question 5.3: To what extent does bycatch influence where you choose to fish?

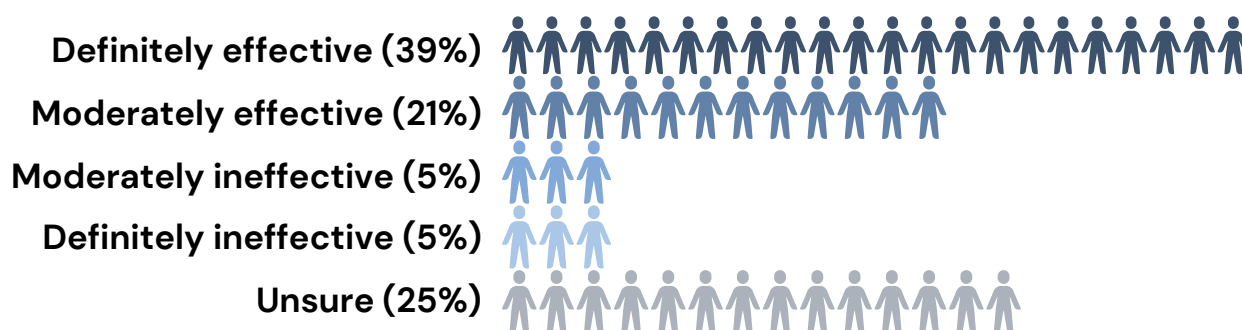


A deceased green sea turtle lies on a beach in Puerto López. The team determined this turtle likely drowned in a fishing net before being released and washing ashore.

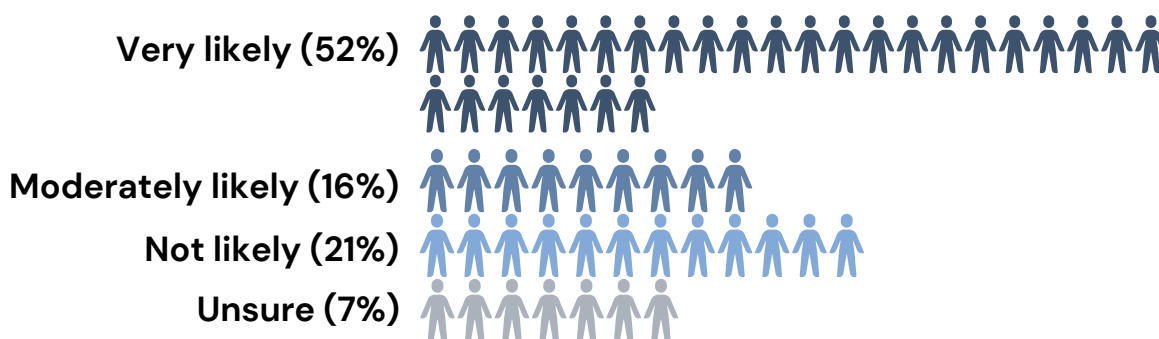
Objective 5:

Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.4: To what extent do you think the addition of LED lights to fishing nets would be effective to reduce bycatch?



Question 5.5: How likely would you be to use LED lights?



"If we don't see it, we won't believe it." Many fishermen showed interest in LED lights in theory, but were skeptical of their utility. Moreover, many fishermen who do not use gillnets do not see the need for LED lights for their fishing art.

Objective 5:

Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.6: Under what circumstances would you consider using LED lights on your fishing line?

UNDER WHAT CIRCUMSTANCES WOULD YOU CONSIDER USING LED LIGHTS ON YOUR FISHING LINE?	HOW MANY FISHERMEN SHARED THIS ANSWER?
<p>I would <u>always</u> use them, under any condition.</p>	<p>Total: 7% (4/56) SE: 13% (2/16) MA: 9% (2/23) ES: 0% (0/16)</p>
<p>I would only use them conditionally (e.g. if catch was not impacted, if fishermen could test them first, if there were no piracy dangers, etc.).</p>	<p>Total: 63% (35/56) SE: 75% (12/16) MA: 35% (8/23) ES: 94% (15/16)</p>
<p>I would <u>never</u> use them, under any condition.</p>	<p>Total: 20% (11/56) SE: 6% (1/16) MA: 43% (10/23) ES: 0% (0/16)</p>

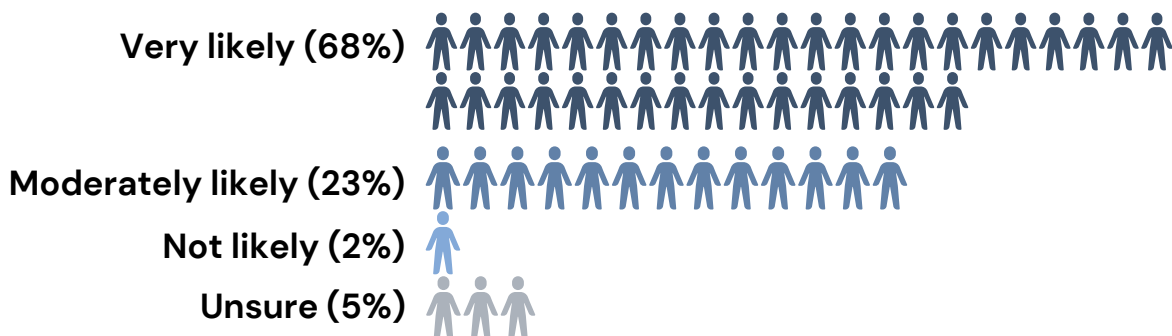


Objective 5: Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.7: To what extent do you think Marine Protected Areas (MPAs) are an effective conservation tool?



Question 5.8: How likely would you be to support an MPA in Ecuador? In your fishing area?



Objective 5:

Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.9: Under what circumstances would you consider supporting an MPA in your fishing area?

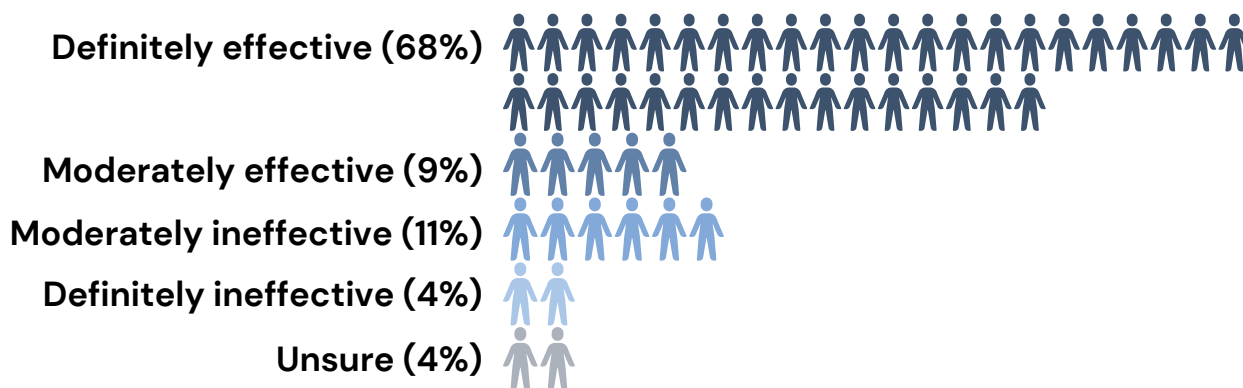
UNDER WHAT CIRCUMSTANCES WOULD YOU CONSIDER SUPPORTING AN MPA IN YOUR FISHING AREA?	HOW MANY FISHERMEN SHARED THIS ANSWER?
I would <u>always</u> support one, under any condition.	Total: 27% (15/56)
I would only support one conditionally (e.g. if benefits fishermen, if protected properly, if helped the economy, etc.).	Total: 59% (33/56)
I would <u>never</u> support one, under any condition.	Total: 2% (1/56)

Question 5.10: To what extent would you like to participate if an MPA were being planned in your fishing area?

