Final Report

Mapping Ocean Wealth: Nature-Based Tourism Values in the Gulf of California and Baja California Peninsula

Prepared for

The Nature Conservancy, México

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1. Executive Summary

Marine ecotourism is an important and rapidly-growing international industry. In addition to providing recreation for participants and direct and indirect economic benefits to coastal communities, it can foster and incentivize additional social and environmental benefits through marine conservation. Globally, marine ecotourism generates over US$50 billion per year in expenditures, including activities such as snorkeling and scuba diving, whale, shark, and bird watching, kayak tours along mangrove forests, and sport fishing.

In Mexico, over US$16 billion per year are spent by 29 million tourists in general, sustaining over 2 million jobs across the country. The Gulf of California and Baja California Peninsula in particular are renowned for their coastal and marine ecosystems, which include rocky and coral reefs, mangrove and kelp forests, diverse islands and coastal lagoons. These diverse habitats support highly productive marine ecosystems, including iconic whale nurseries, aggregations of sharks and other fishes, and exceptionally high species diversity. This region receives 3.8 million annual tourists, including the states of Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit, and Jalisco.

Based on data collected in this study, each year marine ecotourism in the Gulf of California and Baja California Peninsula results in:

- 896 thousand visits;
- US$518 million in expenditures;
- 256 formal ecotourism operators supporting 3,575 direct jobs.

The state of Baja California Sur is vital for ecotourism in the Gulf of California, contributing over half of total employment (136 operators and 2,088 direct jobs) and 60% of total expenditures (US$314 million per year). Sport fishing and diving are key year-round activities, though whale and whale shark watching are essential seasonal components of ecotourism in the state. Accordingly, a range of species were highlighted by ecotourism operators, including sea lions, whale sharks, marlin, grey whales, dorado, dolphins and jacks.

Challenges named by ecotourism operators include lack of infrastructure, portrayals of Mexican violence in popular media, resource management policies, and operating costs. Employment, and the ability to make economy and conservation compatible goals were noted as some of the biggest opportunities provided by ecotourism. Ecotourism research has grown in the region, though we highlight a need for more integration of economic aspects and systematic studies. Continued collaboration between stakeholders will be vital for maximizing the potential sustainable social, ecological and economic benefits of ecotourism in the Gulf of California and Baja California Peninsula.

2. Resumen Ejecutivo

El ecoturismo marino es una industria internacional importante y con rápido crecimiento. Además de ofrecer recreación a sus participantes y beneficios directos e indirectos a las comunidades costeras, puede fomentar y crear incentivos para beneficios sociales y económicos adicionales a través de la conservación marina. A nivel mundial, el ecoturismo marino genera más de US$50 mil millones en gastos, incluyendo actividades como el buceo, avistamiento de tiburones, ballenas y aves, tours en kayak a lo largo de manglares, y pesca deportiva.

En México, 29 millones de turistas en general gastan más de US$16 mil millones al año, sosteniendo más de 2 millones de empleos a lo largo del país. El Golfo de California y Península de Baja California en particular se distinguen por sus ecosistemas marinos y costeros, incluyendo arrecifes coralinos y rocosos, manglares y bosques de algas, y una diversidad de islas y lagunas costeras. Estos diversos hábitats sostienen ecosistemas marinos muy productivos, incluyendo agregaciones icónicas de ballenas, tiburones y otros peces, y una excepcional diversidad de especies. La región recibe 3.8 millones de turistas al año, incluyendo los estados de Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit y Jalisco.

Según los datos recopilados en este estudio, cada año el ecoturismo marino en el Golfo de California y Península de Baja California resulta en:

- 896 mil visitas;
- US$518 millones en gastos;
- 256 operadores formales que generan 3,575 empleos directos.

El estado de Baja California Sur es de particular importancia para el ecoturismo en la región del Golfo de California, contribuyendo más de la mitad del empleo total (136 operadores y 2,088 empleos) y 60% de los gastos (US$314 millones por año). Los operadores identificaron a la pesca deportiva y buceo como actividades claves a lo largo del año, aunque el avistamiento de ballenas y tiburón ballena son componentes esenciales del ecoturismo en el estado por temporada. Por ende, una variedad de especies fueron señaladas por los operadores del ecoturismo, incluyendo al lobo marino, tiburón ballena, marlín, ballena gris, dorado y jurel.

Los retos nombrados por los operadores del ecoturismo incluyen falta de infraestructura, presentación de la violencia en México en los medios populares, políticas de manejo de recursos, y costos de operación. La generación de empleos y la posibilidad de alinear metas económicas y de conservación fueron señaladas como los principales beneficios del ecoturismo. La investigación sobre el ecoturismo ha crecido en la región, aunque señalamos la necesidad de mayor integración de aspectos económicos y estudios sistemáticos. La colaboración entre diversos actores será vital para maximizar los posibles beneficios sociales, ecológicos y económicos que el ecoturismo ofrece al Golfo de California y Península de Baja California.

3. Background

Nature-based tourism, or ecotourism, is one of the fastest growing industries around the world (Honey and Krantz 2007). The defining characteristic of a true ecotourism activity or operation is that it benefits directly from healthy ecosystems and/or wild populations. Recreational enjoyment and associated economic benefits are therefore inherently and inextricably linked to nature conservation.

Marine ecotourism developed relatively recently compared to other forms of ecotourism (such as hunting, camping or freshwater fishing) historically tied to social traditions in Europe and North America. With some 40% (and increasing) of the world's population now living near marine coasts, however, marine ecotourism increasingly generates significant participation and subsequent economic benefits. Activities such as whale and shark watching, snorkeling and scuba diving, and recreational fishing attract over 120 million annual participants globally, generating almost US$50 billion and supporting over one million jobs (Cisneros-Montemayor and Sumaila 2010).

In México, the most important region for marine ecotourism is undoubtedly the Gulf of California and the Baja California Peninsula. The area's extensive coastline includes rocky reefs, mangroves, seagrass and kelp beds, a number of small and large islands, and large and productive upwelling zones. These habitats support vibrant marine ecosystems and consequently have a thriving ecotourism industry. For example, shark watching revenue in the region (US$12 million) already represents more than half the landed value from shark fisheries in the country (US$21 million) (Cisneros-Montemayor et al. 2013). Nevertheless, this wealth of resources is threatened by ongoing and increasing human activity including unsustainable commercial fisheries and coastal development. These human pressures can also include ecotourism activity itself if not properly managed (Harriott 2002; Lewin, Arlinghaus, and Mehner 2006; Newsome, Lewis, and Moncrieff 2004).

Millions of foreign and domestic tourists visit Mexican sites every year, including archeological site, museums, urban centers, resorts and more. Annual tourist arrivals provide a very good indicator of global economic trends, leisure time and disposable income. These data are compiled and often available from dedicated official Mexican databases (e.g. INEGI – Mexico's National Institute of Statistics and Geography) and international tourism agencies (e.g. United Nations World Tourism Organization [UNWTO], World Travel and Tourism Council [WTTC]). Although such data sources provide robust measures, they do so at large spatial scales (e.g. per state). The specifics of smaller-scale operations must be understood if robust conclusions are to be drawn regarding revenues from marine ecotourism specifically in the study region.

In order to understand patterns in behaviors, trends in revenues and projected future development in the Gulf of California and Baja California Peninsula, field-based work is essential. There are various methodologies to estimate the economic impacts of ecotourism at local and

regional scales, though direct surveys provide the most reliable data. Including this data drawn directly from operators helps to evaluate the status of the industry, highlights key benefits, challenges and information gaps, and allows for future planning.

Assessing and communicating the scale of economic value from ecotourism is key to developing policies for its sustainable management. There are a number of local case studies on the economic impacts of ecotourism along the Baja California Peninsula, though this has not yet been researched along the entire region using a standardized framework. The Nature Conservancy Mapping Ocean Wealth initiative presents a unique opportunity to undertake this research in collaboration with multiple stakeholders and scientists, and provide results that can inform both policy-makers and the general public on the vital role of ecotourism in the Gulf of California and Baja California Peninsula.

This report includes summary statistics for tourism and ecotourism at various scales, notably participation, direct and indirect expenditures economic impacts, total operators and employment. In addition, we provide additional quantitative and qualitative information drawing on survey results and complemented by additional research. The key research questions to be addressed are:

1) What are the economic impacts from marine ecotourism in Baja California Sur and the Gulf of California?
2) Where are economic impacts from marine ecotourism generated, and how do they flow within and outside of local sites?
3) What are the main identified benefits and challenges of sustaining the ecotourism in the region?

4. Methods summary

A. Overview

"Ecotourism", in this study, refers to dedicated recreational activities, conducted by individuals independently or as part of a tour, relying on living organisms. Unless otherwise noted, we use the term to refer to marine ecotourism specifically, including wildlife watching, scuba diving and snorkeling, recreational fishing, kayaking, and general nature viewing. Note that in this definition we do not consider associated educational or conservation objectives as a necessary part of ecotourism.

The main objective of this study is to estimate the yearly economic value of ecotourism for formal operators in the Baja California Peninsula and the Gulf of California. This includes participation, revenue, employment, and economic expenditures, as well as qualitative observations. Additionally, we compile available data on total tourism and temporal trends at area, state, and national levels.

Following from Figure 4.A.1, this research includes three main components:

1) **Field:** Including the main operator surveys, and supporting tourist surveys and informal interviews. These supply the main data required for estimating operator revenues.
2) **Research:** Comprising data compilation and analyses, and a formal literature review. These supply information for large-scale analyses, and supporting data for estimation of economic benefits.
3) **Model:** Data from Field and Research components is integrated for analysis and estimations. As required, this involves direct estimation and meta-analysis.

The full methodology for all components is presented in Section 8.

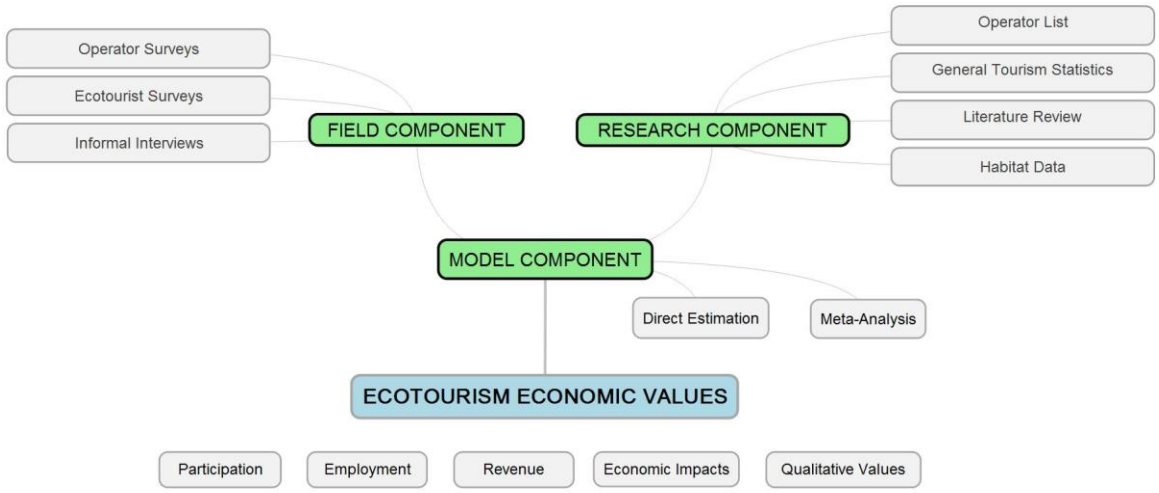

Figure 4.A.1. Conceptual diagram of estimation methods for ecotourism economic values.

B. Key definitions

Ecotourism refers to dedicated recreational activities, conducted by individuals independently or a part of a tour, relying on living organisms. Unless otherwise noted, we use the term to refer to marine ecotourism specifically, including wildlife watching (e.g. whales, sharks), scuba diving and snorkeling, recreational fishing, kayaking, and general nature viewing (e.g. a mangrove tour). Note that in this definition we do not consider associated educational or conservation objectives as a necessary part of ecotourism.

Study area, unless otherwise specified, refers to the Gulf of California and Baja California Peninsula coastal and marine zones (see Study Area section).

Location and Site Locations are cities and towns where ecotourism operators are based, and are the smallest unit of aggregation for results. Sites are specific areas where ecotourism takes place, e.g. an island or dive spot.

Operators are individuals or companies offering ecotourism as a primary or complementary service. This study focuses primarily on formal operators based on official records, though informal (unlicensed) operators may certainly be prevalent in some areas.

Vessel includes versatile *pangas* (open-deck fiberglass boats commonly used in artisanal fisheries), as well as dedicated diving or sport fishing boats, yachts, or sailboats (if the latter are used for ecotourism specifically).

Diving refers to both scuba diving and snorkeling, unless otherwise noted.

Whale watching is the dedicated watching of marine mammals, including whales, dolphins, or pinnipeds, from a vessel or possibly underwater. We explicitly try to separate this from general scuba or snorkel activities that may occasionally encounter marine mammals.

Shark watching is the dedicated watching of sharks from a vessel or possibly underwater. We explicitly try to separate this from general scuba or snorkel activities that may occasionally encounter sharks.

Recreational fishing refers to fishing activity where the main motivation is not consumption, sale, or trade of catch.

Expenditure is the disbursement of money from tourists to pay for items related to ecotourism, such as excursions, hotels, meals and beverages, souvenirs, taxis, transfers, etc. In this study, "direct" expenditure is solely attributable to ecotourism activities (e.g. tour price, rentals), with "indirect" expenditures referring to other spending that may be partly, but not solely related to ecotourism (e.g. accommodation and meals for duration of stay). Our use of indirect expenditures is different from other commonly used definitions, where it refers to secondary spending made by producers (tour operators, in this case).

Revenue is the money received by tour operators from tourists in exchange for their excursions. Revenue is the total money received, whereas their *profits* are what are retained after covering the costs of tour operation (profit = revenues – costs). Here, revenues and "direct" expenditures theoretically represent the same thing.

Employment includes both full-time and part-time and seasonal jobs direct ecotourism jobs (i.e. working for ecotourism companies), expressed in full-time equivalents (FTEs) (e.g. two half-time jobs equal one FTE).

Economic impact is defined herein and limited to revenues generated through tourist expenditures on marine-based tourism, which includes all their "direct" (tours, etc.) and "indirect" expenditures (hotels, meals and beverages, etc.). It can also include the "secondary" expenditures by producers (for example, tour operators spending their profits in other parts of the economy) and induced effects occurring from other tertiary producer spending, but this has a high degree of uncertainty and is hence beyond the scope of this study.

C. Study Area

The Gulf of California (or Sea of Cortez) on the eastern coast of the Peninsula is one of the most productive bodies of water in the world, and provides most of Mexico's marine fisheries catches. The high marine productivity lends itself well to ecotourism operations based around the diversity and abundance of marine life that can be seen in and around the waters of the peninsular. On the western coast of the Peninsula, the California Current and multiple upwelling and coastal lagoon systems support highly productive and iconic marine ecosystems.

