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Comparing Apples to Oranges, and Turning Them Into Fish; A Framework for Valuing Marine Species Used by Competing Resource Users

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Comparing Apples to Oranges, and Turning Them Into Fish; A Framework for Valuing Marine Species Used by Competing Resource Users

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Masters of Advanced Studies in Marine Biodiversity and Conservation

Capstone Report – June 9, 2016

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Introduction

About Economic Valuations: An economy can be defined in terms of its capital, assets available for use, and the production, consumption, and transfer of that capital. There are various types of capital including financial, (money), fixed, (machinery and infrastructure), natural, (natural resources), human, (labor), and social (social networks and community (Ecotrust Canada 2013). Some of these forms of capital are easier to measure than others, generally because a market exists for them, from which benefits can be valued.

In an age where our marine resources are on a precipitous decline, it is imperative that we protect what we have so it can sustain current and future generations. Yet, generally speaking, policy makers will ignore the importance of these ecosystems and the species within them unless there is a price tag attached to it (Costanza et al. 1997). Economic valuations, or assigning monetary value to environmental resources (whether or not market prices are available), are useful to consider when making choices that involve tradeoffs in allocating resources, especially when the choice involves groups that value the resource differently. However, this is just one of the many ways in which to measure the value of an environmental component. While I am not of the belief that something needs to have a price tag attached to it in order to be considered important, I do recognize that this is how many sectors operate, and it is my opinion that if a valuation is to be done anyway, it might as well be done with a degree of higher accuracy and consideration for multiple resource users.

If marine planning and management are to be done effectively, it is imperative that planners and decision makers are well informed of the importance of a given resource to all user groups. Typically, this only extends to the user groups that in some way “consume” the resource, whether that is in an extractive manner by removing the species from the environment or in a non-extractive manner by viewing it or appreciating its existence. Rarely do we see evidence of work done to document the resource’s importance to local families and communities, those who are oftentimes the ones most affected by policy decisions regarding the fate of the resource (Ecotrust Canada 2013).

There are many ways to measure the values a marine species provides a community, but the following are those I felt were the most applicable to my project, and as such are what I concentrated on. There are two main ways to measure willingness to pay, usually the most standard way to quantify benefits, stated preference and revealed preference. Stated preference, not used in this project because of time and resource constraints, provides a means for estimating nonmarket benefits based primarily on existence value (Goodstein 2011). Revealed preference, used to measure benefits associated with recreational resources, is a market based approach to estimating a non-market value, and is the technique I have employed for my project (Goodstein 2011). It is important to note that the measure of willingness to pay, a good’s market price, is not the complete measure of it’s economic value, but rather the minimum amount people who value the good are willing to pay (Ecosystem Valuation site). Within this

examination of benefits, economists can look at use values^a (both consumptive and non-consumptive) and non-use values^b (existence, option, and biodiversity). Again, because of time and resource constraints, this project only takes into consideration the use values associated with a marine species.

The following are general challenges to economic valuations that I tried to overcome with the creation of my framework: **1)** Time and money intensive, **2)** Difficult to get competing resource users to agree on a policy, **3)** Don't know what information you're lacking, and **4)** You can't add financial values to qualitative ones (you can't add apples to oranges, adding various values together does not always work).

Project Background and Motivation: Originally this capstone was intended to be an economic analysis of the main industries of two towns in Baja California Sur, La Paz (an area that relies of a mix of tourism and fisheries) and Cabo Pulmo (an area that relies predominantly on tourism). Unfortunately not only was there a definite lack of data to perform the comparison, but in determining what types of data were needed as well, a sort of framework to place it all in. So I came up with the idea of creating a framework that would show exactly where the missing data points were. After some more discussion, the idea grew into a new question: "How would you value a marine species?" After a short examination of some environmental valuation papers, I began to notice that a majority of the time, the value of a species was contingent on it's market-value, with little to no consideration to the, albeit more difficult to quantify, non-market values.

In an attempt to better understand the non-market values of marine species, I took part in two trips; one to the 2016 Slow Fish Sustainable Seafood Conference in New Orleans and the other to La Paz and Cabo Pulmo. During both trips I had the opportunity to speak with a variety of individuals from fishermen and tourism operators, to local politicians and leaders of NGOs. I heard that fishing was a way of life, a connector amongst people in the community that made them who they were, gave them a sense of place and belonging. Furthermore, that most were actively fighting to protect not only the health fish they were fishing, but also the right to do so, so that they could one day pass it on to their children.

I saw all these interesting questions that needed answering with no real clear way to answer them. If you focus on one component in isolation you reach one very specific conclusion. I heard stories of times when people focused too much on the profit and jobs tourism created in a given community, and missed out on understanding how important fishing is to the areas culture. Stories of those who concentrated solely on how important fishing was to the community, and how much profit it brought in, but overlooked the importance of the species being retained in the ecosystem. Oversights

^a **Use Value** – *Involves direct enjoyment or consumption of an environmental good.* (Keohane and Olmstead 2007)

^b **Non-use Value** – *The desire to preserve a resource for future generations or the pleasure taken from the knowledge that something exists; they involve benefits derived from the existence of an environmental amenity, but not from its direct use.* (Keohane and Olmstead 2007)

such as these are some of the many reasons why a more complete spectrum of the values a particular marine species brings to a community is needed. One that is inclusive of the easier to quantify market values, but also of the harder to measure non-market values. I found that what was missing was a consideration for a cultural and biological aspect, the intangible non-market values. A cultural component because rarely do we see evidence of work done to document the resource's importance to local families and communities, who are oftentimes the ones most affected by policy decisions regarding the fate of the species in question. A biological component which would give value to a species for its existence and importance in the ecosystem; a component that would also protect against the presumption that complete extraction could be justified if a species had no tourism or cultural value.

During the course of my project I hoped to overcome the following difficulties that are characteristic of most valuations: **1)** time and money intensive, **2)** values change across time and across individuals, and **3)** many times you don't know what information you're lacking. The last, and perhaps most challenging difficulty I wanted to tackle is that you can't add apples to oranges; adding up all the different values a species bring to a community does not necessarily make sense, especially when it comes to adding monetary values to cultural and biological values. That being said, I present my research question: How do you place a value on a marine species used by competing resource users?

The first goal of this project was to identify if there was a gap in existing research on valuing a marine species used by competing resource users by conducting a literature review on both terrestrial and marine ecosystem and species valuations. The second goal, if a gap did in fact exist, was to create a framework that would serve the following purposes: 1) Inform local policy makers and stakeholders of the spectrum of values surrounding a species as well as the tradeoffs between different types of values and 2) Provide researchers who wish to conduct economic valuations on marine species with a framework that will identify what the gaps in their data.

By doing this, I hope to provide policy makers with a framework that will enable them to move beyond the dollar sign attached to the value of a marine species, or to at least make them aware of its non-market values as well as potential. Above all else, I wanted the framework to be relatively cheap, easier to complete than traditional methods, user friendly, and easily accessible.

Methods

Literature Review: To familiarize myself with the realm of environmental valuations as well as to determine if there was a gap on valuing a marine species used by competing resource users, I conducted a literature review using Google Scholar. I broke each paper down into the following sections: component valued (fisheries, sportfishing, non-extractive tourism, cultural, or biological), subcomponent (i.e. if the component was tourism, the subcomponent would be snorkeling), species that was valued, the method of how it was valued, how it ranked in terms of importance to the other values

in the paper. From here I divided the papers into three categories of market values (fisheries^c, sportfishing^d, and non-extractive tourism^e) and non-market values (cultural and biological). I built my framework around these five components because they encompassed all stakeholders who would be the most effected by a policy change to either increase the amount of conservation or exploitation for a particular marine species.

Creation of Forms: From the literature review, a list of pertinent data needed for each of the five components was constructed, from which six forms were created: three market value financial forms (fisheries, sportfishing, and tourism), two qualitative non-market value forms (cultural and biological), and one summary form.

My literature review provided me with an understanding of the most crucial areas of consideration for the **financial forms**^f, where most currently used methods are similar or exactly the same (as there are only so many ways you can measure a market value). I adapted equations for calculating activity expenditures for both sportfishing and non-extractive tourism used by O'Malley et al. (2013) as well as from Cisneros et al. (2013). Outside of this, of the work done for these three components was in determining what limitations I needed to overcome and work around, and which ones I had to accept, ignore, and move on from.

For the **cultural form**, I adapted my list of ten cultural values from those I came across during my literature review, many of the papers which had chosen values based off of the "Millennium ecosystem assessment" (2005), which in addition to the report published by Ecotrust Canada (2013), have served as the basis from which I have defined each value^g. For the **biological form**^h I modified the approach used by Luck et al. (2009) who combined two previous frameworks into one. The first concept called for valuing "service providing" units (which linked ecosystem services to the populations that made them possible) and the second for valuing "key ecosystem service providers" (which described the functional traits and functional importance of groups that supply ecosystem services) (Kremen et al. 2005, Luck et al. 2003). For this form a created a series of questions that would ascertain the species' importance to the ecosystem and what its conservation status is.

^c For the purposes of this project, fisheries include both commercial and artisanal

^d While sportfishing is seen as a type of tourism, for the purposes of this project it was designated as a separate component to better evaluate extractive versus non-extractive tourism

^e For the purposes of this project, non-extractive tourism activities are defined as those that do not remove the species of interest from their natural environment, and include the following: snorkeling, SCUBA diving, wildlife-viewing, and wildlife-feeding

^f O'Malley et al., 2013; Norman and Catlin, 2007; Vianna et al. ____; Cisneros-Montemayor et al., 2010; Bennett et al., 2003; Anderson and Ahmed, 1993; Clua et al., 2011; Cisneros-Montemayor et al., 2013; O'Donnell et al., 2013; Beaumont et al., 2008; Chen and Phillips, 2002; Fernando and Stevens, 2011; Heinrichs et al., 2011; Southwick Associates, 2008

^g MEA, 2005; Milcu et al., 2013; Beaumont et al., 2008; Vianna et al., ____; Bennett et al., 2003; De Groot et al., unpublished; O'Donnell et al. 2013; Dudwick et al., 2006; Plieninger et al., 2012

^h Beaumont et al., 2008; Luck et al., 2009; [check for missing](#)

The framework in action: From the list of type of information needed to complete the valuation I was able to place the data that had been available for my previous capstone project. From there I used Microsoft Excel to construct two charts, one for La Paz and one for Cabo Pulmo, depicting if the necessary data was: **1) Available**, **2) Easily obtainable**, or **3) Not available**. From these charts simple 100% stacked column graphs were created in Excel.

