



# COMMUNITY CONSULTATIONS FINDINGS

November 2016



## Acknowledgments

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## About the Waitt Institute

The Waitt Institute endeavors to ensure ecologically, economically, and culturally sustainable use of ocean resources. The Institute partners with governments committed to developing and implementing comprehensive, science-based, community-driven solutions for sustainable ocean management. Our goal is to benefit coastal communities while restoring fish populations and habitats. Our approach is to engage stakeholders, provide the tools needed to design locally appropriate policies, facilitate the policymaking process, and build capacity for effective implementation and long-term success.

## About Blue Halo Montserrat

The Blue Halo Initiative sets out to empower communities to restore their oceans, and use ocean resources sustainably, profitably, and enjoyably for this and future generations. This is done by partnering with governments, communities, and scientists to create and implement ocean policies, including sustainable fishing practices and comprehensive ocean zoning. The Waitt Institute provides the toolkit, and the partner governments provide the political will. The Blue Halo Initiative deeply engages stakeholders in a science-based, community-driven approach.

An electronic retrievable copy (PDF file) of this report may be obtained at no cost from the Waitt Institute website at [www.waittinstitute.org](http://www.waittinstitute.org).

Cover Images: Photos from ocean stakeholder and fisher surveys (© Robin Ramdeen, 2016)



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## 1. INTRODUCTION

Blue Halo Montserrat is a partnership between the Government of Montserrat, the people of Montserrat, and the Waitt Institute. The goal of Blue Halo Montserrat is to foster the sustainable, profitable, and enjoyable use of ocean resources for current and future generations. In February 2015, the Government of Montserrat and the Waitt Institute signed a Memorandum of Understanding to develop a Sustainable Ocean Policy for Montserrat that is based on scientific data and input from the people of Montserrat.

The purpose of this Report is to inform the development of the Montserrat Sustainable Ocean Policy. The Report presents findings from community consultations conducted by the Waitt Institute and the Government of Montserrat. Community consultations are a core aspect of the Blue Halo Initiative to engage communities and ocean users and synthesize data from three sources: First, a survey with 127 members of the general public to explore people's values and concerns related to the ocean as well as their support for marine conservation. Second, a survey of 38 ocean stakeholders to gauge their support for fisheries management options. Third, a series of six community meetings to solicit stakeholder feedback regarding ocean management and the Blue Halo Initiative. In addition to the Community Consultations, the Waitt Institute and its partners conducted a marine scientific assessment, a fisheries stock assessment, fisheries projection models, and an analysis of Montserrat's legal system. Collectively these reports will inform the design and implementation of a Sustainable Ocean Policy.

Following this introduction, the Waitt Institute provides a detailed overview of the methods in Chapter 2. Chapter 3 presents the findings from the surveys and community meetings. Chapter 4 synthesizes and discusses these findings.

## 2. METHODOLOGY

The Waitt Institute conducted community consultations to raise awareness of the Blue Halo Initiative, start a dialogue with stakeholders about ocean conservation, and solicit feedback on ocean use and management. The consultation process consisted of a series of meetings with stakeholder groups, a short survey for the public, and a longer survey of ocean stakeholders. This section outlines the objectives and methods for each of these efforts.

### COMMUNITY SURVEY

The Waitt Institute surveyed 127 Montserrat residents between September 2015 and August 2016. The survey instrument included 12 questions that explored people’s values and concerns related to the ocean as well as their support for marine conservation. Appendix 1 provides the full survey instrument. Some surveys were only partially completed. Therefore, throughout the report, the results identify the number of respondents to a question.

The Waitt Institute and trained volunteers administered this survey through in-person interviews in Brades, Carr’s Bay, and Little Bay. The survey targeted members of the general public of all ages and gender. Table 1 compares the share of survey respondents to the 2011 census population<sup>1</sup> across age groups. The data show that age of survey respondents is close to that of Montserrat’s population. However, this survey slightly over-represents young adults (18-30) and middle-age adults (31-45).

**Table 1. Age Comparison of Waitt Institute Survey Data and 2011 Census Data**

Age	Community Survey (n=115)	2011 Census (n=3,951)
15-18	5%	8%
18-30	19%	14%
31-45	35%	27%
45-60	19%	26%
Over 60	22%	24%

Note: Census age groups differ slightly from the Waitt Institute's response options. Census age groups are 15-19, 20-29, 30-44, 45-59, 60 and over. Excluded census data of children below 15 years as these were not targeted in this survey.

Table 2 shows that the Waitt Institute’s community survey slightly over-represents Montserrat’s male population.

**Table 2. Gender Comparison between Waitt Institute Survey Data and 2011 Census Data**

	Waitt Institute (n=88)	2011 Census (n=4,922)
Male	57%	52%
Female	43%	48%

<sup>1</sup> <http://www.gov.ms/wp-content/uploads/2011/02/Montserrat@AGlance.pdf>

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## STAKEHOLDER SURVEY

The Waitt Institute administered additional questions through structured interviews to respondents from the Community Survey who have a high stake in ocean management. The survey explored stakeholder opinions towards ocean management tools, including ocean zoning, gear bans, and catch limitations. Appendix 2 presents the full survey instrument.

The target population included anyone who has a stake in ocean management, and may influence or be affected by ocean regulations. Given the relatively small size of ocean stakeholders on Montserrat, the Waitt Institute attempted a census approach, and identified respondents during the community consultation process.

Between September 2015 and August 2016, the Waitt Institute completed 45 interviews with stakeholders consisting of fishers (18), recreational ocean users (11), government representatives (11), scuba dive operators (3), and restaurant owners (2). In the absence of data that can serve as a reference frame, it is difficult to know if survey respondents closely mirror the actual population of ocean stakeholders on Montserrat. For example, there is no central fisher registration on Montserrat that could lend insights to the demographics of this stakeholder group. However, based on observations the Waitt Institute assumes that the survey responses underrepresent older fishermen.

Throughout this report, survey findings indicate the total answers to a given question, because not all respondents completed the entire survey.

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## STAKEHOLDER MEETINGS

The Waitt Institute conducted six meetings with community groups between September 2015 and May 2016. These meetings included participants who self-identified as fishers, farmers, and members of other community groups. The Waitt Institute advertised these meetings through local media and outreach.

During the meetings, Waitt Institute staff provided attendees with information about the Initiative, answered questions, and solicited stakeholder feedback regarding concerns, priorities, and ideas for how to improve ocean management on Montserrat. The findings in this Report capture the key topics that arose in each of the meetings, and are based on the Waitt Institute's meeting notes.

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## RESEARCH LIMITATIONS

The Waitt Institute designed the surveys to provide results that would represent opinions of Montserrat's public (Community Survey) and ocean stakeholders (Stakeholder Survey). However, there are a number of methodological challenges that limit the external and internal validity of our findings. This section briefly describes these challenges and limitations.

- **Selection bias & self-selection bias:** Selection bias occurs when proper randomization through probability sampling is not achieved. Self-selection bias occurs when individuals subscribe

themselves to the group of respondents. Both of these biases undermine the external validity of findings because respondents may differ in observable or unobservable ways from non-respondents. Given that the Community Survey was available to anyone without a randomly selected sample, selection bias and self-selection bias may be present in these findings.