There are six states bordering on the Gulf of California, Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit, and Jalisco. This report focuses particularly on Baja California Sur (where most interviews were conducted), though we do use available data and fieldwork results to provide preliminary estimates for these states. The largest ecotourism sites in these states are Puerto Peñasco and San Carlos in Sonora, Mazatlán in Sinaloa, Nuevo Vallarta and Sayulita in Nayarit, and Puerto Vallarta in Jalisco. Future studies could provide better data on these sites, but also for others along the coast that may contribute significantly at more local scales.

The Baja California Peninsula runs from the American border with California, south to Cabo San Lucas (Figure 4.C.1). It includes two Mexican states, Baja California and Baja California Sur with a total area of approximately 145 km^2. The peninsula has a total population of approximately 3.7 million, with most living in cities at the northernmost end of Baja California (e.g., Tijuana, Mexicali, Ensenada). In Baja California Sur, most of the population is concentrated in the Los Cabos area (287 thousand) and La Paz (215 thousand). The peninsula exhibits diverse geography in a relatively small area with mineral-rich mountain ranges running through the center interspersed with desert, chaparral and forest ecosystems fed by a mixture of arid to Mediterranean climates.

Industries along the Baja Peninsula include electronics, textiles, plastics, metal products, automobile components, paper, beverages and processed foods. The manufacturing industry alone now employs approximately 300,000 people. More recently tourism has become a large part of the regions' economic growth with large investments from foreign bodies. Easy tourist access across the border from southern California and Arizona now makes the northern peninsular a common weekend vacation spot for U.S. residents, whilst the largest tourist hub for longer stays is the southern peninsular cities of Cabo San Lucas and San José del Cabo. Overall, the economic impacts of tourism in Baja California Sur are estimated at approximately US$725 million USD (Gobierno del Estado 2015).

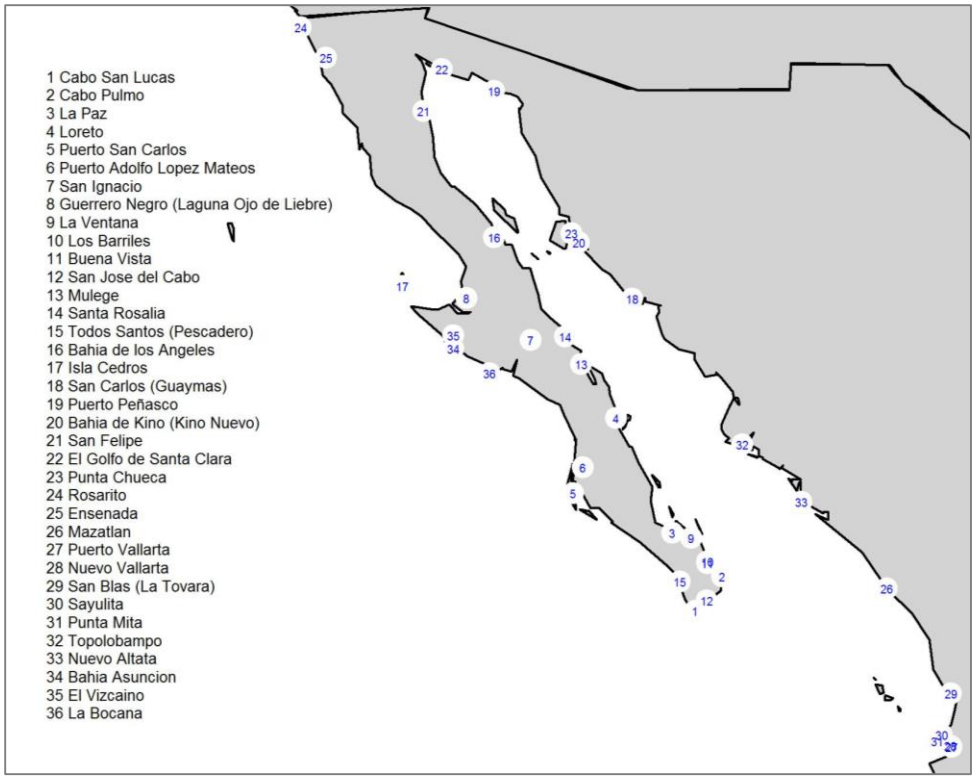

Figure 4.C.1. Gulf of California and Baja California Peninsula, including research regions used in this study. Points indicate key locations with ecotourism activity.

5. Results and Analysis

A. Overall tourism: National, State, and Regional data

Mexico attracts 29 million international visitors per year, supporting an estimated 2 million jobs around the country (UN-WTO 2016). Total expenditures by tourists are estimated at US$16 billion per year, equal to 1.3% of Mexico's GDP. Although there have been recent decreases in total arrivals, total expenditure per capita has increased substantially and is currently reported at US$668 (BANXICO 2016)(Fig. 5.A.1). States along the Gulf of California receive 3.8 million annual tourists (INEGI 2016), with the highest number of visitors, by state, arriving in Puerto Vallarta (Jalisco), Los Cabos (Baja California Sur), Nuevo Vallarta (Nayarit), Mazatlán (Sinaloa), San Carlos (Sonora), and Ensenada (Baja California).

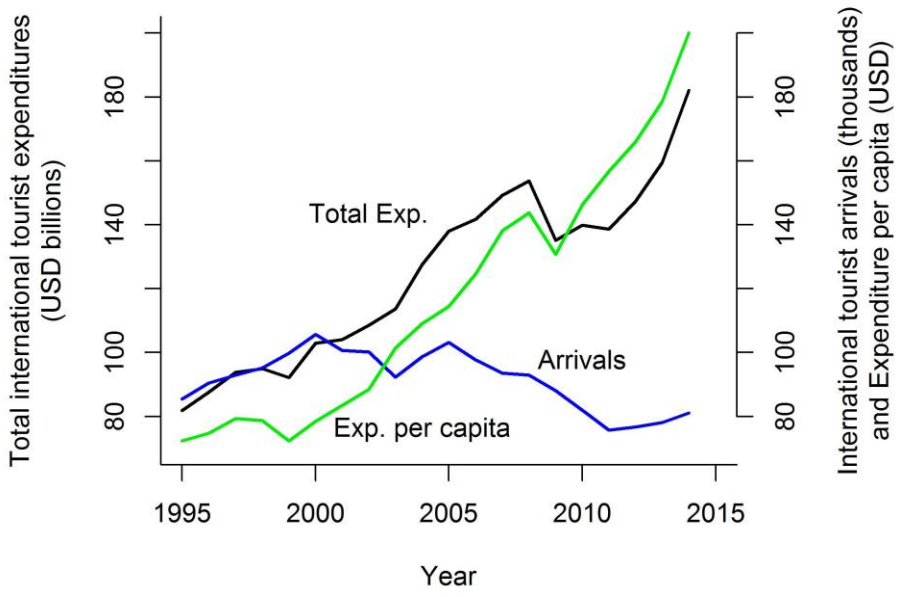

Figure 5.A.1. Total arrivals, expenditures, and expenditures per capita by international visitors to Mexico (Source: BANXICO 2016).

Overall tourism trends follow very similar patterns across the Gulf of California states, with Jalisco receiving the highest number of tourists (Fig. 5.A.2). It is worth noting that, despite receiving less overall tourists than other states, Baja California Sur has a steady tourism stream throughout the year. Given that BCS is the state that is least accessible (aside from a ~20 hour drive to La Paz, it requires air or ferry travel from the mainland), these trends are remarkable and, based on tourist comments, directly tied to the relatively good status of local ecosystems.

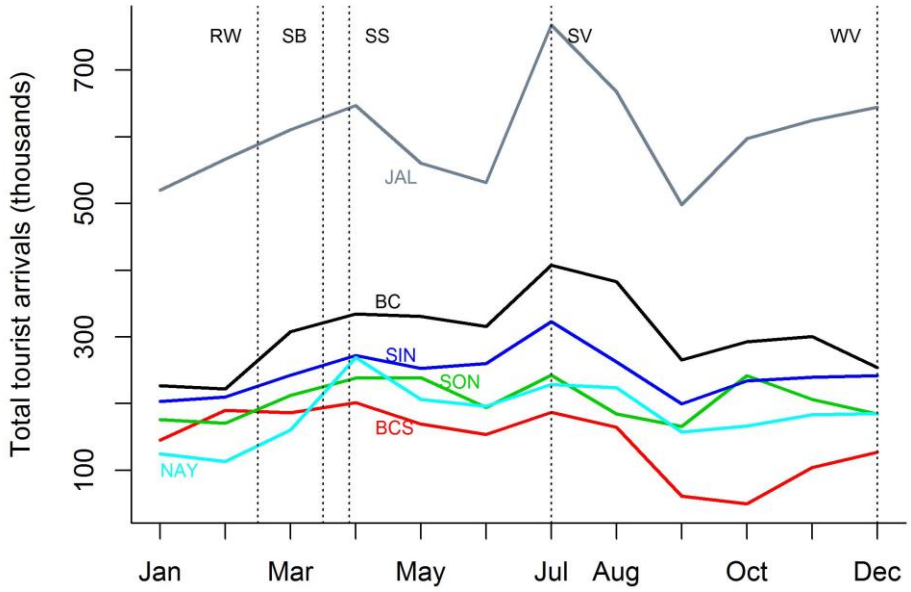

Figure 5.A.2. Monthly tourist arrivals in states bordering on the Gulf of California, by month for 2014 (Source: SECTUR 2016). Dashed lines indicate start of holiday periods. RW= Reading Week (Canada); SB= Spring Break (USA); SS= Semana Santa (México); SV= Summer Vacation; WV= Winter Vacation.

Summary statistics are available at different scales depending on the indicator. Table 5.A.1 shows available data on tourist arrivals for key areas in the Gulf of California and Baja California region. Table 5.A.2 shows data at the municipal level for each state.

Table 5.A.1. Domestic, foreign, and total tourist arrivals, and average length of stay for coastal areas in the Gulf of California region, as available from INEGI (2016) for 2013. Domestic and foreign arrival numbers may not equal total due to rounding. NA= Data not available.

	Tourist arrivals in 2014 (thousands)			Average length of stay (days)		
Area	**Domestic**	**Foreign**	**Total**	**Domestic**	**Foreign**	**Total**
Baja California	***1,176***	***360***	***1,538***	***1.3***	***1.4***	***1.3***
Ensenada	362	143	506	1.4	1.4	1.4
Mexicali	409	87	496	1.5	1.7	1.6
Playas de Rosarito	338	96	434	1.1	1.2	1.1
San Felipe	67	34	102	1.1	1.1	1.1
Baja California Sur	***613***	***933***	***1,550***	***2.4***	***3.9***	***3.2***
Loreto	64	25	90	1.4	3.0	1.8
La Paz	272	26	299	1.7	2.3	1.7
Cabo San Lucas	189	641	831	3.1	5.3	4.8
San José del Cabo	88	241	330	3.4	4.8	4.4
Sonora	***736***	***47***	***783***	***1.7***	***2.6***	***1.8***
Guaymas	222	10	232	1.7	1.4	1.7
Hermosillo	514	37	551	1.7	1.8	1.7
Sinaloa	***2,138***	***337***	***2,477***	***1.7***	***2.6***	***1.8***
Culiacán	517	6	524	1.3	2.7	1.3
Los Mochis	206	3	210	1.4	1.5	1.4
Mazatlán	1,415	328	1,743	2.5	3.6	2.7
Nayarit	***1,921***	***396***	***2,319***	***2.8***	***3.9***	***3.2***
Guayabitos	690	37	728	2.8	3.6	3.2
San Blas	126	9	136	2.2	2.8	2.5
Tepic	331	3	334	2.6	3.0	2.8
Nuevo Vallarta	774	347	1,121	3.6	6.1	4.3
Jalisco	***1,225***	***394***	***1,620***	***2.8***	***5.0***	***3.3***
Puerto Vallarta	1,225	394	1,620	2.8	5.0	3.3
Total	**7,809**	**2,467**	**10,287**	**2.1**	**2.9**	**2.4**

Table 5.A.2. Total stock of rooms, golf courses, and marinas for municipalities in the Gulf of California and Baja California Peninsula region, as available from INEGI (2016) for 2013. Only coastal municipalities corresponding to ecotourism locations are included. NA= Data not available.

State	Rooms	Golf courses	Marinas
Baja California	***19,637***	***7***	***5***
Ensenada	2,685	2	4
Mexicali	4,663	2	1
Playas de Rosarito	2,990	1	0
Tijuana	9,299	2	0
Baja California Sur	***21,196***	***16***	***22***
Comondú	540	0	0
La Paz	2,947	3	8
Loreto	983	1	1
Los Cabos	15,569	12	11
Mulegé	1,157	0	2
Sonora	***6,736***	***2***	***3***
Guaymas	2,137	1	3
Hermosillo	4,599	1	0
Sinaloa	***17,173***	***7***	***3***
Ahome	2,000	2	0
Culiacán	3,917	1	0
Mazatlán	11,256	4	3
Nayarit	***25,986***	***7***	***4***
Compostela	4,011	1	0
San Blas	852	0	1
Tepic	2,797	0	0
Bahía Banderas	18,326	6	3
Jalisco	***21,963***	***3***	***1***
Puerto Vallarta	21,963	3	1
Total	**112,691**	**42**	**38**

B. Ecotourism in Baja California Sur and the Gulf of California

A total of 98 operator surveys were conducted throughout Baja California Sur (BCS) from December 2015 to February 2016. This represents about 72% of the 136 formal operators registered in BCS (12 of these operators did not appear in official lists, though stated that they were indeed formally registered). An additional 120 dedicated ecotourism operators were identified and screened from Trip Advisor data (see Section 8.A) for the rest of the Gulf of California and Baja California Peninsula (Figure 5.B.1).

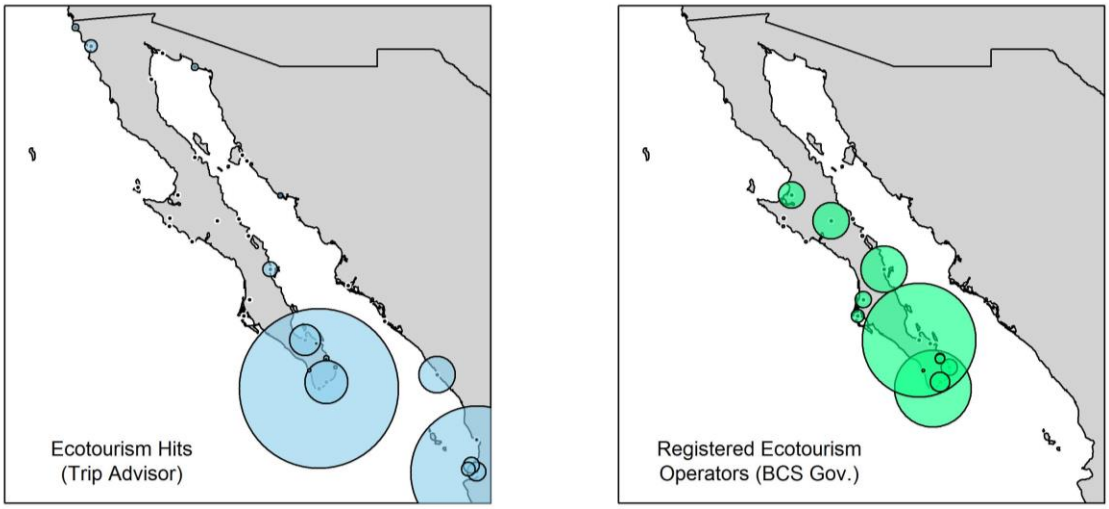

Figure 5.B.1. Ecotourism operators in the Gulf of California and Baja California Peninsula; bubble sizes show the number of operators scaled to the location with most operators (for each map). The left map shows screened Trip Advisor hits for ecotourism at each site. The right map shows formal operators registered in Baja California Sur.