Results

Literature Review: The results of this literature review are by no means a comprehensive assessment of either the marine or terrestrial valuation literature; it is simply what I was able to do with the time and resources available. Of the 33 papers read in my review I found that most valuation papers out there had a terrestrial focus, both in terms of the ecosystems and species valued. In terms of studies valuing the marine realm, they valued the ecosystem as a whole, as opposed to piecing out the biological importance of an individual species, which is exceptionally difficult and thus far has typically only been done for species such as corals and mangroves whose ecosystem services are more clearly defined (Barbier 2012). Additionally, most papers focused on one component in isolation, and papers that did focus on all components were theoretical.

Market Value Forms (Appendices B, C, and D): The three financial forms for fisheries, sportfishing, and non-extractive tourism are filled out in the same manner as a tax form, with each line of the form requesting a specific value. The following types of values are asked for: Money spent by guests on food, accommodations, activity expenditures, and travel and by operators on employee wages and operation costs, the number of guests per activity, the number operators and employees, and either the weight or number of the species of interest caught. From these values the form will compute: **1) Local profit** (defined for the purposes of this project as the total revenue from the activity minus the money spent on local purchases) retained in the community, **2) Number of jobs created**, and **3) Amount of money spent locally on operation costs** (such as maintenance) and employee wages. Additionally, each of the forms has a set of specific instructions and clarifications to points that could possibly be confusing.

Cultural Form (Appendix E): The ten cultural values that I chose to include in my form are as follows: Aesthetic, cultural heritage, educational values and knowledge systems, gifting and trading of seafood, inspiration, recreation, sense of place and identity, social relations, spiritual services, and stewardship. Based on the number of values selected for each of the three components of fisheries, sportfishing, and non-extractive tourism each is assigned a designation of “High”, “Medium”, or “Low” cultural importance (eight or more values is awarded a “High” level, between four and seven a “Medium” level, and fewer than three a “Low” level). Similar to the financial forms, at the end of this

form there are specific directions that provide definitions for each of the values as well as how to determine the designation.

Biological Form (Appendix F): Questions designed to assess the species' importance to the ecosystem and conservation status were used. This form is meant to provide awareness of the various traits of the organism to whoever is valuing it. Based on the number of "Yes" answers to questions on the form, with a "Yes" generally indicating that a species is more vulnerable to exploitation, a level of concern is assigned to each of the three types of activities (fisheries, sportfishing, and non-extractive tourism). One "Yes" corresponds to "No concern", between two and three corresponds to "Moderate concern", and more than four corresponds to "Extreme concern." As was done for the previous forms, there are specific directions that provide definitions for each of the values as well as how to determine the designation.

Summary Form (Appendix G): The end values and designations from each of the five previous forms are included and placed in one summary table, again accompanied instructions on what line to obtain each of the final values from.

Framework Into Action (Figures 1, 2, 3, 4, 5, 6): While I originally thought I had all the necessary information to carry out an evaluation of the industries of La Paz and Cabo Pulmo, it turns out that on average, for each component I only had on average 35% of the total data needed for both (Fig.1, Fig.4). However, out of the data needed for both areas 19% was easily attainable (Fig.2, Fig.5).

Discussion

Financial Components: As the aim of my project was to construct an inclusive framework that was, above all else, quick and relatively cheap to complete, there were many limitations to the extent I was able to delve into aspects of the valuation. Most notably, I was unable to include examples of stated preference/contingent valuations, which are used to provide a means for estimating nonmarket benefits, primarily the existence value, bequest, and unknown future values. Several issues arose around how to measure customer expenditures in such a way that purchases weren't double counted and it was made known how much of each purchase stayed in the community and became local profit.

The first issue I encountered was how to (calculate the appropriate values for travel cost, accommodation expenditures (lodging and food), and activity expenditures)/account for trips where activities other than the ones specified for sportfishing and non-extractive tourism, were engaged in during a single trip. Generally to correct this issue, two main techniques are used to determine how much of the total cost can be attributed to each activity. One method is to look at the amount of time spent doing each activity, and assign a corresponding percent of the cost; the second

involves interviewing or surveying the customers to determine what percent satisfaction each activity provided to their overall trip experience, and likewise assign a corresponding percentage of the cost (Tapsuwan and Asafu-Adjaye 2008). However, because of time constraints, for the purpose of my project and the forms, it is assumed that any trip made to the community is for the explicit purpose of engaging in one of the activities, and as such, other incidental or spillover activities are not accounted for.

The difference in the travel cost to get to the community for those who are closer versus farther away can be substantial, however this by no means indicates that those who have paid the higher travel cost have a higher willingness to pay. This was easily solved as the value I wanted the forms to calculate is the value to the community, generally little of the bulk of the travel cost is retained by the community, so to account for occasions when it did I added sections to the forms for “percent of cost spent locally”. Double counting was an issue for the non-extractive tourism form where there was a possibility that individuals would come to the community to engage in multiple activities, but in the end only have paid one fee for travel, one fee for accommodations, and one fee for activity expenditure. To ensure these weren’t counted twice, a section was put into the form that would calculate an activity specific cost-scaling factor, which when multiplied by each of the aforementioned fees would allocate an appropriate amount of each to each type of activity that was participated in during the trip.

Other limitations that I did not address in my project and that for the sake of time had to simply ignore are as follows: Expenditures at the group versus individual level (Southwick Associated 2008), this being a single species form when multi-species ecosystem based management is the currently accepted practice.

Cultural Component: Placing a dollar value on something that has no market is a challenge, and for this project I was unable to create a way in which to successfully do it. Additionally, it would be near impossible to come up with a list of values that are agreed on by all as encompassing every benefit that a marine species can provide to a community, so I limited myself to the ones that were most frequently mentioned in my literature review.

Biological Component: Generally, when valuations are done they value terrestrial species and/or ecosystems; this is for a couple of reasons. First, when compared to the ocean, land is easier to assign value to because for the most part there is a price to pay for purchasing it; this gives land property rights (Keohane and Olmstead 2007). Previous papers that have attempted to value ecosystem services have looked at the following categories of environmental services: regulation services (i.e. gas and climate regulation as well as bioremediation of waste), support services (i.e. nutrient cycling, resilience, and resistance), provisioning services (i.e. food), and cultural services (i.e. recreation) (Beaumont et al. 2008, Luck et al. 2009). While this is on the system level as opposed to the population or species, I feel this would be a good model to follow, especially considering different levels of biological organization are considered to be responsible for different services; species populations and functional groups are associated with the regulation of biological control (i.e. seed dispersal) whereas on the larger scale,

ecological communities or biogenic habitats as responsible for larger scale services (such as flood control and carbon sequestration) (Luck et al. 2009). The eventual goal of this component is to be able to determine which groups within a given community use the services provided by the species of interest, at what level, and which characteristics of the organism are essential for enabling said service(s) to be provided at the necessary level (Luck et al. 2009).

There were many challenges I encountered when creating the biological form because of my initial desire to have it produce a monetary value representative of the value of the species to the ecosystem. One was the issue of substitutability, wherein the value of one species is conditional on what is going on with the other species interacting with it (Sukhdev 2014). This is especially relevant when considering the calculation of the replacement value for a species, a method often used to represent a fraction of the species' biological value (Luck et al. 2009). However, that is just the value of how it would affect the biological realm, and would not take into account how the loss would affect areas of cultural, fisheries, or tourism. The idea of replacement cost is also problematic because it suggests that the species can be completely replaced (i.e. that one species of herbivorous reef fish could be perfectly and completely substituted for another). Another challenge I ran into during the early stages of my project was that I had planned on including the species' stock assessment as a measure of the species' abundance in the area. However, with that came complications of diminishing marginal returns, essentially the more of something you have, the less important one extra unit of it is (Keohane and Olmstead 2007). In the end I chose to circumvent this issue by choosing a qualitative question for the biological form that asked if there had been any changes in the abundance of the species, as opposed to a quantitative one.

Conclusion

With the creation of my framework and forms I believe I have solved some of the issues that are common to economic valuations; determining where your lack of data lays, the issues of time and money, and the inability to add financial values to qualitative ones. I was unable to tackle the problem of getting competing resource users to agree on a policy, however I feel this is something that can be accomplished by making the framework, these six forms that I have created, available to community stakeholders who wish to value the marine species in their communities. I feel the next step is to put together a workshop of experts in these various fields, who can review the forms so that they can be placed online.

Eventually I would also like to create a second framework, one that would be able to address all the limitations I was either unable to spend time on or which were unnecessary for the first framework. This second framework would be more time and money intensive and would involve the following: a closer examination of the relationship between fisheries and tourism (particularly where there is crossover), stated preference surveys, trends in employment, and trends in business type (i.e. increase in tourism operators or an increase in specialized operators).

Supplementary Materials

Appendix A: Definitions of Terms Used

Aesthetic Values – Defined as possessing feelings of particular beauty towards the species, which can be reflected in things such as art.

Carnivore – An organism that gets food from killing and eating the flesh of another organism.

Critically endangered – Species is assigned this status if it faces an extremely high risk of extinction in the wild. (Definition taken from the IUCN’s Red List)

Cultural heritage Values – Defined as being relevant to local history, culture, and traditions (inclusive of folklore, painting, consumption of species as a traditional food, and cultural and spiritual traditions).

Detritivore – An organism that feeds on dead plant or animal matter.

Educational Values and Knowledge Systems – Defined as experiences with the species, both formal (i.e. in a classroom setting) and informal, which widen knowledge about that species. Knowledge systems are “traditional ecological knowledge”, or societal experiences that have accumulated over the years through interactions with the natural environment and passed down through generations.

Endangered – Species is assigned this status if it faces a very high risk of extinction in the wild. (Definition taken from the IUCN’s Red List)

Food web – Organization that represents the feeding relationships of a community.

Giftng and Trading of Seafood – Defined as catching the species with the purpose of gifting or trading it to another person.

Herbivore – An organism that feeds on plants.

Inspirational Values – Defined as the understanding that the species stimulates new thoughts, ideas, or creative expressions that can take the form of art, folklore, national symbols, architecture, and advertising.

