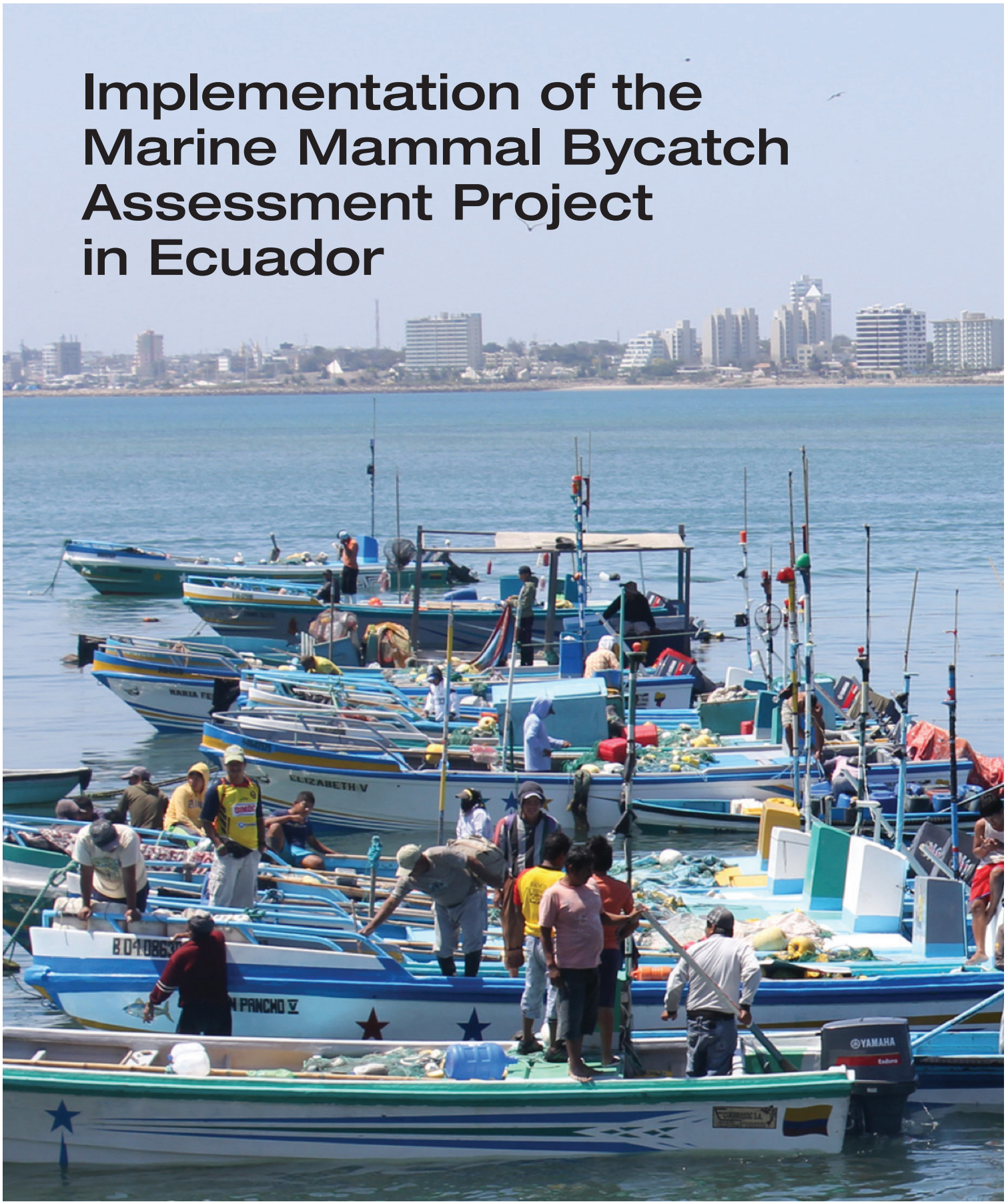
Implementation of the Marine Mammal Bycatch Assessment Project in Ecuador



FINAL REPORT
2015

University of New Hampshire

New England Aquarium

Protecting the blue planet

MUSEO DE BALLENAS
SALINAS - ECUADOR

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I. EXECUTIVE SUMMARY

This is a report of a study to characterize bycatch of marine mammals in fisheries that export fish to the United States of America from Ecuador, and identify opportunities for collaboration on bycatch mitigation. It was conducted by the New England Aquarium in partnership with several researchers in South America and the United States. The study involved compilation of existing data and information on bycatch and national fisheries (fleets, fishing gear, marine mammal interactions, fishery statistics, export markets, etc.), and social science methodologies, including interviews of fishing industry members.

As in other parts of the world, bycatch of marine mammals and other marine vertebrates such as sea turtles and birds occur in both small-scale and industrial fisheries of Ecuador. This has been known for at least two decades. The Ecuadorian fleet includes 339 industrial vessels (mostly purse seiners) and around 20,000 artisanal vessels. Ecuador is one of the most important exporters of fish and marine products to the USA. In 2013, more than 115,000 tons of fish and shrimp with a value of US$900 million were exported to the USA, with an estimated 16% of fish exported as "frozen" or canned, originating from fisheries that cause marine mammal mortality.

For this study, a purposive (non-random) sample of 21 fishing ports in four of five coastal provinces of Ecuador was surveyed. Semi-structured questionnaires with open and closed questions were used to obtain information on marine mammal bycatch, mainly from fishermen[1]. Questionnaires solicited information about the port, gear, fishing expertise and perceptions about marine mammals and bycatch. A total of 194 field interviews were carried out. Interviewed fishermen were found to use nine different types of fishing gear, most frequently gillnets, seines, and longlines.

Fishermen identified nine of the twenty-nine species of marine mammals recorded in Ecuador as bycatch. The marine mammal species reported most frequently as bycatch were the humpback whale, bottlenose dolphin and common dolphin. Most interviewees indicated that the mammal bycatch rate has remained unchanged or increased over the last five years.

Fishing industry sentiments about marine mammals indicate a potential for industry collaboration in bycatch reduction. While fishermen report that mammals cause difficulties for fishing operations, they nonetheless maintain positive perceptions of, and emotions toward, these same mammals, expressing regret or sadness for fishing-related death or injuries that may befall them.

Roughly half of interviewed fishermen considered whales to be disruptive to their fishing operations, while roughly one-third considered them neither of benefit nor problematic, and a few considered them to be both beneficial and problematic. About three-quarters of interviewed fishermen considered dolphins to be neither a problem nor a benefit for fishing operations, more than a third considered them to be beneficial, such as in helping them to locate fish or in navigation, and only a very few considered them to be a nuisance. Almost two thirds of interviewees considered sea lions to be neither problematic nor beneficial, while a third considered them to be a nuisance, and only a few considered them to be both.

When asked to convey their perceptions of these mammals aside from fishing issues, the majority of fishermen reported very positive feelings. With respect to whales, the overwhelming majority of respondents appreciated their tourism value, beauty, behavior, environmental significance, or companionship, with only a few noting that they can be dangerous to boats. With respect to dolphins, the overwhelming majority reported similar positive perceptions, while only a few reported neutral perceptions, and none reported negative ones. Concerning sea lions, more than half of respondents conveyed mainly neutral perceptions, more than a quarter conveyed positive perceptions, such as about their beauty, intelligence, or benevolence, and only a few conveyed negative perceptions. These responses indicate opportunities to support bycatch reduction in collaboration with the fishing industry, given the generally appreciative sentiments expressed by fishermen, especially of whales and dolphins.

Equally encouraging, the overwhelming majority of fishermen expressed interest in future collaborations with other fishing industry members to investigate efficient fishing methods and new markets for catch that is considered more sustainable. When asked for their ideas on mitigating marine mammal bycatch, among the suggestions were to use different gear types, set gear in different locations, manipulate gear to avoid entanglements, free entangled mammals, use sound or other strategies to deter mammals from approaching gear, set gear at deeper depths, and alter gear technology such as using more breakable line.

Currently no regulation exists that directly addresses marine mammal bycatch in Ecuador except for the tuna fleet which is regulated by the Inter-American Tropical Tuna Commission (IATTC). By contrast, several national Action Plans exist for marine species such as sea turtles, sharks and rays and albatross, and even for fresh water mammals, but not for marine mammals. Most bycatch studies have been conducted in Ecuador by NGOs, however future studies to address this problem could benefit from collaborations that involve the fishing industry, government agencies, biologists, social scientists, engineers, and community development agencies. Multiple decades of research on co-management of fisheries and other resources provides potential governance models for the sharing of information, accountability, and decision-making input among government, industry, science, and other interests.