Based on survey data, marine ecotourism in Baja California Sur draws 522 thousand visits per year (307 thousand—1 million), representing an estimated 520 thousand unique visitors. These ecotourists generate a total of US$47 million (US$28 million—95 million) in direct expenditures (i.e. operator revenues) that support 136 operators and 2,088 direct jobs. Indirect expenditures total approximately US$267 million per year (US$59 million—674 million). Marine ecotourism thus generates around US$314 million per year in Baja California Sur (US$88 million—769 million), representing over 40% of total tourism revenues, and almost 5% of the state's gross domestic product.

For the entire Gulf of California, available data including both official records and screened Trip Advisor data (see Section 8.A) suggest a total of approximately 256 marine ecotourism operators. An estimated 896 thousand ecotourism visits are undertaken each year. Based on data on ecotourism operators per site and assuming similar per-operator statistics to Baja California Sur, marine ecotourism is estimated to generate a total of US$518 million (US$180 million—1.2 billion) in direct and indirect expenditures per year, supporting some 3,575 thousand jobs. Summary statistics and spatial distributions of spending are shown in Table 5.B.1, and Figures 5.B.2 and 5.B.3 below. Given that there may be many more operators than found on Trip Advisor, these figures represent a minimum estimate.

Direct expenditures here are equal to operator revenues, and occur at the locations where the activity is performed. There are instances where tourists will be transported to a different location by an operator, but based on our survey data operators overwhelmingly carry out activities at sites that are relatively close to their home base.

*Table 5.B.1. Summary results of ecotourism economic benefits estimation. FTE= full-time equivalents. Values for locations marked with * are entirely estimated. Data for locations with less than 3 operators not disclosed (confidentiality); this data is included in state totals. All values are mid-point estimates.*

				USD millions		
Location	**Operators**	**Visits ('000)**	**Employment (FTE)**	**Direct**	**Indirect**	**Total**
Baja California Sur	***136***	***522***	***2,088***	***47***	***267***	***314***
Cabo San Lucas	35	303	760	19	155	174
La Paz	34	84	490	13	43	56
Loreto	14	9.9	105	2.1	5	7.1
San Ignacio	11	12	216	1.1	6.1	7.2
Guerrero Negro	8	0.8	84	0.1	0.4	0.6
San José del Cabo	6	6.4	51	1.6	3.3	4.9
Cabo Pulmo	6	29	32	2.9	15	18
Adolfo López Mateos	5	15	62	0.5	7.9	8.4
Puerto San Carlos	4	6.8	38	0.4	3.5	3.9
Buena Vista	3	3.6	47	1.1	1.9	3.0
Los Barriles	3	28	113	4.6	14	19
Mulegé	2	3.1	12	-	-	-
Bahía Asunción	2	6.2	25	-	-	-
Santa Rosalía	1	3.1	12	-	-	-
Todos Santos	1	3.1	12	-	-	-
Bahía de los Ángeles	1	3.1	10	-	-	-
La Bocana	1	2.4	17	-	-	-
Baja California	***10***	***31***	***124***	***1.0***	***16***	***17***
Ensenada*	6	18	75	0.6	9.5	10.1
Rosarito*	3	9	37	0.3	4.7	5.0
San Felipe*	1	3.1	12	-	-	-
Sonora	***6***	***19***	***68***	***1.4***	***10***	***11.4***
San Carlos	4	10	31	1.2	5.2	6.3
Puerto Peñasco*	3	9	37	0.3	4.7	5.1
Sinaloa	***17***	***52***	***212***	***1.6***	***27***	***29***
Mazatlán*	*17*	*52*	*212*	*1.6*	*27*	*29*
Nayarit	***24***	***74***	***299***	***2.3***	***38***	***40***
Nuevo Vallarta*	9	28	112	0.9	14	15
Sayulíta*	8	24	100	0.8	12	13
Punta Mita*	7	21	87	0.7	11	12
Jalisco	**63**	**196**	**784**	**6**	**100**	**106**
Puerto Vallarta*	63	196	784	6	100	106
Total	256	897	3,575	77	641	518

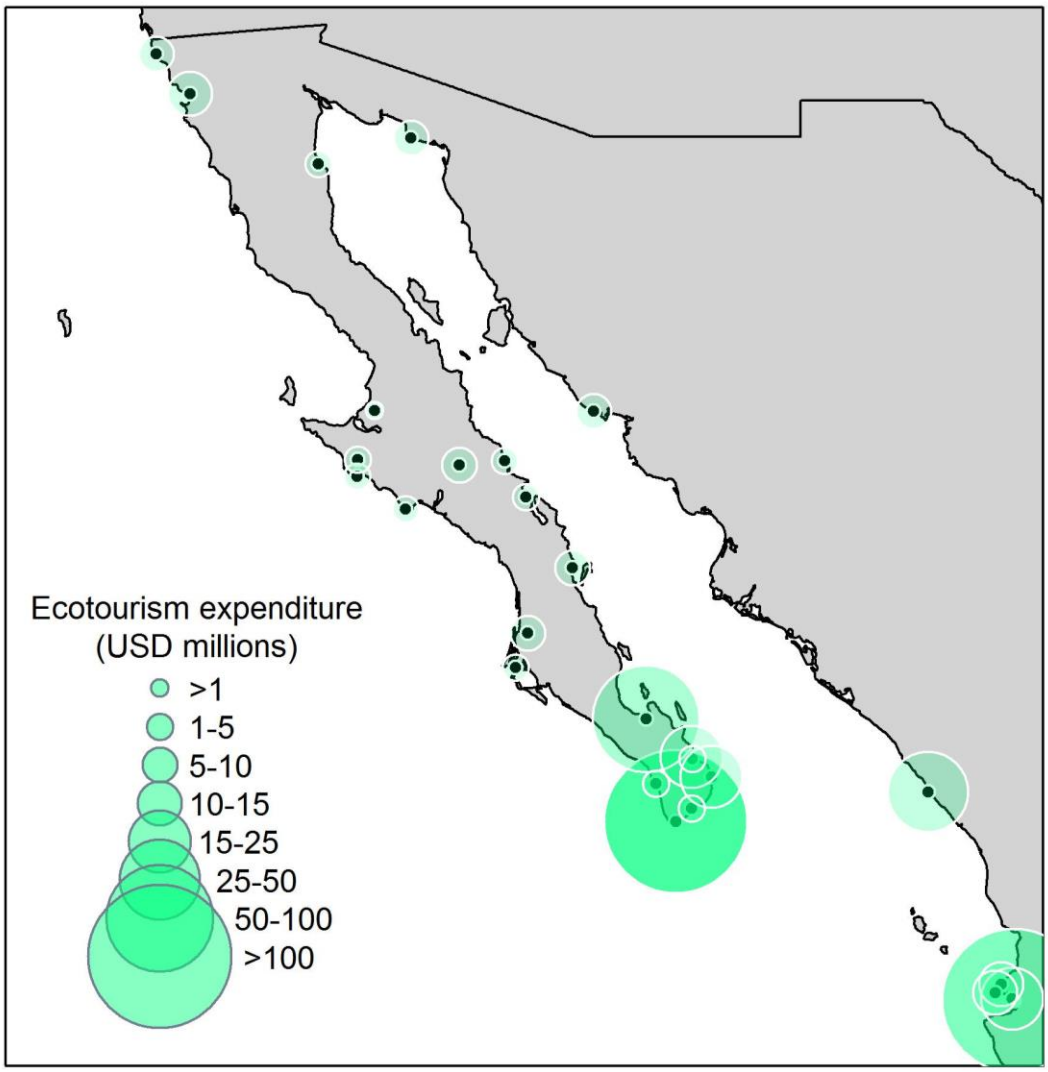

Figure 5.B.3. Total expenditures on marine ecotourism in the Gulf of California, by location.

Our results provide the first estimates of economic impacts from ecotourism in the Gulf of California region as a whole, and highlight the importance of Baja California Sur in particular for marine ecotourism in the Gulf of California. The three areas with the highest economic impact (midpoint) estimates from our analysis were La Paz, Loreto and Puerto Vallarta. This is due to higher numbers of dedicated marine ecotourism operators in comparison to other marine-based activities, and the average price of operations being higher at these sites.

It must be stressed that ecotourism attractions also add to an areas' general appeal to tourists, even if they themselves do not take part in these activities. Ecotourism can thus have significant indirect and non-market economic values through its direct incentives to maintaining clean,

healthy marine ecosystems and surrounding communities. Indeed, these positive benefits of ecotourism aside from market values were noted in many of our interviews with both operators and tourists (Section D). This influence of ecotourism can subsequently increase the appeal of traditionally mass-tourism locations such as Cabo San Lucas, Mazatlán, and Puerto Vallarta, and would be very interesting to explore in future research.

The highest per-operator ecotourism revenue in Baja California Sur was noted in Los Barriles, Cabo San Lucas, and Cabo Pulmo (Figure 5.B.4). Variation in annual revenues was high within and across locations. This may be a function of larger numbers of different activities on offer to tourists as well as competition between operators and specialty markets leading to a wider range of prices. It is crucial to note that these are gross revenues, not operator profits. On average, 50% of operator revenue goes towards operation costs (e.g. fuel, repairs, etc.), without accounting for labor costs (i.e. wages paid to their employees). A full evaluation of profitability requires additional data collection, and almost certainly a formal agreement and collaboration with individual operators and associations.

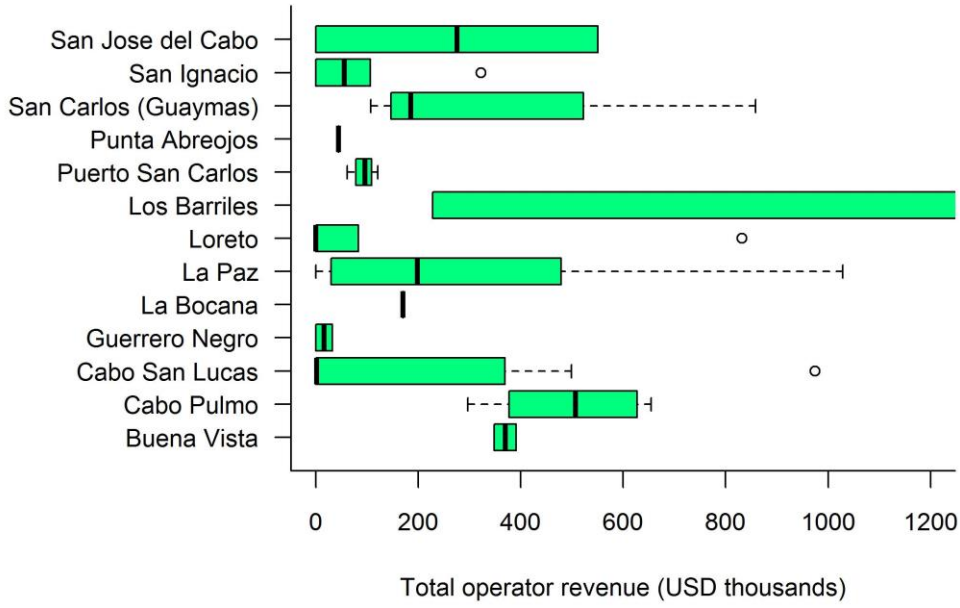

Figure 5.B.4. Average ecotourism operator revenue in Baja California Sur based on survey responses.

Within the study locations surveyed, sport fishing was identified by the most number of operators as an activity offered (Fig. 5.B.5). This is unsurprising as it has very few physical boundaries in terms of areas within which it can operate and has the flexibility to change location and target species, based on weather conditions and the time of year. It was followed by diving (including snorkeling), whale watching and kayak trips. Shark watching was highly important at

specific locations. A total of 482 ecotourism vessels were used by operators surveyed, plus an additional 219 kayaks and 77 paddleboards for rent (Fig. 5.B.6). The most common type of vessels used by surveyed operators were *pangas* (*n*= 185).

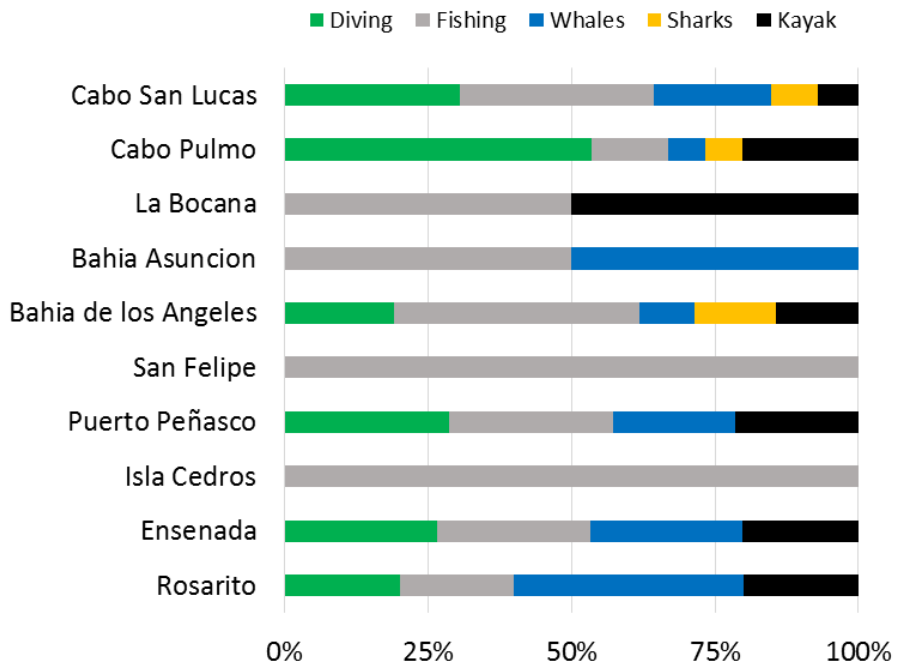

Figure 5.B.5. Percentage of ecotourism operators offering specific activities, by location. (Source: Trip Advisor 2016).