Keystone Species – For the purpose of this form defined as a species that has a disproportionately large effect on its environment relative to its abundance such that its

removal causes effects to other organisms and/or possible the habitat it occupies. (Or use this one defined by Paine: “Species that exerts top-down influence on lower trophic levels and prevents species at lower trophic levels from monopolizing critical resources, such as competition for space or key producer food sources.”)

Least concern – Species is assigned this status if it faces the lowest risk because it is widespread and abundant. (Definition taken from the IUCN’s Red List)

Migratory Species – Any species with a significant proportion of members that cyclically and predictably cross one or more national or jurisdictional boundaries
-Definition courtesy of the text of “The Convention of the Conservation of Migratory Species.” To learn more, please visit: www.cms.int/en/convention-text

Near threatened – Species is assigned this status if it is likely to become endangered in the future. (Definition taken from the IUCN’s Red List)

Omnivore – An organism that feeds both on plants and other living animals.

Resilient – Defined as the capacity of a species to respond to change or a disturbance in the ecosystem by resisting damage or being able to recover quickly.

Recreational Values – Defined as experiences with the species that provide recreational opportunities that offer the user refreshment and stimulation of the mind and body.

Sense of Place and Identity Values – Defined as experiences with the species that foster a sense of authentic human attachment and characterize the community; any aspect of interacting with the species that affords an important way of life for community members

Social Relation Values – Defined as experiences with the species that provide opportunities to meet with friends and have an influence of the types of social relationships in a community such as participation in professional or informal associations, unions, or clubs.

Slow to Reproduce – Species that are slow to reproduce generally have long gestation periods (the time in which the organism is developing in the mothers womb) and a low number of offspring that are slow to mature, are large in size, and have long life spans.

Spiritual Service Values – Defined as spiritual, religious, or other forms of exceptional personal meaning, which can be attributed directly to the species or an activity that involves the species, which inspires awe, reverence, humility, or cause one to “become aware of forces larger than oneself”.

Stewardship – Defined as members of the community contributing in some manner to the protection of this species.

Top Predator – Defined for the purpose of this form as a predator that sits at the top of the food chain and is not preyed upon by others. The removal of a top predator generally triggers a change in prey populations, primary producers, and ecosystem processes.

Unknown – Species is assigned this status if there is not enough information available on it to correctly assess its status. (Definition taken from the IUCN's Red List)

Vulnerable – Species is assigned this status if it faces a high risk of extinction in the wild. (Definition taken from the IUCN's Red List)

Appendix B: MARINE SPECIES VALUATION – FISHERIES

For clarifications to any of the below questions, please consult the General Instructions section found at the end of this form.

A) General

1. Name of community: _____
2. Location of community: _____
3. Species to be valued: _____
4. Proceed to Section B

B) Using Catch Data

5. Average number of kilograms of species sold in the past year: _____ kg
6. Average sale price of species per kilogram in the past year: \$ _____ per kg
7. Take value from Line 5 and multiply by value from Line 6:
Line 5 _____ kg X Line 6 \$ _____ per kg = \$ _____ (total revenue)
8. Proceed to Section D

C) Costs

9. Fishers' reported average weekly fishing income: \$ _____ per week
10. Fishers' reported average weeks spent fishing per year: _____ weeks per year
11. Number of fishermen: _____ fishermen
12. Multiply the value from line 9 by the value from line 10:
Line 9 \$ _____ per week X Line 10 _____ weeks per year = \$ _____ per year per fisherman
13. Multiply value from line 11 by the total from line 12:
Line 11 _____ fishermen X Line 12 \$ _____ per year = \$ _____ per year for all fishermen
14. Average cost to buy a new boat: \$ _____
15. Average lifetime of a new boat: _____ years
16. Divide the value from Line 15 by the value from Line 16:
Line 15 \$ _____ ÷ Line 16 _____ years = \$ _____ per year
17. Divide the value from Line 10 by 52: _____ portion of the year spent fishing the species
18. Multiply the value from Line 17 by the value from Line 18 and then divide by 100:
Line 17 \$ _____ per year X Line 18 _____ per year = \$ _____ boat cost of fishing the species
19. Average amount spent on boat maintenance over the past year: \$ _____ per year
20. Average amount spent on fishing gear over the past year: \$ _____ per year
21. Average amount spent on fuel over the past year: \$ _____ per year

22. Average amount spent on permits over the past year if applicable: \$ _____ per year
23. Add values from lines 19, 20, 21, 22, and 23 together:
 Line 19 \$ ____ + Line 20 \$ ____ + Line 21 \$ ____ + Line 22 \$ ____ + Line 23 \$ ____ = \$ ____ **total cost per boat**
24. Percent of total costs that are local: _____ % **spent locally**
25. Multiply the value from Line 24 by the value from line 23 and divide by 100:
 Line 24 \$ _____ **per boat** X Line 23 _____ % ÷ 100 = \$ _____ **spent on local costs**
26. Number of boats that fish for the species: _____ **boats**
27. Multiply the value from Line 25 by the value from Line 26:
 Line 25 \$ _____ **per boat** X Line 26 _____ **boats** = \$ _____ **total local cost of all boats**
28. Add the value from Section C Line 13 to the value from Line 27:
 Line 13 \$ _____ **spent on local workers**+ Line 28 \$ _____ **spent on local costs** = \$ _____ **spent locally**
29. Proceed to Section E

D) Calculation of Fisheries Profit

30. Subtract value from Section C line 28 from the value from Section B line 7:
 Line 7 \$ _____ **in total revenue** – Line 28 \$ _____ **spent locally**= \$ _____ **in local profit**

E) Calculation of Commercial fishing value per individual caught

31. Divide the value from Section B Line 5 by the average weight in kg for one individual of the species:
 Line 5 _____ **kg** ÷ _____ **kg** = _____ **average number of individuals caught**
32. Divide the value from either Section E Line 29a or Line 29b by the value from Line 31:
 Line 30\$ _____ ÷ Line 31 _____ **individuals** = \$ _____ **per individual**

General Instructions

This form should be filled out on the community scale. The necessary information should be inclusive of the entire commercial fishery for the valued species, not per fishing fleet or boat. For all values that ask for an average, please include the previous year's annual average.

Specific Instructions

Section A

Line 1

You must enter the name of the town or community for which you are filling out this valuation form for

Line 2

You must enter the location of the town or community for which you are filling out this valuation form for. For example: "I wish to value a marine species found in La Jolla, California. The location you would write down is La Jolla, San Diego, California, United States of America

Line 3

You must fill in the name of the species for which you are filling out this valuation form for. The scientific name is preferred, but if not available or known, the common name is fine.

Section B

Line 7

This equation uses catch data to get the market value for the species, which is then used to obtain the estimated total revenue for the fishery.

Section C

Line 12

This equation uses the income of one fisherman and the number of weeks they spend fishing in one year to calculate their estimated annual income.

Line 13

This equation uses the total number of fishermen fishing for the species and the estimated annual income of one fisherman from Line 12 to calculate the estimated annual income for all fishermen, which is used as a proxy for the total revenue from the fishery.

Line 16

This equation uses the average cost of buying a boat and the average lifetime of the boat to determine the cost per year of a boat. For the purposes of this form, it is assumed

that each boat used in the fishery is bought new. Because of this assumption, this value will likely provide an

overestimate of the costs, and thus a slight underestimate of the commercial value of fishing for the species.

Line 17

It is assumed in this form that the boat is used year-round to either catch the specific species of interest, or other species. It is not assumed that there will be a significant amount of time when the boat is idle.

Line 18

This equation uses the average time a boat spends per year fishing for the species and the average cost of the boat per year to determine what portion of the cost of the boat is attributed to the species.

Line 23

This equation uses the cost of the boat, the cost of maintenance, gear, fuel, and permits to estimate the total costs of fishing for the species.

Line 28

As the purpose of this form is to determine the value of the species to the specific community, this equation uses the amount of money spent locally in the community on both operation costs and wages for workers to compute the total money spent locally.

Section D

Line 30

This equation uses total revenue and total amount of money spent locally to estimate the value of local profit for commercial fishing for the desired species.

Section E

Line 32

This equation uses the average local profit for the fishery and the number of individuals of the species caught per year to estimate a value per individual for the fishery.

Appendix C: MARINE SPECIES VALUATION – SPORTFISHING

For clarifications to any of the below questions, please consult the Instructions section found at the end of this form

A) General

1. Name of community: _____
2. Location of community: _____
3. Species to be valued: _____
4. Average number of outings per trip: _____ outings per trip
5. Average number of days per trip: _____ days per trip
6. For multi-species sportfishing expeditions, percent of total catch that is the species: _____ %
7. Proceed to Section B

B) Customer Travel Expenditures

8. Average cost of travel during trip: \$ _____ per trip
9. Percent of total trip travel that is local: _____ %
10. For single species sportfishing expeditions, multiply the value from Line 8 by the value from Line 9 and divide by 100:
Line 8 \$ _____ per trip X Line 9 _____ % ÷ 100 = \$ _____ local travel expenditure for single species outings
11. For multi-species sportfishing trips, multiply the value from Line 6 by the value from line 10 and divide by 100:
Line 6 _____ % X Line 10 \$ _____ ÷ 100 = \$ _____ local travel expenditure for multi-species outings
12. Proceed to Section C

C) Customer Accommodation Expenditures

13. If the cost of the activity includes the cost of lodging and food, proceed to section D. If the cost of the activity covers the cost of lodging, but not food, proceed to Line 17. If the cost of the activity covers the cost of food but not lodging, then proceed to Line 14 and skip Lines 17 – 19.
14. Average cost of lodging at destination for one night: \$ _____ per night
15. Average number of nights per trip: _____ nights
16. Multiply the value from Line 14 by the value from Line 15:
Line 14 \$ _____ per night X Line 15 _____ nights per trip = \$ _____ per person per trip
17. Average cost of one meal from one restaurant in your community: \$ _____ per meal
18. Average number of meals purchased per day: _____ meals per day

19. Multiply the value from Section A Line 5 by the value from Line 17 and the value from Line 18:

Line 5 _____ days X Line 17 \$ _____ per meal X Line 18 _____ meals per day = \$ _____ per person per trip

20. Add the value from Line 16 to the value from Line 19 (where applicable)

Line 16 \$ _____ + Line 19 \$ _____ = \$ _____ per person per trip

21. For multi-species sportfishing trips, multiply the value from Line 6 by the value from line 20 and divide by 100:

Line 6 _____ % X Line 20 \$ _____ ÷ 100 = \$ _____ accommodation expenditure for multi-species trips

22. Proceed to Section D

D) Customer Activity Expenditures

23. Average cost of a sportfishing outing in your community: \$ _____ per outing

24. Does the average cost of a sportfishing outing in your community include the cost of all of the following: gear, bait, the boat used, and the cost of a permit.