[1]All interviewees were male (though there are some women in the Ecuadorian fishing industry), thus this report uses the term fisherman rather than the gender-neutral term fisher.

RESUMEN EJECUTIVO

Este informe da cuenta de un estudio para caracterizar la captura incidental de mamíferos marinos en pesquerías ecuatorianas que exportan pescado a los Estados Unidos de América e identificar oportunidades de colaboración para mitigarla. Fue realizado por el New England Aquarium en colaboración con investigadores sudamericanos y estadounidenses. El estudio incluyó la recopilación de datos e información existente sobre la captura incidental y las pesquerías nacionales (flotas, artes de pesca, interacciones con mamíferos marinos, estadísticas de pesca, mercados de exportación, etc.), y metodologías de ciencias sociales incluyendo entrevistas a personas relacionadas con la industria pesquera.

Al igual que en otras partes del mundo, en Ecuador la captura incidental de mamíferos y otros vertebrados marinos, tales como tortugas y aves, se produce durante faenas de pesca tanto en las pesquerías de pequeña escala como en la industrial. Esto se conoce desde hace al menos dos décadas. La flota ecuatoriana incluye 339 embarcaciones industriales (en su mayoría cerqueros) y alrededor de 20,000 embarcaciones artesanales. Ecuador es uno de los mayores exportadores de pescado y productos marinos a los Estados Unidos. En 2013, se exportaron más de 115,000 toneladas de pescado y camarones con un valor de 900 millones de dólares, con un estimado de 16% de pescado exportado como "congelado" o "enlatado" suministrado por pesquerías que causan mortalidad de mamíferos marinos.

Para este estudio, una muestra dirigida (no aleatoria) de 21 puertos pesqueros en cuatro de las cinco provincias costeras de Ecuador fue escogida. Cuestionarios semiestructurados con preguntas abiertas y cerradas fueron utilizados para obtener información sobre la captura incidental de mamíferos marinos, principalmente de los pescadores[2]. En los cuestionarios se solicitó información sobre el puerto, el aparejo de pesca, la experiencia de pesca y las percepciones sobre los mamíferos marinos y la captura incidental. Se realizaron un total de 194 entrevistas de campo. Los pescadores entrevistados utilizaron nueve tipos diferentes de artes de pesca, con mayor frecuencia redes de enmalle, redes de cerco y palangres.

Los pescadores identificaron nueve de las veintinueve especies de mamíferos marinos registrados en Ecuador como captura incidental. Las especies reportados con mayor frecuencia fueron la ballena jorobada, el delfín mular y el delfín común. La mayoría de los entrevistados indicaron que la tasa de captura incidental de mamíferos ha mantenido la misma intensidad o ha aumentado en los últimos cinco años.

La percepción positiva de la industria pesquera sobre los mamíferos marinos favorece la potencial colaboración para reducir la captura incidental. Si bien los pescadores informaron que los mamíferos causan dificultades para las operaciones de pesca, aún mantienen una percepción positiva y sensible hacia estos mamíferos, expresando pesar o tristeza por los daños que la pesca les puede ocasionar.

Aproximadamente la mitad de los pescadores entrevistados consideraron que las ballenas eran perjudiciales para sus operaciones de pesca, mientras que aproximadamente un tercio no las consideraba ni beneficiosas ni perjudiciales, y unos pocos consideraban que eran un beneficio, o ambos tanto un beneficio como una dificultad. Aproximadamente tres cuartas partes de los pescadores entrevistados consideraron que los delfines no eran una dificultad ni un beneficio para las operaciones de pesca, más de un tercio los consideraron beneficiosos para encontrar peces o navegar, y solo unos pocos los consideraron una dificultad. Casi dos tercios de los entrevistados consideraron que los leones marinos no eran una dificultad ni un beneficio, mientras que un tercio los consideraba una dificultad, y solo unos pocos los consideraban un beneficio, o ambos un beneficio y una dificultad.

Cuando se les pidió que transmitieran sus percepciones sobre estos mamíferos aparte de los problemas de pesca, la mayoría de los pescadores reportaron sentimientos muy positivos. Con respecto a las ballenas, la gran mayoría de los encuestados apreció su valor turístico, belleza, comportamiento, importancia ambiental o compañía, y solo unos pocos señalaron que pueden ser peligrosos para los barcos. Con respecto a los delfines, la gran mayoría reportó percepciones positivas tales como su belleza, inteligencia, alegría, compañerismo y valor turístico, mientras que solo unas pocas reportaron percepciones neutrales y ninguna reportó percepciones negativas. Con respecto a los leones marinos, más de la mitad de los encuestados transmitieron principalmente percepciones neutras, más de un cuarto transmitió percepciones positivas, tales como su belleza, inteligencia o benevolencia, y solo unas pocas transmitieron percepciones negativas. Estas respuestas indican oportunidades para futuras inversiones en la reducción de la captura incidental en colaboración con la industria pesquera, dados los sentimientos generalmente apreciativos, especialmente de ballenas y delfines.

También fue alentador saber que la abrumadora mayoría de los pescadores expresó interés en futuras colaboraciones con otros miembros de la industria pesquera en temas relacionados con métodos de pesca más eficientes y nuevos mercados. Cuando se les preguntó por sus ideas sobre cómo mitigar la captura incidental de mamíferos marinos, entre las sugerencias se incluyen el uso de artes de pesca alternativos, colocarlos en lugares diferentes, modificar los aparejos para evitar enredos, eliminar mamíferos enredados, usar sonido u otras estrategias para evitar que se acerquen, colocar los aparejos a mayor profundidad, y mejoras tecnológicas de los aparejos de pesca como el uso de una línea más débil.

Actualmente no existe una regulación que aborde directamente la captura incidental de mamíferos marinos en Ecuador, excepto en la flota atunera industrial que está regulada por la Comisión Interamericana del Atún Tropical (CIAT). Por otro lado, existen varios planes de acción nacionales para especies marinas como tortugas, tiburones y rayas y albatros, e incluso para mamíferos de agua dulce, pero no para mamíferos marinos. La mayoría de los estudios de captura incidental en Ecuador han sido realizados por ONGs. No obstante, futuros estudios para abordar este problema podrían beneficiarse de la colaboración entre la industria pesquera, agencias gubernamentales, biólogos, científicos sociales, ingenieros y agencias de desarrollo comunitario. Décadas de investigación sobre el comanejo de la pesca y otros recursos proporcionan modelos de gobernabilidad potenciales para compartir información, rendición de cuentas y aportes para la toma de decisiones entre el gobierno, la industria, la ciencia y otros intereses.

[2]Todos los entrevistados fueron hombres, aunque hay también mujeres en la industria pesquera ecuatoriana. Por ello el documento hace referencia al término "fishermen" y no al término neutro "fisher".

II. BACKGROUND

Following the recommendation of a workshop held in 2011 in Tampa, Florida, to address bycatch in artisanal gillnet fisheries by developing and sharing tools for bycatch assessment, the New England Aquarium sponsored this project to support development of capacity within Latin American countries to assess marine mammal bycatch. The focus was on Chile and Ecuador which are two of the region's major exporting nations. Argentina was also included, as it appears to have an interest in gaining greater access to U.S. markets. Support for this project was intended to help develop new approaches for documenting bycatch with key trading partners, and identifying opportunities for bycatch reduction.

The goal of this national project was to support a contextualized assessment of marine mammal bycatch in select Ecuadorian fisheries, and to explore possibilities to reduce it. Specifically, the objectives were to:

(1) Produce a summary of what is known from published literature and government reports on marine mammal bycatch in fisheries in Ecuador.

(2) Review official records and documentation of industrial and small-scale fisheries in Ecuador to produce national level characterizations of those fisheries including the gear used, scale of operation, observer coverage (if any) and bycatch data.

(3) Where government documentation was absent or insufficient, design and administer questionnaires through personal interviews with fishermen in order to understand the nature and scale of marine mammal bycatch.

(4) Work with fishing industry members, fisheries managers, and marine mammalogists on identifying ideas for the research and development of practical bycatch reduction strategies.

III. INTRODUCTION

The incidental mortality of marine mammals during fishing operations, commonly referred to as bycatch, is the greatest anthropogenic threat to many species. It is estimated that more than 300,000 cetaceans die annually mainly in gillnets worldwide (Read et al., 2006). The problem appears to have worsened over time; and with certain exceptions, no substantial improvements have been achieved recently (Reeves et al., 2013). In most developing countries marine mammal bycatch occurs mainly in small-scale fisheries, which are widely dispersed among these countries and not closely monitored (see examples in Perrin et al., 1994). In the last 20 years 75% of odontocete and 64% of mysticete species were recorded entangled in nets around the world (Reeves et al., 2013). Bycatch is not always discarded; it may be sold either for human consumption or used as bait (Van Warebeek and Reyes, 1994; Félix and Samaniego, 1994; Ávila et al., 2008), which sometimes makes it difficult to differentiate between incidental and directed catches.