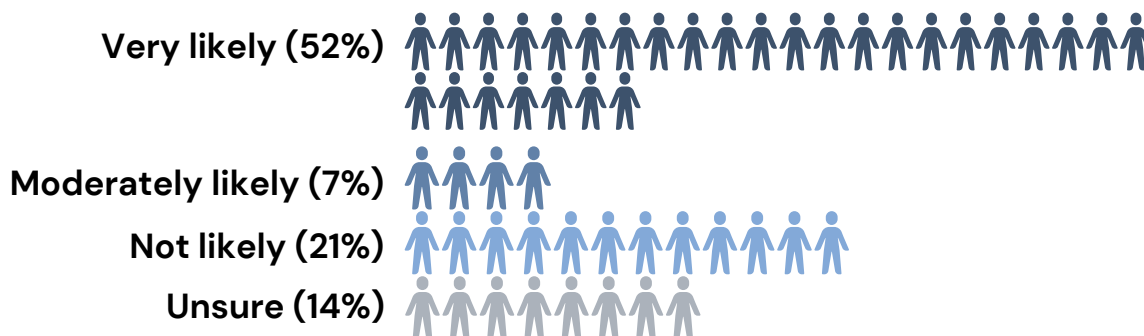


Objective 5: Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.11: To what extent do you think No Take Zones (NTZs) are an effective tool for conservation?



Question 5.12: How likely would you be to support an NTZ in Ecuador? In your fishing area?



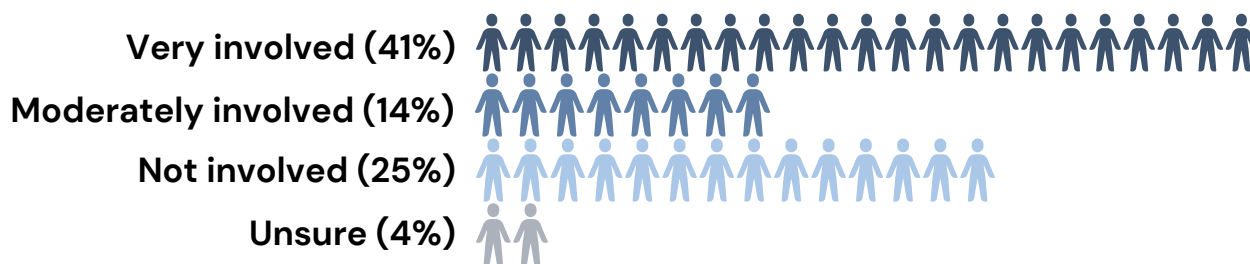
Objective 5:

Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.13: Under what circumstances would you consider supporting an NTZ in your fishing area?

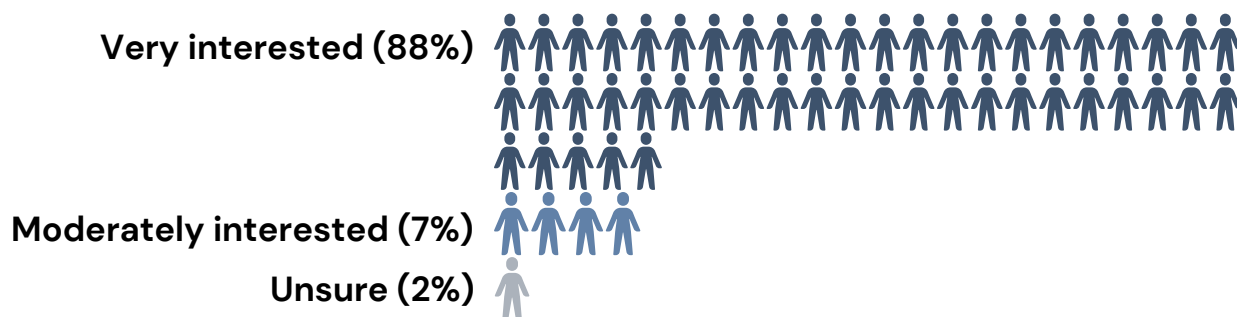
UNDER WHAT CIRCUMSTANCES WOULD YOU CONSIDER SUPPORTING AN NTZ IN YOUR FISHING AREA?	HOW MANY FISHERMEN SHARED THIS ANSWER?
I would <u>always</u> support one, under any condition.	Total: 13% (7/56)
I would support one conditionally (e.g. if scientific studies are done, if other work is provided, if controlled, etc.).	Total: 55% (31/56)
I would <u>never</u> support one, under any condition.	Total: 13% (7/56)

Question 5.14: To what extent would you like to participate if an NTZ were being planned in your fishing area?



Objective 5: Understand how fishermen feel about fishing technologies, policies and regulations from the government (cont.)

Question 5.15: To what extent would you be interested in advising a group of scientists and government officials about the priorities of fishermen?



For province breakdown of this question, see Appendix 23



Discussion

General Notes:

Response percentages are broken down into provinces for many questions and can be found in the Appendices section. We only interviewed one person in El Oro before it became unsafe for the team to continue. There are many questions that the fisherman in El Oro did not answer; for that reason, many tables and charts in both the Findings and Appendices sections do not have data from that province at all. Finally, fishermen were able to give multiple answers for all questions that did not use a Likert scale. Therefore, the percentages often do not add up to 100 in the tables and graphs found throughout the report.

Objective 1: To understand the relationship between fishermen and the ocean

Question 1.1: The majority of fishermen reported that the ocean is important from a service provisioning standpoint. Common answers across the provinces were that the ocean provides food and a job. Those two reasons often preceded any other reason. This question often had to be clarified by stating that fishermen could answer from standpoints apart from economic and/or sustenance importance, including religious, spiritual, familial or cultural standpoints. This led many to recount stories of their childhoods in fishing families or discuss their perceived connections between religion (often Catholicism) and the ocean. It is interesting to note here that although fishermen were described to the team as "men of few words" by fishermen and non-fishermen alike, we found that the semi-structured interview style led to profound discussions, with many fishermen keen to share their stories and experiences.