_____ Yes _____ No

25. If you answered “Yes” to Line 24, please multiply the value from Section A Line 4 to the value from Line 22 and then proceed to Section E line 33

Line 4 _____ outings per trip X Line 23 \$ _____ per outing = \$ _____ per person per trip

26. If you answered “No” to Line 24 please proceed to Line 27

27. Please fill in the average cost of the following factors in your community.

a) Average cost of fishing license or permit: \$ _____ per outing

b) Average cost of gear: \$ _____ per outing

c) Average cost of bait: \$ _____ per outing

d) Average cost of cleaning and packaging fish: \$ _____ per outing

28. Add the values from Lines 27a, 27b, 27c, and 27d together where applicable:

Line 27a \$ _____ + Line 27b \$ _____ + Line 27c \$ _____ + Line 27d _____ = \$ _____ per outing

29. Add the value from Line 23 to value from Line 28:

Line 23 \$ _____ per outing + Line 28 \$ _____ per outing = \$ _____ per person per outing

30. Multiply the value from Section A Line 4 by the value from Line 29:

Line 4 _____ outings per trip X Line 29 \$ _____ per outing = \$ _____ per person per single species trip

31. For multi-species outings, please multiply the value from Section A Line 6 to the value from Line 29:

Line 6 _____ % X Line 29 \$ _____ per trip ÷ 100 = \$ _____ per person per multi-species trip

32. Proceed to Section E

E) Customer and Operator Information

33. Average number of outings per week: _____ outings per week
34. Average number of weeks per year this activity is done: _____ weeks per year
35. Multiply the value from Line 33 by the value from Line 34:
 Line 33 _____ outings per week X Line 34 _____ weeks per year = _____ outings per year per operator
36. Average number of guests per outing: _____ guests per outing
37. Multiply the value from Line 35 by the value from Line 36:
 Line 35 _____ outings per operator X Line 36 _____ guests per outing = _____ total guests per operator
38. Number of operators in your community: _____ operators
39. Multiply the value from Line 37 by the value from Line 38:
 Line 37 _____ total guests per operator X Line 38 _____ operators = _____ guests for all operators
40. Proceed to section F

F) Costs

41. Employees' reported average weekly income: \$ _____ per week
42. Employees' reported average weeks spent working per year: _____ weeks per year
43. Number of employees: _____ employees
44. Multiply the value from line 38 by the value from line 43:
 Line 38 _____ operators X Line 43 _____ employees = _____ total number of employees
45. Multiply the value from line 41 by the value from line 42:
 Line 41 \$ _____ per week X Line 42 _____ weeks per year = \$ _____ per year per employee
46. Multiply value from line 44 by the total from line 45:
 Line 44 _____ employees X Line 45 \$ _____ per year = \$ _____ per year for all employees
47. Average cost to buy a new boat: \$ _____
48. Average lifetime of a new boat: _____ years
49. Divide the value from Line 47 by the value from Line 48:
 Line 47 \$ _____ ÷ Line 48 _____ years = \$ _____ per year
50. Average amount spent on boat maintenance over the past year: \$ _____ per year
51. Average amount spent on sportfishing gear over the past year: \$ _____ per year
52. Average amount spent on fuel over the past year: \$ _____ per year
53. Average amount spent on permits over the past year if applicable: \$ _____ per year
54. Add values from lines 49, 50, 51, 52, and 53 together:
 Line 49 \$ ____ + Line 50 \$ ____ + Line 51 \$ ____ + Line 52 \$ ____ + Line 53 \$ ____ = \$ ____ cost per operator

55. Percent of total costs that are local: _____ % spent locally
56. Multiply the value from Line 54 by the value from line 55 and divide by 100:
Line 54 \$ _____ per boat X Line 55 _____ % ÷ 100 = \$ _____ spent on local costs
57. Multiply the value from Line 38 by the value from Line 56:
Line 38 _____ operators X Line 56 \$ _____ spent locally = \$ _____ total local cost for all operators
58. Add the value from Line 46 to the value from Line 57:
Line 46 \$ _____ spent on local workers+ Line 57 \$ _____ spent on local costs = \$ _____ spent locally
59. Proceed to Section G

G) Sportfishing Revenue

60. Add the value from Section B Lines 10 and 11 to the value from Section C Lines 20 and 21, and either the value from Section D Line 23 or Section D Lines 30 and 31:
Line 10 \$ _____ per trip + Line 11 \$ _____ per trip + Line 20 \$ _____ per trip + Line 21 \$ _____ per trip + Line 20 \$ _____ per trip OR + Line 30 \$ _____ per trip + Line 31 \$ _____ per trip = \$ _____ per trip per guest
61. Divide the value from Line 60 by the value from Section A Line 4:
Line 60 \$ _____ total trip cost ÷ Line 4 _____ outings per trip = \$ _____ Total cost per outing per guest
62. Multiply the value from Line 35 by the value from Line 38 and the value from Line 61:
Line 35 _____ outings per year per operator X Line 38 _____ operators X Line 61 \$ _____ per outing = \$ _____ Total revenue per year of sportfishing

H) Sportfishing Profit

63. Subtract the value from Section F Line 58 from the value from Section G Line 62:
Line 62 \$ _____ in total revenue – Line 58 \$ _____ spent locally= \$ _____ in local profit

I) Calculation of Sportfishing value per individual caught

64. Average number of individuals caught per year: _____ individuals per year
65. Divide the value from Line 63 by the value from Line 64:
Line 63 \$ _____ ÷ Line 64 _____ individuals = \$ _____ per individual

General Instructions

This form should be filled out on the community scale. The necessary information should be inclusive of the entire Sportfishing industry for the valued species, not per operator. Average values should be done per operator and computed for one individual going on one sportfishing trip. For the values that ask for an average, please include the previous year's annual average. For the purposes of this form, it is assumed that each sportfishing customer has come to your community for the specific purpose of engaging in sportfishing, and as such, other incidental and additional activities are not accounted for.

Specific Instructions

Section A

Line 1

You must enter the name of the town or community for which you are filling out this valuation form for

Line 2

You must enter the location of the town or community for which you are filling out this valuation form for. For example: "I wish to value a marine species found in La Jolla, California. The location you would write down is La Jolla, San Diego, California, United States of America

Line 3

You must fill in the name of the species for which you are filling out this valuation form for. The scientific name is preferred, but if not available or known, the common name is fine.

Line 4

For the purposes of this form, the term "trip" refers to the reason for coming to the area to engage in sportfishing, and then term "outing" refers to each time a customer goes out to participate in the activity of sportfishing.

Section B

Line 8

This average is inclusive of only the portion of travel to and around your community that can be considered local (whether that be by plane, train, car, etc.).

Line 9

As the purpose of this form is to determine the value of the species to the specific community, only travel costs that occurred locally are to be counted.

Section C

Line 14

This average should be inclusive of the cost to stay one night at any establishment in the community. For example, for a single day trip two nights of accommodations would

be attributed to the activity This is likely to provide an overestimate as those who engage in sportfishing tend to not stay at the more expensive resorts, and the accommodations average will take the price to stay for one night at such an establishment into consideration.

Section D

Line 27

For Lines a – d, if one of the values is not applicable to your community, then please leave blank.

Line 15

This equation adds up the activity expenditures associated with sportfishing for one guest. These expenditures do not account for the purchase of anything outside of the direct cost of the activity (such as food and drinks, or souvenirs). This section also doesn't account for possible tips to crewmembers, which can be substantial for sportfishing. For these reasons, Line 15 will likely produce an underestimate of customer activity expenditure.

Section E

Line 24

This equation uses the average number of guests per year engaging in sportfishing for one operator and the number of operators in the community to estimate the total number of guests per year for all sportfishing operators.

Section F

Line 49

This equation uses the average cost of buying a boat and the average lifetime of the boat to determine the cost per year of a boat. For the purposes of this form, it is assumed that each boat used in sportfishing is bought new. Because of this assumption, this value will likely provide an overestimate of the costs, and thus a slight underestimate of the value of sportfishing for the species.

Line 58

As the purpose of this form is to determine the value of the species to the specific community, this equation uses the amount of money spent locally in the community on both operation costs and wages for workers to compute the total money spent locally, or total local costs.

Section G**Line 60**

This equation uses the average amount spent on local travel, accommodations, and sportfishing activities by all customers who participated in either single species or multi-species (or both) sportfishing trips to estimate the total revenue for sportfishing of the desired species

Section H**Line 27**

This equation uses the average annual total revenue of sportfishing for the species and the total amount of money spent locally to estimate the value of the local profit of sportfishing for the desired species.

Section I**Line 65**

This equation uses the value of local profits from sportfishing the species brings into the community and the average number of individuals caught per year to estimate a value per individual for the industry.

Appendix D: MARINE SPECIES VALUATION – NON-EXTRACTIVE TOURISM

For clarifications to any of the below questions, please consult the Instructions section found at the end of this form.