The extent of marine mammal bycatch, as well as bycatch of other non-target vertebrate species such as sea turtles and birds, is poorly known in Ecuadorian fisheries (but see a recent study by Coello et al., 2011). Marine mammal bycatch has been indirectly recognized by local authorities to occur in the industrial tuna purse seine fishery. For this reason Ecuador adopted the provisions issued by the Inter-American Tropical Tuna Commission (IATTC) to protect dolphin populations affected by the international tuna fleet in the eastern tropical Pacific. In addition, in 1996 and later in 2002, specific regulations to protect sea turtles from trawling operations required the use of turtle excluder devices (TEDS)[3] for the Ecuadorian trawling fleet. In addition to conservation measures, their objective was to avoid risking an embargo on the Ecuadorian shrimp fishery.

Although these regulations constitute important steps to reduce bycatch in industrial fisheries, in the case of artisanal fisheries the situation is different. For many years the problem with artisanal fishing has received little government attention, even to quantify its extent. The Ecuadorian artisanal fishing sector is characterized by its large size, fast growth and regulatory challenges. Ecuador has the largest artisanal fleet in the Southeast Pacific that produces one of the highest levels of fishing effort in Latin America (Steward et al., 2010). Several programs have been implemented by the Ecuadorian government to improve conditions in the sector, which include new port facilities, loans for upgrading equipment, and fuel subsidies. However, management of these fisheries has received little attention. Statistics on artisanal fisheries are only partially available from eight ports monitored by the National Institute of Fisheries in the 1990's and during first decade of the millennium (Peralta, 2003; 2009), and more recently in nine ports by the Sub-Secretary of Fishing Resources (information available from its website for 2007-2011). No

[3]Ministerial Resolutions Nº 121 (1996) and 047(2002), Undersecretary of Fisheries (Subsecretaría de Pesca). Published in the Official Register 930 (April 1996) and 642 (August 2002), respectively.

assessments have been conducted for any commercial stock exploited by this sector, nor has a detailed census been conducted except for counts of fishermen, boats and gear at ports (e.g., Solís-Coello and Mendívez, 1999; Herrera et al., 2013). Therefore, it is not possible to determine the true fishing effort with precision, the areas where fishing activities concentrate, or the status of fisheries resources. Under this scenario, it is not surprising that marine mammal bycatch is also not well documented.

This report contains results of a study conducted in 2014-2015 in Ecuador to determine interactions that may be occurring between fisheries and marine mammals (dolphins, whales and sea lions) within key marine fisheries exporting catch to the United States. The first part of the report includes information about the fishing sector in Ecuador, such as the institutions involved, regulations related to bycatch, the main fisheries exporting products to the USA, fleet characteristics, and available information on marine mammal bycatch. The second part of the report includes an analysis of the major findings of almost two hundred interviews with fishermen and port officials.

This is the first time that a mammal bycatch study has investigated the small-to-medium-scale Ecuadorian purse seine fishery. The hope is that the information produced by this study will help to design a program to address bycatch in Ecuadorian fisheries and ensure the future of fishing productivity without compromising the viability of marine mammal populations currently affected.

3.1. Brief information about Ecuador

Ecuador is located on the northwest coast of South America, bordered on the north by Colombia and on the south and east by Peru. Its area encompasses approximately 260,000 km2 (Figure 1). The current human population is 15.7 million. Administratively, Ecuador is divided into 24 provinces, five of which include coastlines on the Pacific Ocean: Esmeraldas, Manabí, Santa Elena, Guayas and El Oro. Provinces represent the second hierarchical level within the political-administrative structure of the country. The main fishery statistics in this report are from the five coastal ones.

The coast of Ecuador is part of the neotropical biogeographic region named Chocó, which extends from southern Panama to northwestern Peru. Because of its high rainfall and isolation due to the Andes mountain range in the east, and its variety of ecosystems, it is one of the most biologically diverse areas of the world. The Andes crosses Ecuador from north to south creating three distinct geographical areas: the coast, the Andes and the Amazon. Additionally, Ecuador has an island territory, the Galapagos archipelago, located 1,000 km to the west. Temperatures in the coastal and Amazon region range between 20 and 33 °C and in the Andean region between 3 and 26 °C.

The coastal area is characterized by the seasonal influence of the cold and productive Humboldt Current from the south, and warm tropical waters of the Panama Bight from the north. The mixing of these water masses creates the Equatorial Front. The Front moves from north to south along the coast of Ecuador, depending on the strength of the Southeast Pacific anticyclonic winds, causing an annual variation of sea surface temperature between 22 and 28°C (Cucalón, 1996). In general terms, sea conditions are fairly stable off Ecuador during the year with no storms, hurricanes or other strong oceanographic events. However, the area is affected during El Niño – Southern Oscillation phenomenon (ENSO) years, resulting in a significant impact on fisheries resources and entire ecosystems (Barber and Chavez, 1983).

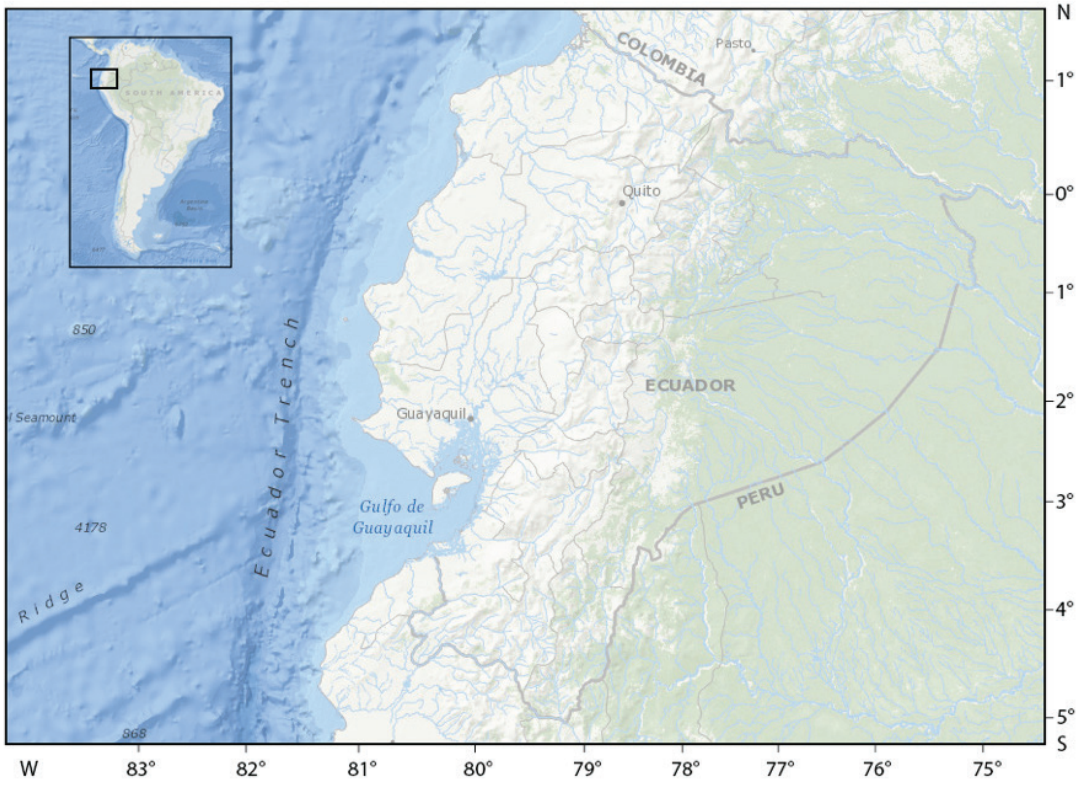

Figure 1. Map of Ecuador.

IV. MAIN FISHERIES IN ECUADOR

Fishing is one of the most important economic activities along the coast of Ecuador. Despite being a relatively small country with 650 km of coastline, in 2013 Ecuador exported 427,975 tons of marine products valued at USD$1.659 million (Proecuador, 2014). The main destination countries of Ecuadorian fishing and aquaculture products in 2013 were Spain and the United States with 15.3 and 14.7% of the FOB value, respectively. In 2013, the sector accounted for 1.8% of Ecuador's GDP. Fish products exported by Ecuador are from both industrial and small-scale fisheries, and include different forms such as fresh, frozen, canned and alive.