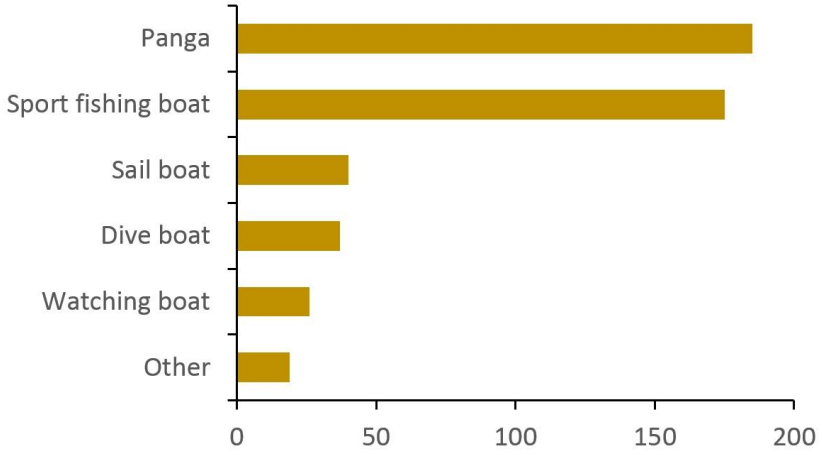

Figure 5.B.6. Number of marine ecotourism vessels, by type, owned by operators surveyed in Baja California Sur. An additional 296 kayaks and paddleboards were reported as used for rentals.

Understanding which species are important to the ecotourism operations spanning the Baja Peninsula is essential if conservation measures are to be used to protect them from detrimental anthropogenic activities. Considering sports fishing and diving were two of the biggest operator types noted in our surveys it is not surprising that fish species make up the majority of species deemed important by tour operators (Figure 5.B.7). It is difficult to compare the importance of different fish species as dive operators often mentioned groupings like “reef fish” whereas sport fisher operators were more specific in their responses. However, these results do support the argument that, although many different species are vital to maintain ecosystems on the whole, a few iconic species are much more easily identifiable by ecotourists and operators. Species groups ranked highest by operators include reef and pelagic fish (37%), cetaceans (29%), sharks (20%), pinnipeds (11%), and others (2%; including mangroves, turtles, and birds). Individual species scores are shown in Figure 5.B.7.

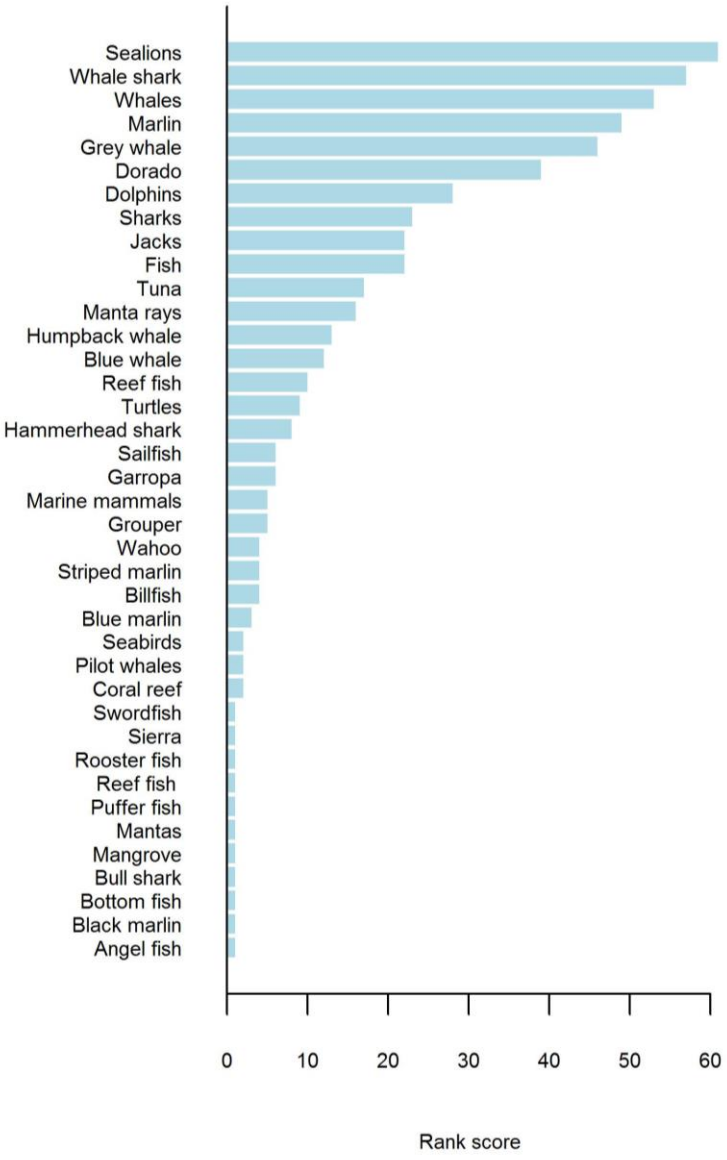

Figure 5.B.7. Most important species for ecotourism as ranked by operators.

It is also important to mention that the species noted in figure 5.B.7 are not weighted per area. This means, for example, that the high number of jacks may only apply to a specific reef area, rather than the whole of the Baja Peninsula across which the interviews were undertaken. This is likely to be the case with the "jacks" response from operators, all of which were at Cabo Pulmo where many tourists come for dive operations to see large schools of *Caranx sexfasciatus* (big eye trevally). Whale sharks thus receive the highest rank due to their iconic appeal and important in La Paz, that also has the most operators. This is similar for grey whales on the Pacific side of the state. Sea lions are widespread throughout the region and are a great complement to any tour since they're always around and tourists love them.

The types of species highlighted by operators reflects the importance of rocky reef and coastal lagoon habitats for marine ecotourism in the Gulf of California. Indeed, from conversations with operators and tourists it seemed almost too obvious to mention that rocky reefs and coastal ecosystems are the general attraction in addition to particular species.

Figure 5.8.8. Ecotourism sites identified by operators surveyed.

Based on tourist interviews (*n*=50, representing a total of 144 travelers), 61% were from the United States, 24% from Mexico and 8% from Canada. Figure 5.B.9 shows the percentage breakdown per state for tourists from Canada and America. California had the largest proportion of tourists followed by British Columbia and Oregon (Fig. 5.B.9). It is unsurprising that the majority of ecotourists surveyed in the Gulf of California region were from the U.S. and Canada (Figure 5.B.9), as these are key sources of general global tourism, have well-established demand for ecotourism in particular, and are geographically as close as can be to Mexican destinations.

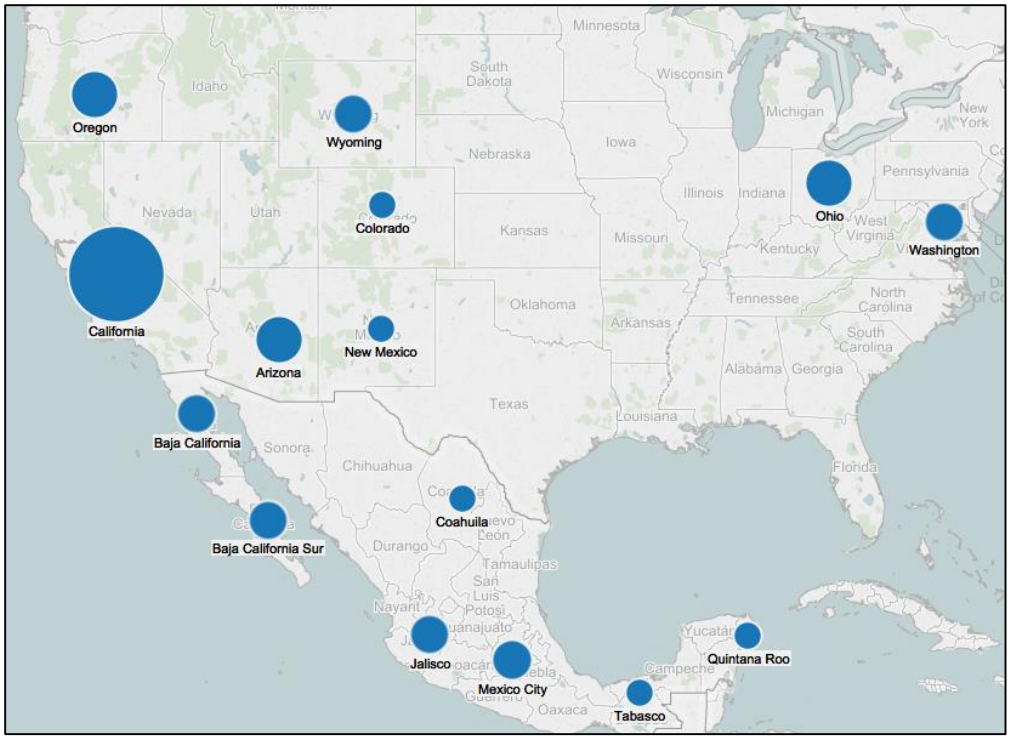

Figure 5.B.9. Home state or province of ecotourists surveyed in Baja California Sur. Size of bubble is proportional to % of survey answers. Note: For ease of demonstration, diagram does not include 1 interviewee from Europe and 1 from United Arab Emirates.

Nevertheless, 48% of ecotourists interviewed noted that in recent years they had travelled for ecotourism in other parts of the world, from Galapagos to Australia to Thailand to Turkey (Figure 5.B.10). While not a primary objective of this survey, these results show 1) the relatively high-end tourism market that can be accessed through ecotourism, and 2) the fact that for modern travelers there are countless possible destinations for ecotourism. It is more important than ever to offer these potential tourists healthy and attractive marine ecosystems to build on the other advantages of travel to the Gulf of California and Mexico.

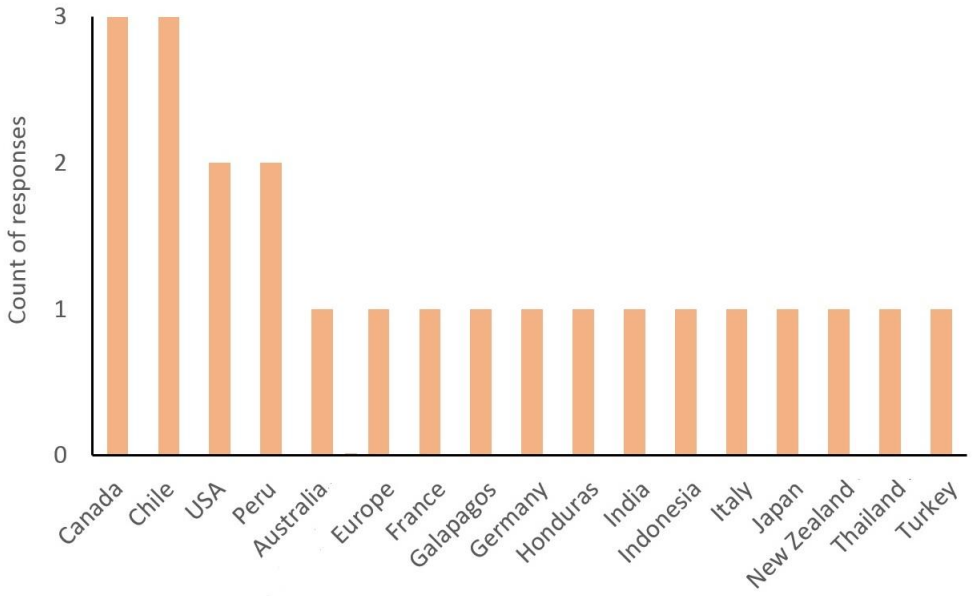

Figure 5.B.10. Alternative ecotourism locations (other than Mexico) visited by tourists surveyed in Baja California Sur (based on 50 interviews). Mexico was the number one response at 44% of all responses.

C. Literature review

We conducted a literature search for peer-reviewed publications, books and university theses, analyzing ecotourism in the Baja California Peninsula and the states neighboring the Gulf of California down to Puerto Vallarta, northwest Mexico. Within any particular publication, one or a number of different factors and investigations may be described relating to ecotourism. We therefore define an 'article' as a published journal paper and a 'study' as a separate investigation of ecotourism or factors or variables related to ecotourism. A factor or variable 'related' to ecotourism is any measure, which the authors of an article specifically relate to the ecotourism industry such as employment, economic metrics, anthropogenic infrastructure, environmental status and variations thereof. A full methodology for the formal review is presented in Section 8.F.

The literature search identified 47 publications directly (quantitative analysis) or indirectly (discussion) pertaining to marine ecotourism in the Baja California Peninsula region. There was a significant increasing trend in the number of publications, books (n=7) and peer review articles (n=25) between 1994 and 2014 ((Figure 5.C.1). The same linear increase in publication numbers was seen for theses (n=15) studying marine ecotourism, although it was not statistically

significant. The majority of studies were concentrated around Baja California Sur, with only four present on the eastern coast of the Gulf of California (Figure 5.C.2).

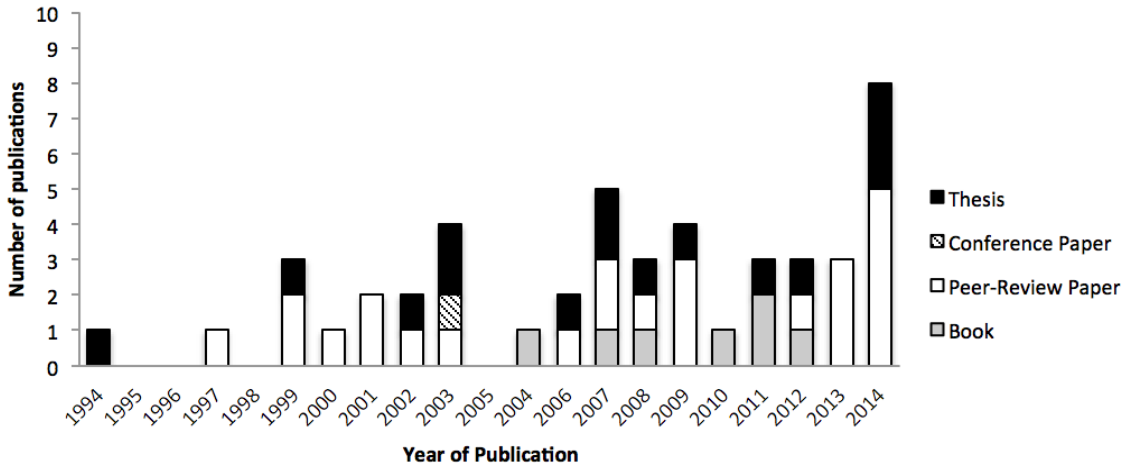

Figure 5.C.1. Numbers of publications per year, by publication type Note: one publication from 1976 was not included in the figure or analyses.

Figure 5.C.2. Map of the Baja California Peninsula and the approximate locations of studies and the years of publications

The number of studies using survey or interview techniques (n=26) also increased over the study period (Figure 5.C.3). Similar linear increases were seen for literature review techniques (n=12) and studies using quantitative observations (n=22) to collect their data, although these were not statistically significant. There were no tendencies noted for study methods using qualitative discussion (n=7), modeling approaches (n=7) or GIS specific studies (n=4).