- **Sample frame error:** Sample frame error occurs when the sample frame is not a perfect representation of the population. It reduces the ability to generalize any findings to the target population of interest. The Waitt Institute was most interested in collecting feedback from those who have a stake in the ocean but lacked data on ocean stakeholder socio-demographic characteristics. Therefore, it is difficult to determine if respondents of the Stakeholder Survey closely mirror the actual population of ocean stakeholders.
- **Unit non-response bias:** There is potential for unit non-response bias in this survey as those who responded may be systematically different, in terms of socio-demographics or opinions regarding the ocean, from those who did not respond to this survey. Non-response bias can result in under- or over-representation and impacts the ability to extrapolate survey results. In the absence of knowing population-level characteristics, the Waitt Institute cannot determine the extent of non-response bias in this survey.
- **Item-non response bias:** There is potential for item non-response bias, which occurs if survey respondents skip a question that they perceive as sensitive or difficult. As a result, findings related to questions that were perceived as a sensitive topic such as illegal fishing gear may be under-represented.
- **Measurement error:** Measurement error concerns the validity and reliability of quantitative data. The Waitt Institute mitigated potential measurement error through multiple strategies. The Team reviewed the survey instrument to ensure that there were no double-barreled questions or leading questions, and reviewed the overall logical flow of the questions so as not to confuse respondents.

### 3. RESULTS

This section presents findings from the community and stakeholder surveys as well as the community meetings.

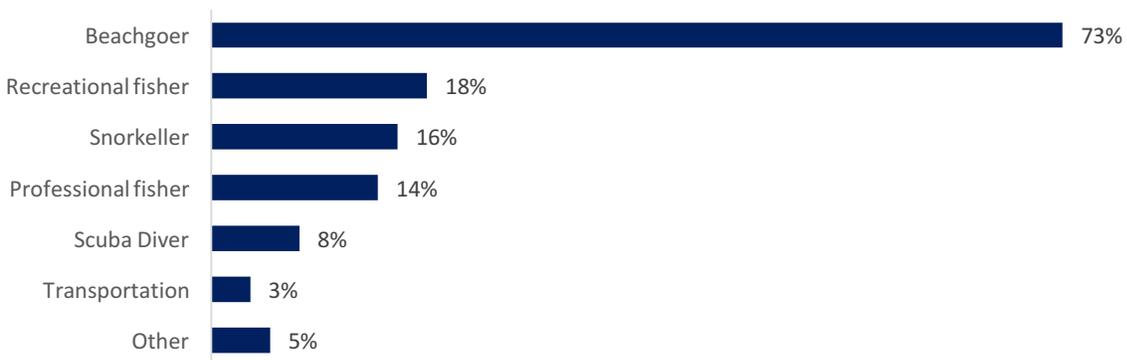
#### COMMUNITY SURVEY

The Waitt Institute surveyed 127 residents from 25 villages on Montserrat to explore people’s values and concerns related to the ocean and gauge their support for marine conservation. This section presents the survey results. Since many surveys were only partially completed, the figures present the number of responses, “n,” to a given question.

#### Value & Use of the Ocean

Survey results indicate that people on Montserrat highly value the ocean. Over two-thirds (73%) reported that they regularly go to the beach and have done so for their entire life. Additionally, almost one-third said they fish recreationally (18%) or professionally (14%) as shown in Figure 1.

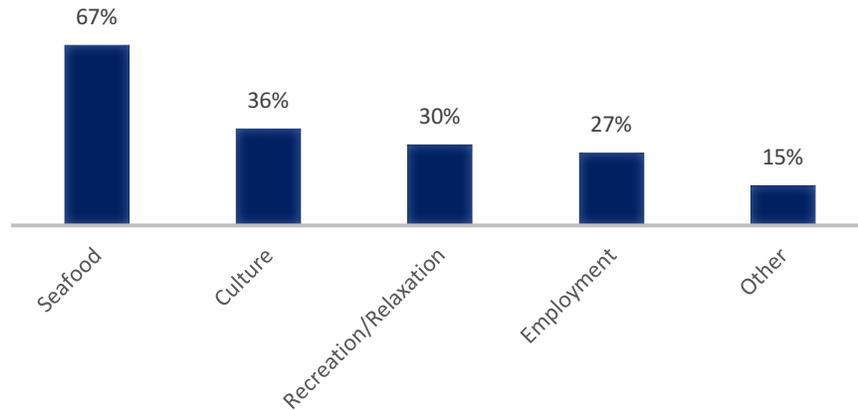
**Figure 1. How People Use the Ocean (n= 119)**



*Note: Other comprised transportation, travelling and nature.*

Additionally, almost all (92%) described the sea as important. Two-thirds (67%) explained that the ocean is an important source of seafood, and one-third said the ocean is important to their culture (36%) and recreation (30%) as shown in Figure 2.

**Figure 2. Why the Sea Is Important (n=73)**



Respondents who elaborated on their relationship with the sea most commonly explained that they associate the ocean with a sense of calm and peace as illustrated in their quotes below.

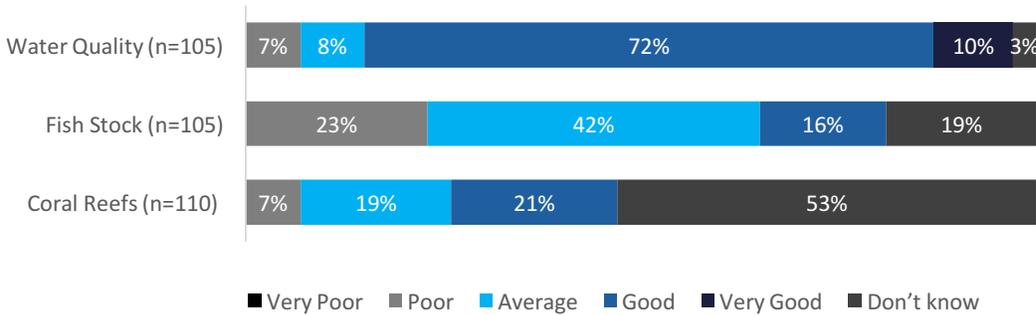
- Fishing is my therapy, it takes away the stress of people (Male, 40 years)
- The ocean is a medicine, it's relaxing to watch the waves (Female, 50 years)
- The sight of the ocean every morning, the scenery is refreshing so natural and blue (Male, 40 years)
- [My favorite thing about the sea is] collecting shells (Female, 40 years)

### **Perception of Ocean Health and Threats to Marine Ecosystems**

The survey explored people's perceptions towards the health of marine ecosystems and threats to the ocean.