4.1. Industrial fisheries

4.1.1. Private organizations

There are several industrial fishing associations. The more important ones include the following:

1. National Chamber of Aquaculture, created in 1993. Based in Guayaquil, this association represents persons and companies dedicated to production, culture, processing and trading of aquatic species and related activities.
2. Tuna Association of Ecuador (ATUNEC), created in 1994. ATUNEC is based in Manta, Manabí, where the major tuna fleet of Ecuador is located. Its mission is generating strategies to optimize the operation of the national fleet working in international waters of the eastern tropical Pacific.
3. National Chamber of Fisheries (CNP) is a private institution based in Guayaquil created by law in 2003. The main objective is promoting the development and diversification of bioaquatic resources (fishing and aquaculture) either for exportation or local consumption.
4. Ecuadorian Association of Shrimp Trawling Vessels (ASEARBAPESCA), created in 1987 by shrimp trawling owners and based in Guayaquil.
5. Association of Exporters of Whitefish of Ecuador (ASOEXPEBLA), created in 1994 in Manta to promote the sustainable development of fish export companies. Fish are caught by both artisanal and industrial purse seine fisheries. Members of ASOEXPEBLA export around 70% of the white fish from Ecuador.

4.1.2. Industrial fleet

The Ecuadorian industrial fleet (licensed) operated in 2014 with 339 vessels (Table 1; Figure 2). In terms of economic value, the most important is the tuna fishery. By number of vessels the most important is the small pelagic fleet. Both fisheries use purse seine nets but the size of the boats and the geographic range are significantly lower in the latter fishery. Ecuador has the largest tuna fleet of the tropical eastern Pacific with 108 vessels weighing between 50 and 1700 tons. The fleet works in both territorial and international waters. The small pelagic fleet includes 191 vessels weighing between 3.5 and 156 tons. This is a coastal fishery that concentrates activities in the Gulf of Guayaquil and along the central coast of Ecuador, and targets mainly thread herring, sardines and mackerel (Prado, 2009; González and Solis, 2010). Additionally, there is a fleet of 5 vessels using pole-and-line and traps (162-726 tons), and a licensed foreign fleet of 7 vessels (22-183 tons) (Table 1). There are 28 owners/companies registered as industrial fishing vessel operators. Complete information on the licensed industrial fleet in 2014 is included in Appendices 1, 2, 3 and 4.

Table 1.

The Ecuadorian industrial fleet by type of gear licensed in 2014. Source: Vice Ministry of Fisheries.

VESSEL TYPE	NUMBER OF VESSELS
Purse seine tuna (nationals)	101
Purse seine tuna (foreigner associated)	7
Purse seine small pelagic	190
Long line	36
Pole and line, traps	5
TOTAL	**339**

Additionally, there is a licensed fleet of 202 trawling vessels for small shrimp (*Protrachypene precipua* and *Xiphopenaeus riveti*) and hake (*Merluccius gayi*). The level of interaction with marine mammals in this fleet is unknown. However, because of the slow operational speed of vessels when using this type of gear it is presumed that the level of bycatch, if any, is low. However, interactions of marine mammals with trawl nets are documented in other fisheries (Northridge, 1985).

4.2. Artisanal or small-scale fisheries

The artisanal fishery[4] is an important socio-economic sector of the coast of Ecuador. However, official fishery statistics do not distinguish between subsistence and commercial fishing. For most fishers from large ports and coastal cities fishing is their main economic activity, and most fish captured is sold, but for small ports and landing sites capture is probably used for both subsistence and income.

4.2.1. Artisanal fishers' associations

It is unknown how many artisanal fishermen exist in the country because most of the activity is carried out without direct control by fishing authorities. Numbers range between 25,783 and 80,000 (FENACOPEC, 2009; Herrera et al., 2011). Organized fishers belong to more than 300 organizations that joined the National Federation of Fishing Associations (FENACOPEC), an organization created in 1989 and based in Guayaquil (FENACOPEC, 2009). FENACOPEC is a powerful organization and

Figure 2. Ecuadorian industrial purse seiners. Left: tuna vessel; right: small pelagic vessel. Photos: F. Félix.

acknowledged by fishing authorities as representing the artisanal fishing sector. Government programs created to assist the artisanal sector are usually implemented through FENACOPEC networks. However, interviews conducted during this study demonstrated that most artisanal fishers have no formal affiliation with this group.

4.2.2. Artisanal fleet

The most recent evaluation of the artisanal fisheries sector conducted by the National Fisheries Institute was carried out during 2009 and 2010 (Herrera et al., 2013). According to this report, there are 219 fish landing sites on the Ecuadorian coast, including well-established ports with fleets of over a thousand boats and small coves with half a dozen boats. The Ecuadorian artisanal fleet numbers an estimated 20,000 vessels, including wooden boats, fiberglass boats, "bongos", etc. (Table 2; Figure 3). More than 140 species of fishes are captured by the artisanal fishery in Ecuador (Solis-Coello and Mendívez, 1997).

The following description of fishing vessels is from Herrera et al. (2013). Balse, bongo and canoa 1 are small boats propelled either by sail or oars. Balse are made of several logs of balsa wood tied with ropes. Bongo and canoa 1 are made of single carved trees. Canoa 2 is larger, made of wood and uses one small outboard engine. Panga boats, both large and small, are made mainly of fiberglass and in some cases of wood or plywood. The difference basically is storage capacity and range. Smaller boats are powered by small outboard engines and used near to the coast and in estuaries. Larger boats usually use either outboard (75 hp) or larger stationary engines, and operate mainly in pelagic waters. The use of a larger mother ship towing several small boats is increasing, particularly with longlines departing from Manta. There are some large sail boats made of wood which usually have an auxiliary engine.

Fishing gear used by the artisanal fleet includes four major types: 1) gillnets, surface and bottom; 2) longlines, surface and bottom; 3) hand line; and 4) riso, a small purse seine net operated from an open boat. It is not possible to individually characterize artisanal fleets by fishing gear, as fishermen may use different gear depending on the season and target species. Sometimes artisanal fishermen use more than one gear at a time. Although there is a general pattern in relation to the use of gear, many fishermen are opportunistic and may work on different boats with different gears, in different seasons and from different ports. In addition, many of them may engage in other activities such as agriculture and trade when catches decrease.

Table 2.

Ecuadorian artisanal fleet according to the classification used by the National Institute of Fisheries (Herrera et al., 2013). Some Spanish terms were translated for the purpose of this report.

	MATERIAL		
TYPE	WOOD	FIBERGLASS	TOTAL
Balse	39		39
Bongo	1,904		1,904
Canoa 1	2,461		2,461
Canoa 2	2,816		2,816
Panga	448		448
Boat	2,586	8,941	11,527
Large boat	523	17	540
Sail	36		36
	10,813	**8,958**	**19,771**

[4]Article 21 of the Fishing Law defines an artisanal fishery as one that is carried out by independent fishermen or as organized in cooperatives or associations, in which fishing constitutes their principal way of life and in which the catch is used for domestic consumption, and caught with small-scale gear using small boats.

Figure 3. Fishing boats at Santa Rosa, the second largest artisanal port in Ecuador. Photo: F. Félix.

4.2.2.1. Gillnets

Different types of gillnets are used by artisanal fishermen in Ecuador depending on the target species and port. Gillnets used for large pelagic fish such as tuna, marlins and sharks, are made of polyamide multifilament. The net may extend between 400 and 1200 m in length, and between 1 and 8 m in height (Herrera et al., 2013). The stretched mesh size varies between 70 to 150 mm (Figure 4).

Figure 4. Artisanal gillnet used for large pelagic fish in Ecuador. Photo: F. Félix.

Gillnets used primarily in shallow areas and estuaries are made of polyamide monofilament (Figure 5). Their length varies between 200 and 1,400 m, between 1 and 8 m high and between 70 and 200 mm mesh size (Herrera et al., 2013). Because they are lighter, cheaper and occupy relatively little deck space, fishermen usually carry several panels onboard. The impact of this type of net on cetaceans is unknown but it is possible that it can entangle and injure small cetaceans.

It is estimated that about 23,000 gillnets are used in Ecuador (Table 3). Surface gillnets are mainly used in ports located in the central (Manabí and Santa Elena) and northern (Esmeraldas) coastal regions of the country. Bottom gillnets are used in central and southern (El Oro) ports. More information on this gear, dimensions and target species is provided in Appendix 5.

Figure 5. Polyamide monofilament gillnet in a boat at Palmar, Ecuador. Photo: F. Félix.

Table 3.

Estimated number of gillnets and longlines per type in each coastal province of Ecuador. Source: Herrera et al. (2013).