A) General

1. Name of community: _____
2. Location of community: _____
3. Species to be valued: _____
4. Average number of species-specific outings taken per trip:
 - a) Snorkel: _____ outings
 - b) SCUBA diving: _____ outings
 - c) Wildlife-viewing: _____ outings
 - d) Wildlife-feeding: _____ outings
 - e) Total number of outings per trip: _____ outings
5. Divide the values for Lines 4a – 4d by Line 4e:
 - a) Line 4a _____ ÷ Line 4e _____ = _____ **Cost-scaling factor for Snorkel**
 - b) Line 4b _____ ÷ Line 4e _____ = _____ **Cost-scaling factor for SCUBA**
 - c) Line 4c _____ ÷ Line 4e _____ = _____ **Cost-scaling factor for Wildlife-viewing**
 - d) Line 4d _____ ÷ Line 4e _____ = _____ **Cost-scaling factor for Wildlife-feeding**
6. Average number of days per trip _____ days
7. Proceed to Section B

B) Customer Travel Expenditures

8. Average cost to travel to destination: \$ _____ per trip
9. Percent of total trip travel that is local: _____ %
10. Multiply the value from Line 8 by the value from Line 9 and divide by 100:
 Line 8 \$ _____ per trip X Line 9 _____ % ÷ 100 = \$ _____ **local travel expenditure for single species outings**
11. Proceed to Section C

C) Customer Accommodation Expenditures

12. If the cost of the activity includes the cost of lodging and food, proceed to section D. If the cost of the activity covers the cost of lodging, but not food, proceed to Line 16. If the cost of the activity covers the cost of food but not lodging, then proceed to Line 13 and skip Lines 16 – 18.
13. Average cost of lodging at destination for one night: \$ _____ per night

14. Average number of nights per trip: _____ nights
15. Multiply the value from Line 13 by the value from Line 14:
Line 13 \$ _____ per night X Line 14 \$ _____ nights per trip = \$ _____ per person per trip
16. Average cost of one meal from one restaurant in your community: \$ _____ per meal
17. Average number of meals purchased per day: _____ meals per day
18. Multiply the value from Line 16 by the value from Line 17:
Line 16 \$ _____ per meal X Line 17 _____ meals per day = \$ _____ per person per trip
19. Add the value from Line 15 to the value from Line 18 (where applicable)
Line 15 \$ _____ + Line 18 \$ _____ = \$ _____ accommodations per person per trip
20. Proceed to Section D

D) Customer Activity Expenditures

21. Average cost of a species-specific outing in your community:
- a) Snorkel: \$ _____ per outing
 - b) SCUBA Diving: \$ _____ per outing
 - c) Wildlife-viewing: \$ _____ per outing
 - d) Wildlife-feeding: \$ _____ per outing
22. Proceed to Sections E – P when applicable

E) Snorkel Customer and Operator Information

23. Average number of outings per week: _____ outings per week
24. Average number of weeks per year this activity is done: _____ weeks per year
25. Multiply the value from Line 23 by the value from Line 24:
Line 23 _____ outings per week X Line 24 _____ weeks per year = _____ outings per year per operator
26. Average number of guests per outing: _____ guests per outing
27. Multiply the value from Line 25 by the value from Line 26:
Line 25 _____ outings per year X Line 26 _____ guests per outing = _____ guests per year per operator
28. Number of species-specific snorkel operators in your community: _____ operators
29. Multiply the value from Line 27 by the value from Line 28:
Line 27 _____ guests per year X Line 28 _____ operators = _____ guests per year for all operators
30. Proceed to Section F

F) Snorkel Costs

31. Employees' reported average weekly income: \$ _____ per week
32. Employees' reported average weeks spent working per year: _____ weeks per year

33. Number of employees: _____ employees
34. Multiply the value from Line 28 by the value from Line 33:
Line 28 _____ operators X Line 33 _____ employees = _____ total number of employees
35. Multiply the value from Line 31 by the value from Line 32:
Line 31 \$ _____ per week X Line 32 _____ weeks per year = \$ _____ per year per employee
36. Multiply value from Line 34 by the total from Line 35:
Line 34 _____ employees X Line 35 \$ _____ per year = \$ _____ per year for all employees
37. Average cost to buy a new boat: \$ _____
38. Average lifetime of a new boat: _____ years
39. Divide the value from Line 37 by the value from Line 38:
Line 37 \$ _____ ÷ Line 38 _____ years = \$ _____ per year
40. Average amount spent on boat maintenance over the past year: \$ _____ per year
41. Average amount spent on snorkel gear over the past year: \$ _____ per year
42. Average amount spent on fuel over the past year: \$ _____ per year
43. Average amount spent on permits over the past year if applicable: \$ _____ per year
44. Add values from Lines 39, 40, 41, 42, and 43 together:
Line 39 \$ ____ + Line 40 \$ ____ + Line 41 \$ ____ + Line 42 \$ ____ + Line 43 \$ ____ = \$ ____ cost per operator
45. Percent of total costs that are local: _____ % spent locally
46. Multiply the value from Line 44 by the value from Line 45 and divide by 100:
Line 44 \$ _____ per operator X Line 45 _____ % ÷ 100 = \$ _____ spent on local costs
47. Multiply the value from Line 28 by the value from Line 46:
Line 28 _____ operators X Line 46 \$ _____ spent locally = \$ _____ total local cost for all operators
48. Add the value from Line 36 to the value from Line 47:
Line 36 \$ _____ spent on local workers + Line 47 \$ _____ spent on local costs = \$ _____ spent locally
49. Proceed to Section G

G) Snorkel Revenue

50. Multiply the value from Section A Line 5a by the value from Section B Line 10:
Line 5a _____ snorkel cost scaling factor X Line 10 \$ _____ = \$ _____ Snorkel travel cost
51. Multiply the value from Section A Line 5a by the value from Section C Line 19:
Line 5a _____ snorkel cost scaling factor X Line 19 \$ _____ = \$ _____ Snorkel accommodation cost
52. Add the value from Section D Line 21a to the values from Lines 50 and 51
Line 21a \$ _____ + Line 50 \$ _____ + Line 51 \$ _____ = \$ _____ Total revenue per person per outing

53. Multiply the value from Section E Line 29 by the value from Line 52:

Line 29 _____ guests X Line 52 \$ _____ Total cost = \$ _____ Total revenue per year for all outings

54. Proceed to section H if applicable

H) SCUBA Customer and Operator Information

55. Average number of outings per week: _____ outings per week

56. Average number of weeks per year this activity is done: _____ weeks per year

57. Multiply the value from Line 55 by the value from Line 56:

Line 55 _____ outings per week X Line 56 _____ weeks per year = _____ outings per year per operator

58. Average number of guests per outing: _____ guests per outing

59. Multiply the value from Line 57 by the value from Line 58:

Line 57 _____ outings per year X Line 58 _____ guests per outing = _____ guests per year per operator

60. Number of species-specific SCUBA operators in your community: _____ operators

61. Multiply the value from Line 59 by the value from Line 60:

Line 59 _____ guests per year X Line 60 _____ operators = _____ guests per year for all operators

62. Proceed to Section I

I) SCUBA Costs

63. Employees' reported average weekly income: \$ _____ per week

64. Employees' reported average weeks spent working per year: _____ weeks per year

65. Number of employees: _____ employees

66. Multiply the value from Line 60 by the value from Line 65:

Line 60 _____ operators X Line 65 _____ employees = _____ total number of employees

67. Multiply the value from Line 63 by the value from Line 64:

Line 63 \$ _____ per week X Line 64 _____ weeks per year = \$ _____ per year per employee

68. Multiply value from Line 66 by the total from Line 67:

Line 66 _____ employees X Line 67 \$ _____ per year = \$ _____ per year for all employees

69. Average cost to buy a new boat: \$ _____

70. Average lifetime of a new boat: _____ years

71. Divide the value from Line 69 by the value from Line 70:

Line 69 \$ _____ ÷ Line 70 _____ years = \$ _____ per year

72. Average amount spent on boat maintenance over the past year: \$ _____ per year

73. Average amount spent on sportfishing gear over the past year: \$ _____ per year

74. Average amount spent on fuel over the past year: \$ _____ per year

75. Average amount spent on permits over the past year if applicable: \$ _____ per year
76. Add values from Lines 71, 72, 73, 74, and 75 together:
Line 71 \$ ____ + Line 72 \$ ____ + Line 73 \$ ____ + Line 74 \$ ____ + Line 75 \$ ____ = \$ ____ cost per operator
77. Percent of total costs that are local: _____ % spent locally
78. Multiply the value from Line 76 by the value from line 77 and divide by 100:
Line 76 \$ _____ per operator X Line 77 _____ % ÷ 100 = \$ _____ spent on local costs
79. Multiply the value from Line 60 by the value from Line 78:
Line 60 _____ operators X Line 78 \$ _____ spent locally = \$ _____ total local cost for all operators
80. Add the value from Line 68 to the value from Line 79:
Line 68 \$ _____ spent on local workers+ Line 79 \$ _____ spent on local costs = \$ _____ spent locally
81. Proceed to Section J

J) SCUBA Revenue

82. Multiply the value from Section A Line 5b by the value from Section B Line 10:
Line 5b _____ cost scaling factor X Line 10 \$ _____ = \$ _____ SCUBA travel cost
83. Multiply the value from Section A Line 5b by the value from Section C Line 19:
Line 5b _____ cost scaling factor X Line 19 \$ _____ = \$ _____ SCUBA accommodation cost
84. Add the value from Section D Line 21b to the value from Lines 82 and 83
Line 21b \$ _____ + Line 82 \$ _____ + Line 83 \$ _____ = \$ _____ Total revenue per person per outing
85. Multiply the value from Section F Line 61 by the value from Line 84:
Line 61 _____ guests X Line 84 _____ Total cost = \$ _____ Total revenue per year for all outings
86. Proceed to Section K if applicable

K) Wildlife-viewing Customer and Operator Information

87. Average number of outings per week: _____ outings per week
88. Average number of weeks per year this activity is done: _____ weeks per year
89. Multiply the value from Line 87 by the value from Line 88:
Line 87 _____ outings per week X Line 88 _____ weeks per year = _____ outings per year per operator
90. Average number of guests per outing: _____ guests per outing
91. Multiply the value from Line 89 by the value from Line 90:
Line 89 _____ outings per year X Line 90 _____ guests per outing = _____ guests per year per operator
92. Number of species-specific wildlife-viewing operators in your community: _____ operators
93. Multiply the value from Line 91 by the value from Line 92:
Line 91 _____ guests per year X Line 92 _____ operators = _____ guests per year for all operators

L) Wildlife-viewing Costs

94. Employees' reported average weekly income: \$ _____ per week

95. Employees' reported average weeks spent working per year: _____ weeks per year

96. Number of employees: _____ employees

97. Multiply the value from Line 92 by the value from Line 96:

Line 92 _____ operators X Line 96 _____ employees = _____ total number of employees

98. Multiply the value from Line 94 by the value from Line 95:

Line 94 \$ _____ per week X Line 95 _____ weeks per year = \$ _____ per year per employee

99. Multiply value from Line 97 by the total from Line 98:

Line 97 _____ employees X Line 98 \$ _____ per year = \$ _____ per year for all employees

100. Average cost to buy a new boat: \$ _____

101. Average lifetime of a new boat: _____ years

102. Divide the value from Line 100 by the value from Line 101:

Line 100 \$ _____ ÷ Line 101 _____ years = \$ _____ per year

103. Average amount spent on boat maintenance over the past year: \$ _____ per year

104. Average amount spent on gear over the past year: \$ _____ per year

105. Average amount spent on fuel over the past year: \$ _____ per year

106. Average amount spent on permits over the past year if applicable: \$ _____ per year

107. Add values from Lines 102, 103, 104, 105, and 106 together:

Line 102 \$ ___ + Line 103 \$ ___ + Line 104 \$ ___ + Line 105 \$ ___ + Line 106 \$ ___ = \$ ___ cost
per operator