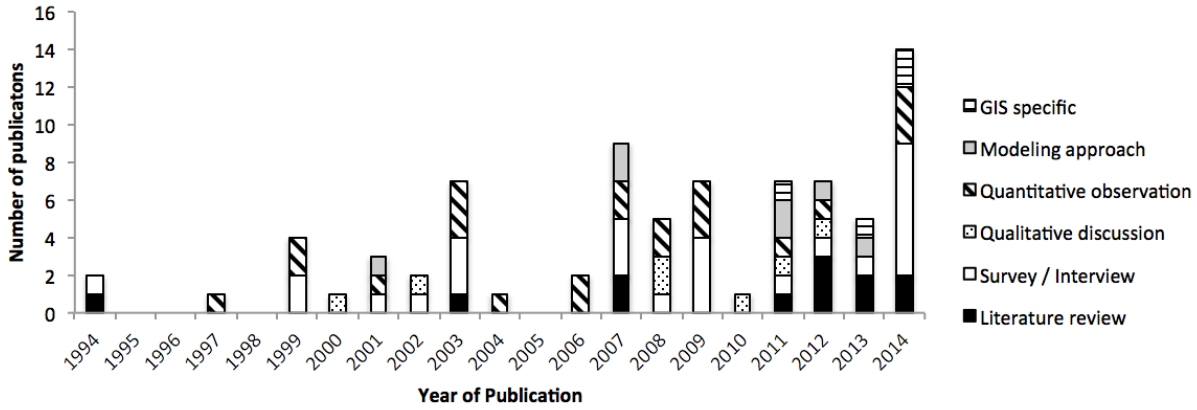

Figure 5.C.3. Numbers of publications highlighted in the literature search per year, separated by study type Note: one publication from 1976 was not included in the figure.

Of the publications reviewed, 70% either conducted formal analyses around a species or species group or made specific comment on one (Figure 5.C.4). Cetaceans and fishes were the most common species groups studied while turtles and pinnipeds the least. Species noted in publications included grey whales (*Eschrichtius robustus*), whale sharks (*Rhincodon typus*), blue marlin (*Makaira mazara*), humpback whale (*Megaptera novaeangliae*), and billfish (Istiophoridae, Xiphiidae). Although one species of bird, the snowy plover (*Charadrius alexandrinus*), was noted, this was from a study undertaken in 1976 (Anderson et al. 1976) that only mentions development potential in Baja and therefore does not compare well with the more rigorous discussions of marine tourism in Baja over the last 20 years. Figure 5.C.5 shows a map of where the species-specific studies were located along Baja.

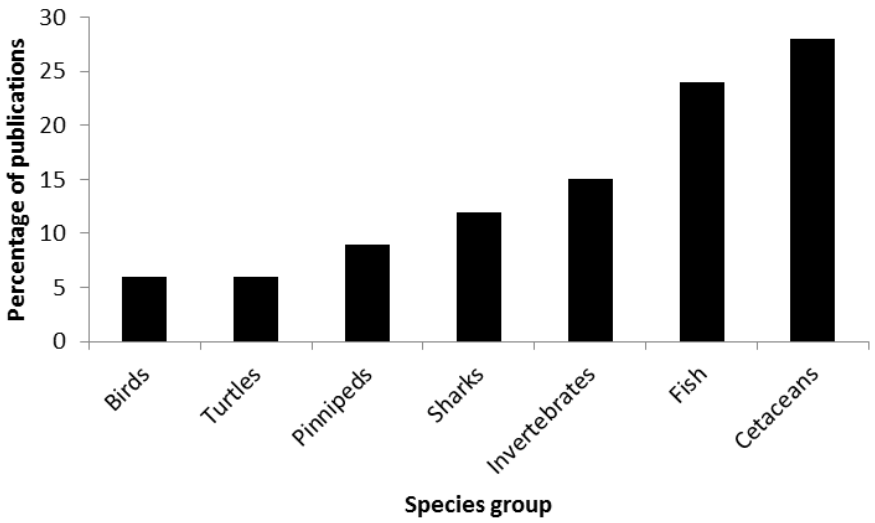

Figure 5.C.4. Percentage of publications studying or discussing the different species groups noted in the review (N=33).

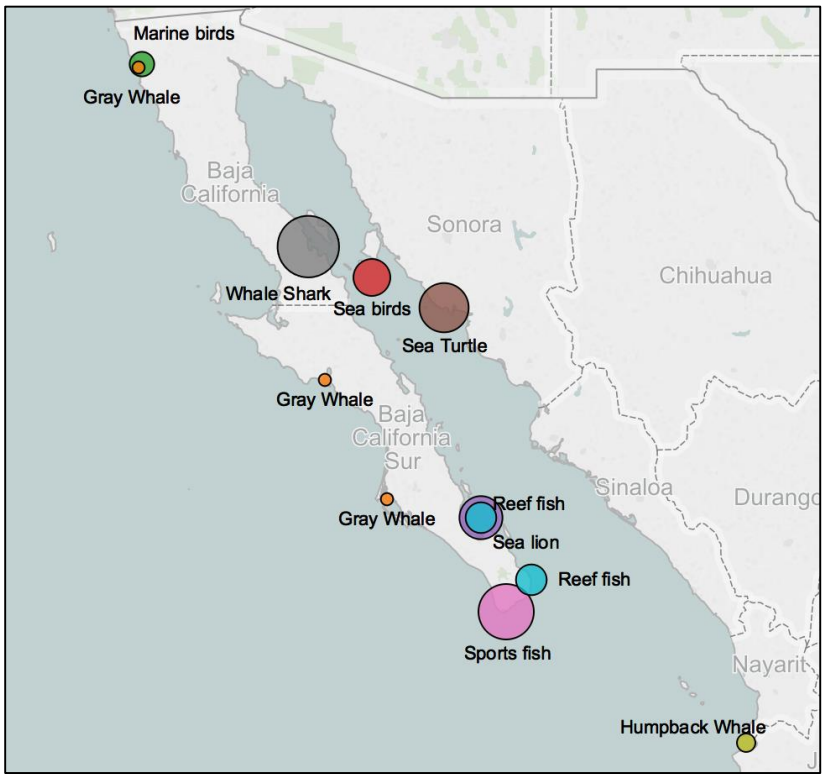

Figure 5.C.5. Map of the Baja California Peninsula and the approximate locations of species specific studies. The size of the bubbles represent the proportion of studies at each location for the respective species.

Publications studying or discussing whale sight-seeing tourism were focused on the Pacific coast of Baja including the well-established ecotourism destination of San Ignacio (Chong 2008; Agersted 2009). Being the most charismatic of the species noted, it is not surprising that whales (grey and humpback) were the largest of the species groups noted. The large number of studies concentrating on reef fish species was centered on the rocky reefs of Cabo Pulmo as were the studies noting invertebrate species (Arizpe 2008). A twenty year closure to fishing has meant a 463% increase in fish biomass (Aburto-Oropeza et al. 2011) in Cabo Pulmo, which is now an important model system of successful ecotourism and marine conservation globally (Leslie et al. 2013). Surprisingly, only one of the studies highlighted in the literature search looked specifically at sports fishing in Baja. Considering the general declining state of the Gulf of California's fishing industry (Sala et al. 2004; Velarde et al. 2015) and the large number of sports fishing operators working in Baja, we expected more publications to detail the sports fishing industry as an economically viable alternative to traditional fishing (Barnett et al. 2015).

The majority (68%) of publications focused on ecological goals or discussions whilst a quarter looked at economics and the remaining 7% on human social wellbeing (Figure 5.C.6). These trends may be partly due to overarching funding priorities in the region, so the funding agency was recorded for each publication whenever available. Funding was attributed primarily (23%) to Mexico-only sources, with equal proportions (15% each) from Mexican sources with foreign collaborators or from foreign sources (Figure 5.C.7). These results highlight interesting research and discussion, though it must be noted that around half (48%) of the publications did not state the source of financial support.

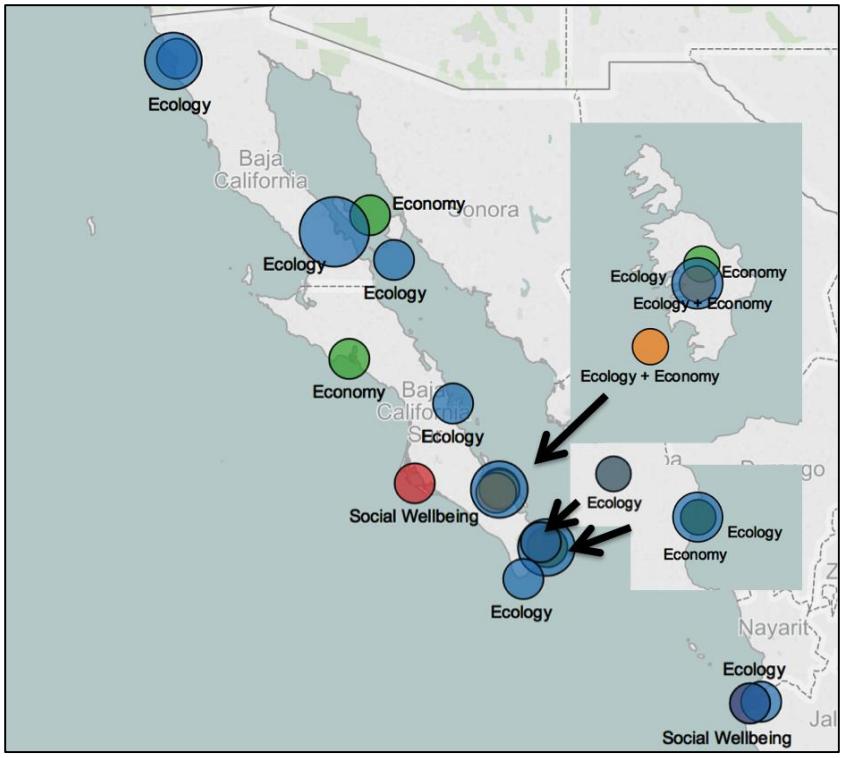

Figure 5.C.6. Map of the Baja California Peninsula and the approximate locations of studies that focus on ecology, economy or human social wellbeing. The size of the bubbles represent the number of studies for each topic.

D. Qualitative Data

Although the main objective of this study was to estimate the economic benefits of ecotourism to operators in Baja California Sur and the Gulf of California, it is highly useful to recognize the qualitative observations made by operators during the course of the survey work.

Many respondents stated that the main benefits of ecotourism for their communities included generation of employment and local economic impacts in what can be remote areas with few alternative industries. Indeed, ecotourism was noted as an important way of promoting and putting communities on the map both at the national and international level. Furthermore, many operators noted the positive effects of ecotourism on conservation, with the opportunity to sustainably generate economic benefits and take care of their ecosystems at the same time. Potential employment alternatives included fishing, retail, food, and administrative services, among many others, but it is noteworthy that almost all respondents preferred working in ecotourism than such alternatives.

The main self-identified challenges for ecotourism operators included enduring low-tourism months, innovating new products and activities to offer potential clients, and a lack of investment in promotion and basic infrastructure (e.g. roads) on the part of the government. Some operators also noted degradation of local ecosystems that directly affect their business, as well as challenges with competition from informal operators.

Below is a very short and informal selection of direct quotes from respondents reflecting their concerns and thoughts on the ecotourism industry.

Table 5.D.1. Quotes from operators during surveys, regarding both benefits and challenges of sustaining ecotourism in their community.

Benefits
"Another way of making money, without ecological disadvantages."
"Big for the local economy…Helps increase awareness and conservation."
"There is a global interest in ecotourism and it depends directly on conservation".
"If there is nothing else nature can always provide attractions."
"The benefits of ecotourism for our community is to able to educate people about the need to take care of the environment, for them to know local marine fauna and to generate income while protecting our seas"
"Ecotourism projects a positive image of this area."
"Provides worldwide promotion to need for large marine protected areas."
"We can share what we learn and see."
"People get educated and respect [nature]."
"More ecotourism is better for all tourism."
"Creates publicity for the community."
"You leave to the next generation their corresponding right to know and enjoy species, learn from living things and preserve life, which is the key thing."
"Influx of income and improvements for the family."
"All of the ejido members [we work with] have health insurance."
"Increase the number of job opportunities and promote the natural beauty of Baja California Sur while promoting species conservation."
Challenges
"Making enough money to expand without ruining the ecosystem which we all rely upon."
"Generalization in media reports regarding violence in Mexico that do not apply to the local area."
"Dealing with low-tourism months."
"Little government investment in publicity or transport routes…makes getting tourists [here] difficult."
"Having people understand the harm that can come from not taking care of the environment."
"Price of electricity and fuel."
"Lack of culture of respect [for environment]."
"Remoteness of site. Bad roads. Lack of technology."
"Grave problems are bad highway, no medical services, limited basic services (water, electricity) that impede competition with [other sites]."
"I don't think the National Natural Protected Areas Commission (CONANP) is not doing a very good job."
"Personnel is difficult, graduates of the [UABCS] tourism degree can't speak english and don't know about low-impact strategies."
"Informal ["pirate"] tour operators."

E. Caveats

- *Sampling schedule (time of the year):* The types of ecotourism engaged in and reported on in this study could vary over the year based on weather, daylight, oceanic conditions, and overcrowding due to popularity. In this study we collected samples from tourists about the types of activities they were engaged in during our sample period (December 2015 through February 2016), and this may have biased the results regarding the volume and types of ecotourism engaged in by tourists. While attempts were made to overcome these biases, they should be recognized at the outset.
- *Survey recall and design biases:* Tour operators were asked to recall several characteristics of their business over the course of a year, such as busy and slow periods, and roughly how many customers they would service during these periods. While most business operators would be expected to have reasonable recall about these characteristics, it should be recognized that recall might have been unreliable. There might also have been incentives to under-state or over-state certain figures (i.e. understating their number of customers – and hence revenue – for fear of taxation implications).
- *Double-counting tourists:* If multiple surveyors were used to undertake interviews there is always a risk that the same tourists are interviewed twice, though it is highly unlikely that a tourist would not point out that they had already been interviewed. In the case of operator surveys, it is possible that the same tourists have been on multiple tours with multiple operators. This does not affect revenue estimates, but adds risk of overestimating indirect expenditures when these are calculated based on operators visits. This is addressed by providing upper and lower estimates assuming no overlap (i.e. every operator visit reported is a unique tourist) and triple-overlap (i.e. tourists on average go on three separate tours). This issue can be addressed through tourist surveys at each operator, though this requires a concerted collaborative effort and agreement with operators throughout the study region.
- *Sample size and available data:* Sample size is always a consideration in any study, and the compilation of an initial list of formal operators was vital for survey efforts and for estimating confidence in results. Nevertheless, more time (e.g. a whole year of interviews) would obviously increase robustness of estimates and patterns, and may allow for more in-depth data collection through a closer collaboration with ecotourism operators at various sites, and with different levels of government or non-government organizations.
- *Reliability of publications reviewed:* This analysis included theses, books and conference papers, that may not always be subject to as stringent as that of peer-review journal articles. While this may be problematic in terms of comparing specific results, it does not affect our analyses regarding general trends in research.