	GILLNETS			LONGLINES		
PROVINCE	BOTTOM	SURFACE	BOTTOM, MULTIPLE MESH SIZE	SURFACE	MID-WATER	BOTTOM
Esmeraldas	301	3,458	172	888	0	1,174
Manabí	1,740	2,035	1,149	4,040	250	747
Santa Elena	1,819	2,139	2,219	2,100	1,250	456
Guayas	120	3,567	1,125	0	0	405
El Oro	1,075	0	2,059	0	0	93
TOTAL	**5,055**	**11,199**	**6,724**	**7,028**	**1,500**	**2,875**

4.2.2.2. Longline

Longlines are used as frequently as gillnets. They may contain between 200 and 3,000 hooks. The hook shape and type of bait may vary. Longlines are set on the surface, mid-water or bottom. It is estimated that around 11,500 longlines are used in Ecuador (Table 3). Surface longlines are used mainly in central Ecuador (Manabí and Santa Elena) and in the south (El Oro). Bottom longlines are mainly used in the north (Esmeraldas). Mid-water longlines are used mostly in Santa Elena ports. There are no reports of interactions of marine mammals with longlines in Ecuador, but there are of sea turtles and birds (Birdlife, 2011; Andraka et al., 2013).

4.2.2.3. Riso

Riso is a relatively new type of small purse seine. There is no official information about this gear, but its use seems to be increasing. The net is made of polyamide multifilament and is 500 m long, 50 m high, and with 1.5 cm mesh size. The net is towed onboard with a small winch. Boats are similar to those carrying gillnets and longlines but with some modifications. This type of fishery is located mainly in the central and northern ports of the country and targets medium-sized fish (e.g., *Family Sciaenidae*, *Carangidae* and *Scombridae*).

Figure 6. Open boat with purse seine gear at Anconcito, Ecuador. See the small winch on the center of the boat. Photo: F. Félix.

V. SPECIES OF MARINE MAMMALS IN ECUADOR

Twenty-nine species of marine mammals have been recorded in Ecuador, including from mainland and Galápagos Islands waters. These consist of 6 Mysticeti or baleen whales, 20 Odontoceti or toothed whales and dolphins, and three pinnipeds (sea lions) (Table 4). There are no endemic species from this region, except for two pinnipeds from the Galápagos. Probably there are more species of cetaceans in the Ecuadorian EEZ but they have not been recorded yet, particularly oceanic species such as beaked whales (Ziiphidae). Doubts about the identity assigned to some species persist, such as the minke whale observed in the Galápagos and referred to as *Balaenoptera acutorostrata* (e.g., Merlen, 1995) as well as a sei whale (B. borealis) recorded in the mid-twentieth century between Ecuador and the Galápagos (Loesh, 1966). Estimates of cetacean abundance in Ecuador exist only for the humpback whale (Félix et al., 2011), and partly for coastal dolphins in the Gulf of Guayaquil (Félix, 1994).

Table 4.

Marine mammal species recorded in Ecuadorian waters off both the mainland and the Galápagos Islands. Scientific names as well as common names in Spanish and English are included. Source: Félix and Prieto (1991); Félix et al. (1994, 1995, 2011a); Merlen (1995); Palacios et al. (1997); Chiluiza, et al. (1998); Félix and Haase (2014). *Species for which there is a published record of bycatch, 1992-2011 (see Appendix 6).

SCIENTIFIC NAME	COMMON NAME (SPANISH)	COMMON NAME (ENGLISH)	DISTRIBUTION	
			MAINLAND	GALÁPAGOS
MISTICETI				
Balaenoptera musculus	Ballena azul	Blue whale	x	x
Balaenoptera physalus	Ballena de aleta	Fin whale	x	x
Balaenoptera borealis	Ballena sei o boba	Sei whale	x	x
Balaenoptera edeni	Ballena de Bryde	Bryde's whale	x	x
Balaenoptera bonaerensis	Ballena minke Antártica	Antarctic minke whale	x	
*Megaptera novaeangliae**	Ballena jorobada	Humpback whale	x	x
ODONTOCETI				
*Delphinus delphis**	Delfín común de rostro corto	Short-beaked common dolphin	x	x
Feresa attenuata	Orca pigmea	Pygmy killer whale	x	x
*Globicephala macrorhynchus**	Ballena piloto de aletas cortas	Short-finned pilot whale	x	x
*Grampus griseus**	Delfín de Risso	Risso's dolphin	x	x
Lagenodelphis hosei	Delfín de Fraser	Fraser's dolphin		x
Orcinus orca	Orca	Orca	x	x
Peponocephala electra	Ballena cabeza de melón	Melon-headed whale	x	x
Pseudorca crassidens	Falsa orca	False killer whale	x	x
*Stenella attenuata**	Delfín manchado	Spotted dolphin	x	x
Stenella coeruleoalba	Delfín listado	Stripped dolphin	x	x
Stenella longirostris	Delfín tornillo	Spinner dolphin		x
Steno bredanensis	Delfín de dientes rugosos	Rough-toothed dolphin		x
*Tursiops truncatus**	Bufeo	Bottlenose dolphin	x	x
Kogia breviceps	Cachalote pigmeo	Pygmy sperm whale		x
*Kogia sima**	Cachalote enano	Dwarf sperm whale	x	x
*Physeter macrocephalus**	Cachalote	Sperm whale	x	x
Hyperoodon planifrons	Ballena nariz de botella austral	Southern bottlenose whale		x
Mesoplodon densirostris	Ballena picuda de Blainville	Blainville's beaked whale	x	x
Mesoplodon ginkgodens	Ballena picuda de ginkgo	Ginkgo-toothed beaked whale		x
*Ziphius cavirostris**	Zifio de Cuvier	Cuvier's beaked whale	x	x
PINNIPEDIA				
Arctocephalus galapagoensis	Lobo fino de Galápagos	Galápagos fur seal	x	x
Otaria flavescens	Lobo marino sudamericano	South American sea lion	x	x
Zalophus wollebaeki	Lobo marino de Galápagos	Galápagos sea lion	x	x

VI. LEGAL FRAMEWORK OF FISHERIES

6.1. Fishery governance

Fishing activities in the country are carried out under the Fishing and Fisheries Development Law issued in 1974 and revised in 1985; the regulations required for implementing the law were re-issued in 2002. Over the years the fishery authority has come under different ministries (e.g., industry, agriculture, etc.) and several secondary regulations have been issued or modified to identify administrative roles and responsibilities. The last change occurred in March 2007 when Executive Decree No. 144 stated that the institution responsible for policy, control and fisheries management in Ecuador is the Ministry of Agriculture, Livestock and Fisheries, through the Vice Minister of Aquaculture and Fisheries based in Manta City. The Vice Ministry includes two Sub Secretariats--Aquaculture and Fishing Resources (SRP)--and 12 units and directorates. Among the latter are the Regional Directorate of Fisheries based in Guayaquil City, which is responsible for program management and fisheries oversight in three coastal southern provinces (Guayas, El Oro and Los Ríos); and the General Directorate of Fisheries, which is responsible for the control and monitoring of fishing and fish trade.

In addition, the National Council of Fisheries Development is a government agency responsible for developing the national fisheries policy, the approval of plans and programs for fisheries development, and the annual evaluation of the sector to enable authorities to make any necessary adjustments. Figure 7 shows the current fishing agencies in the country.

6.1.1. Sub Secretary of Fishing Resources (SRP)

The mission of the Sub Secretariat of Fishing Resources is to manage, regulate, control, develop and report on the activities conducted by industrial and artisanal fisheries through basic and applied research, technological innovation, capacity building, promotion of products in the domestic market, and the conservation and sustainable management of fishing resources. The SRP has four units: policy and planning, artisanal fisheries, industrial fisheries and control. The Control unit has 11 offices in major mainland ports.

6.1.2. Co-management potential

Multiple decades of research on co-management of fisheries and other resources provide potential governance models for the sharing of information, accountability, and decision-making among government, industry, science, and other interests (Allison and Horemans, 2006; National Research Council, 2008; Brewer and Watts, 2016; d'Armengol et al., 2018). Ecuadorian governmental and non-governmental organizations have already developed related approaches in other policy areas. The New England Aquarium and other boundary-spanning organizations have organized programs in this vein to address bycatch issues in other locales. Data presented below suggest that such approaches might be well-received by the Ecuadorian fishing industry.

6.2. Regulations pertaining to conservation and bycatch in fisheries

6.2.1. Marine mammals

Ecuador adopted protection measures for dolphins in the tuna fishery in 1990 through Resolution 203, which prohibits setting fishing gear on dolphins. The government later adopted regulations in concordance with IATTC measures and the dolphin protection program (AIDCP) (1999) (Table 5).