Question 1.2: Over half of the fishermen stated that they believe their fellow fishermen think the same way they do about the ocean. This trend remained across the provinces – each had at least 50% respond that their colleagues think as they do about the ocean, whether that is from a provisional, cultural or respect viewpoint. For those who believe their fellow fishermen think the same, the answer was often a simple, "Of course; we are all fishermen." One fisherman elaborated, "In the ocean, when you go out to work, [the ocean is] company. Because if not, it's just the water of the ocean and you don't have anything [else]." For those who disagreed that all fishermen think the same way about the ocean, the majority commented that not everybody thinks alike, and it is impossible for them to know how their colleagues think.



Discussion, cont.

Objective 2: To understand how fishermen define “conservation”

Question 2.1: Many fishermen answered this question with a "traditional" response: conservation means preserving and protecting species. A few listed out specific species they believe should be protected (e.g. certain fish species, hammerhead sharks, turtles). In all three provinces, at least one fisherman brought up that governmental conservation policies often seemed to be at the expense of artisanal fishing. For example, one fisherman acknowledged that while he understands that fishing off-seasons allow for species to reproduce and mature, the lengths of these seasons seem arbitrary and are not explained well to fishermen. During those off-season months, multiple fishermen reported that they become financially insecure and/or food insecure. Another point of contention between the government and artisanal fishermen revolves around the perceived leniency given to industrial fishermen. According to many artisanal fishermen, industrial fishing boats are indiscriminate in their catch, killing both immature and mature fish individuals and having large amounts of bycatch in the process. Nonetheless, the Ley de Pesca and authorities seem to give industrial fishermen passes to continue fishing this way. Artisanal fishermen consequently report questioning why they are fined heavily for surpassing their catch quota or catching an endangered species when their actions are negligible compared to those of industrial fishermen. These two examples highlight common frustrations within coastal fishing communities and illuminate some reasons for artisanal fishermen's failing faith in governmental conservation policies.

The remaining answers to this question were bucketed in three ways: taking individual action, taking community action, and governmental action:

- Individual actions mostly centered around sustainable fishing practices, such as not littering plastics while at sea, not dumping excess fuel in the ocean and respecting off-seasons and catch limits. One fisherman in Esmeraldas commented on the importance of "self-educating" on topics of species conservation using the vast amount of educational resources available on the internet.
- Community actions included beach cleanups and raising awareness about local, national and international ocean issues. Only one fisherman mentioned working more closely with the authorities as a community to prevent problems from getting worse; no fishermen mentioned wanting conservation as a joint endeavor between their communities and the government.
- Governmental action had two major responses: limiting the power of industrial fishermen and ensuring that authorities protect artisanal fishermen and fishing areas, including MPAs, actively and consistently. This will be further explored in the discussion for Objective 3.



Discussion, cont.

Objective 3: To understand the conservation priorities of fishermen

Question 3.1: The overwhelming response to the question of how the ocean has changed over the last 50 years can be summed up in a quote from one of the fishermen: "Fewer fish, more boats." 86% of fishermen across the provinces reported a noticeable decrease in their target fish – and this was the most prominent response within each province. Along those lines, many fishermen stated that they now:

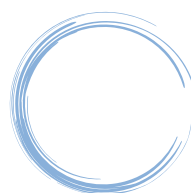
- Have to travel further to fish ("Now you have to go out 100, 120 miles to find fish, and sometimes there is nothing");
- Have to fish for longer periods of time ("There was so much fish [in the past] and I couldn't lift the nets... [now we spend] more time fishing, and we catch less");
- Have noticed local extinctions of certain fish species ("Species like the chucuaca and cabezudo [have] disappeared," noted a fisherman in Esmeraldas)

One fisherman commented in despair about the decline in fish, "How are you going to return home without food?"

Nearly half of the fishermen also reported that fishing has become more challenging and dangerous. The root cause for this is an increase in piracy over the last half decade. We heard countless stories of fishermen being targeted for their motors, fuel, fishing gear, catch, and technology. We also heard far too many stories of the increase in violence against artisanal fishermen at the hands of pirates, particularly if the fishermen refused to acquiesce to the pirates' demands. The fisherman interviewed in Esmeraldas still has bullet fragments in his body from a recent homicide attempt at sea. Others spoke of murdered family members and colleagues at the hands of pirates, and a few said they did not want to be photographed out of fear of violence from pirates if they were being watched.

Others reported that there are more threats to the ocean ecosystem. One fisherman commented that the rivers in Manabí bring "pure mud and trash" into the ocean; in Santa Elena, a fisherman called what is happening to the ocean a "total crisis." This crisis is often due to a lack of awareness and/or respect from fishermen, according to 41% of our sample of fishermen. One fisherman told of his colleagues catching turtles and claiming them as bycatch, "even though it was not accidental."

Finally, while a few fishermen talked about the woes of changing technologies ("in the past, fishermen fished with a hook"; "some [technologies] are like science fiction"), some fishermen did note that different arts of fishing are improving with technology "each day."



Discussion, cont.

Objective 3: To understand the conservation priorities of fishermen (cont.)

Question 3.2: After being asked how the ocean has changed, we asked the fishermen why they believed those changes had occurred. The majority listed a variety of anthropogenic threats to the ocean, such as:

- The decimation of local fish populations by industrial boats, often comparing the tonnage caught by an industrial ship in one night to that of their small boats in a few weeks/a month
 - For example, a Manabí fisherman said, "In 22 days, a small artisanal boat can catch 30 tons, but an industrial boat can catch 1,000 tons in one night."
- Too many boats on the water, especially industrial boats
- Exploitation of fish, especially small fish, and overfishing
- Irresponsible local and national tourism
- Fishermen not respecting off-season restrictions
- General law-breaking and disrespect, especially in MPAs

Over 1/3 of fishermen also commented on their perceived failure of the government, authorities and scientists to uphold laws, protect artisanal fishermen and engage fishing communities. Specifically, fishermen have shared that "we don't have fishing control by the authorities," "park rangers do nothing, and "there are no workshops" by scientists to work with fishermen on marine issues. A final 14% attributed these changes to natural or climate phenomena, including earthquakes, changes in wave patterns, dried up rivers, and nature's tendency to "protect herself" by moving fish further away from the shore.

Question 3.3: The response to this question was almost invariably, "Better." For older fishermen, a common response was "like it was before," or "how it used to be." Nearly half of the fishermen elaborated further, calling for "abundance," "richness" and "healthiness." A few called for greater government involvement, saying "the authorities are the ones who have to take action; they have the financial resources to [do] what is needed." Across all provinces, at least one fisherman reflected that they would not want their children or grandchildren to be involved with artisanal fishing at all.



Discussion, cont.

Objective 3: To understand the conservation priorities of fishermen (cont.)

Question 3.4: The responses to the question about what must happen now to create a healthier ocean broadly centered around policy and community. Over half of the fishermen called for new policies to be not only created, but strongly enforced. New policies are needed to protect both artisanal fishermen and the ocean. Marine conservation without measures to protect those who depend on the ocean doing only half the work. After all, as one fisherman pointed out, "You can't take away the fishermen [from the sea.]" Over half of the fishermen also called for existing policies and laws to be better enforced, especially to increase safety for artisanal fishermen. Specifically, fishermen called for more legal enforcement of industrial shrimp and tuna boats because "the industrials do not get tired" and continue to fish in great quantities.