6. Conclusions

Based on data collected in this study, marine ecotourism in the Gulf of California and Baja California Peninsula region attracts 896 thousand visits per year, generating a total of US$59 million in direct and US$458 million in indirect expenditures for a total of US$518 million in expenditures per year. As stated repeatedly by operators (and tourists) in the course of interviews, marine ecotourism has the potential to incentivize conservation and educate both visitors and locals about the importance of healthy of a healthy natural environment, while also providing livelihood opportunities to local populations. Indeed, results suggest that marine ecotourism in the Gulf of California and Baja California Peninsula region supports 256 ecotourism operators and 3,575 direct jobs.

The state of Baja California Sur is particularly important for ecotourism in the Gulf of California region, contributing half of total employment (136 operators and 2,088 direct jobs) and 60% of total expenditures (US$314 million per year). The grown in the number of operators in La Paz has been remarkable (López-Espinosa de los Monteros 2002), though from conversations with operators it may have led to over-supply, particularly when considering informal seasonal or year-round operators. This is an issue that must be addressed through open discussion with multiple stakeholders, who already recognize the potential for both economic and ecological benefits of ecotourism if it is managed sustainably.

There were some common themes regarding the challenges and benefits of ecotourism in the region. Challenges included lack of infrastructure, portrayals of Mexican violence in popular media, resource management policies, and operating costs, while employment, and the ability to make economy and conservation compatible goals were noted as some of the biggest opportunities provided by ecotourism. There is ongoing growth in ecotourism research in the region, though we highlight a need for increased integration of economic aspects and systematic studies. Continued collaboration between stakeholders will be vital for maximizing the potential sustainable economic and ecological benefits of ecotourism.

Operators identified sport fishing and diving as key year-round activities, though whale and whale shark watching are essential seasonal components of ecotourism throughout the state. Accordingly, a range of species were highlighted by ecotourism operators, with the top five mentioned including whale sharks, whales, sea lions, dorado, and jacks. These rankings result from a combination of particular appeal and number of operators at a given location, but nevertheless reflect the diversity of species and habitat, and highlight iconic species for marine ecotourism. These patterns are also reflected in academic research, and it would be useful to further promote the importance of ecosystems, in addition to particular species, as conservation and resource management units. Marine ecotourism research in the region currently has a tendency towards ecology over economy and social wellbeing. This pattern may be a result of

the relatively new (yet rapidly growing) academic interest in marine ecotourism, and the historical strength of natural science research in the Gulf of California.

Nevertheless, there are published studies available to compare with our results. For La Paz, previous data collected specifically for shark watching from a subset of 11 operators resulted in an estimate of just over US$1 million per year (Cisneros-Montemayor et al. 2013). This is reasonable compared with our estimates, that account for many more operators and their activities throughout the entire year (shark watching occurs for only ~3 months). In a study estimating tourist carrying capacity at Cabo Pulmo reefs, Álvarez (2012) notes a total of 8,600 thousand visitors in 2011, with estimated direct expenditures of approximately US$130 thousand—235 thousand for a mean per capita tour price of US$21. Our estimates for Cabo Pulmo are significantly higher, due to higher tourist arrivals reported by operators (22 thousand—37 thousand) and higher mean per capita tour prices (US$100). These differences may very well reflect the growing interest in Cabo Pulmo as a tourist destination, including recent (blocked) attempts to build mass-tourism resorts and the fact that car rental companies at the San José del Cabo airport may inquire if renters will be travelling to Cabo Pulmo (for insurance premium purposes, pers. obs.). This interest leads to higher visits, and subsequent higher prices. In San Ignacio, there was an observed quadrupling in visitor numbers from 1994 to 2000, with a slight decrease in 2004 following the September 11th attacks and early 2000s economic recession (Rossing 2006). Our results support a growing trend, with more local operators (11 compared to 7) and higher tourist arrivals based on survey data (9 thousand—18 thousand). Nevertheless, direct expenditure estimates were similar, with US$800 thousand—1.5 million in our study compared with US$1.7 million (Rossing 2006).

Aside from comparisons with our estimation results, the discussion above highlights the need for in-depth baseline studies that are systematic across time and the region. Much of coastal Baja and its surrounding waters are understudied, evident from large stretched of coast with no noted publications and the grouping of publications around established towns and cities. In itself this highlights a tendency for studies of marine ecotourism to be reports on extant operations rather than projections or predictions on the future potential of areas yet to be developed. This is something that would be beneficial to address, particularly in areas of special ecological or archaeological interest in addition to potential revenue gains (Vanderplank et al. 2014).

The increased research effort over the twenty years studied is a promising trend, which the authors hope will continue, considering the potential of the Baja California Peninsula for sustainable marine ecotourism. In particular, we believe that a continued effort to increase the amount of peer-reviewed output will benefit the development of the marine ecotourism industry in a sustainable way as it already has done for example, in the formation of strict rules governing sightings programs for whales (Heckel et al. 2001; 2003) and whale sharks (Cárdenas-Torres et al. 2007). Theses made up approximately one third of all published materials reviewed, yet very few were found to lead to peer-reviewed articles. Given the generally high level of marine research at Mexican universities, recognizing the need for robust, peer-reviewed academic

literature by NGOs and government agencies can incentivize students to follow through on their research efforts.

This study highlights the current status and economic aspects of marine ecotourism in the Gulf of California and Baja California Peninsula. Based on these findings, key recommendations for further research are:

- As tourism and population sizes in Baja increase, it is important to have qualitative and quantitative information and recommendations ready for development committees wishing to create tourism hotspots. This includes investments in predictive and spatial research that is directly useful for marine spatial planning and for ensuring sustainable coastal development.
- Pre-development studies are highly beneficial in informing stakeholders, and must by definition anticipate rather than follow industry expansions.
- Promoting the publication of theses in peer-review publications is needed to give their findings more weight in potential management decisions, and helps better-prepare students at undergraduate and graduate levels.
- Sport fishing is under-represented in the literature as an ecotourism activity although it was prevalent in the operations surveyed in the field.
- Increased research regarding economics and social wellbeing are needed to provide managers with robust information relating to Baja's marine ecotourism development.
- Collaborations and co-management can be strengthened by actively incorporating stakeholders and the wider community into research, and reporting findings back to them.

Marine ecotourism is a highly significant—and growing—industry across the Gulf of California and Baja California Peninsula, and is directly related to local and regional benefits. There is much room for improving and expanding data collection and research into the many aspects of marine ecotourism; however, as this study shows, there is a wealth of information available to build upon and researchers and managers need not begin with a blank slate. The multi-faceted benefits of marine ecotourism are promising, yet not automatic. Achieving the full potential social, ecological, and economic benefits of marine ecotourism requires collaboration by stakeholders, and sound current and future policy to ensure sustainable actions are developed and implemented.

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8. Supplementary information

A. Research methods

There were three specific objectives for the "Research" component of this study. First, to generate lists of marine ecotourism operators by location to be used in subsequent field survey efforts (Section 8.B). The second to compile data regarding general tourism in Mexico and the Baja California Peninsula and Gulf of California region. These numbers include total arrivals, expenditures, general infrastructure, and temporal trends, at national, state, and regional levels as available. Thirdly, following from the previous point, identify and extract key information to complement survey data and allow for estimating (particularly "indirect" as defined in this report) economic impacts form marine ecotourism. A formal review of ecotourism literature in the Baja California Peninsula and Gulf of California region was undertaken as part of the research component; the full methods for this effort are presented separately in Section 8.F.

The most important data sources for tourism at various spatial scales useful for our study were the National Institute for Statistics and Geography (INEGI; *www.inegi.org.mx*), Banco de México (BANXICO; *www.banxico.org.mx*), the Secretariat of Tourism (SECTUR; *www.sectur.gob.mx*), and UN-World Tourism Organisation (UNWTO). Data from these institutions were accessed from online collections, all freely accessible except for the UNWTOs advanced statistical data repository (*www.e-unwto.org*). Data were subsequently reformatted and compiled into a relational database for analysis.

Through personal communication with staff at the Baja California Sur State Tourism Secretariat, we were able to obtain a detailed list of formally registered tourism companies in the state. These lists were provided by location and type of activity, and were subsequently reformatted to allow for queries regarding our objectives. Records in this list were thoroughly screened to extract only marine ecotourism operators, and to identify multiple records corresponding to the same operator. For example, a company offering scuba diving, general tours, and sport fishing, would appear three times in original government records but only represents one unique operator for our survey and subsequent estimation efforts.

This final list represents our baseline number of operators at each location in Baja California Sur, thought these were furthered screened during field surveys (see Section 8.B). Outside of Baja California Sur, a screened Trip Advisor list was used as a baseline for estimating operator numbers at each location (see Section 8.E).

Trip Advisor, an online searchable website of travel-related information (*www.tripadvisor.com*), was a useful resource to identify ecotourism operators, as official government data was only available for Baja California Sur. Searches were performed using location and activity keywords (i.e. "[city name] + [activity type]"). Results were then filtered manually according to applicability

to the study, and relevant information was collected about each applicable operator. The information collected was:

Location: The city in which the Operator was located in. If more than one location was listed, the primary or headquarter location was used, with a note about other locations recorded.

Operator name: The name that was registered with the government was used as the primary name. If the operator was not on the government list, then the name used on the operator's website was recorded. Any variations of spelling, or if multiple names were used, all were recorded under "Name".

Latitude and Longitude: The latitude and longitude was obtained by inputting the Operator's address in GoogleMaps. After the address is found in GoogleMaps, the latitude and longitude is displayed in the browser address bar. If the Operator's address was not listed in the government data or on a website, or if the address could not be located in GoogleMaps, then the coordinates for the city in which the Operator was located was used.

Activities Offered: Primary activities were; scuba diving/snorkeling, sport fishing, whale watching, whale shark tours, kayaking, and sea lion tours. Activities were marine-based and were recorded as available, not available or available in another location. Activities were recorded as available if the Operator specifically listed the activity as an option for purchase, for example a kayak tour that offers the "chance of seeing whales" was recorded only as available for kayaking, and not available for whale watching. Activities were recorded as not available if the Operator did not list the activity. Activities were recorded as available in another location if the activity offered occurs in a location other than where the Operator is located.

Season Notes: Start and stop months were recorded for Operators and activities that are seasonal.

Operator Details: Information was collected from government data, internet searches, and the Operator's website. Information about each Operator was collected when available and includes; website, phone number, e-mail, year established, and address. The address recoded is the location where tourists report to and where activities are conducted from. If an address was not listed then as much information about the location was recorded to aid in field survey efforts.

B. Field methods

Field surveys were used to acquire data in order to determine the economic impact of marine based ecotourism in Baja California Sur and the Gulf of California. Economic impact is here defined as operator revenues, indirect expenditure by tourists, and employment generated. Economic impact measures the contributions of an activity to the economy, whereas economic value is measured by estimating consumer and producer surplus and is beyond the scope of this study.

As other studies that have examined the economic impact of nature-based tourism (for example, see Cisneros-Montemayor et al. 2013; Cisneros-Montemayor and Sumaila 2010; Vianna et al. 2012; Balmford et al. 2015), our surveys were designed to ascertain tourist's expenditures on marine-based ecotourism in Baja California Sur and the Gulf of California. Following from this, field surveys of marine ecotourism operators are the main source of data for this study, and focus on collecting information on yearly visitor trips, average tour and rental costs, employees, key species and habitat, and perceived benefits and challenges of marine ecotourism in the region (this section). In the course of these surveys, we also collected supporting and qualitative data from tourists regarding the importance of ecotourism, its relation to other tourism activities, their opinions on ecotourism and environmental protection, and some basic demographic information (Section 8.C).

Given the short time frame for field research, it was not possible to undertake an explicit collaborative approach to trust-building and data collection, so surveys were designed to collect as much useful information as possible while maximizing response rates and avoiding survey fatigue. Surveys were pilot tested to ensure comprehension, identify reluctance to answering certain questions, and determine if there was potential for question formulation bias in responses (none were noted). Surveys were modified slightly after pilot testing to streamline for interviewers and reduce survey fatigue. Some questions that respondents were reluctant to answer (for example, direct questions regarding profits or costs) were substituted for others that were less intrusive yet allowed for subsequent calculations. The final operator and tourist surveys are included in Sections 8.C and 8.D.

Ecotourism operator contact information was identified for each site from operator lists compiled through our research (see Section 8.A). We focused on operators primarily engaged in marine ecotourism, and made initial contact primarily in person, followed by phone, or email when necessary. Interviewers explained the project background, including economic and conservation objectives and key methods, with particular emphasis on the ethical use and sharing policies for interview data.

Whenever possible, interviews were done with the company owners, and in every case the time was taken to provide a space for discussion on various related topics, thus encouraging trust. In the process of compiling all qualitative and quantitative survey data in a database for analysis

(Section 8.E), any individual identifiers (company names, contact, etc.) were removed to maintain confidentiality in accordance with our agreement with respondents. Furthermore, data for locations with less than three operators is presented in aggregation with other locations.

Following this protocol, there was high interest in the research and an overwhelming acceptance rate for interviews. Many operators asked that the final report results (or a summary thereof) be shared upon completion. There were instances where companies found in official or unofficial operator lists (Section 8.A) no longer existed or no longer offered marine ecotourism tours, and these were noted in our lists. In the very rare (n=2) cases were operators declined to be interviewed, they were thanked for their time and not pressed further.

Following from Section 8.A and the primary research objectives, the sites in Baja California Sur where interviews were conducted are shown in Table 8.B.1. An additional location, San Carlos, Sonora, was surveyed opportunistically. The number of surveys required for a representative sample (confidence level= ±5%) at a given location was calculated and formed the baseline survey target at each location, a highly useful reference for planning research logistics and priorities.

Table 8.B.1. Marine ecotourism survey locations in Baja California Sur. "Target" refers to the survey target number at each site, for a confidence level of ±5%. "Surveys" indicates the number of surveys completed at each site.