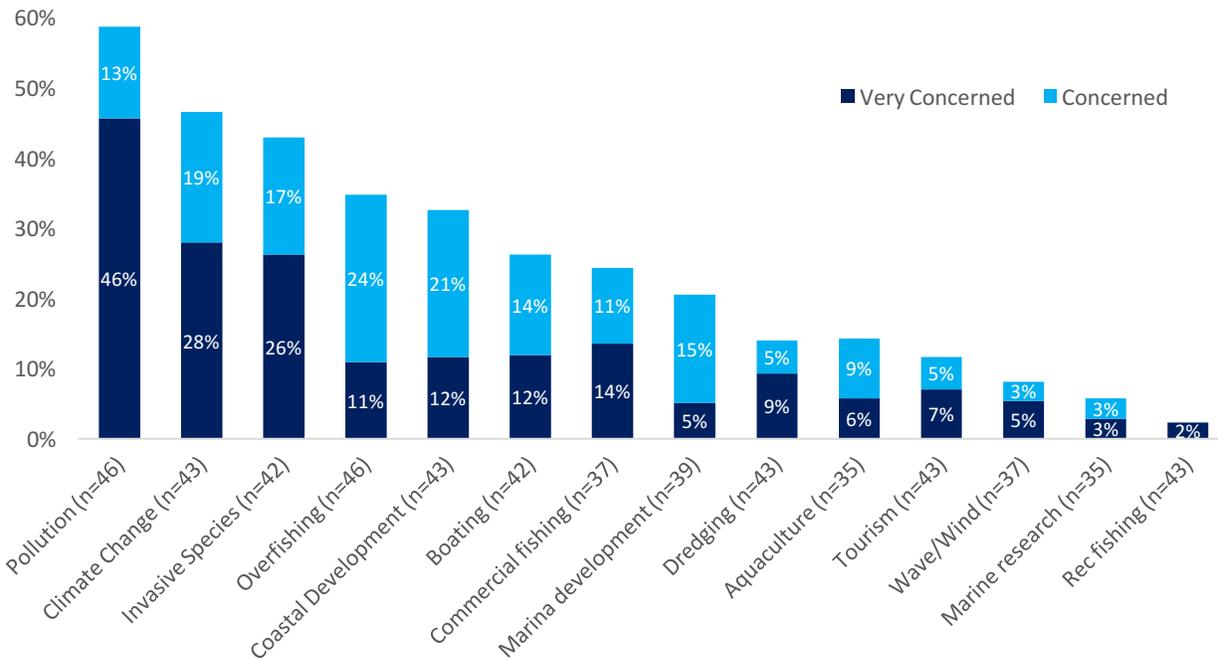
Figure 3 shows that the majority describe Montserrat's water quality as good or very good. In comparison, significantly fewer believe that Montserrat's fish stock or coral reefs are healthy. Notably, more than half (53%) reported that they cannot assess the health of coral reefs. When asked how these conditions have changed over the last 10 years, the majority thought fish populations (40%) are decreasing, but again, expressed that they did not know enough to assess the change of coral reefs over time. It should be noted that these findings present people's perceptions and may not align with the findings of the Marine Scientific Assessment.

**Figure 3. People's Perception of Ocean Health**



Despite the positive impression of Montserrat’s water quality, more than half (59%) raised concerns about pollution when presented with a list of potential threats to marine environments. Close to half are concerned about climate change and invasive species such as lionfish. Still one-third reported that they are concerned about overfishing (35%) and coastal development (33%) as shown in Figure 4.

**Figure 4. Threats to the Ocean**



**Support for Ocean Management & Marine Reserves**

The survey also explored people’s perception towards ocean management on Montserrat. Survey findings indicate that there is support for enhanced ocean conservation. When asked if there is too much, too little, or just the right amount being done to manage oceans on Montserrat, the majority (74%) felt there is too little ocean management on Montserrat.

**Figure 5. Public Perception of Ocean Management (n=88)**

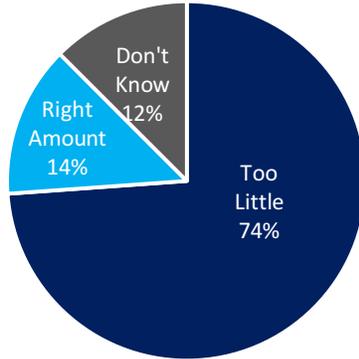
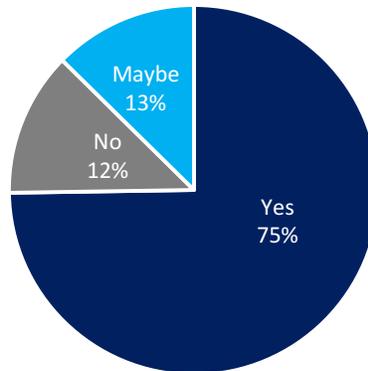


Figure 6 shows that many (75%) support marine reserves, only a small group (13%) is not in favor. Those who were unsure explained that it depends on the size and socioeconomic impacts of that zone, as well as the location and length of closure.

**Figure 6. Support for Marine Reserves (n=103)**



Survey findings indicate that respondents have diverse priorities for ocean management. Respondents provided a number of suggestions to manage Montserrat’s ocean better, as presented in Table 3. Most commonly, they recommended curbing pollution by reducing litter, trash, or banning plastics altogether. Several also mentioned the need to prevent overfishing (11%), improve enforcement (10%), and provide more education (8%).

**Table 3. Suggestions for Improved Ocean Management (multiple responses)**

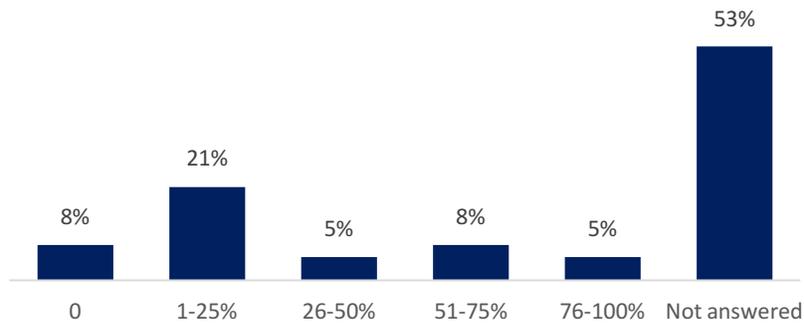
Suggestions	Percent (n=127)
Curb pollution / ban plastics	31%
Limit catch / prevent overfishing	11%
Improve enforcement	10%
More education / communication / outreach	8%
Ban destructive gear	2%
Ocean zoning	2%

Suggestions	Percent (n=127)
Better manage foreign fishing	2%
Improve safety	2%
Build on existing regulation (CEMA)	2%
Control lionfish	1%
Consultation Process for proposed coastal development	1%
Don't know	7%
Not answered	27%

### Household Income from Ocean Use

Survey findings indicate that most people do not depend on the ocean as a source of income. Figure 7 shows that only a small minority (5%) reported that most of their income comes from ocean-based activities. However, these data may underrepresent the economic dependence on the ocean as more than half of the respondents declined to answer, and some of Montserrat’s full-time fishers did not participate in the survey. These data are also not capturing the economic value of subsistence fishing.

**Figure 7. Percent of Household Income from Ocean Use (n=127)**




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### STAKEHOLDER SURVEY

This section presents the results from the Stakeholder Survey with 45 respondents who also took part in the Community Survey presented above. Respondents of the Stakeholder Survey included fishers (18), recreational ocean users (11), government representatives (11), scuba dive operators (3), and restaurant owners (2). Questions explored respondents’ opinions of current fishing regulations and support for different management options.