11% of fishermen think that scientists need to work more closely with fishing communities to educate and engage, with one fisherman stating, "Environmentalists should give talks - that's the bottom line." 38% think communities (more broadly) need to come together to take communal action. As one fisherman pointed out, "If we don't do it ourselves, no one will do it for us." The responses were similar across all the provinces.

Question 3.5: Many of the answers to the previous question called for policy and regulation change in favor of artisanal fishermen. When asked what actions they could personally take to play a role in bettering the health of the ocean, the majority of fishermen focused on their roles as responsible fishermen. This included actions like removing trash from the ocean and beaches, collecting ghost nets as they come across them and respecting the off-season. The focus on individual actions was particularly strong in Manabí, where nearly every fisherman commented on their own role in conserving the ocean. Fishermen also commented on the power of acting as a community, both as fishing communities and coastal communities, more generally. A Santa Elena fisherman commented that he can "try to guide people [in his community] who are not aware" of marine issues. Fishermen from Manabí noted that they could "[promote] an example that change is possible, because change comes from ourselves" and that everyone can "talk to their family and friends" to raise communal awareness. A few fishermen also said they would support environmental education in their communities, especially for children. While those fishermen said they would gladly serve as examples in their communities, they acknowledged that workshops for fishermen and the community at large would be helpful.



Discussion, cont.

Objective 4: To understand the relationships between fishermen and marine animals

Question 4.1: The question of "In what ways are the animals in the ocean important to you" elicited confusion for many fishermen and was a question with fewer responses. Most answered that animals are important for food and financial stability. When we clarified that this question included non-target species, such as turtles or dolphins, fishermen answered in one of two ways: 1) again, that marine animals are important as food and/or resources or 2) the fishermen shared a story about a specific animal and expounded on the non-financial importance of oceanic fauna. These stories were often accompanied by the word "animalito," which is the Spanish diminutive form of the word "animal" and is used as a term of endearment. A quarter of the fishermen responded by discussing how ocean animals deserve respect. These answers either stated that animals, as beautiful living beings, inherently deserve respect and to live, or that animals, as creations of God, deserve to live. One fisherman commented that "[marine animals] give life to the ocean." Another noted that while some animals (like sea turtles) can be nuisances, "We are in their habitat; we cannot complain."

Nearly a quarter of the fishermen also shared that they believe animals to be important for the roles they play in the ocean. A fisherman from Santa Elena said that "every [animal] is important, from the turtles to the small fish, because each one plays a role in the ecosystem." A fisherman in Manabí shared that he heard about small animals in some places that clean bigger animals and are not eaten by those larger animals, after which we talked about other instances of mutualism and he excitedly wrote down the word "symbiosis" in his phone to research it further. Even when the primary importance of marine animals for fishermen was from a resource perspective, some fishermen acknowledged the connection between non-target species and other animals. For example, one fishermen noted that "[animals] are important because they all serve the food chain." A few fishermen also noted that conservation of ocean organisms is critical now for both future fishing generations and artisanal fisheries in the future. Only a couple of fishermen mentioned the importance of some animals, such as turtles and sharks, in curative medicine practices. These fishermen were from older generations, when practices of bleeding live turtles to cure ailments and making medicines from sharks were more common in Ecuador.



Discussion, cont.

Objective 4: To understand the relationships between fishermen and marine animals (cont.)

Question 4.2–4.5: These questions often brought up impassioned stories, either of appreciation or disgust, about certain animal species.

Sea turtles: 91% of fishermen have either strongly or moderately positive perspectives of sea turtles. It is important to note that some of these perspectives are positive because the fishermen enjoy eating turtle meat or use turtle oil as medicine. Some fishermen are parts of groups who actively care for turtles; in fact, some already use LED lights to dissuade turtles from entangling in their nets. One fisherman, who stated that he did not care about marine animals initially, admitted that "[sea turtles] look very pretty when the water is clear." Many fishermen were quick to say that they always release accidentally caught sea turtles from their nets, even though some of these same fishermen later stated they do not consider bycatch to be a problem (and perhaps it is a rare enough occurrence that it is not a problem for them). The sole fisherman in El Oro said he has seen artisanal fishermen kill sea turtles with sticks. This practice is done because it is easier and takes less time to cut a dead sea turtle out of a net than disentangle a live one.

Sharks and rays: 71% of fishermen have either strongly or moderately positive perspectives of sharks and rays, though the majority hold moderately positive perspectives. Nearly half of the sample of Santa Elena fishermen stated that they had moderately negative perspectives of sharks. Their reasons included "because they bite," "because they come close when there is blood in the water" and that sharks can do damage to nets if they are not released in time. Many commented that when they catch sharks as bycatch, they prefer to eat or sell them instead of "wasting" the meat by throwing the shark back in the ocean, and for that reason have a moderately positive perspective of them as a source of food or income. A couple fishermen commented on foreign boats, especially from China, killing vast amounts of sharks for their fins.

Dolphins: 86% of fishermen have either strongly or moderately positive perspectives of dolphins. Common descriptors included that they are marvels, goofy, intelligent, pretty, spectacles, "drunk fish," like dogs and don't hurt anyone. A few fishermen commented that dolphins sometimes steal fish and are nuisances. In Esmeraldas, many fishermen commented that they no longer see dolphins in their fishing areas, though they did in the past.

Seabirds: 79% of fishermen have either strongly or moderately positive perspectives of seabirds. Few offered reasons why, other than that they are animals that must be protected and that it is fun to feed fish to the pelicans and frigatebirds.



Discussion, cont.

Objective 5: To understand how fishermen feel about fishing technologies and governmental policies and regulations

Question 5.1: When asked about bycatch, a third of fishermen reported it being a problem for Ecuadorian fishermen and fishing communities. While the spread of answers to all survey questions had been relatively evenly split until this point (except where noted), in this case 75% of Santa Elena fishermen admitted bycatch is a problem, while only 17% did in Manabí and 6% did in Esmeraldas. In Manabí, many said that while they do catch non-target species, "it does not cost much to release them," "they always release the animals" or "it is not a problem, just an inconvenience." In both Manabí and Esmeraldas, many fishermen noted that while bycatch used to be a problem, there are not enough species left to accidentally catch. Specifically, there are fewer turtles, sharks and dolphins in their fishing areas. Accidental captures are now so infrequent for them not because of effective conservation measures, but because of declining local populations of key predators and keystone species in multiple fishing zones.

An ex-fisherman in Santa Elena brought up an interesting point about defining bycatch as a "problem" when he asked who determined that it was an issue to begin with? He said, "You always hear that there are "problems" within the fishing sector, but if you were to ask the fishermen if [bycatch is a] problem, they would say no - there are problems with the fridge, or the woman, but when you are with the sea, there are no problems. How can you have problems with the sea when you are doing the work that your family has always done?" This was reflected in answers fishermen gave about turtles and sharks. Prior to national and global initiatives to protect these species from extinction, these animals were part of the coastal diet and medicine cabinet. Now, because of local and foreign industrial overfishing in Ecuador's waters, the fisherman pointed out, artisanal fishermen are unable to consume and utilize species they have been using for centuries. This may lead to animosity from fishermen, who are unsure 1) why they are being penalized for overfishing that they do not partake in and 2) why the government is directing them to not fish for animals they and their families have fished for generations.