Location	Operators	Target	Surveys	Date Surveyed
Cabo San Lucas	35	19	35	Jan 2016
La Paz	34	15	28	Feb 2016
Loreto	14	11	6	Feb 2016
San Ignacio	11	9	5	Jan/Feb 2016
Guerrero Negro	8	7	2	Feb 2016
San José del Cabo	6	5	3	Feb 2016
Cabo Pulmo	6	5	6	Dec 2015
P. Adolfo López Mateos	5	4	0	Feb 2016
Puerto San Carlos	4	4	4	Feb 2016
Buena Vista	3	3	2	Feb 2016
Los Barriles	3	3	2	Feb 2016
Bahía Asunción	2	2	0	Jan/Feb 2016
Mulegé	1	1	0	Jan/Feb 2016
Santa Rosalía	1	1	0	Jan/Feb 2016
Todos Santos	1	1	0	Feb 2016
Bahía de los Ángeles	1	1	0	Jan/Feb 2016
La Bocana	1	1	1	Jan 2016
Punta Abreojos	1	1	1	Jan/Feb 2016
San Carlos (Sonora)	6	5	3	Dec 2015

C. Operator survey

Interviewer initials	
Date	
Location	
Survey #	

A.1) How many years have you operated this eco-tourism company? _____

A.2) What type of tours do you operate and how important is each (number order below each)?
(whale watch / scuba + snorkel / kayak / fishing / national park visits / other)

A.2a. What are the three most important species for your tour company?
1. 2. 3. Other (optional)

A.2b. If you operate a fishing business, how many fish does your business catch on average per day?

A.3) What are your busiest (J-F-Mr-Ap-My-Jn-Jl-Ag-S-O-N-D) and slowest (J-F-Mr-Ap-My-Jn-Jl-Ag-S-O-N-D) months?

B.1) How many customers do you serve *approximately* each year? _____

B.2) On average, how many people per day do you serve during:

Your busiest months? _____ Your slowest months? _____

B.3) How many vessels/units do you operate in your business, and what type?

B.3a. Number _____

B.3b. Type (i.e. kayak, panga, dive boat, catamaran, etc.) _____

B.4) What is the **maximum** capacity (number of people that can fit) of your vessels/units? _____

B.5) How many people total do you employ each year? _____ (total number)
B.5a. How many of these are Mexican? _____
B.5b. Of the permanent staff, how many are full time_____ And how many are part time _____?
B.5c. In addition to your staff, do you hire seasonal workers? (How many) _____

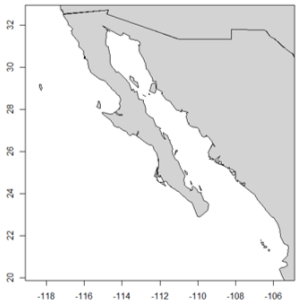
B.6) On average, what percentage of your customers require rental equipment from you? _____%

B.7) What **percent** of your annual revenues do you spend on the **operating costs** of your business? _____%

(If unable to answer, what is the daily percentage spent on operating costs? _____%

Place any available price info here (i.e. cost of a trip, if there are discounts for multiple days, how much equipment rentals cost, etc.)

B.8) Can you indicate the locations you visit most often in your tourism operations? (Area and name.)



C.1) What do you see as the **main challenge** to sustaining an ecotourism business here?

C.1a. Do you think the current state of the environment in which you work is good or bad?
Good_____ [ocean and animals where I work are clean and healthy]
Bad _____ [ocean and/or animals are unhealthy]

C.1b. Do you think the state of the environment where you work is getting better? Yes ☐ No ☐

C.1c. Do you think enough is being done to protect the ocean and animals that you work with, by:
a. the government? Yes ☐ No ☐ c. your company? Yes ☐ No ☐
b. the local city and community? Yes ☐ No ☐ d. you personally? Yes ☐ No ☐

C.2) What are the **benefits** of ecotourism to the local community and to Mexico?

C.3) If you were not operating this company, what would you work as?

C.4) Is this what you would prefer to work as? If not, what would you most like to work as?

Thank you for taking time to participate in this survey!
Do you have any last comments?

D. Tourist survey

Interviewer initials	
Date	
Location	
Survey #	

A.1) How many **days** have you been on this trip **so far**? _____

A.2) How many nights are you staying for in total _____

A.3) How many people are you travelling with_____?

Respondent is Male ☐ Female ☐ and approximate age _____

A.4) What is your nationality _____ / where are you from _____?

A.5) How many times have you been to Mexico? _____ times. This is my first trip ☐ (Skip if Mexican).

A.6) Have you been on an ecotourism holiday in the past 3 years? No ☐ Yes ☐ country(ies)_____

A.7) What is the **one main reason** for visiting Mexico on this trip?
Beaches / Wildlife _____ / Scuba snorkel / Kayaking / Fishing / National parks / Nightlife / Other

A.8) Have you done any of the following on this trip?
Wildlife viewing / Scuba snorkel / Kayaking / Fishing / National Parks

A.9) What percentage of your decision to come to Mexico was based on ecotourism? _____

A.10) Would you come back to Mexico for the same reason? Yes ☐ No ☐

A.11) Are any of these activities more important than ecotourism for you:
Beaches / Nightlife + Casinos / Shopping + Spas / Watersports / Museums + culture / Cruises / Other

---

B.1) Did you purchase your trip **as a package**? Yes ☐ How much did it cost _____per person (currency) No ☐

What was included in your package?

Item	Included?	Details
Airfare	Yes ☐ No ☐	Round-trip? ☐ One-way? ☐
Accommodation	Yes ☐ No ☐	Hotel ☐ Condo/home rental ☐ Cruise ship ☐ Other ☐
Food/beverages	Yes ☐ No ☐	
Transfers	Yes ☐ No ☐	
Excursions/tours	Yes ☐ No ☐	
Other (please specify:_____)	Yes ☐ No ☐	

Have you had (or will you have) any additional costs? If so, how much and on what? _____ (currency)

B.2) Because you did not purchase a package, how much did you spend on the following:

Accommodation _____(per day) **OR** _____(total) - currency

Food/beverages _____(per day) **OR** _____(total) - currency

Transfers/taxis _____(per day) **OR** _____(total) - currency

Excursions/tours _____(per day) **OR** _____(total) - currency

Other _____(per day) **OR** _____(total) - currency

C.1) Would you say the current state of the environment where you participated in ecotourism is good or bad?
Good_____ [ocean and animals where I work are clean and healthy]
Bad _____ [ocean and/or animals are unhealthy]

C.2) What do you think the best way to protect the environment and ecotourism here could be?

Government _____

Ecotourism companies _____

Local community _____

Thank you for taking time to participate in this survey!
Do you have any last comments?

E. Estimation methods

Following from our research objectives, economic impacts from marine ecotourism are estimated in terms of operator revenue, employment generated, and indirect expenditures by ecotourists. Operator revenues represent gross income for companies that offer marine ecotourism activities as a primary service. Participant expenditures represent money spent by participants in ecotourism activities during their stay at a given location, in addition to direct tour costs. Calculating net profits of ecotourism operators was beyond the scope of this research, though we did collect basic operation cost data that could be used for future analyses. Unless otherwise specified, all data used in estimations were performed using data available from our research (Section 8.A) and field surveys (Sections 8.B, 8.C, 8.D).

Visits data for each operator were available through our surveys, with specific questions on visitors per month during busy and slower months, and a list of these months for each operator (Section 8.C). Total clients per year were estimated by multiplying the clients per month for busy/slow months by the number of busy/slow months. When the busy/slow months did not add up to 12 (for example, some operators noted that some months were "medium" and did not fall in either category), the balance of months was multiplied by the average number of clients per month in busy/slow months.

Any data on tour pricing was converted to per capita units; for example, a tour price of $150 per vessel for a vessel with capacity for three clients would result in a per capita tour cost of $50. If operators each charged a single per-person fee for services, revenue would simply be the product of this per capita price and the total number of clients during a given time period. However, each operator commonly offers a range of prices for specific services (for example, whale watching versus recreational fishing, or if equipment rental is charged separately), so this calculation becomes more complicated and must necessarily include confidence bounds. When multiple prices were indicated, values were first weighted based on the importance of each type of activity as ranked by operators. Subsequently, the lower bound for price per capita is equal to the minimum price, with the upper bound equal to the value of the third-quantile using all prices. This assumption results in conservative estimates by decreasing the chance that extreme high values skew average revenue. Revenue from ecotourism tours is then estimated as:

$$Tour\ Revenue = \begin{cases} Clients \cdot \min(Operator\ prices\ per\ capita) & Lower\ Bound \\ Clients \cdot 3\text{rd Quantile}(Operator\ prices\ per\ capita) & Upper\ Bound \end{cases}$$

Equipment rental revenue was estimated based on the mean price of equipment rentals, and the percentage of total clients per month requiring rentals in addition to the main tour price.

$$Rental\ revenue = Clients\ \cdot \%\ Renting\ Gear\ \cdot Rental\ Price$$

Subsequently, total revenue for each operator (OpR) is simply Tour Revenue + Rental Revenue.

Based on the observed discrepancy between unique, formally-registered, operators and individual advertisements on Trip Advisor, the latter were reduced based on the ratio between Trip Advisor hits and official operators at each location for Baja California Sur. From available data, this ratio equals 3.7. For each location, we distinguish between revenue estimated directly from survey data, and indirectly based on a meta-analytical approach that assigns operators without direct revenue data the mean value of operators with data. Finally, total revenue for each location is equal to:

$$Total\ Revenue = \sum OpR\ (surveys) + [\ \overline{OpR\ (surveys)}\ \cdot Operators\ without\ data]$$

The equation above also provides upper and lower bounds for estimates by using the standard deviation of operator revenues from survey data.

A key challenge in estimating indirect expenditures from tourists is the issue of double-counting unique tourists. For example, a single tourist can go on two separate tours with two unique operators. While this does not impact estimates of operator revenues (i.e. each operator reports and was paid for their trip), it may lead to overestimated indirect expenditures when these are based on reported operator trips. Resolving this issue would require close collaboration between researchers and operators at multiple locations (as tourists can travel throughout the region), though for the purposes of this study it can be addressed by setting confidence bounds for indirect expenditure estimates based on the degree of overlap between reported operator trips. This in effect is a conversion factor between trips and tourists. Using available state-level tourism data (Section 8.A), we set the lower bound for tourists as the Average Length of Stay - 1 (assuming tourists will rest for at least one day between tours), and the upper bound at 1, i.e. all trips reported by operators represent unique tourists. Then, we use the upper and lower estimates of expenditure per capita estimated from our tourist surveys (US$387, separate from tour costs; Section 8.D) and from government data (US$ 635; BANXICO 2016).

Operators were asked to identify key species and sites for ecotourism activities. Each set of answers was assigned a score from 1 to 3 based on their ranking (most important=3, next most=2, etc.). Finally, scores were aggregated by the species or sites to produce the final rank scores.

Aside from meeting the objectives of this research, surveys provided a significant amount of useful data for future analysis. Table 8.E.1 below provides these interactions, some of which were indeed used in our estimation methods.

Table 8.E.1. Ecotourism operator and tourist survey data interactions. Columns indicate survey question number. "Operator" refers to operator survey (Section 8.C) and "Tourism" refers to tourist survey (Section 8.D).

Operator	Tourism	Information
A1		Year of establishment along the region.
A2a-b		Rank of ecotourism activities, and species, by economic importance; relative importance of actually catching fish; estimating tourism value of fish vs. landed value.
A3		Test how tourist arrivals match with business timelines for ecotourism operators (i.e. is it all about how many tourists are coming, or about species in the area; this will obviously be a bit of both. Perfect set of data for binomial model used previously for whale watching and estimate the potential for future tourism based on species distribution and current or projected tourism.
B1-2		Yearly participants in (formal) ecotourism activities; combined with municipal-level data on total arrivals, it also gives the proportion of total tourists that participate in ecotourism.
B1-2, Box		Monthly (and subsequent yearly) revenue from ecotourism tours.
B1-2	B1-2	Estimate of indirect expenditure in ecotourism activities (known tourists multiplied by known non-tour expenditures).
B1-2	A8	Partially filter out double-counting of indirect expenditure by tourists. For example, if tourists report participating in an average of 2 ecotourism activities during the same trip, total indirect expenditure based on the total number of clients reported by operators would be divided by 2.
B1-2, B6, Box		Revenue from rental equipment.
B5, B7-8		Employment, and a rough estimate for wages if fuel costs are discounted from the operating costs (B7) using the distance between the port location and the locations of their main ecotourism sites (B8), and capital depreciation is accounted for based on average lifetime of vessels, engines, and other gear.
B7		Gross profits, and indirect economic impact of ecotourism activities.
B8		Map of key ecotourism sites in the region.
A2, B8	A2, A7-8	Relative importance of specific habitat types for ecotourism.
C1-2		Qualitative aspects of ecotourism from operators' perspective.
C3-4		Current opportunity costs for operators, and perceived barriers to labor mobility that might be addressed through targeted capacity-building.
	A2	Average length of trip.
B1, B2	A1-3	Total expenditure for the trip.
	A3	Average size of party and allows for per-capita expenditure when only totals are reported, or total expenditure when only per-capita is reported.
	A4	Key areas where tourists are coming from, a sense of current market tapped.
	A6	Alternative markets for the pool of tourists in Mexico (competition).
	A7-11, B1-2	Ranking ecotourism activity as an attractor for overall tourism, and percentage of spending attributable to ecotourism.
	A9, B1-2	Total spending by package tourists compared to non-package, and estimate of additional spending by package tourists. Can be combined with A9 to split spending not wholly attributable to ecotourism.
	C1	Could be combined with additional information on leisure spending patterns related to income to see the current segment (socioeconomic) of tourists in the region, by specific activity.

F. Literature review methods

The literature search was undertaken using the commercial search engine Google Scholar, which indexes the full text of scholarly literature across an array of publishing formats. Google Scholar was chosen over Web of Science and Scopus as it gives a higher number of results per general search term (on average), covers non-ISI listed journals (wider search base), and gives lower citation noise [lower citation variation (85% unique entries compared with ISI's 60%)] (Pauly and Stergiou 2005; Meho and Yang 2007).

Combinations of the following general search terms were used: 'marine', 'ecotourism', 'tourism', 'industry', 'holiday', 'vacation', 'recreation', 'economy', 'infrastructure', 'employment', 'environment', 'eco', 'nature', along with a secondary search using terms related specifically to ecotourism activities in Mexico as well as 'diving', 'snorkeling', 'whale watching', 'shark watching', 'beach', 'kayak', 'sailing', 'cruise', 'fishing', 'angling', 'wildlife', 'national park', 'protected area'.

The first one hundred search results from each keyword combination were examined, for a total of 2,300 hits evaluated for possible inclusion in the review (23 searches x 100 hits of each). From these hits, a total of 47 unique publications were formally reviewed, with 8 data variables extracted and entered into a database (Table 8.F.1). In addition to categorical variables, brief one-sentence summaries of each article were made to allow discussion of more general, non-quantifiable patterns post-analysis and increase the utility of the database resulting from the literature review (Section 8.G).

Table 8.F.1. List of data variables extracted (where possible) from each publication selected by the literature review.