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### FEEDBACK ON MANAGEMENT & REGULATIONS

The survey explored stakeholder perceptions towards ocean management, including ocean zoning, gear restrictions, and other conservation measures such as temporary closures.

### Ocean Zoning

Survey results show that over two-thirds (78%) of stakeholders find the approach of ocean zoning “somewhat” or “very” useful to balance all uses and ensure sustainability. Only a small group (5%) described ocean zoning as “not at all” useful, another 8% were either neutral or said it could be “a little” useful and provided the following explanations:

- Depends, because we are not heavy into fishing here so might not matter.
- Might be difficult with such a small area.
- Limited fishing grounds, so difficult to do ocean zoning.

**Figure 8. Usefulness of Ocean Zoning (n=37)**

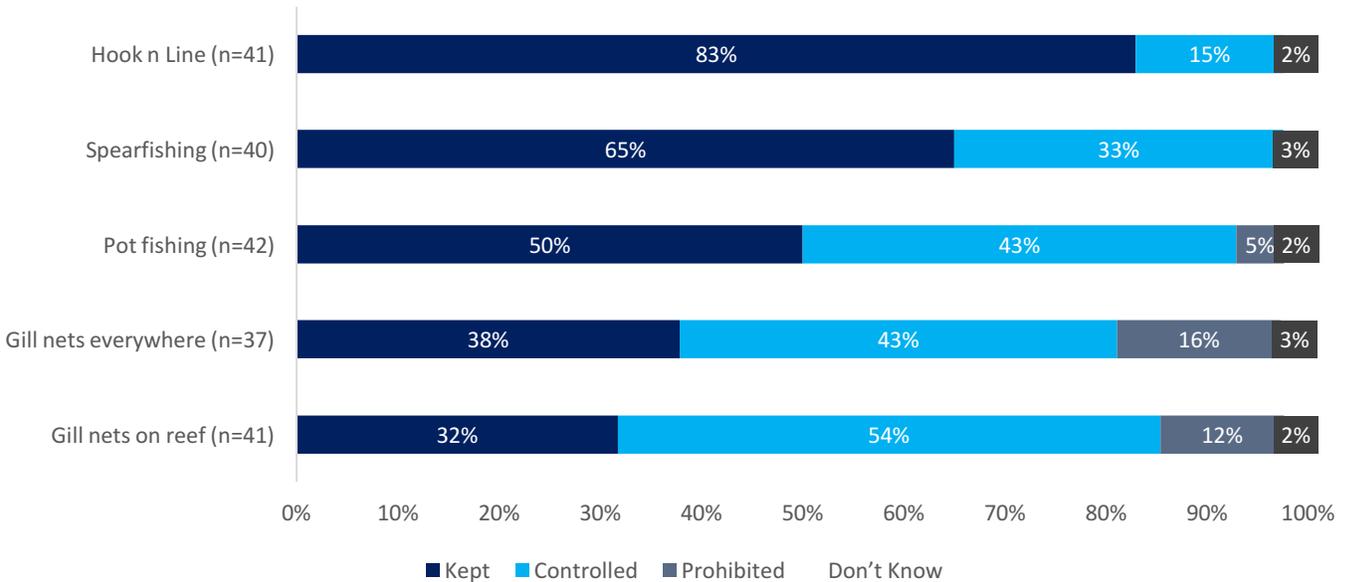


### Gear Restrictions and Catch Limitations

To date, Montserrat does not regulate fisheries through gear or catch restrictions. To gauge stakeholders’ support for stronger regulation through a Montserrat Sustainable Ocean Policy, the Waitt Institute asked stakeholders if specific gear types and fishing practices should be kept as is, controlled more, or banned.

Figure 9 presents stakeholder feedback regarding gear restrictions. It shows that almost two-thirds of ocean stakeholders would support stricter controls or bans for gill nets. Furthermore, reactions were mixed for pot fishing, and over two-thirds said that spearfishing as well as fishing with hook and line should be kept as is. In addition to what is shown in the Figure below, there was overwhelming support for escape traps to be included in fishing pots to enable small or undesired fish to escape (28 of 29 respondents).

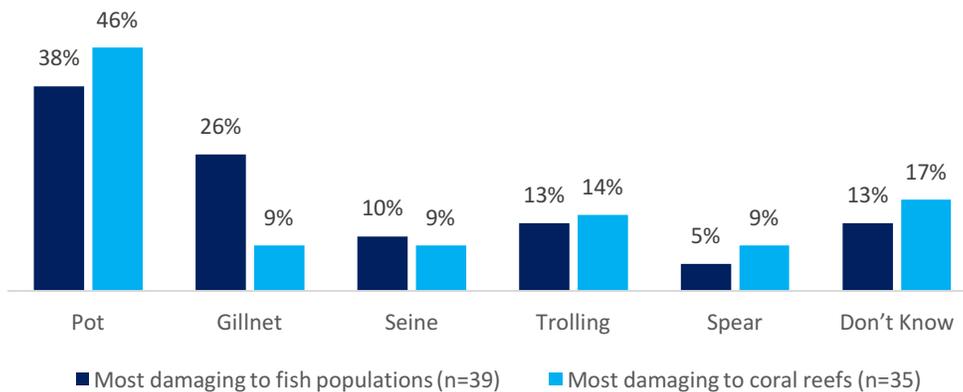
**Figure 9. Stakeholder Support for Gear Restrictions**



Examining opposition to gear restrictions in more detail showed that respondents who prefer to keep regulations “as is” include fishers, government representations, and recreational users. However, the fishers’ have the strongest opposition to gear restrictions. Most fishers want to keep the status quo for spearfishing (16/17), hook and line (17/17), and pot fishing (13/16). While no fisher is in support of any bans, there is some support stricter controls for gill nets in Montserrat’s waters (7/10).

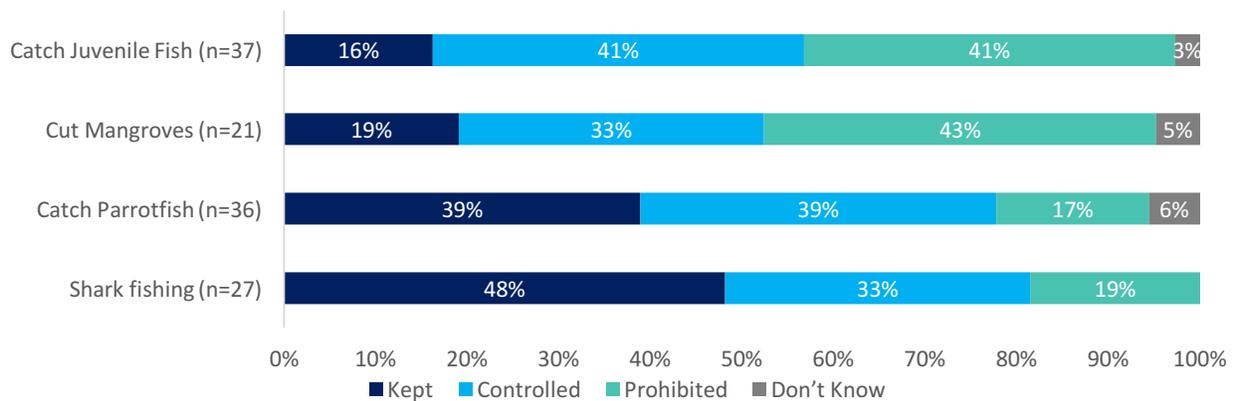
To help contextualize stakeholders’ support for gear restriction, the Waitt Institute further asked stakeholders which fishing gear they feel is most damaging to fish population and coral reefs. Figure 10 below shows that approximately half regard pot fishing as the most damaging, followed by the use of gillnets. Approximately one-third of the fishers interviewed for this survey reported that they use fish pots (4/14). No one reported the use of gill nets.