In 1990, the government issued Resolution No. 196 which protects whales. The Galápagos Marine Resources Reserve was declared a "whale sanctuary" and the rest of Ecuadorian territorial waters a "whale refuge", prohibiting any activity that threatens the lives of these marine mammals. This statement was considered at the time as a way to support the moratorium on whaling declared by the International Whaling Commission (IWC) in 1986. However, the extent of the prohibition is unclear as bycatch is not mentioned, nor whether "these animals" also include small cetaceans. In 2000, the Ministry of Environment issued Resolution No. 5 which expressly prohibits whaling in the country. Regarding artisanal fisheries, no specific regulations exist in the country on marine mammals. In fact, there is not an official statement acknowledging the problem.

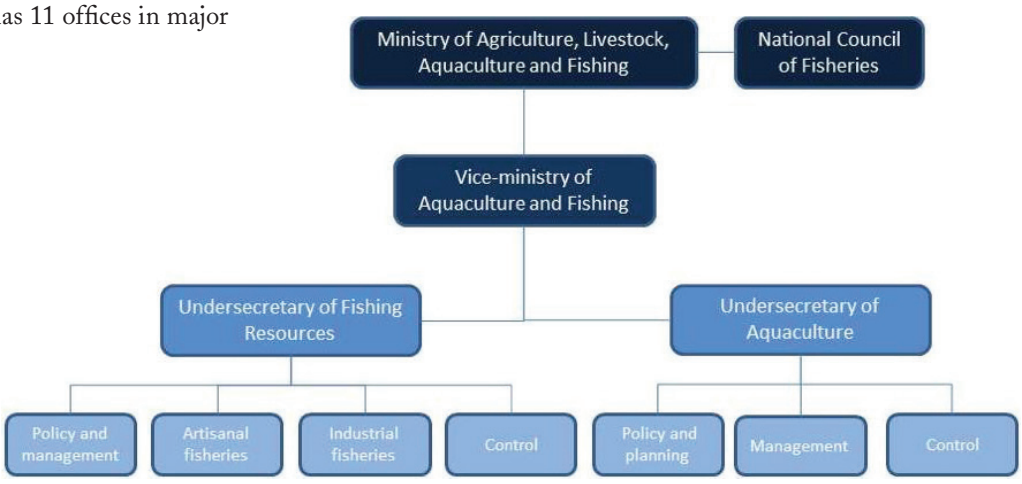

Figure 7. Organigram of the current fisheries institutions in Ecuador.

Table 5.

Relevant resolutions issued by the Sub-Secretary of Fishing Resources (SRP) regarding protection of species that may be involved in interactions with fisheries.

ISSUE	REGULATION
Protection of whales in jurisdictional waters of Ecuador. The Galápagos Marine Reserve was declared as a whale sanctuary.	Resolution 196, May 1990
Prohibition of setting on dolphins during tuna fishing operations	Resolution 203, May 1990
Protection for all species of sea turtles in Ecuador	Resolution 212, 1990
Prohibition of whaling	Resolution 5, 2000
Prohibition of shark fishing	Executive Decree 486, 23 July 2007
Prohibition of ray fishing (*Manta birostris, Mobula spp*.)	Resolution 93, 26 August 2010
Closure of shrimp trawl fishery (penaeid shrimps)	Resolution 065, 7 Dec 2012
Prohibition of taking hammerhead sharks (adults)	Resolution 116, 26 August 2013
Regulations for tuna vessels: observers on board, prohibition of fishing aggregating devices FADs, mitigation measures for incidental catch of sea turtles, dolphins and sharks, prohibition to land capture from vessels included in illegal, unreported and unregulated (IUU) fishing lists	Resolution 174, 7 October 2013

6.2.2. Sea turtles

All species of sea turtles in Ecuadorian waters are protected since 1990 when capture, processing and trading was prohibited (Resolution 212). In 2001 Ecuador joined the Inter-American Convention for Protection and Management of Sea Turtles (CIT) that established management measures to protect all populations and species of sea turtles within the area of the Convention. In 2014 the Ministry of Environment of Ecuador (MAE) adopted the National Programme for the Conservation of Sea Turtles (MAE, 2014). One of the main objectives of this Plan is to reduce the impact of fisheries by working together with the Sub-Secretary of Fisheries to assess and mitigate the impact of fisheries on these species.

6.2.3. Sharks

Shark fishing has been prohibited in Ecuador since 2007 by Executive Decree 486. However, the current catch (2011) according to official statistics is around 11,000 tons/year (statistics available from the website of the Vice Ministry of Fisheries). The Decree also obligates fishermen to land all sharks with fins attached to the body, otherwise they will not be considered as bycatch. Other specific regulations that prohibit the catch of whale sharks, hammerhead sharks and rays have been issued more recently (see Table 5).

6.2.4 Seabirds

Ecuador is signatory to the multilateral Agreement on the Conservation of Albatrosses and Petrels. In November 2008 Birdlife International's Global Program on Marine Birds was created in Ecuador, which promotes their conservation as part of fishing activities. The program included workshops, interviews, placement of observers on board and testing modified gear (Samaniego, 2009, 2011). Between 2010 and 2014, around 300 hundred trips were conducted aboard different fishing vessels (trawl, gillnets and longlines) and no mortality or entanglement was recorded (Samaniego, 2011, 2012, 2014). Similarly, no mortality of marine birds was reported in a bycatch study conducted on artisanal gillnet fleet from Santa Rosa, Salinas, in the period June 2009 and December 2010 by researchers of the National Institute of Fisheries (Coello et al., 2011).

6.3. International fisheries agreements

Ecuador has no specific fishing agreements with the United States. However, it is a party, or is in the process of becoming a party, to several regional fisheries organizations that regulate industrial fisheries.

6.3.1. Inter-American Tropical Tuna Commission (IATTC)

Ecuador is a signatory country to the IATTC Convention (1949) since 1961 but has not ratified the Antigua Convention (2010) which replaced the former. Ecuador has the largest tuna fleet in the eastern Pacific with 101 vessels. The capacity of most vessels ranges between 200 to 600 tons with few exceeding 1000 tons (see details in Appendix 1). The IATTC management measures are implemented through specific regulations of the Sub-Secretary of Fishing Resources (SRP).

Under the framework of the IATTC, Ecuador has also signed the Agreement on the International Dolphin Conservation Programme (AIDCP) (1999), by which the country is committed to undertake measures to reduce the incidental mortality of dolphins during fishing activities of the tuna purse seine fleet.

6.3.2. South Pacific Fisheries Management Organization

Ecuador joined the South Pacific Regional Fisheries Management Organisation (SPRFMO) in May 2015. The Ecuadorian fleet does not have a specialized fleet to catch jack mackerel (*Trachurus murphyi*), the main species currently regulated by this organization, but catches are occasionally reported mainly in the Gulf of Guayaquil (National Institute of Fisheries, 2014). However, in March 2014 Resolution No. 081 was issued, which authorizes and regulates the jack mackerel fishery in jurisdictional waters.

VII. CURRENT EFFORTS AND PROGRAMS TO ADDRESS BYCATCH

7.1. Governmental institutions

7.1.1. National Institute of Fisheries (Instituto Nacional de Pesca)

The National Institute of Fisheries, under the Ministry of Agriculture, Livestock, Aquaculture and Fisheries, carries out scientific research in support of fisheries management. The Institute is involved with various projects to evaluate living aquatic resources and their environment such as tuna, shrimp, squid, large and small pelagics, as well as carrying out hydroacoustic surveys. In addition to scientific research, the institution provides services assessing the quality of fishery and aquaculture products.

In 2011, the National Fisheries Institute published a document on bycatch in artisanal surface gillnets in Santa Rosa (Santa Elena province). The study included sharks, rays, birds, sea turtles and marine mammals (Coello, 2011). This is the first time that a government institution in Ecuador was involved in evaluating marine mammal bycatch.

Researchers from this institution regularly publish results through its four technical journals. The Institute has a website with general information and technical reports (www.institutopesca.gob.ec).

7.1.2. Technical Secretariat of the Sea (Secretaría Técnica del Mar [SETEMAR])

SETEMAR was created in 2011 with the mission to lead the coordination and formulation of an inter-sectoral plan among government agencies for ocean and coastal marine issues, through monitoring and enforcement of its policies. According its mandate, SETEMAR developed nine Oceanic and Coastal Policies adopted in 2012 and published in the Official Register Nº 383 in November 2014.

In early 2015, SETEMAR made public a proposal for a National Program for the Prevention and Control of the Incidental Capture in Fisheries, captured under two policies (out of seven total) to:

Policy 1: Preserve the natural and cultural heritage, ecosystems and biodiversity of marine and coastal area, respecting the rights of nature in mainland Ecuador, the Galápagos Archipelago, the territorial waters, the contiguous zone, the economic exclusive zone and the Antarctic; and

Policy 3: Develop and promote scientific research and technological innovation for a knowledge fair and caring society, in ocean and coastal marine realms.