108. Percent of total costs that are local: _____ % spent locally

109. Multiply the value from Line 107 by the value from line 108 and divide by 100:

Line 107 \$ _____ per operator X Line 108 _____ % ÷ 100 = \$ _____ spent on local costs

110. Multiply the value from Line 92 by the value from Line 109:

Line 92 _____ operators X Line 109 \$ _____ spent locally = \$ _____ total local cost for all operators

111. Add the value from Line 99 to the value from Line 110:

Line 99 \$ _____ spent on local workers+ Line 110 \$ _____ spent on local costs = \$ _____ spent locally

112. Proceed to Section M

M) Wildlife-viewing Revenue

113. Multiply the value from Section A Line 5c by the value from Section B Line 10:

Line 5c _____ cost scaling factor X Line 10 \$ _____ = \$ _____ Wildlife-viewing travel cost

114. Multiply the value from Section A Line 5c by the value from Section C Line 19:
Line 5c _____ **cost scaling factor** X Line 19 \$ _____ = \$ _____ **Wildlife-viewing accommodation cost**
115. Add the value from Section D Line 21c to the value from Lines 113 and 114
Line 21c \$ _____ + Line 113 \$ _____ + Line 114 \$ _____ = \$ _____ **Total revenue per person per outing**
116. Multiply the value from Section I Line 93 by the value from Line 115:
Line 43 _____ **guests** X Line 115 \$ _____ **Total cost** = \$ _____ **Total revenue per year for all outings**
117. Proceed to Section N if applicable

N) Wildlife-feeding Customer and Operator Information

118. Average number of outings per week: _____ **outings per week**
119. Average number of weeks per year this activity is done: _____ **weeks per year**
120. Multiply the value from Line 118 by the value from Line 119:
Line 118 _____ **outings per week** X Line 119 _____ **weeks per year** = _____ **outings per year per operator**
121. Average number of guests per outing: _____ **guests per outing**
122. Multiply the value from Line 120 by the value from Line 121:
Line 120 _____ **outings per year** X Line 121 _____ **guests per outing** = _____ **guests per year per operator**
123. Number of species-specific wildlife-feeding operators in your community: _____ **operators**
124. Multiply the value from Line 122 by the value from Line 123:
Line 122 _____ **guests per year** X Line 123 _____ **operators** = _____ **guests per year for all operators**
125. Proceed to Section O

O) Wildlife-feeding Costs

126. Employees' reported average weekly income: \$ _____ **per week**
127. Employees' reported average weeks spent working per year: _____ **weeks per year**
128. Number of employees: _____ **employees**
129. Multiply the value from Line 123 by the value from Line 128:
Line 123 _____ **operators** X Line 128 _____ **employees** = _____ **total number of employees**
130. Multiply the value from Line 126 by the value from Line 127:
Line 126 \$ _____ **per week** X Line 127 _____ **weeks per year** = \$ _____ **per year per employee**
131. Multiply value from Line 129 by the total from Line 130:
Line 129 _____ **employees** X Line 130 \$ _____ **per year** = \$ _____ **per year for all employees**
132. Average cost to buy a new boat: \$ _____
133. Average lifetime of a new boat: _____ **years**

134. Divide the value from Line 132 by the value from Line 133:
Line 132 \$ _____ ÷ Line 133 _____ years = \$ _____ per year
135. Average amount spent on boat maintenance over the past year: \$ _____ per year
136. Average amount spent on gear over the past year: \$ _____ per year
137. Average amount spent on fuel over the past year: \$ _____ per year
138. Average amount spent on permits over the past year if applicable: \$ _____ per year
139. Add values from Lines 134, 135, 136, 137, and 138 together:
Line 134 \$ ____ + Line 135 \$ ____ + Line 136 \$ ____ + Line 137 \$ ____ + Line 138 \$ ____ = \$ ____ cost per operator
140. Percent of total costs that are local: _____ % spent locally
141. Multiply the value from Line 139 by the value from line 140 and divide by 100:
Line 139 \$ _____ per boat X Line 140 _____ % ÷ 100 = \$ _____ spent on local costs
142. Multiply the value from Line 123 by the value from Line 141:
Line 123 _____ operators X Line 141 \$ _____ spent locally = \$ _____ total local cost for all operators
143. Add the value from Line 131 to the value from Line 142:
Line 131 \$ _____ spent on local workers+ Line 142 \$ _____ spent on local costs = \$ _____ spent locally
144. Proceed to Section P

P) Wildlife-feeding Revenue

145. Multiply the value from Section A Line 5d by the value from Section B Line 10:
Line 5d _____ cost scaling factor X Line 10 \$ _____ = \$ _____ Wildlife-feeding travel cost
146. Multiply the value from Section A Line 5d by the value from Section C Line 19:
Line 5d _____ cost scaling factor X Line 19 \$ _____ = \$ _____ Wildlife-feeding accommodation cost
147. Add the value from Section D Line 21d to the value from Lines 145 and 146:
Line 21d \$ _____ + Line 145 \$ _____ + Line 146 \$ _____ = \$ _____ Total revenue per year for all outings
148. Multiply the value from Section H Line 124 by the value from Line 147:
Line 124 _____ guests X Line 147 \$ _____ Total cost = \$ _____ Total revenue per year for all outings
149. Proceed to Section Q

Q) Profits

150. Subtract the value from Section F Line 48 from the value from Section G Line 53:
Line 53 \$ _____ - Line 48 \$ _____ = \$ _____ in local profit for snorkeling
151. Subtract the value from Section I Line 80 from the value from Section J Line 85:
Line 85 \$ _____ - Line 80 \$ _____ = \$ _____ in local profit for SCUBA diving

152. Subtract the value from Section L Line 111 from the value from Section M Line 116:
Line 116 \$ _____ - Line 111 \$ _____ = \$ _____ **in local profit for wildlife-viewing**
153. Subtract the value from Section O Line 143 from the value from Section P Line 148:
Line 148 \$ _____ - Line 143 \$ _____ = \$ _____ **in local profit for wildlife-feeding**
154. Add the values from Lines 150, 151, 152, and 153:
Line 150 \$ _____ + Line 151 \$ _____ + Line 152 \$ _____ + Line 153 \$ _____ = \$ _____
_____ **total local profit for all non-extractive tourism activities in the community**
155. Proceed to Section R

R) Employment

156. Add the values from Lines 34, 66, 97, and 129:
Line 34 _____ + Line 66 _____ + Line 97 _____ + Line 129 _____ = _____ **total number of jobs for all non-extractive tourism activities in the community**
157. Proceed to Section S

S) Local Costs

158. Add the values from Section F line 48, Section I Line 80, Section L Line 111, and Section O Line 143:
Line 48 \$ _____ + Line 80 \$ _____ + Line 111 \$ _____ + Line 143 \$ _____ = \$ _____
total money spent by all non-extractive tourism operators on local costs

General Instructions

This form should be filled out on the community scale. The necessary information should be inclusive of the entire tourism industry for the valued species, not per operator. Average values should be done per operator, when the activity is centered ONLY around the species of interest, and computed for one individual going on one tourism outing. Applicable species-specific activities are as follows: snorkel trips, SCUBA trips, wildlife viewing trips, and wildlife feeding trips. If an operator offers species-specific tours of one of the aforementioned types in addition to other activities, they are still eligible to be included in this valuation.

Specific Instructions

Section A

Line 1

You must enter the name of the town or community for which you are filling out this valuation form for

Line 2

You must enter the location of the town or community for which you are filling out this valuation form for. For example: "I wish to value a marine species found in La Jolla, California. The location you would write down is La Jolla, San Diego, California, United States of America

Line 3

You must fill in the name of the species for which you are filling out this valuation form for. The scientific name is preferred, but if not available or known, the common name is fine.

Line 5

For the purpose of this form, a cost-scaling factor is needed to account for instances when there are multiple types of activities participated in per trip, so that the cost of travel and accommodations are not counted more than once.

Section B

Line 9

As the purpose of this form is to determine the value of the species to the specific community, only travel costs that occurred locally are to be counted.

Section C

Line 13

The accommodation values here are not for a customer's entire trip; they are only for the portions of the stay that can be attributed to the activity. For example, for a single day trip two nights of accommodations would be attributed to the activity. This value is likely an underestimate

Line 10

This equation uses the average cost of accommodation and the average number of nights stayed at said accommodation to estimate the average accommodations expenditure per trip for a single person.

Section D

It is assumed that the cost of the species-specific activity includes the cost of gear rental.

Lines 21a – 21d

You must enter a value for at least one of these Lines. If your community does not have one of the four types of species-specific tourism listed, leave the respective Line blank.

Sections E – P

Lines 39, 71, 102, 134

This equation uses the average cost of buying a boat and the average lifetime of the boat to determine the cost per year of a boat. For the purposes of this form, it is assumed that each boat used in the non-extractive tourism activity is bought new. Because of this assumption, this value will likely provide an overestimate of the costs, and thus a slight underestimate of the non-extractive tourism value of the species.

Lines 53, 85, 116, 148

These values will likely be an underestimate of total species-specific tourism revenue because they do not account for the purchase of anything outside of travel, accommodations and the cost of the activity, and therefore leave out purchases such as food and drinks, fuel and transportation around the community, as well as any souvenirs bought. This section also doesn't account for possible tips to operators.

Lines 48, 80, 111, 143

As the purpose of this form is to determine the value of the species to the specific community, this equation uses the amount of money spent locally in the community on both operation costs and wages for workers to compute the total money spent locally, or total local costs.

Section Q**Lines 150, 151, 152, 153**

These lines use the values for total revenue for each type of activity and the total amount of money spent locally to compute the amount of profit for each that stayed locally.

Line 154

This equation adds up the amount of local profit for each type of activity in order to compute the total amount of local profit for non-extractive tourism in the community.

Section R**Line 155**

This equation adds up the number of local jobs for each type of non-extractive tourism activity to compute the total number of local jobs created by non-extractive tourism in the community.

Section S**Line 156**

This equation adds up the total amount of money spent locally by each type of non-extractive tourism activity to compute the total amount of money spent locally by non-extractive tourism operators in the community.