**Figure 10. Stakeholders’ Perceptions of Damaging Gear Types**



Survey findings indicate stronger support for catch restrictions when compared to restricting fishing gear. Figure 11 shows that more than three-quarters of ocean stakeholders report that catching juvenile fish should be controlled more (41%) or banned (41%). Similarly, most would support tighter regulations that restrict cutting of mangroves as a habitat for juvenile fish to grow. Close to half (48%) felt that shark fishing should be kept as is. Some respondents elaborated on their response and explained that shark fishing is not a dominant activity on Montserrat; therefore, there is no need to restrict it. As with gear restrictions, opposition to catch restrictions is stronger among fishers. Most fishers reported they do not want catch restrictions except for juvenile fish.

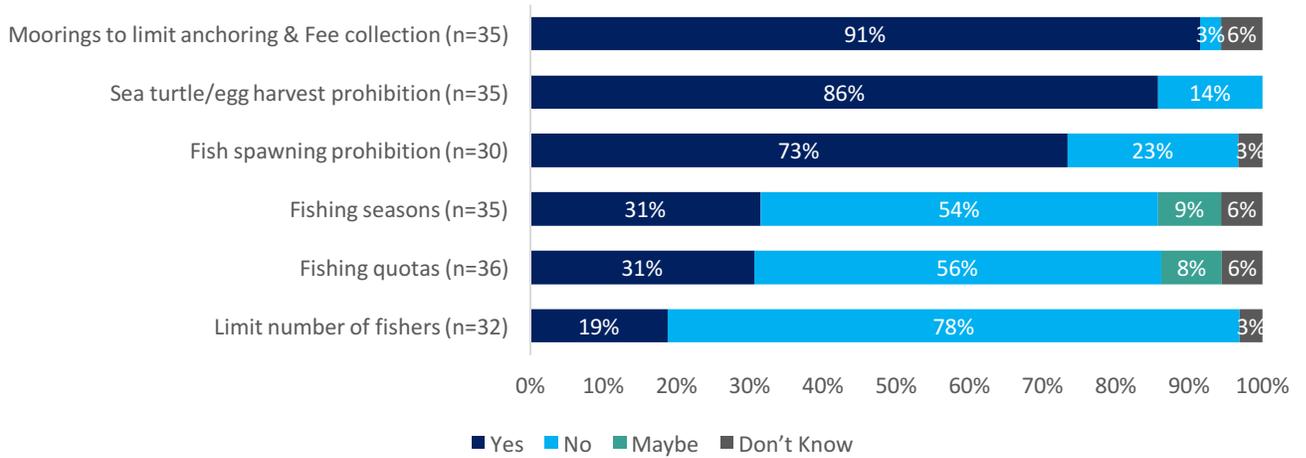
**Figure 11. Stakeholder Support for Catch Restrictions & Habitat Preservation**



*Note: Not all percentages add up to 100% due to rounding*

In addition to gear and catch restriction, the Waitt Institute asked stakeholders about their support of quotas, seasonal closures and mooring and restricted anchoring as shown in Figure 12. The data indicate broad support for the installation of moorings to limit anchoring (91%), prohibiting sea turtle egg harvest (86%), and fishing prohibition during spawning season (73%). In contrast, fewer stakeholders would support fishing quotas (31%), closed seasons for fishing (31%), or limiting the number of fishers (19%).

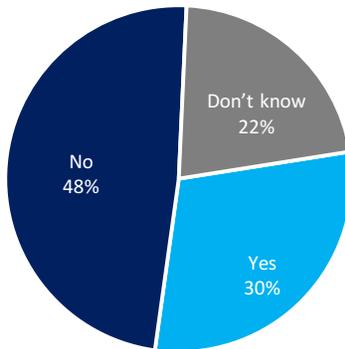
**Figure 12. Support for Quotas, Seasonal Closures and Restricted Anchoring**



**Illegal Fishing**

Less than one-third of ocean stakeholders view illegal fishing as a problem on Montserrat.

**Figure 13. Stakeholders' Perspective on Illegal Fishing (n=38)**



## COMMUNITY MEETINGS

The Government of Montserrat and the Waitt Institute facilitated eight stakeholder meetings for fishers, farmers, NGOs, and community groups. This section details the key issues and recommendations from each stakeholder meeting.

### Fishers

Twenty-five fishers attended a meeting led by the Director of Agriculture and Fisheries at the Market in Little Bay. The meeting served as an initial introduction of the Blue Halo Initiative (BHI) to this stakeholder group, and solicited preliminary feedback from fishers.

**Table 4. Feedback from Stakeholder Meeting with Fishers**

Key Issues	Stakeholder Recommendations
<ul style="list-style-type: none"><li>▪ Need for better representation of fisher folks by the Fisheries Department</li><li>▪ Formal licensing system since currently there is no registry for fishers</li><li>▪ Foreign fishing</li></ul>	<ul style="list-style-type: none"><li>▪ Fisheries Department could have more training programs e.g. GPS course</li></ul>

### Fishers Association

Twelve members of the Montserrat Fishers Association attended a meeting in Little Bay with president John Lee and the Blue Halo Site manager for a participatory discussion on ocean zoning. When asked what type of fishing they engaged in, the majority of the participants mentioned deep water line fishing, but there was one fisher who engaged in pot-fishing. After a short presentation on the BHI process, toolkit and outputs, fishers were asked what concerns they had about fisheries management and what ideas they had for how it could be improved on Montserrat. The table below captures the key themes that emerged in the discussion.

**Table 5. Feedback from Stakeholder Meeting with Fishers Association**

Key Issues	Stakeholder Recommendations
<ul style="list-style-type: none"><li>▪ Ocean jurisdiction</li><li>▪ Lack of a boat registry</li><li>▪ Low catches</li><li>▪ Pot theft</li></ul>	<ul style="list-style-type: none"><li>▪ Set territorial boundaries</li><li>▪ Trap identification</li></ul>

## Farmers

Nine (9) farmers came together to learn about the Blue Halo Initiative and have an introduction to SeaSketch, by visiting scientists Dr. McClintock and Ms. Grace Goldberg. A few participants commented that plastic pollution was becoming an issue on land, and this had potential impacts for the sea. One farmer asked for BHI to support her to encourage customers to reduce the amount of plastic bags used when vegetable shopping by providing re-usable grocery bags.