Question 5.2: Two-thirds of fishermen reported that bycatch impacted them only a small amount or not at all. Common answers for the third who answered that they were impacted by bycatch were: losing out on money by discarding bycatch they could not sell for fear of being fined (e.g. turtles and sharks), bycaught animals damaging their nets or bycaught animals eating their catch. The biggest damages reported were during whale migration season.

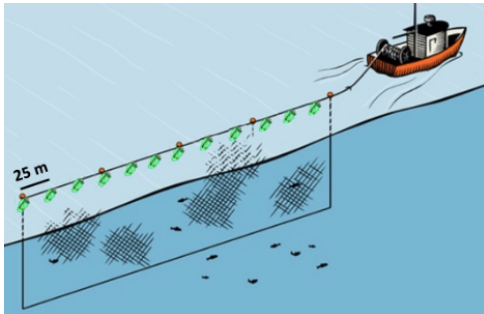


Discussion, cont.

Objective 5: To understand how fishermen feel about fishing technologies and governmental policies and regulations (cont.)

Question 5.3: Only one fisherman out of the whole sample said that bycatch strongly influenced where he fished. The major influence was whale bycatch; fishermen tend to avoid migration routes when whales are passing through the area. 75% of the sample reported bycatch only influenced where they fished a small amount or not at all. Further explanation was very limited for this answer. It appeared that for commonly bycaught animals, like sea turtles and sharks, fishermen did not change their fishing location. It should be noted that fishermen now have fewer options on where they fish, meaning that they must go further out to find fish and therefore may encounter more and different species as bycatch.

Questions 5.4 – 5.6: The questions regarding using LED lights on fishing line were prefaced with a brief description of what LED lights are and how they work, and each fisherman was shown the same diagram of LED lights on a gillnet (shown here). After this explanation, 60% of fishermen



thought LED lights could either definitely or moderately be effective in reducing bycatch, while 36% thought the lights would be ineffective or were not sure of their efficacy.

However, over two-thirds of fishermen said that they would be willing to try the lights. This was further explained in the question asking under what conditions they would use the lights. While four fishermen said they would always use the lights, two-thirds said they would only use them under certain conditions. Many wanted more proof, either from scientific studies or from their own trials. Others said they did not need proof, but would only use them if it was guaranteed that their catch numbers would not be impacted. Another common condition is if fishermen were either provided with a financial incentive to use the lights, or if the government subsidized the cost of the lights or gave them to artisanal fishermen for free. 20% of fishermen said they would never use the lights. Those who gave this answer either believe that these lights would not work for their fishing art (for example, some longline fishermen believing that the lights do not apply to their form of fishing), that the lights would signal their boat's location to pirates and they would be targeted, or because the lights would actually scare fish away. One fisherman commented that he has seen fish scared of the light of a cigarette butt, and therefore is certain fish would not enter his net with lights. Esmeraldas was evenly split between those who thought LED lights were effective to some extent and those unsure of their efficacy; the other two provinces had the majority of fishermen believing the lights to be at least somewhat effective.



Discussion, cont.

Objective 5: To understand how fishermen feel about fishing technologies and governmental policies and regulations (cont.)

Questions 5.7 – 5.10: As with the question about LED lights, the section of questions surrounding MPAs was prefaced with a brief explanation of what Marine Protected Areas (MPAs) are and how they function. Ecuador's coast contains many reserves. Even if fishermen do not live alongside an MPA, many are familiar with the Galápagos Islands, the marine reserve that surrounds them and associated restrictions within marine reserves. While the majority of fishermen from Santa Elena and Manabí believe MPAs to be an effective conservation tool, the majority of fishermen in Esmeraldas believe them to be moderately to definitely ineffective. However, across all three provinces, almost all the fishermen said they would be moderately to very likely to support an MPA. This seems to indicate that while fishermen in Esmeraldas find current MPAs to fail in their goals to support marine species, they see the potential in MPAs as a tool. This is supported by their reasons for why they believe MPAs to be ineffective: "nobody takes care of them," "nobody protects them" and "nobody controls them." Therefore, while fishermen in Santa Elena and Manabí may be more amenable to newly created MPAs in their fishing areas, a different approach should be taken in Esmeraldas by government officials, naval authorities and park rangers.

When asked under what circumstances fishermen would support an MPA in their fishing area, a quarter said that they would unconditionally support an MPA. As with the implementation of LED lights, the majority of fishermen gave conditions under which they would support an MPA. These included:

- If the MPA benefits them and their catch rates
- If industrial fishermen are effectively kept out of the marine reserves
- If species would be adequately protected by the creation of an MPA
- If the government considered reducing or getting rid of the off-season months
- If the park rangers do their jobs to protect the MPA and the species within it
- "As long as they don't forget about the [artisanal] fishermen" and if local fishermen are given opportunities to continue working in the MPA in a responsible manner

The majority of fishermen in Santa Elena and Manabí stated that they would like to be involved in some capacity if a new MPA was being planned in their fishing zone; however, 50% of the fishermen in Esmeraldas said they would not want to be involved, highlighting that more work will need to be done in that province to show the potential of properly managed MPAs as a conservation tool.



Discussion, cont.

Objective 5: To understand how fishermen feel about fishing technologies and governmental policies and regulations (cont.)

Questions 5.11 – 5.14: Initially, very few fishermen were familiar with the concept of a No Take Zone (NTZ). After understanding the differentiation between an MPA and an NTZ, 77% of fishermen thought that NTZs are either definitely or moderately an effective conservation tool. Interestingly, 69% of fishermen in Esmeraldas considered NTZs an effective tool compared with the 13% who thought MPAs are an effective conservation tool. Though over half of the fishermen across the provinces reported they would be likely to support an NTZ, only 7 out of 56 fishermen said that they would support an NTZ under any condition. When questioned specifically if they would support an NTZ in their area, over half said only under certain conditions. These conditions were similar to those provided for conditions under which an MPA would be supported and included:

- If the industrials are kept out of the NTZ effectively
 - One fisherman said of the government and authorities in this question that "the enemy of my enemy is my friend," meaning that while normally fishermen in his circle have conflict with authorities, if the industrials – the biggest enemy to artisanal fishing – are kept away from artisanal fishing areas and local fish nurseries, this could be an occasion for fishermen to form a working relationship with local authorities on an NTZ creation
- If fishermen are provided with job alternatives if they can no longer fish in their traditionally fished areas due to an NTZ creation
- If fishermen are given financial support for having to travel further if they can no longer fish in their traditionally fished areas
- If their catches are not impacted by the creation of an NTZ nearby
- If scientific studies are carried out that indicate an NTZ is necessary
- If his fishing cooperative/fishing community is in support of an NTZ

Over half of the fishermen surveyed said they would want to be involved in planning an NTZ to some extent. When asked why, only two fishermen commented. One said he would want to be involved to offer alternative views, or views from an artisanal fisherman that might not be considered otherwise. The other said that he would be interested in having dialogue with scientists and/or the government upon an NTZ proposal to see what reasons are provided.