Appendix E: MARINE SPECIES VALUATION – CULTURAL

Please consult the directions at the end of this form before proceeding. It should be noted that all values have been placed in alphabetical order, and that the sequence in which they appear is not a reflection of ranking.

A) General

1. Name of community: _____
2. Location of community: _____
3. Species to be valued: _____

B) Spectrum of Cultural Values

	Fishing	Sportfishing	Non-extractive Tourism
1. Aesthetic			
2. Cultural heritage			
3. Educational Values and Knowledge Systems			
4. Gifting and trading of Seafood			
5. Inspiration			
6. Recreation			
7. Sense of Place and Identity			
8. Social Relations			
9. Spiritual Services			
10. Stewardship			
11. Total	a)	b)	c)

C) Level of Value

	Commercial Fishing	Sportfishing	Non-extractive Tourism
1. Total	a) ____	b) ____	c) ____
2. Designation	a) ____ High ____ Medium ____ Low	b) ____ High ____ Medium ____ Low	c) ____ High ____ Medium ____ Low

General Instructions

This form should be filled out on the community scale and should reflect the values of those who are residents of the area, not those who are visitors.

Specific Instructions

Section A – General

Line 1

You must enter the name of the town or community for which you are filling out this valuation form for

Line 2

You must enter the location of the town or community for which you are filling out this valuation form for. For example: “I wish to value a marine species found in La Jolla, California. The location you would write down is La Jolla, San Diego, California, United States of America

Line 3

You must fill in the name of the species for which you are filling out this valuation form for. The scientific name is preferred, but if not available or known, the common name is fine.

Section B – Spectrum of Values

For the following cultural values, please assign the following numbers to each based on their importance to the community aspect in question using the following:

- 0 = no value
- 1 = value

The definitions for the 10 cultural values are adapted from The Millennium Ecosystem Assessment (2005) and Beaumont et al. (2008) and are as follows:

Line 1

Aesthetic Values – Defined as possessing feelings of particular beauty towards the species, which can be reflected in things such as art.

Line 2

Cultural heritage Values – Defined as being relevant to local history, culture, and traditions (inclusive of folklore, painting, consumption of species as a traditional food, and cultural and spiritual traditions).

Line 3

Educational Values and Knowledge Systems – Defined as experiences with the species, both formal (i.e. in a classroom setting) and informal, which widen knowledge about that species. Knowledge systems are “traditional ecological knowledge”, or societal experiences

that have accumulated over the years through interactions with the natural environment and passed down through generations.

Line 4

Gifted and Trading of Seafood – Defined as catching the species with the purpose of gifting or trading it to another person.

Line 5

Inspirational Values – Defined as the understanding that the species stimulates new thoughts, ideas, or creative expressions that can take the form of art, folklore, national symbols, architecture, and advertising.

Line 6

Recreational Values – Defined as experiences with the species that provide recreational opportunities that offer the user refreshment and stimulation of the mind and body.

Line 7

Sense of Place and Identity Values – Defined as experiences with the species that foster a sense of authentic human attachment and characterize the community; any aspect of interacting with the species that affords an important way of life for community members

Line 8

Social Relation Values – Defined as experiences with the species that provide opportunities to meet with friends and have an influence of the types of social relationships in a community such as participation in professional or informal associations, unions, or clubs.

Line 9

Spiritual Service Values – Defined as spiritual, religious, or other forms of exceptional personal meaning, which can be attributed directly to the species or an activity that involves the species, which inspires awe, reverence, humility, or cause one to “become aware of forces larger than oneself”.

Line 10

Stewardship – Defined as members of the community contributing in some manner to the protection of this species.

Section C

Line 1

Place the values from Section B Lines 11a, 11b, and 11c as in the corresponding lines 1a, 1b, and 1c in Section C

Line 2

Place a check next to the designation that that corresponds to the values from Lines 1a, 1b, 1c using the following guide:

- If the value is greater than 8 check “High”
- If the value is between 4 – 7, check “Medium”
- If the value is less than 3 check “Low”

Appendix F: MARINE SPECIES VALUATION – BIOLOGICAL

For clarifications to any of the below questions, please consult the General Instructions section found at the end of this form.

A) General

1. Name of community: _____
2. Location of community: _____
3. Species to be valued: _____

B) Importance to the Ecosystem

1. Where does this species sit in the ecosystem’s food web?

- Carnivore Herbivore
 Detritivore Omnivore

2. What are the top three species that this species consumes?

- a. _____
- b. _____
- c. _____

3. What are the top three species that consumes this species?

- a. _____
- b. _____
- c. _____

4. Does the species provide any services to the environment? If so, what are they?

5. Is this species a keystone species?

- Yes No

6. Is the species migratory?

- Yes No

7. Where is this species found?

- Coral reef Mangrove forest
 Estuary Kelp forest
 Open Ocean Rocky intertidal

B) Status

1. Is this species the only top predator in the system?
 Yes No
2. Is this species the only herbivore in the system?
 Yes No
3. What is the status of this species?
 Least concern Endangered
 Near threatened Critically endangered
 Vulnerable Unknown
4. Is the species slow to reproduce?
 Yes No
5. What is the average lifespan of one individual of the species? _____ years
6. How resilient is this species to changes in the environment?
 Very Somewhat Not at all
7. Have its numbers increased or a decreased?
 Increased Decreased
8. Are there more or less adults?
 More Less
9. Are the individuals larger or smaller?
 Larger Smaller
10. Do you know why these changes might have happened? If so, please describe why.
 Yes No

11. Is there anything else about this species that is important?

C) Level of Concern

1. No concern Moderate concern Extreme concern

General Instructions

This form should be filled out on the community scale. The goal of this form is to determine the “in ecosystem” value of the species.

Specific Instructions

Section A – General

Line 1

You must enter the name of the town or community for which you are filling out this valuation form for

Line 2

You must enter the location of the town or community for which you are filling out this valuation form for. For example: “I wish to value a marine species found in La Jolla, California. The location you would write down is La Jolla, San Diego, California, United States of America

Line 3

You must fill in the name of the species for which you are filling out this valuation form for. The scientific name is preferred, but if not available or known, the common name is fine.

Section B – Importance to Ecosystem

Line 1

Carnivore – An organism that gets food from killing and eating the flesh of another organism.

Detritivore – An organism that feeds on dead plant or animal matter.

Herbivore – An organism that feeds on plants.

Omnivore – An organism that feeds both on plants and other living animals.

Food web – Organization that represents the feeding relationships of a community.

Line 2

The goal of this question is to ascertain what other species are important for the survival of this species (aims to get at supporting service models and predator prey interactions).

Line 3

The goal of this question is to ascertain what other species depend on this species for their survival (aims to get at supporting service models and predator prey interactions).

Line 4

Examples of services to the environment include...

Line 5

Keystone Species – For the purpose of this form defined as a species that has a disproportionately large effect on its environment relative to its abundance such that its removal causes effects to other organisms and/or possible the habitat it occupies. (Or use this one defined by Paine: “Species that exerts top-down influence on lower trophic levels and prevents species at lower trophic levels from monopolizing critical resources, such as competition for space or key producer food sources.”)

Line 6

Migratory Species – Any species with a significant proportion of members that cyclically and predictably cross one or more national or jurisdictional boundaries -Definition courtesy of the text of “The Convention of the Conservation of Migratory Species.” To learn more, please visit: www.cms.int/en/convention-text

Section B – Status

Line 1

Top Predator – Defined for the purpose of this form as a predator that sits at the top of the food chain and is not preyed upon by others. The removal of a top predator generally triggers a change in prey populations, primary producers, and ecosystem processes.

Line 2

Herbivore – Please consult the definition provided in the Specific Instructions for Section B Line 1

Line 3

Definitions of these categories are taken from the IUCN’s Red List and are as follows:

Least concern – Species is assigned this status if it faces the lowest risk because it is widespread and abundant.

Near threatened – Species is assigned this status if it is likely to become endangered in the future.

Vulnerable – Species is assigned this status if it faces a high risk of extinction in the wild.

Endangered – Species is assigned this status if it faces a very high risk of extinction in the wild.

Critically endangered – Species is assigned this status if it faces an extremely high risk of extinction in the wild.

Unknown – Species is assigned this status if there is not enough information available on it to correctly assess its status.

To see a list of species that have already been listed, please visit www.iucnredlist.org to learn more

For more information on how to assess the status of the species, please visit www.iucnredlist.org/status/categories_criteria_2_3 to learn more

Line 4

Slow to Reproduce – Species that are slow to reproduce generally have long gestation periods (the time in which the organism is developing in the mothers womb) and a low number of offspring that are slow to mature, are large in size, and have long life spans.

Line 5

Resilient – Defined as the capacity of a species to respond to change or a disturbance in the ecosystem by resisting damage or being able to recover quickly.

Line 12

If there is any other information you feel is important and would benefit the accurate valuation of this species, please write it here.

Section C – Level of Concern

Line 1

Place a check next to the level of concern that that corresponds to the following guide:

- If your form has between 1 and 2 “Yes” answers, please check the “no concern” box
- If your form has between 3 and 4 “Yes” answers, please check the “moderate concern” box
- If your form has 5 or more “Yes” answers please check the “extreme concern” box

Appendix G: MARINE SPECIES VALUATION – SUMMARY FORM

The following form provides a summary of the financial market values as well as the cultural and biological non-market values of the species to the community. Please consult the directions at the end of this form before proceeding. All values necessary to complete this form are to be obtained from the previously completed Fisheries, Sportfishing, and Non-extractive Tourism forms.

A) General

1. Name of community: _____
2. Location of community: _____
3. Species to be valued: _____

B) Summary of Market and Non-market Values

	Fisheries	Sportfishing	Non-extractive Tourism
Line 1: Local Profit	a) \$ ____	b) \$ ____	c) \$ ____
Line 2: Local jobs Money spent locally	a) ____ jobs	b) ____ jobs	c) ____ jobs
	i) \$ ____	ii) \$ ____	iii) \$ ____
Line 3: Cultural	a) _____	b) _____	c) _____
Line 4: Biological	_____		

General Instructions

This form should be filled out on the community scale and should reflect the values of those who are residents of the area, not those who are visitors.

Specific Instructions

Section A

Lines 1 – 3

Please fill in these lines in the same manner as the previous forms.