The objective of this proposal is to prevent, control and reduce the incidental catches of non-target species, particularly in the case of endangered species. There have been two technical meeting with relevant stakeholders to define the specific objectives of program and the actions to be implemented. *[Note: As of 2016 this entity no longer exists].*

7.2. Intergovernmental organizations

7.2.1. The Permanent Commission for the South Pacific (CPPS)

Created in 1952, CPPS is an intergovernmental organization that coordinates maritime policies among its four member states (Chile, Colombia, Ecuador and Peru). Its purview includes scientific research, legal matters and environment protection. Since 2001 CPPS is based in Guayaquil, Ecuador. CPPS is also the Executive Secretary of the Lima Convention and its Action Plan for the Protection of the Marine and Costal Environment in the Southeast Pacific, one of the UN Environment Regional Seas Programs of which Panama is also a party.

In order to promote the conservation of marine mammals through regional cooperation, in 1992 the Southeast Pacific countries adopted the Action Plan for the Conservation of Marine Mammals in the Southeast Pacific. Within the framework of this Action Plan, different activities have been carried out, most of them focused on capacity building for technicians of governmental and scientific institutions, pilot projects on marine mammal bycatch, training on whale disentanglement, habitat modeling exercises, and the creation of a georeferenced database and digital repository (SIBIMAP), among others.

7.3. Non-governmental organizations

7.3.1. Whale Museum (Museo de Ballenas)

The Whale Museum is a NGO based in Salinas, Ecuador. It aims to contribute to the knowledge and conservation of marine mammals that inhabit Ecuadorian waters, through education and training of professionals, students and the general public. It has a private collection of marine mammal specimens open to the public since June 2004.

The main study carried out by researchers of the Whale Museum is a population assessment of Southeast Pacific humpback whales since 1991. This program focuses on several topics including marine mammal biology and ecology, interaction with fisheries, behavior, and strandings, among other topics. Additionally, it has conducted research on seabirds. Most of its studies are published in scientific journals. Articles and technical material for dissemination are available from its website (www.museodeballenas.org).

7.3.2. Ecuadorian Foundation for the Study of Marine Mammals - FEMM (Fundación Ecuatoriana para el Estudio de Mamíferos Marinos - FEMM)

The Ecuadorian Foundation for the Study of Marine Mammals was the first NGO created in the country dedicated to the research and conservation of marine mammals. It is based in Guayaquil. Researchers of this NGO carried out the first formal studies in Ecuador on marine mammals, on species such as coastal dolphin (*Tursiops truncatus*) and humpback whales, strandings, and the first studies on interactions with fisheries. Current activities include environmental impact studies, management plans for protected areas, and whale watching.

7.3.3. Blue Equilibrium (Equilibrio Azul)

Blue Equilibrium is a NGO working on conservation and research of marine biodiversity. Most of its work has been done in the Machalilla National Park, Province of Manabí. Its main projects include monitoring the shark fishery , bycatch of seabirds and sea turtles, tagging manta rays and sea turtles, monitoring sea turtle nesting beaches, reef monitoring and environmental education. Some technical documents are available from their bilingual website (in Spanish and English) - www.equilibrioazul.org.

7.3.4. Pacific Whale Foundation – Ecuador (Pacific Whale Foundation – Ecuador)

The Ecuador branch of the international NGO, Pacific Whale Foundation, is based in Puerto Lopez, Machalilla National Park, in the central part of Ecuador (Province of Manabí). It has conducted research on the distribution and abundance of humpback whales and bycatch of cetaceans. Other activities include training, environmental education and whale watching. Information on its activities, including scientific and technical publications, are available only in English through its website, www.pacificwhale.org/content/ecuador-research.

7.3.5. World Wildlife Fund (WWF)

World Wildlife Fund (WWF) was the first international NGO in the country. It began operations in Ecuador in 1962 in the Galápagos. Its country program has four focal areas: 1) sustainable tourism; 2) environmental management (solid waste, and renewable energy), 3) fisheries; and 4) management of protected areas. Regarding fisheries, its most important program involves certification of the mahi mahi (*Coriphaena hippurus*) fishery under the standard of the Marine Stewardship Council. In 2003, with the Inter-American Tropical Tuna Commission (IATTC), the National Oceanic and Atmospheric Administration (NOAA) and The Ocean Conservancy, WWF initiated a program to reduce the incidental mortality of sea turtles by changing traditional hooks for circle hooks. This program is on-going, and is supported by fishing authorities. WWF maintains a national website www.wwf.org.ec in English and Spanish, with brochures and other documents available on the site.

7.3.6. Nazca Marine Research Institute (Instituto de Investigaciones Marinas Nazca)

The Nazca Marine Research Institute is a NGO founded in 2004 to improve knowledge of the marine and coastal biodiversity of the region. Its work focuses on ecology, systematics and the conservation and sustainable use of marine resources, including fisheries. It has conducted research on humpback whales in the northern part of Ecuador. Nazca has a bilingual website (www.institutonazca.org) with general information about its activities. Some technical documents are available, especially maps on biophysical and ecological topics. They also have a Twitter handle: Instituto Nazca.

7.3.7. Birds and Conservation (Aves y Conservación)

Birdlife Ecuador is a subsidiary of Birdlife International based in Quito, the capital of Ecuador. It was created in 1986 with the objective to contribute to the conservation of birds and their habitats. Since 2009, it has been implementing the Global Seabird Program in Ecuador to monitor seabird bycatch, particularly that of albatrosses and petrels in artisanal fisheries, and by purse seine vessels in the central part of Ecuador. It has also implemented mitigation measures, with an experienced team working aboard fishing vessels with fishermen. Activities are disseminated through the site www.avesyconservacion.org.

7.4. Universities

There are five universities in the country offering degrees in marine science and fisheries (Table 6). Many of their students have worked on theses related to fisheries and marine biodiversity.

Table 6.

Universities on the coast of Ecuador with degrees related to marine biology and fisheries.

UNIVERSITY	DEGREE	LOCATION (CITY AND PROVINCE
Universidad de Guayaquil	Biology	Guayaquil, Guayas
Escuela Politécnica del Litoral ESPOL	Biology	Guayaquil, Guayas
Universidad Península de Santa Elena	Marine biology	Libertad, Santa Elena
Universidad Técnica Eloy Alfaro	Fisheries biology	Manta, Manabí
Universidad Católica del Ecuador PUCE	Marine biology	Bahía de Caráquez, Manabí

VIII. PROJECT IMPLEMENTATION

8.1. Compilation of available Information on marine mammal bycatch

There are only 14 reports and scientific papers published between 1990 and 2012, related to marine mammal bycatch in Ecuador; seven published in international journals and seven in local technical journals. In addition, there are 5 technical reports submitted to the Scientific Committee of the International Whaling Commission (IWC). Only three published studies included interviews and/or observers on board to assess bycatch, five refer to stranding records, two rely on whale entanglement rates observed at sea, and the rest are reviews. All studies refer to artisanal gillnets used for large pelagic fish such as tuna, marlins, and sharks, among others.

The first studies to assess the magnitude of the marine mammal bycatch in Ecuador were carried out in early 1990's. Reports identified problems for several species of small cetaceans such as the common dolphin (*Delphinus delphis*) and spotted dolphin (*Stenella attenuata*) (Félix and Samaniego, 1994) (Figure 8). The authors mentioned a possible trade of dolphin carcasses between Ecuadorian and Peruvian fishermen to be used as bait. Additionally, sperm whales (*Physeter macrocephalus*) and humpback whales (*Megaptera novaeangliae*) were found beached during that decade entangled with fishing gear, showing that the problem also affected large whales (Chiluiza et al., 1997; Félix et al., 1997).

Figure 8. Common dolphin caught in gillnet off Salinas, Ecuador (Photo: J. Samaniego).

Newer bycatch studies were conducted in the same ports off the central coast of Ecuador (Rosero and Castro, 2010; Coello et al., 2011). The results of these studies showed that cetacean bycatch continued in significant numbers as reported by Félix and Samaniego (1994) twenty years ago. It is important to highlight that for the first time a government institution, the National Fisheries Institute, conducted an assessment of bycatch in Santa Rosa (Coello et al., 2011). The assessment focused on the artisanal gillnet fishery, and monitored sharks, sea turtles, seabirds and marine mammals. Even though a government institution conducted the study, no management measure has been taken to mitigate the impact on marine mammals in artisanal fisheries; nor have any studies assessed alternatives to reduce the associated mortality of these species in Ecuador.