Discussion, cont.

Objective 5: To understand how fishermen feel about fishing technologies and governmental policies and regulations (cont.)

Question 5.15: To the question of if they would want to be involved in advising a group of scientists and/or government officials about the priority of artisanal fishermen, 53 of the 56 fishermen in the sample said they would be interested in doing so, to some extent, with 49 stating they would be "very interested." One fisherman reported that he was not sure, and two fishermen, including the only fisherman surveyed from El Oro, did not give an answer.

This is perhaps the most important question of the survey, as it shows a willingness, across provinces, of fishermen to share their views on conservation and the path forward for marine resource protection. Some fishermen specified that they would be willing to help scientists, but not the government. Mistrust continues to run deep between fishermen and the government and local authorities. Therefore, the government should consider the roles scientists and NGOs, like The Leatherback Project, can play in the initial steps of opening conservation dialogues with fishing communities along the coast of Ecuador.



Discussion, cont.

Final comments: At the end of the survey, we asked fishermen if they had anything they wanted to add, clarify or share. Here are some of their answers:

"There is always talk of the 'fishing problem,' but I do not agree. **Fishing is a very noble activity**, as much as agriculture and other productive activities are that human beings have developed, ancestrally, for millennia. Since man has existed, fishing activities have existed; [fishing] is something that man developed for his subsistence."

"We have to **raise awareness** and think about tomorrow and our ancestry."

"I am grateful for [TLP's] presence, because **our port feels abandoned**."

"The **life of the fisherman** is critical and is hard."

"I ask [that] biologists hold talks on what is happening about **incidental fishing**."

"All the **money goes to tourism**, and not to the fishermen."

"I want to share the **reality of fishermen**. We don't [all] have the same mindsets, so you have to talk to a lot of people."

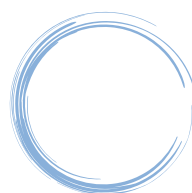
"Little things add up to big things. **Change depends on everyone**. For all necessities, sacrifice is needed."

"We want more **benefits for fishermen**."

"Politicians only come [to the coast] during a campaign, and **they never to talk to the fishermen after**."

"Do you know what the problem is? **That we, the fishermen ourselves, are the pirates**."
(Referring to the increase in piracy attacks on artisanal fishermen.)

"Here, we live from fishing, and we **fish with fear**."





PROPOSED NEXT STEPS

Regarding the survey:

1 Make edits to the survey before continuing

There are a few questions that should be edited prior to continuing with the survey. It is essential to remember that learning from the fishermen requires that our survey and interview **questions undergo iterative edits**. It is also critical to remember that the fishermen in various ports and provinces have different **levels and forms of education and knowledge** (Western, patrimonial, cultural, etc.). The **language** used in this survey and in any surveys going forward can either **create barriers**, or can be tailored to invite conversation. For example, the way in which No Take Zones were described in our survey, using phrases like "extractive practices," put a few fishermen in a defensive position when answering questions regarding their support of NTZs. Beyond individual words, some concepts that made sense to the research team were out of place in the survey. For example, the background question asking for what reasons fishermen fish was met with many confused looks; obviously, they fish for fish and to support their families. **Reconsidering the phrasing** of our questions before surveying in the El Oro and Guayas provinces is important to ensure we are removing any biases or barriers from our questions.

2 Continue gathering data from provinces

Before a full report can be given to the government, it is important that the **El Oro and Guayas provinces are adequately surveyed**. The primary consideration in these provinces is **safety**, both of our research team and of the fishermen opting to be interviewed. With an increase in **piracy** and the presence of **narcotrafficking gangs** along the coast, it is paramount that nobody is threatened or harmed by participating in this research.

The information gained from the sample of Santa Elena, Manabí and Esmeraldas fishermen in this study showed **similar threats, perceptions and priorities** in all three provinces. However, the remaining 64 surveys of the 120 collected thus far must be analyzed and decoded in conjunction with all surveys conducted in the remaining two provinces. Once all the data are entered, everything can be **fully analyzed for patterns**, similarities and differences along Ecuador's five coastal provinces. Beyond survey data, more **cameras should be given out to fishermen**, when safe to do so, to increase fishermen involvement and collect more media data about a day in the life of an Ecuadorian artisanal fisherman.



For future governmental interactions with fishermen:

1 Prioritize listening to fishermen

For many fishermen, conservation of marine resources is tantamount to **conservation of their livelihoods** and cultures. A common theme amongst fishermen across all three provinces in this sample is **feeling abandoned** by the government and authorities. Beyond the feeling of neglect, there is a wide perception that **industrial fishermen are favored** over artisanal fishermen. Within recent years, **piracy** has become a threat to not only artisanal fishing as a livelihood, but artisanal fishermen's lives themselves. Almost every fisherman we spoke with had either experienced an attack or robbery by pirates, or knew a colleague who had. Now, more than ever, it is imperative that the government:

1. **Listens** to the variety of threats to artisanal fishermen across the five coastal provinces,
2. **Validates** those concerns, and
3. **Works with fishermen** and fishing cooperatives to come up with plans to increase the safety and sustainability of the artisanal fisherman.

2 Create local initiatives

Conservation is very rarely a "one-size-fits-all" endeavor. While patterns may seem consistent across the coastal provinces, not all provinces are equal in their capacity for conservation initiatives. For example, there are multiple fishing ports in the Santa Elena province that have been exposed to LED lights as a way to diminish bycatch, and fishermen there seem open to the concept because they have seen research that verifies the efficacy of the lights and have heard word-of-mouth proof from their fellow fishermen that lights do not reduce their catch. A local initiative might work well in Santa Elena to increase the use of LED lights because there is scientific evidence that the lights work, as well as initial buy-in from multiple fishermen. However, little work with LED lights has been done in Esmeraldas, and piracy seems to be a growing threat to fishermen there. Therefore, an initial initiative specific to Esmeraldas may focus on creating interdisciplinary groups of fishermen, naval authorities, NGOs and local and national government leaders to create measurable, lasting and accountable ways to protect artisanal fishermen.



For future governmental interactions with fishermen, cont.:

3 Increase fishermen participation

Before beginning our interviews, the team was told by a number of people that the fishermen would not want to talk, that artisanal fishermen are ignorant on topics of conservation and that fishermen would not be willing to help in the future. Our team found this to be **unequivocally false**. Very few fishermen turned down interviews, and the data show that **many fishermen want to be involved in advocating for their communities** moving forward. There are a variety of ways to **increase fishermen participation** in marine conservation, such as:

1. Encouraging the **creation of fishing cooperatives** to promote local organization,
2. Innovating ways to **include fishermen in scientific research**,
3. Setting up **workshops** that include roundtable discussions between **multiple stakeholders**, including fishermen, scientists, NGOs and government officials, and
4. Working with fishermen to connect different fishing cooperatives, communities and provinces to **increase information** sharing across the coast.