Section B – Summary of Values

Line 1a

Copy the value from the Fisheries form Section D Line 30

Line 1b

Copy the value from the Sportfishing form Section H Line 63

Line 1c

Copy the value from Non-extractive Tourism form Section Q Line 154

Line 2a

Copy the value from Fisheries form Section C Line 11

Line 2i

Copy the value from Fisheries form Section C Line 28

Line 2b

Copy the value from Sportfishing form Section F Line 44

Line 2ii

Copy the value from Sportfishing form Section F Line 58

Line 2c

Copy the value from Non-extractive Tourism form Section R Line 155

Line 2iii

Copy the value from Non-extractive Tourism form Section S Line 156

Line 3a

Copy the designation from the Cultural form Section C Line 2a

Line 3b

Copy the designation from the Cultural form Section C Line 2b

Line 3c

Copy the designation from the Cultural form Section C Line 2c

Line 4

Copy the designation from the Biological form Section C Line 1. Use the following guide as a suggestion for management:

- If Biological form Section C Line 1 indicated “No concern”, species is fine to be involved in fisheries, sportfishing, and non-extractive tourism
- If Biological form Section C Line 1 indicated “Moderate concern”, species is fine to be involved in sportfishing and non-extractive tourism
- If Biological form Section C Line 1 indicated “Extreme concern”, species is not fine to be involved in fisheries, sportfishing, or non-extractive tourism

Appendix H: Tables and Graphs

La Paz Components	Information Needed	Available?	Obtainable?	Percent Complete
Fisheries	Annual average catch of species for all fleets in the community (in kg)	YES		
	Average sale price of the species (\$/kg)	YES		
	Average annual income of the fishermen	YES		
	Number of weeks per year spent fishing the species	YES		
	Number of fishermen fishing the species	NO	YES	
	Cost to buy a new boat	NO		
	Lifetime of a new boat	NO		
	Percent of the year spent fishing the species	YES		
	Average amount spent on boat maintenance per year	NO		
	Average amount spent on fuel per year	NO		
	Average amount spent on permit per year	NO		
	Number of boats fishing the species	NO	YES	
Total	12	5	2	41.67
Sportfishing	Average number of outings per trip	YES		
	Average number of days and nights per trip	YES		
	Average cost to travel to community	NO	YES	
	Average cost of lodging	NO	YES	
	Average cost of a meal	NO		
	Average number of meals purchased per day	NO		
	Average cost of one outing	NO		
	Number of outings per year	NO		
	Number of operators	YES		
	Number of guests per outing	YES		
	Number of individuals of the species caught	NO		
Total	11	4	2	36.36
Non-extractive Tourism	Average number and type of outings per trip	NO		
	Average number of days and nights per trip	YES		
	Average cost to travel to community	NO	YES	
	Average cost of lodging	YES		
	Average cost of a meal	YES		
	Average number of meals purchased per day	NO		
	Average cost of outing	YES		
	Number of outings per year	NO		
Number of operators	YES			
Number of guests per outing	YES			
Total	10	6	1	60

Cultural	Aesthetics	NO		
	Cultural heritage	NO		
	Educational values and knowledge systems	NO		
	Giftng and trading of seafood	NO		
	Inspiration	NO		
	Recreation	NO		
	Sense of place and identity	NO		
	Social relations	NO		
	Spiritual services	NO		
	Stewardship	NO		
Total	12	0	0	0
Biological	Where the species sits in the food web	YES		
	The top three species that the valued species consumes	NO	YES	
	The top three species that consume the valued species	NO	YES	
	If the species is considered a keystone species	NO	YES	
	If the species is migratory	NO	YES	
	Type of habitat the species is found in	YES		
	If the species is the only top predator in the system	YES		
	If the species is the only herbivore in the system	YES		
	What the IUCN status of the species is	NO	YES	
Total	9	4	5	44.44
Total	54	19		35.19

Figure 1

La Paz Components	Data We Have	Data We Can Get	Data We Don't Have	Total
Fisheries	5	2	5	12
Sportfishing	4	2	5	11
Non-extractive Tourism	6	1	3	10
Cultural	0	0	10	10
Biological	4	5	0	9
Total	19	10	23	52
Percent Presence	35.54	19.23	44.23	100

Figure 2

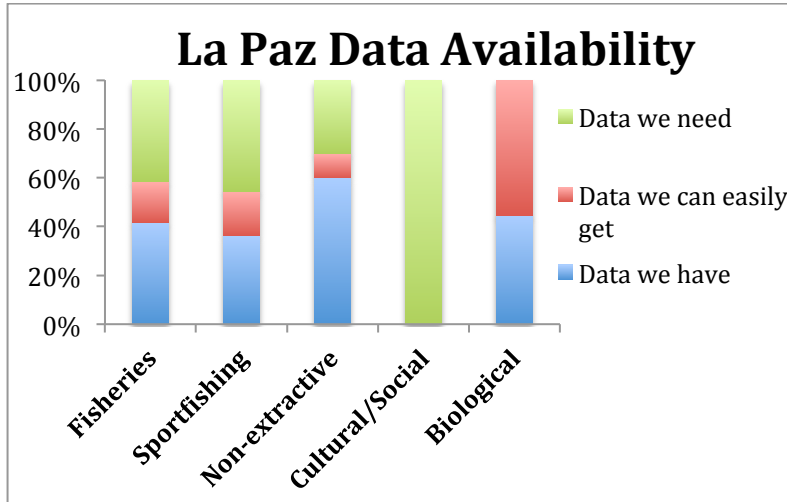


Figure 3

Cabo Pulmo Components	Information Needed	Available?	Obtainable?	Percent Complete
Fisheries	Annual average catch of species for all fleets in the community (in kg)	NO		
	Average sale price of the species (\$/kg)	NO		
	Average annual income of the fishermen	NO		
	Number of weeks per year spent fishing the species	NO		
	Number of fishermen fishing the species	NO		
	Cost to buy a new boat	NO		
	Lifetime of a new boat	NO		
	Percent of the year spent fishing the species	NO		
	Average amount spent on boat maintenance per year	NO		
	Average amount spent on fuel per year	NO		
	Average amount spent on permit per year	NO		
	Number of boats fishing the species	NO		
	Total	12	N/A	
Sportfishing	Average number of outings per trip	YES		
	Average number of days and nights per trip	YES		
	Average cost to travel to community	NO	YES	
	Average cost of lodging	NO	YES	
	Average cost of a meal	NO		
	Average number of meals purchased per day	NO		
	Average cost of one outing	NO		
	Number of outings per year	NO		
	Number of operators	YES		
	Number of guests per outing	YES		
Number of individuals of the species caught	NO			
Total	11	4	2	36.36
Non-extractive Tourism	Average number and type of outings per trip	NO		

	Average number of days and nights per trip	YES		
	Average cost to travel to community	NO	YES	
	Average cost of lodging	YES		
	Average cost of a meal	YES		
	Average number of meals purchased per day	NO		
	Average cost of outing	YES		
	Number of outings per year	NO		
	Number of operators	YES		
	Number of guests per outing	YES		
Total	10	6	1	60
Cultural	Aesthetics	NO		
	Cultural heritage	NO		
	Educational values and knowledge systems	NO		
	Gifting and trading of seafood	NO		
	Inspiration	NO		
	Recreation	NO		
	Sense of place and identity	NO		
	Social relations	NO		
	Spiritual services	NO		
	Stewardship	NO		
Total	10	0	0	0
Biological	Where the species sits in the food web (i.e. carnivore, herbivore, etc.)	YES		
	The top three species that the valued species consumes	NO	YES	
	The top three species that consume the valued species	NO	YES	
	If the species is considered a keystone species	NO	YES	
	If the species is migratory	NO	YES	
	The type of habitat the species is found in	YES		
	If the species is the only top predator in the system	YES		
	If the species is the only herbivore in the system	YES		
	What the IUCN status of the species is	NO	YES	
Total	9	4	5	44.44
Total	42	14		33.33

Figure 4

Cabo Pulmo Components	Data We Have	Data We Can Get	Data we Don't Have	Total
Fisheries	N/A	N/A	N/A	N/A
Sportfishing	4	2	5	11
Non-extractive Tourism	6	1	3	10
Cultural	0	0	12	12
Biological	4	5	0	9
Total	14	8	20	42
Percent Presence	33.33	19.05	47.62	100

Figure 5

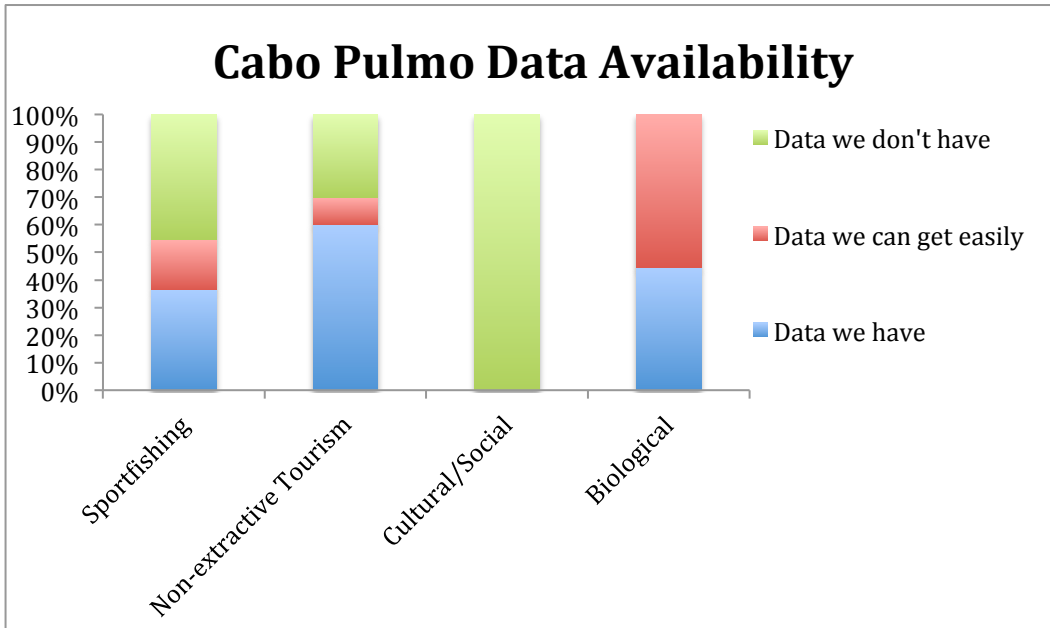


Figure 6

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