Another farmer, spoke of the issue of overfishing and the need for government to make tough decisions to protect the marine environment, especially in terms of runoff and garbage entering through the ghauts (ravines leading to the sea).

**Table 6. Feedback from Stakeholder Meeting with Farmers**

Key Issues	Stakeholder Recommendations
<ul style="list-style-type: none"><li>▪ Plastic pollution</li><li>▪ Overfishing</li></ul>	<ul style="list-style-type: none"><li>▪ Re-usable grocery bags</li><li>▪ Government intervention</li></ul>

## Governor's Community Morning Meeting

About twenty-five community members from private, governmental, and NGO groups met at the Governor's house for an introduction to Blue Halo and a review of the preliminary results from the Ocean Stakeholder Survey. Attendees critically discussed the support of fishers for sustainable ocean policies and how policies can preserve the traditional fishing rights in Montserrat. One enforcement officer commented that he would rather see closed seasons for parrotfish instead of a complete ban, as in the case with Barbuda's fishery regulations.

**Table 7. Feedback from Stakeholder Meeting with Governor's Guests**

Key Issues	Stakeholder Recommendations
<ul style="list-style-type: none"><li>▪ Rumors of lack of support for BHI in Barbuda</li><li>▪ Aversion to bans on parrotfish fishing</li><li>▪ Protect traditional fishing rights</li></ul>	<ul style="list-style-type: none"><li>▪ Protect pot-fishing on Montserrat</li><li>▪ Parrotfish open/close season</li></ul>

## Community Clubs

### Rotary Club, 17<sup>th</sup> November 2015

Site Manager was given a warm welcome to the Rotary Club. Overall, participants felt that the project was important for environmental management in Montserrat, the concern about conflict amongst

fishers adhering to the recent regulations at the Barbuda pilot site was mentioned, and the importance of data-sharing was mentioned.

**Davy Hill, 23<sup>rd</sup> November 2015**

Eight members from the Davy Hill Community came together to learn about the BHI and provide their feedback. Issues of concern included lionfish invasion, and seafood safety, including ciguatera and the problem of pollution on the island.

**St. John’s Action Group, 25<sup>th</sup> February 2016**

Three members of the St. John’s Action Group met at the Disaster Management and Control Authority office to learn about the Blue Halo Initiative on Montserrat. The turn-out was much lower than expected, due to a conflicting event at University of the West Indies on the same evening. The group’s main concerns to Montserrat’s ocean health were pollution and lionfish invasion. All 3 members were in agreement that ocean zoning was a useful concept to better manage ocean resources in Montserrat and were supportive of marine reserves.

**Drummonds Group, Monday 29<sup>th</sup> February 2016**

Six members of the Drummonds community attended a presentation on BHI. The issue of plastic bag pollution was a focus of our discussion on potential threats to Montserrat’s environment. The need for public education and awareness on the dangers of plastics and the need to remind citizens of the land-ocean connection were discussed. A question about what could be done to stop the influx of Sargassum seaweed on the sea-shore was brought up by one participant.

**Table 7. Feedback from Stakeholder Meeting with the Community Groups**

Key Issues	Stakeholder Recommendations
<ul style="list-style-type: none"> <li>▪ Data sharing</li> <li>▪ Lionfish invasion</li> <li>▪ Seafood poisoning</li> <li>▪ Pollution</li> </ul>	<ul style="list-style-type: none"> <li>▪ Need for public awareness to address indiscriminate dumping of garbage in ghauts</li> <li>▪ Re-usable bags</li> </ul>

## 4. DISCUSSION

Blue Halo Montserrat builds upon the concept of empowering the people of Montserrat to support the development of a sustainable ocean policy. Community consultations are a core aspect of the Initiative to engage communities and ocean users and include surveys and stakeholder meetings. This section discusses the findings from the community consultations and their relevance for the development of a sustainable coastal policy in Montserrat.

### Perception of Marine Ecosystems

Survey findings indicate that people on Montserrat value the ocean and marine resources. Three of four respondents (73%) go to the beach regularly and have done so their entire life. Almost all (92%) describe the ocean as important, most commonly for access to seafood (67%), culture or heritage (36%), and recreation (30%).

However, survey results show that people are concerned about the health of Montserrat's marine environment. When asked about threats to Montserrat's marine environment, the most commonly mentioned concern is ocean pollution (59%). The issue of pollution also arose in several stakeholder meetings, and when asked about suggestions for improved ocean management, people's top recommendation was to curb pollution (31%). Other commonly mentioned concerns include invasive species (43%) and overfishing (35%). Most respondents describe the health of Montserrat's fish stocks as average (42%) or poor (23%) and more than one-third (39%) believe that fish stocks are deteriorating. Interviews conducted by researchers from Colby University with 20 fishers support these findings. In this study, fishers highlighted decreasing stocks for lobster, conch, corals, groupers, parrotfish, and other species, however, they contribute the decline to long-term effects of the volcanic eruption rather than overfishing.

Notably, survey findings indicate a lack of knowledge about marine ecosystems among many members of the public. When asked about the health of ecosystems, more than half reported that they do not know if Montserrat's reef are healthy or unhealthy, and still one-fifth could not assess the state of Montserrat's fish stock. These findings suggest the need for basic information about marine environments through awareness campaigns and inclusion of the topic in the school curriculum.

### Support for Ocean Management

Survey findings indicate that people on Montserrat support the development of sustainable ocean policies. Further, three in four respondents (74%) reported that the current level of ocean management on the island is not enough and would support the creation of marine reserves (75%).

The surveys explored specific conservation actions among 45 representatives from key stakeholder groups, including fishers, government employees, recreational ocean users, dive operators, business owners in the hospitality industry and community members.

Marine spatial planning is a widely-used tool to prioritize and manage marine resources. It is designed to reduce conflicts among ocean uses, make trade-offs among competing uses, and address cumulative impacts. Ocean zoning allocates marine space to one or multiple uses that may include areas designated for marine protected areas (including marine reserves), aquaculture, various types of fishing, shipping, recreation, mooring/anchoring, and energy production. A key challenge of ocean zoning is balancing environmental, economic, social, and cultural interests in delineation of zone boundaries. To help inform decision-making related to ocean zoning, the Waitt Institute gathered stakeholders' feedback regarding the usefulness of zoning. Findings from the stakeholder survey suggest that the majority of stakeholders find the concept of ocean zoning useful.

Regulating the use of fishing gear is another measure to manage fishing output and enhance marine resource management. Gear restrictions can be designed to protect young fish, conserve stocks, reduce by-catch, or decrease fishing efficiency. Findings indicate mixed support for gear restrictions. More than half support prohibition or stricter controls for the use of gillnets, and close to half support stricter controls for fish pots. Fishers generally prefer to keep the status quo, indicating some opposition to gear restrictions from this stakeholder group. However, almost all would support a requirement for escape traps to protect juvenile fish.