4 Engage scientists and citizens alike

Many fishermen called for **increased education and engagement** in their communities. Education and engagement can be broken into two broad categories:

1. **Education for fishermen** on issues of sustainability, endangered animals, new fishing technologies, etc. and engagement in scientific studies, and
2. **Education for the broader community** on community-level sustainability and resiliency and engagement in community-building activities centered around marine resource preservation and community pride.

While many communities may be wary of government involvement, many **fishermen expressed interest in working with scientists and NGOs**. Educational workshops, beach cleanups, sustainability demonstrations, art creation, public documentary viewing, and educational signs are all ways in which communities can be engaged and educated. Creating **local sustainability goals** or environmental team projects is another way to **build community** and fuel confidence in the power of artisanal fishermen and fishing communities.





CITATIONS + APPENDICES

CITATIONS

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APPENDICES

Appendix 1 (Question 1.1)

	SE	MA	EO	ES
% who reported a provisioning ecosystem service as a reason the ocean is important; # who responded/total # of fishermen from province	75 (12/16)	74 (17/23)	100 (1/1)	81 (13/16)
% who reported a cultural ecosystem service as a reason the ocean is important; # who responded/total # of fishermen from province	56 (9/16)	26 (6/23)	0	31 (5/16)
% who reported the ocean is inherently valuable and beautiful as a reason the ocean is important; # who responded/total # of fishermen from province	44 (7/16)	22 (5/23)	0	6 (1/16)

APPENDICES

Appendix 2 (Question 1.2)

	SE	MA	ES
% who reported "my fellow fishermen think the same"; # who responded/total # of fishermen from province	50 (8/16)	52 (12/23)	56 (9/16)
% who reported "my fellow fishermen think differently"; # who responded/total # of fishermen from province	38 (6/16)	30 (7/23)	6 (1/16)
% who reported "don't know/unsure"; # who responded/total # of fishermen from province	6 (1/16)	0	0

APPENDICES

Appendix 3 (Question 3.1)

	SE	MA	EO	ES
% who stated "there are fewer fish"; # who responded/total # of fishermen from province	94 (15/16)	100 (23/23)	100 (1/1)	56 (9/16)
% who stated "fishing as a livelihood is more challenging and dangerous"; # who responded/total # of fishermen from province	63 (10/16)	35 (8/23)	100 (1/1)	44 (7/16)
% who stated "attitudes/actions of some fishermen not respectful of resource"; # who responded/total # of fishermen from province	13 (2/16)	17 (4/23)	100 (1/1)	31 (5/16)
% who stated "more threats to greater ocean ecosystem"; # who responded/total # of fishermen from province	31 (5/16)	52 (12/23)	100 (1/1)	31 (5/16)
% who stated "technologies and conservation measures have improved resource abundance and fishing practices"; # who responded/total # of fishermen from province	13 (2/16)	4 (1/23)	0	0

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Appendix 4 (Question 3.2)

	SE	MA	EO	ES
% who stated "natural/climate phenomena have changed the ocean"; # who responded/total # of fishermen from province	25 (4/16)	13 (3/23)	0	6 (1/16)
% who stated "humans have degraded the ocean's ecosystems and resources"; # who responded/total # of fishermen from province	81 (13/16)	78 (18/23)	100 (1/1)	94 (15/16)
% who stated "the government has inadequately protected both the ocean and artisanal fishermen"; # who responded/total # of fishermen from province	31 (5/16)	39 (9/23)	0	38 (6/16)

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Appendix 5 (Question 3.3)

	SE	MA	ES
% who stated "better, generally"; # who responded/total # of fishermen from province	44 (7/16)	43 (10/23)	56 (9/16)
% who stated "that the ocean is healthy and full of fish"; # who responded/total # of fishermen from province	38 (6/16)	43 (10/23)	6 (1/16)
% who stated "that fishermen have a say in the future of the ocean, from tourism to policies"; # who responded/total # of fishermen from province	0	9 (2/23)	0
% who stated "that authorities and the government create a safe fishing environment for artisanal fishermen"; # who responded/total # of fishermen from province	13 (2/16)	9 (2/23)	0

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Appendix 6 (Question 3.4)

	SE	MA	ES
% who stated "new policies must be created and enforced"; # who responded/total # of fishermen from province	56 (9/16)	70 (16/23)	56 (9/16)
% who stated "existing policies and laws need to be enforced to increase safety"; # who responded/total # of fishermen from province	50 (8/16)	70 (16/23)	56 (9/16)
% who stated "scientists need to work with fishing communities to educate and engage"; # who responded/total # of fishermen from province	13 (2/16)	9 (2/23)	13 (2/16)
% who stated "communities need to come together and take communal action"; # who responded/total # of fishermen from province	44 (7/16)	43 (10/23)	25 (4/16)

APPENDICES

Appendix 7 (Question 4.2)

	SE	MA	EO	ES
% who stated "strongly positive"; # who responded/total # of fishermen from province	69 (11/16)	43 (10/23)	100 (1/1)	44 (7/16)
% who stated "moderately positive"; # who responded/total # of fishermen from province	13 (2/16)	52 (12/23)	0	50 (8/16)
% who stated "indifferent"; # who responded/total # of fishermen from province	13 (2/16)	0	0	0
% who stated "moderately negative"; # who responded/total # of fishermen from province	6 (1/16)	0	0	6 (1/16)

APPENDICES

Appendix 8 (Question 4.3)

	SE	MA	EO	ES
% who stated "strongly positive"; # who responded/total # of fishermen from province	6 (1/16)	17 (4/23)	100 (1/1)	38 (6/16)
% who stated "moderately positive"; # who responded/total # of fishermen from province	44 (7/16)	48 (11/23)	0	63 (10/16)
% who stated "indifferent"; # who responded/total # of fishermen from province	13 (2/16)	17 (4/23)	0	0
% who stated "moderately negative"; # who responded/total # of fishermen from province	38 (6/16)	13 (3/23)	0	0

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Appendix 9 (Question 4.4)

	SE	MA	EO	ES
% who stated "strongly positive"; # who responded/total # of fishermen from province	56 (9/16)	35 (8/23)	100 (1/1)	19 (3/16)
% who stated "moderately positive"; # who responded/total # of fishermen from province	25 (4/16)	61 (14/23)	0	56 (9/16)
% who stated "indifferent"; # who responded/total # of fishermen from province	0	4 (1/23)	0	0
% who stated "moderately negative"; # who responded/total # of fishermen from province	13 (2/16)	0	0	0

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Appendix 10 (Question 4.5)

	SE	MA	EO	ES
% who stated "strongly positive"; # who responded/total # of fishermen from province	19 (3/16)	22 (5/23)	100 (1/1)	19 (3/16)
% who stated "moderately positive"; # who responded/total # of fishermen from province	48 (11/16)	61 (14/23)	0	44 (7/16)
% who stated "indifferent"; # who responded/total # of fishermen from province	13 (2/16)	9 (2/23)	0	0

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Appendix 11 (Question 5.2)