Variable	Description of variable
Year	Year in which the article was published. 1994 – 2014 (20 years)
Publication	Type of publication in which article appears. Book, Conference paper, Peer-review paper, Thesis
Location of Study	Latitude and Longitude (if not clearly stated a middle point of the general study area was recorded). Groups also given (Baja California - general, North, South and Pacific coast of Baja)
Species studied	Which species were the focal point of the discussions (highest taxonomic resolution possible was recorded)
Study method	The way in which data were gathered / recorded within the article. Literature review, survey / Interview, Qualitative discussion, Quantitative Observation, Modeling approach, GIS specific study
Study topic	Main study topic area in which the article focuses its discussion. Ecology, Economy, Social wellbeing (note one study can have more than one study topic focus)
Funding	If noted, a description of where the funding for the article came from. International, International organization within Mexico, Mexican organization, Funding not specified

Initially, OLS regression was used to look at the trends in publication numbers over time. The methods used within each study or discussion was also described in order to look at potential trends in research (Tables 8.F.1, 8.F.2). It must be noted that the statistics described herein for each are casual tendencies, as in all cases normality is violated, but data was not transformed in order to reduce the tendency to inflate Type I error. The geographic distribution of the studies across Baja California was visualized using the software Tableau 9.1. For publications focusing on specific organisms, each species or animal group was quantified. We defined three main classes of work a priori within which the majority of studies can be categorized. Those with tendencies to approach ecology, economy or social (human) wellbeing. Finally, in order to elucidate the financial investments being made in marine ecotourism research in Baja, we noted the location from which funding came from for each publication reviewed where specified.

Table 8.F.2. Statistics resulting from regressions between Year of publication and Publication type. Note: Conference papers were not included as only 1 was highlighted in the literature review.

Publication type	R^2	F statistic	P (α 0.05)
Publications overall	0.43	14.18	<0.01
Book	0.25	6.42	0.02
Peer-Review paper	0.25	6.42	0.02
Thesis	0.17	3.84	0.065

Table 8.F.3. Statistics resulting from regressions between Year of publication and Study type. Note: Modeling approaches and GIS were not included due to less than 6 years in which such studies were noted.

Study type	R^2	F statistic	P (α 0.05)
Literature review	0.31	8.55	0.087
Survey / interview	0.21	4.93	0.039
Qualitative discussion	0.1	2.18	0.156
Quantitative observation	0.16	3.55	0.075

G. Ecotourism publications in the Gulf of California region

Year	Title	1st author	Publication	Key remarks
2012	Diagnostico Y Perspectivas Del Turismo Alternativo En Todos Santos, Baja California Sur.	Acevedo	UABCS	Development of the ecotourism sector must involve the inclusion of the local communities and all stakeholders must be involved with future management designs.
2014	Proyecto De Sustentabilidad Ecoturístico En El Parque Nacional Cabo Pulmo; Análisis De Los Servicios Ecosistémicos Para La Implementación De Actividades Económicas Turísticas	Aguilar	UABCS	Development of ecotourism in Cabo Pulmo must primarily be sustainable giving priority to the environmental services of the local area, then the economy of the tourism industries in the area.
1999	Conservation And Management-Oriented Ecological Research In The Coastal Zone Of Baja California, Mexico	Anamaria	J. of Coastal Conserv.	destruction of dunes will have huge consequences for bird populations and use of this resource into the future
1976	Seabirds In The Gulf Of California: A Vulnerable, International Resource	Anderson	Nat. Res. J.	Conservation of birds needs prioritizing over development as once populations are impacted hard to restore to natural levels.
2004	El Turismo Como Alternativa A La Pesca En El Manejo De Un Arrecife Coralino. Caso Cabo Pulmo, Golfo De California.	Arizpe	UABCS	The conversion from fishing to dive operations in Cabo Pulmo has actually afforded greater economic returns to the local population of the village.
2014	Geodiversidad Y Paisaje: Un Análisis De Su Potencial En Baja California, México	Ayala	Invest. Geograficas	Idea of Geoparks and their scale means practical conservation units and the involvement of many sectors for their conservation and all ecosystem services within each area
2009	Investigating The Potential For Marine Resource Protection Through Environmental Service Markets: An Exploratory Study From La Paz, Mexico	Barr	Ocean & Coast. Man.	compensation (60USD per week) outweighed willingness to pay by tourism sector
2014	Spatial Journeys: Eco-Tourism In The Lower Delta Region Of The Colorado River & The Upper Gulf Of California.	Clement	Uni of Arizona	Preservation through tourist that involves locals is the key to management of the area.
2014	Educación Ambiental Para Prestadores De Servicios Turísticos Vinculados Al Avistamiento De Cetáceos En Puerto Adolfo López Mateos, Municipio De Comondú Baja California Sur (BCS)	Colin	UABCS	Tourists in general would benefit from more environmental information for the sightseeing they are undertaking. This will have wider-reaching benefits in terms of stakeholder education and environmental awareness.
2009	Impactos Del Turismo En Las Comunidades Pesqueras De La Bahia De Banderas, Nayarit-Jalisco.	Dagostino	Acta Pesquera	Livelihood and satisfaction of fishermen was greater in years gone by but the opinion of ecotourism is good and fishermen expect that it will help low economic returns experienced in recent years in the fishing industry locally.

Year	Title	1st author	Publication	Key remarks
2002	The Impact Of International Tourism On Community-Based Development In Baja California Sur, Mexico.	Doloutskaia	Duke Uni	Communities need to clearly define their development goals and in many cases it is beneficial to enlist the help of NGOs to study the present systems and provide recommendations for development
2007	Property Rights-Based Management: Whale Shark Ecotourism In Bahia De Los Angeles, Mexico	Dowdell	Fisheries Research	Best option for the area is a concession of the area in favor of the local users
2003	Tourism-Based Revenue Generation Mechanisms	Drum	World P. Congress	Protected areas need income generation strategies including visitor fees
2008	The Imprints Of Tourism inn Puerto Vallarta Jalisco, Mexico	Everitt	The Canadian Geographer	Economic change must come with Environmental sustainability if the growth is to be sustainable.
2013	The Impact Of Vessel Crowding On The Probability Of Tourists Returning To Whale Watching In Banderas Bay, Mexico	Foucat	Ocean & Coast. Man.	Crowding in operations negatively affects the likelihood of returning to the area for tourists and most tourists agreed a maximum number of boats for a trip was 2
2006	Some Biological Aspects Of Blue Marlin (Makaira Nigricans) In The Recreational Fishery At Cabo San Lucas, Baja California Sur, Mexico	Garcia	Bull. Mar. Sci.	Higher SST mean better catch for the sports fishers and few reproductively active females were caught in the fishery.
2013	Economic Analysis Of The Tourism And Its Impacts In The Ecosystems Services For The Coastal Area In Baja California Sur	Garcia	J. Bus. & Econ.	Housing and tourism developments have caused significant changes in ecosystem services in the area.
2001	Management Priorities For Magdalena Bay, Baja California, Mexico	Hastings	J. Coast. Conserv.	Conflicts exist in Bahia Magdalena between different stakeholder groups related to management priorities
2001	The Influence Of Whalewatching On The Behaviour Of Migrating Gray Whales (Eschrichtius Robustus) In Todos Santos Bay And Surrounding Waters, Baja California, Mexico	Heckel	J. Cet. Res. & Man.	Whales behavior did not change during the south bound migration but did alter during the north bound migration
2003	Issue Definition And Planning For Whalewatching Management Strategies In Ensenada, Mexico	Heckel	Coast. Manag.	Mexican Whale-watching law is insufficient and self-regulation and law enforcement needs addressing so migration corridors are not pushed offshore in the long-term
2008	Servicios Turísticos – Bahia de los Ángeles: recursos naturales y comunidad;	Danneman	Línea base 2007	Environmental protection must come before the economic development of Bahia de Los Angeles

Year	Title	1st author	Publication	Key remarks
2003	Influencia Del Turismo Sobre La Conducta Del Lobo Marino De California Zalophus Californianus En La Lobera Los Islotes, B. C. S., México.	Martagon	CICIMAR	25% of disturbances to the sea lion colony are directly caused by human interaction with the sea lions. There are no signs of habituation of the sea lions to the humans visiting the area.
2014	Servicios Ecosistémicos Con Potencial Turístico Del Parque Nacional Archipiélago Espíritu Santo, México	Martinez	Teoría y Praxis	The same restrictions should apply to sport fishing as they do to artisanal fishing and more policing of the local waters is needed to ensure rules are followed by all stakeholder groups.
2014	Ecosystem Services And Their Impact On Poverty And Inequality In Coastal Communities Of Baja California Sur	Monroy	Int. J. Sust. Dev. & Plan.	Smaller communities dependent on ecosystem services had a higher poverty level, while ecosystems had a positive effect on improving the distribution of wealth.
2007	The Economic Benefits Of Ecosystem-Based Marine Recreation: Implications For Management And Policy	Cisneros-Montemayor	UBC	Participation in ecosystem-based marine recreational activities has increased around the world, adding a new dimension to human use of the marine ecosystem and another good reason to strengthen management measures worldwide.
2012	Ecosystem Models For Management Advice: An Analysis Of Recreational And Commercial Fisheries Policies In Baja California Sur, Mexico	Cisneros-Montemayor	Ecol. Model.	The effects of ecosystem dynamics in an already overfished system must not be overlooked, as they can negate or even reverse desired outcomes from management.
2002	Evaluating Ecotourism In Natural Protected Areas Of La Paz Bay, Baja California Sur, Mexico: Ecotourism Or Nature-Based Tourism?	Monteros	Biod. & Conserv.	Majority of operators classified as ecotourism operators were found to be benefiting conservation locally in some way but costs are not comparable to those, which are required to conserve the protected areas of the region.
2014	La Huella De Carbono De La Observación De Ballena Jorobada (Megaptera Novaeangliae) En Las Islas Marietas, Nayarit, México	Ortega	Rev. Int Contam. Amb.	Per passenger carbon footprints of the whale watching operations in Islas Marietas are above the global average.
2000	El Ecotourismo, una nueva modalidad del turismo de masas	Rabago	Rev. Int Contam. Amb.	In order for ecotourism to develop to its full potential it is essential to have local communities involved at all stages of its development.
2013	Impact Of Climate Change On Sustainable Management Of Gray Whale (Eschrichtius Robustus) Populations: Whale-Watching And Conservation	Salvadeo	Arch. Bio. Sci.	Climate change is good for calf production in terms of numbers but bad in terms of the new areas that will eventually become new whale watching grounds where the whales will face new threats.

Year	Title	1st author	Publication	Key remarks
2007	A Social Relational Approach To The Conservation And Management Of Fisheries: The Rural Communities Of The Loreto Bay National Marine Park, BCS, Mexico	Sanchez	Simon Fraser Uni	Cultural values and tradition are deeply embedded in fishing communities and information sharing is prevalent within communities but not as widespread between communities.
2003	The Influence Of Social Capital On The Development Of Nature Tourism: A Case Study From Bahia Magdalena, Mexico	Sawatsky	Uni of Toronto	Significant differences in the types of social capital can explain the structure of ecotourism operations in Bahia Magdalena.
2014	How Do Small-Scale Fishers Adapt To Environmental Variability? Lessons From Baja California, Sur, Mexico	Sievanen	Mar. Stud.	Fishers have become more concerned with environmental variability and fluctuations in catch but tourism development may give them an adaptation strategy which can mitigate reductions in earnings from catch fluctuations
2009	Management Of A Marine Protected Area For Sustainability And Conflict Resolution: Lessons From Loreto Bay National Park (Baja California Sur, Mexico)	Stamieszkin	Ocean & Coast. Man.	Management needs to be based on ecosystem science and good communication between all stakeholders is essential to ensure shared co-management of the area
1997	Human Perturbations And Conservation Strategies For San Pedro Mártir Island, Islas Del Golfo De California Reserve, México	Tershy	Env. Conserv.	Commercial fishers responsible for more of the disturbances to the natural systems than tour operators that follow their own guidelines to ensure minimal disturbance to the animals
1999	A Survey Of Ecotourism On Islands In Northwestern México	Tershy	Env. Conserv.	Neither government regulations nor cost of trips are important impediments to ecotour operators in the Northern GoC.
2007	Community-Based Management Through Ecotourism In Bahia De Los Angeles, Mexico	Torres	Fish. Res.	Human interactions with the whale sharks may lead to negative impacts for both the sharks and the tourist industry relying on them. This paper lead to the generation of a "code of conduct" for whale-shark tourism operations
2011	Economic Benefits Of Recreational Services Provided By The Aquatic Biodiversity Of The National Park Archipielago Espiritu Santo	Trejo	UNAM	Foreign visitors perceive a greater benefit of local biodiversity conservation than local tourists and are willing to pay more to conserve it.
1999	Balancing Conservation With Development In Small-Scale Fisheries: Is Ecotourism An Empty Promise?	Young	Human Ecol.	Secure local access rights and mobilization of nascent community-based organization could help develop the ecotourism industry in Baja significantly.
2011	Maestría En Ingeniería Civil Planeación Territorial “Planeación Para El Desarrollo Regional Sustentable Con La Incorporación Del Turismo En El Corredor Costero San Felipe – San Luis Gonzaga, Baja California, México (1988-2008).”	Zavala	Inst.Poli.Nac.	Infrastructure is the primary consideration in building tourism in the area of San Felipe and adjacent tourism corridors.

Year	Title	1st author	Publication	Key remarks
1994	Evaluating Ecotourism In Mexico'S Biosphere Reserves : Whale Watching Activities In The World Heritage Site Of Laguna San Ignacio, Baja California Sur, Mexico 1994-2002	Agerted	UBC	Stakeholders would benefit from evaluating their current costs and consider technological investment (boat engines) as well as the wider spread use of the internet to promote their businesses
2009	Establishing A Socio-Economic Baseline Of Sea Turtle Ecotourism In Baja California Sur, Mexico	Finkbeiner	Duke Uni	Perception of ecotourism are optimistic although current participation is low and in some areas infrastructure lacking for current development of the industry
2008	Sustainability And Balanced Ecotourism Management: Lessons From Whale Watching In Laguna San Ignacio, Baja California Sur, Mexico	Chong	Uni of Ontario	Future research should look at developing new ecotourism strategies as well as using St Ignacio as a case study on which to build other ecotourism opportunities in Mexico
2010	Sustainable Tourism Planning For The Only Coral Reef In The Gulf Of California: Cabo Pulmo National Park	Arizpe	Sust. Tour.IV	The quality of life has improved greatly since the protection of the area. High impact sites need close future management observation to ensure the sustainability of the developments in the area.
2011	An Alternative Tourism Model For Sustainable Development En Los Cabos, Baja California Sur, Mexico	Arizpe	Ecosyst. Sust. Dev. VIII	Los Cabos has inadequate development plans. Steps need to be taken to ensure that mass tourism does not overtake ecotourism in the area and in BCS in general.
2007	Traditional And Alternative Tourism In Loreto	Gamez	Loreto, The future of the first capital of the Californias	Continued development of Cabo Pulmo must account for the ecological integrity of the reefs on which the tourism is based and its development must involve the participation of all stakeholder groups
2012	Sustainability And The Traditiona Tourism Model In Baja California Sur, Mexico	Ganster	Sust. Tour.V	The development of tourism in Baja California presents a clear threat to the ecosystems in the area. Future management considerations must foremost consider the environment, then the industry development of BCS.