Survey findings indicate a stronger support for catch restrictions compared to restricting fishing gear. Catch restrictions are another approach to manage marine resources by protecting a single species that provides a specialized function in the ecosystem or that is endangered due to overharvesting or other threats. Three in four stakeholders (73%) would support catch restrictions during spawning season. Additionally, most stakeholders support outright prohibition to take juvenile fish, sea turtle harvest (86%), and still over one-third (39%) supports stricter controls for catching parrotfish. The vast majority of stakeholders (91%) would also support moorings to limit anchoring damage.

**APPENDIX 1. GENERAL SURVEY INSTRUMENT**



Name:

Date:

Gender:

Neighborhood:

Birth year:

Interviewer:

1. What's your favorite thing about the ocean?

2. Is the ocean important to you? If yes, why

- Seafood  Culture  Employment  Other

3. How would you describe your relationship with the ocean?

(Check 1 or more and indicate how often for each)

	Daily	Weekly	Monthly	Quarterly	Yearly	Starting Year
<input type="checkbox"/> Beach Goer	<input type="checkbox"/>	_____				
<input type="checkbox"/> Snorkeler	<input type="checkbox"/>	_____				
<input type="checkbox"/> SCUBA diver	<input type="checkbox"/>	_____				
<input type="checkbox"/> Pro. Fisher		<input type="checkbox"/>				
_____						
<input type="checkbox"/> Rec. Fisher	<input type="checkbox"/>	_____				

<input type="checkbox"/> Tourism Operator	<input type="checkbox"/>	_____				
<input type="checkbox"/> Rec. boater	<input type="checkbox"/>	_____				
<input type="checkbox"/> Govt./Mgmt.	<input type="checkbox"/>	_____				
<input type="checkbox"/> Transportation	<input type="checkbox"/>	_____				
<input type="checkbox"/> _____	<input type="checkbox"/>	_____				

4. How would you rate the condition of Montserrat's coral reefs?

Very unhealthy     Unhealthy     Average     Healthy     Very healthy

Don't know

In the last 10 years, is the condition  getting better     getting worse     the same

5. How would you rate Montserrat's fish population?

Severely depleted     Depleted     Average     Abundant     Very abundant

Don't know

In the last 10 years, is the condition  getting better     getting worse     the same

6. How would you rate Montserrat's nearshore water quality?

Very poor  Poor  Neutral  Good  Very good  Don't know

In the last 10 years, is the condition  getting better  getting worse  the same

7. Are you concerned about the following activities/potential activities threatening Montserrat's ocean?

Not concerned = 1      Slight concern = 2      Somewhat concerned = 3  
Concerned = 4      Very concerned = 5

\_\_\_\_\_ Overfishing

\_\_\_\_\_ Tourism operations

\_\_\_\_\_ Commercial Fishing

\_\_\_\_\_ Boating/Shipping traffic

\_\_\_\_\_ Recreational Fishing

\_\_\_\_\_ Coastal development/Construction

\_\_\_\_\_ Pollution

\_\_\_\_\_ Invasive Species

\_\_\_\_\_ Climate change

\_\_\_\_\_ Marina development

\_\_\_\_\_ Dredging/mining

\_\_\_\_\_ Aquaculture

\_\_\_\_\_ Wave/wind energy projects

\_\_\_\_\_ Marine research

Other \_\_\_\_\_  
\_\_\_\_\_

8. Overall, how do you feel about ocean management on Montserrat? Is there...

Too much       Too little       Right amount       Don't know

9. What % of your household's income comes from ocean use?

0%     1-25%     26-50%     51-75%     76-100%     Don't know

10. If you could write the rules to manage Montserrat's ocean, what would they be?

11. Do you support the creation of marine reserves, areas closed to fishing and other activities, so the ecosystem can recover?       Yes     No

12. What's your favorite seafood?

## APPENDIX 2. OCEAN STAKEHOLDER INSTRUMENT

Do you ever fish? If yes, what types of fishing gear do you use?

13. Primary gear:

- Hook and line
- Pot/Traps
- Beach seine net
- Gill net
- Trolling
- Spearfishing
- Other \_\_\_\_\_  
\_\_\_\_\_

14. Additional types:

- Hook and line
- Pots/Traps
- Beach seine net
- Gill net
- Trolling
- Spearfishing
- Other

15. Are you aware of any conflicts between different users of the ocean? (e.g. divers and fishermen)

16. Are you aware of any collaborations or partnerships between users of the ocean? (e.g. divers and conservation)

Ocean zoning is a big picture approach to how we manage the ocean that balances all uses and ensures sustainability. Since it's not possible to do every ocean activity in the same place at the same time, instead ocean zoning creates a plan for what happens where. [*Show ocean zoning diagram and factsheet.*]

17. To what extent do you think this concept of ocean zoning would be useful to Montserrat?

Not at all    A little    Neutral    Somewhat    Very    Don't know

Comments:

18. Ocean zoning typically includes some of the following goals. Rate the importance of each goal from 1 = not important to 5 = very important.

- |  |   |
|--|---|
| <input type="checkbox"/> Protect coral reefs           | <input type="checkbox"/> Encourage further recreational/ tourism activities |
| <input type="checkbox"/> Allow fish stocks to increase | <input type="checkbox"/> Allow new ocean development opportunities          |
| <input type="checkbox"/> Curb pollution into the ocean | <input type="checkbox"/> Improve boating safety                             |
| <input type="checkbox"/> Conserve marine environment   | <input type="checkbox"/> Prevent conflicts between ocean users              |
| <input type="checkbox"/> Other _____                   |   |

Comments:

19. What types of zones should be created? (Check all that apply.)

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> General boating                           | <input type="checkbox"/> Diving                        | <input type="checkbox"/> Tour operations         |
| <input type="checkbox"/> Recreation                                | <input type="checkbox"/> Fishing                       | <input type="checkbox"/> Conservation/Protection |
| <input type="checkbox"/> Waste Disposal                            | <input type="checkbox"/> Aquaculture                   | <input type="checkbox"/> Marine research         |
| <input type="checkbox"/> Transport (shipping/ferries/cruise ships) | <input type="checkbox"/> Energy generation (wind/wave) |  |
| <input type="checkbox"/> Other _____                               |  |  |

Comments:

20. Any Montserratian fishing traditions that you think should be part of Fisheries laws?  Yes   
No

21. IF YES: What are they?

22. Do you think illegal foreign fishing is a problem in Montserrat?  Yes  N  don't know

23. What do you think should be done to manage illegal fishing?

Which type of fishing gear do you think is:

24. most damaging to fish populations?

- Hook and line
- Pots/traps
- Beach seine net
- Gill net
- Trolling
- Spearfishing
- Other \_\_\_\_\_  
\_\_\_\_\_

25. most damaging to coral reefs?

- Hook and line
- Pots/traps
- Beach seine net
- Gill net
- Trolling
- Spearfishing
- Other

26. Should hook and line fishing be:  kept as it is  controlled more  restricted  
 don't know?

27. Should pot fishing be:  kept as it is  controlled more  restricted  don't know?

28. Do you think fish pots should have an escape gap that would allow juvenile fish and ornamental fish to escape?  Yes  No

29. Should spearfishing be:  kept as it is  controlled more  restricted  don't know?

30. Should gill net fishing on reefs be:  kept as it is  controlled more  restricted

don't know?