	SE	MA	ES
% who stated "a large amount"; # who responded/total # of fishermen from province	13 (2/16)	4 (1/23)	0
% who stated "a moderate amount"; # who responded/total # of fishermen from province	43 (7/16)	26 (6/23)	6 (1/16)
% who stated "a small amount"; # who responded/total # of fishermen from province	25 (4/16)	30 (7/23)	75 (12/16)
% who stated "not at all"; # who responded/total # of fishermen from province	13 (2/16)	39 (9/23)	19 (3/16)
% who stated "unsure"; # who responded/total # of fishermen from province	6 (1/16)	0	0

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Appendix 12 (Question 5.3)

	SE	MA	ES
% who stated "a large amount"; # who responded/total # of fishermen from province	6 (1/16)	0	0
% who stated "a moderate amount"; # who responded/total # of fishermen from province	31 (5/16)	9 (2/23)	6 (1/16)
% who stated "a small amount"; # who responded/total # of fishermen from province	38 (6/16)	26 (6/23)	44 (7/16)
% who stated "not at all"; # who responded/total # of fishermen from province	19 (3/16)	52 (12/23)	50 (8/16)

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Appendix 13 (Question 5.4)

	SE	MA	ES
% who stated "definitely effective"; # who responded/total # of fishermen from province	50 (8/16)	52 (10/23)	25 (4/16)
% who stated "moderately effective"; # who responded/total # of fishermen from province	31 (5/16)	13 (3/23)	25 (4/16)
% who stated "moderately ineffective"; # who responded/total # of fishermen from province	0	13 (3/23)	0
% who stated "definitely ineffective"; # who responded/total # of fishermen from province	6 (1/16)	9 (2/23)	0
% who stated "unsure"; # who responded/total # of fishermen from province	13 (2/16)	17 (4/23)	50 (8/16)

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Appendix 14 (Question 5.5)

	SE	MA	ES
% who stated "very likely"; # who responded/total # of fishermen from province	56 (9/16)	22 (5/23)	94 (15/16)
% who stated "moderately likely"; # who responded/total # of fishermen from province	19 (3/16)	22 (5/23)	6 (1/16)
% who stated "not likely"; # who responded/total # of fishermen from province	13 (2/16)	43 (10/23)	0
% who stated "unsure"; # who responded/total # of fishermen from province	13 (2/16)	9 (2/23)	0

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Appendix 15 (Question 5.7)

	SE	MA	ES
% who stated "definitely effective"; # who responded/total # of fishermen from province	8 (16/50)	48 (11/23)	13 (2/16)
% who stated "moderately effective"; # who responded/total # of fishermen from province	31 (5/16)	30 (7/23)	31 (5/16)
% who stated "moderately ineffective"; # who responded/total # of fishermen from province	0	13 (3/23)	25 (4/16)
% who stated "definitely ineffective"; # who responded/total # of fishermen from province	0	4 (1/23)	31 (5/16)
% who stated "unsure"; # who responded/total # of fishermen from province	19 (3/16)	4 (1/23)	0

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Appendix 16 (Question 5.8)

	SE	MA	ES
% who stated "very likely"; # who responded/total # of fishermen from province	63 (10/16)	78 (18/23)	63 (10/16)
% who stated "moderately likely"; # who responded/total # of fishermen from province	19 (3/16)	22 (5/23)	31 (5/16)
% who stated "not likely"; # who responded/total # of fishermen from province	0	0	6 (1/16)
% who stated "unsure"; # who responded/total # of fishermen from province	19 (3/16)	0	0

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Appendix 17 (Question 5.9)

	SE	MA	ES
% who stated "would always support"; # who responded/total # of fishermen from province	13 (2/16)	52 (12/23)	6 (1/16)
% who stated "would conditionally support"; # who responded/total # of fishermen from province	75 (12/16)	43 (10/23)	69 (11/16)
% who stated "would not support"; # who responded/total # of fishermen from province	0	0	6 (1/16)

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Appendix 18 (Question 5.10)

	SE	MA	ES
% who stated "very involved"; # who responded/total # of fishermen from province	56 (9/16)	74 (17/23)	38 (6/16)
% who stated "moderately involved"; # who responded/total # of fishermen from province	19 (3/16)	9 (2/23)	6 (1/16)
% who stated "lightly involved"; # who responded/total # of fishermen from province	0	0	25 (4/16)
% who stated "not involved"; # who responded/total # of fishermen from province	6 (1/16)	9 (2/23)	25 (4/16)
% who stated "unsure"; # who responded/total # of fishermen from province	19 (3/16)	0	0

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Appendix 19 (Question 5.11)

	SE	MA	ES
% who stated "definitely effective"; # who responded/total # of fishermen from province	75 (12/16)	65 (15/23)	69 (11/16)
% who stated "moderately effective"; # who responded/total # of fishermen from province	19 (3/16)	9 (2/23)	0
% who stated "moderately ineffective"; # who responded/total # of fishermen from province	0	9 (2/23)	25 (4/16)
% who stated "definitely ineffective"; # who responded/total # of fishermen from province	0	4 (1/23)	6 (1/16)
% who stated "unsure"; # who responded/total # of fishermen from province	6 (1/16)	4 (1/23)	0

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Appendix 20 (Question 5.12)

	SE	MA	ES
% who stated "very likely"; # who responded/total # of fishermen from province	63 (10/16)	35 (8/23)	69 (11/16)
% who stated "moderately likely"; # who responded/total # of fishermen from province	13 (2/16)	9 (2/23)	0
% who stated "not likely"; # who responded/total # of fishermen from province	19 (3/16)	35 (8/23)	6 (1/16)
% who stated "unsure"; # who responded/total # of fishermen from province	6 (1/16)	13 (3/23)	25 (4/16)

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Appendix 21 (Question 5.13)

	SE	MA	ES
% who stated "would always support"; # who responded/total # of fishermen from province	19 (3/16)	17 (4/23)	0
% who stated "would conditionally support"; # who responded/total # of fishermen from province	50 (8/16)	43 (10/23)	81 (13/16)
% who stated "would not support"; # who responded/total # of fishermen from province	6 (1/16)	38 (6/23)	0

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Appendix 22 (Question 5.14)

	SE	MA	ES
% who stated "very involved"; # who responded/total # of fishermen from province	63 (10/16)	43 (10/23)	19 (3/16)
% who stated "moderately involved"; # who responded/total # of fishermen from province	13 (2/16)	13 (3/23)	19 (3/16)
% who stated "not involved"; # who responded/total # of fishermen from province	13 (2/16)	35 (8/23)	25 (4/16)
% who stated "unsure"; # who responded/total # of fishermen from province	13 (2/16)	0	0

APPENDICES

Appendix 23 (Question 5.15)

	SE	MA	ES
% who stated "very interested"; # who responded/total # of fishermen from province	88 (14/16)	87 (20/23)	94 (15/16)
% who stated "moderately interested"; # who responded/total # of fishermen from province	13 (2/16)	9 (2/23)	0
% who stated "unsure"; # who responded/total # of fishermen from province	6 (1/16)	0	0