31. Should gill net fishing everywhere around Montserrat be:  kept as it is  controlled more  
 restricted  don't know?

32. Should fishing for parrotfish be:  kept as it is  controlled more  restricted  
 don't know?

33. Should fishing for shark be:  kept as it is  controlled more  restricted   
don't know?

34. Should catching juvenile fish, conch, or lobster be:  kept as it is  controlled more  
 restricted  don't know?

35. Should the cutting of mangroves be:  kept as it is  controlled more  restricted   
don't know?

36. Should using chemicals to fish be:  kept as it is  controlled more  restricted   
don't know?

37. Should there be a limit/quota on number of fish caught?  Yes  No  don't know

38. Should there be a closed season for fish?  Yes  No  don't know

39. Do you think there should be a limit/quota on number of lobster caught?  Yes  No   
don't know

40. Closed season for lobster?  Yes  No  don't know

41. Do you think there should be a limit/quota on number of conch caught?  Yes  No

don't know

42. Should there be a closed season for conch?  Yes  No  don't know

43. Should fishing be prohibited during spawning?  Yes  No  don't know

44. Should catch of sea turtle or collection of their eggs be prohibited?  Yes  No  don't know

45. Should there be a limit to the number of fishermen on Montserrat?  Yes  No  don't know

46. Should there be a limit to the number of divers on Montserrat?  Yes  No  don't know

47. Should there be moorings to limit anchoring and collect fees?  Yes  No

don't know

48. What do YOU think needs to be done in order to make fishing good for future generations?

49. Who else should I interview?

50. Anything else you'd like to tell me about fishing or the ocean in general on Montserrat?

## APPENDIX 3. SHIFTING BASELINE STUDY

The Waitt Institute partnered with researchers from Colby University who conducted a Shifting Baselines study<sup>2</sup>. One component of the study collected local ecological knowledge of fishers with an aim of identifying changes in the abundance of species and discussing reasons for those changes. The researcher interviewed 20 fishers ranging in age from 19 years to 74 years, over a two-week period during January 2016. Lobster, conch, and coral are perceived to be declining, whereas turtles, lionfish, and sharks are perceived to be increasing in Montserrat.

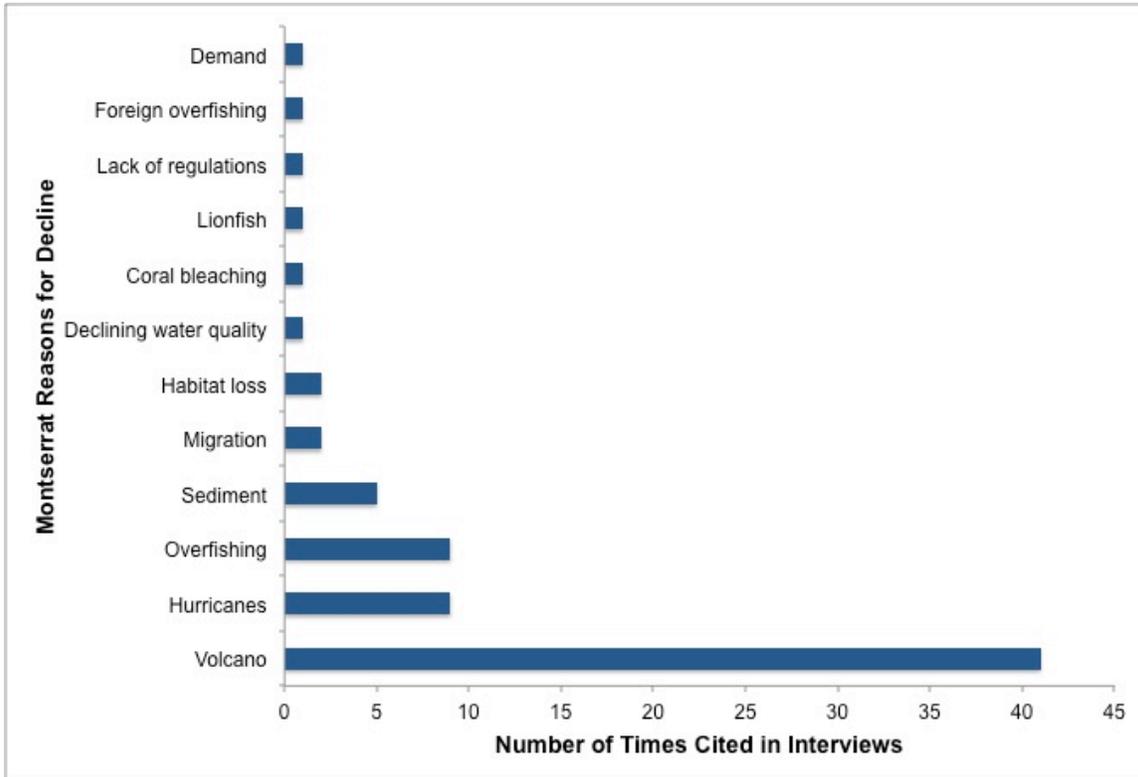
**Table 8. Shifting Baseline Study Responses**

Species	Increase	Decline	Overall Decline	Reasons
<b>Rated as Decline</b>				
Lobster	0	9	0	Volcano (n=9), Migration (n=2) Hurricanes (n=1) Sedimentation (n=1)
Conch	0	10	0	Volcano (n=10), Hurricane (n=2), Overfishing (n=1)
Coral	0	10	0	Volcano (n=10), Hurricanes (n=3), Sedimentation from construction (n=4), Pot fishing/ spearfishing/ nets (n=2), Declining water quality (n=1), Bleaching (n=1)
Grouper	0	5	0	Overharvesting (n=2), volcano (n=2), lionfish eating juveniles (n=1)
Parrotfish	0	6	0	Volcano (n=4), Hurricanes (n=1)
Striped Croaker	0	4		
Angelfish	1	3	0	Habitat loss (n=1)
Jack	0	3	0	Overfishing (n=1), Lack of regulations (n=1)
Seagrass	2	4	0	Volcano (n=3), Hurricane (n=2)
Snapper (queen, mutton, grey, dog)	1	0	2	Overfishing (n=2) Foreign overfishing (n=1) Loss of habitat (n=1) demand (n=1)
Barracuda	1	0	0	Overfishing (n=1)
Rays	0	1	0	Overfishing (n=1)
<b>Rated as Increase</b>				
Turtle	10	0	0	Change in customs (n=9), Protection by law (n=4), Beach area increase (n=3)
Lionfish	10	0	0	
Sharks	3	0	0	Less fishing (n=1)

<sup>2</sup> Paper in press.

The top reasons cited for species decline on Montserrat were natural disasters including Hurricane Hugo in 1989 and the volcanic reuption of the Soufriere Hills in 1995. Other reasons mentioned were overfishing, increased demand for resources, and lack of regulations, among others.

**Figure 14. Shifting Baseline Study Reasons for Decline**



#### APPENDIX 4. REFERENCES

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