In the last ten years there has been an increase in humpback whales (*Megaptera novaeangliae*) entangled in fishing gear (Félix et al., 2011a; Alava et al., 2012) (Figure 9). This may be the result of both increased fishing effort and the recovery of the Southeast Pacific humpback whale stock (referred to as Breeding Stock G by the International Whaling Commission (IWC, 1997). The problem will likely worsen over time if mitigation measures are not implemented.

Figure 9. Humpback whale entangled in a gillnet off of Salinas, Ecuador (Photo: F Félix).

Species reported as bycatch in Ecuador include five delphinids *Delphinus delphis, Stenella attenuata, Grampus griseus, Globicephala marcrohynchus* and *Tursiops truncatus*, one beaked whale, *Ziphius cavirostris*, two physeterids, *Kogia sima* and *Physeter macrocephalus*, and one baleen whale, *Megaptera novaeangliae* (Félix et al 2011b). Detailed information on bycatch rates, fishing gear and species involved is included in a database in Appendix 6.

8.2. Identification of fisheries and products exported from Ecuador to the USA and associated bycatch

8.2.1. Volumes of fish exported by Ecuador

To identify Ecuadorian fisheries with products exported to the USA, several fishing companies located in Manta and Salinas were visited as well as four associations of producers and exporters of fish products. The association of exporters of white fish, ASOEXPEBLA, published a handbook on exported fish products from artisanal fisheries and industrial fisheries (Martinez, 2010). This handbook contains information on fish species, landing areas, and gear used, among other information, which was very useful to characterize fish and other seafood exports. Additional information was obtained from interviews with technical personnel of the Sub-Secretary of Fishing Resources in Manta.

Statistics on fish exported by Ecuador in the last five years were obtained from the Central Bank of Ecuador (www.bce.gob.ec). The United States is one of the main export destinations of Ecuadorian fishery and aquaculture products.

Export volumes increased 23% between 2009 and 2013 from 93,000 to 115,000 t and the value of exports in the same period increased 92% from US$471 million to $909 million (Figure 10). The volume of fish and shrimp exports from Ecuador to the USA increased around 25% in the last five years and the value in US dollars has almost doubled (see Table 7 and 8). These figures reflect an increase in the price of products such as tuna and shrimp in the international market, and the exportation of fish with added value (e.g., fresh).

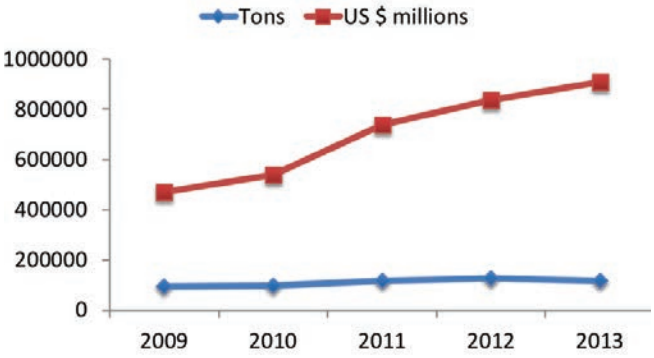

Figure 10. Total exports of fish products from Ecuador to the USA in the period 2009-2013, in tons (blue line) and US dollars (red line). Source: Central Bank of Ecuador.

For analytical purposes, exported products were grouped into five categories: shrimp, tuna, canned sardine/mackerel in tomato sauce and oil, whitefish and others. The first three items are self-explanatory, while the white fish category includes dozens of species of fish taken mainly by small-scale fisheries. The last category includes many species of fish and shellfish in different forms. The proportions of each item in value and tons are shown in Tables 7 and 8. The most important export product to the USA in the period is shrimp with 62% in volume and 65% of total sales in US dollars. The second most important export item is whitefish with 21% of total volume and 22.5% of the total value of exports. Tuna is third with 11.4% of the total volume and 9.65% of the total value. Canned products represented 3.1% and 1% of the volume and total value. Finally, the "others" category represented 2.5% of total volume and 2% of total sales.

8.2.2. Fish origin, fish species and fisheries with potential to cause incidental mortality of marine mammals

Tuna. All tuna included in this category is from the industrial fleet (19% of the total volume and 16% of the value), which is exported whole and processed in various forms. The main tuna species are *Thunnus albacares* and *T. obesus*. This fishery is regulated by IATTC of which both Ecuador and the USA are members. This is one of the best monitored fisheries in the world with an observer coverage level of 100% in vessels over 400 tons. Interactions with cetaceans occur with the Ecuadorian fleet; a boat with the Ecuadorian flag is authorized to set on dolphins, while others set on floating logs and schooling fish where interactions are lower. Information on bycatch is available only to member countries through the IATTC Secretariat, and for this review our inquiries were not answered. Nonetheless, seeing as bycatch in this fishery is already well monitored, it was not included in this study.

Shrimp. Shrimp is mostly exported frozen whole but some is also processed as headless, peeled, and canned, among other forms. Currently all shrimp exports come from coastal aquaculture as shrimp trawling vessels ceased operations in December 2012 (Resolution 065, December 2012). The main species of cultured shrimp are *Litopenaeus vannamei* and *L. stylirostris*. Since all shrimp comes from inland aquaculture facilities there is no possibility that obligate marine cetaceans interact with any stage of production. Fishmeal processed from wild-caught fish likely has marine mammal bycatch however most of it is imported from overseas fisheries.

Table 7.
Volume of fish products exported from Ecuador to the USA in tons during the period 2009-2013. Source: Central Bank of Ecuador.

ITEM	2009	2010	2011	2012	2013
Tuna	6575.90	7788.03	16174.03	16017.94	16024.58
Shrimp	57326.47	59679.72	72182.77	78321.30	72157.42
Whitefish	24168.43	24227.94	21923.32	24310.55	20031.09
Canned	3054.99	2791.72	2978.84	4575.9	3885.30
Other	2443.49	1844.62	2230.87	4299.93	3216.41
TOTAL	**93569.28**	**96332.03**	**115489.83**	**127525.62**	**115314.80**

Table 8.
Value (in US $) of fish products exported from Ecuador to the USA during the period 2009-2013. Source: Central Bank of Ecuador.

ITEM	2009	2010	2011	2012	2013
Tuna	28234.34	33146.93	78389.66	91413.70	106489.14
Shrimp	286719.42	352951.53	488597.08	512151.64	623477.66
Whitefish	142200.94	140497.41	155799.80	199114.54	150682.36
Canned	6007.30	5057.63	5698.02	9094.13	7712.13
Other	8315.20	6448.58	11953.79	25683.51	20764.40
TOTAL	**471477.20**	**538102.08**	**740438.35**	**837457.52**	**909125.69**

Whitefish. This category includes at least 45 fish species as indicated in the ASOEXPEBLA handbook (Martínez, 2010). The main species exported include mahi-mahi, tilapia, tuna, swordfish, billfish, hake, and sharks (as bycatch). The list of target species, landing ports and fishing gear are shown in Appendix 7. The vast majority of whitefish comes from artisanal or small-scale fisheries using gillnets and longlines, but also includes some fish from industrial purse seiners. As mentioned above, whitefish represents approximately 22% of total export value in US$ from Ecuador to the USA in the period 2009-2013 (Tables 7 and 8). Whitefish also includes tilapia *Oreochromis spp.* from aquaculture facilities. Tilapia represents approximately 28% of the whitefish exported to the USA (Table 9). Like shrimp, tilapia comes from inland facilities; therefore this product is not associated with obligate marine cetacean bycatch.

In the case of artisanal products, catches basically come from two types of gear: gillnets and longlines, either surface or bottom set. An effort was made to identify the fishing gear used based on the type of product exported, fresh and frozen/chilled meat (Table 9). It is presumed that most of the fresh product, if not all, is captured with longlines, handlines or pole and line. Fresh fish represents 31% by volume and 34.6% of whitefish export value in the period January 2013-May 2014. Frozen/chilled fish would be mostly caught with gillnets, and represents approximately 40% of total whitefish exported to the USA. This is an approximation because it is not possible to distinguish with precision what proportion of white frozen fish meat comes from each gear type. It is possible that quality and/or market demand are the criteria used in the processing plant to determine the type of product to be exported. It is impossible to know with certainty how much of each of the species listed in Appendix 7 was exported, as processing plants likely do not have records at the level of species in all cases. In the codes used by the Central Bank of Ecuador to classify exports of fish products by categories (e.g., fresh, frozen, processed, etc.) the species of fish exported is not specified in every case.

Table 9.

Composition of the white fish exported from Ecuador to USA in tons and US dollars in the period January 2013-May 2014. Source: Central Bank of Ecuador.

	EXPORTS TO USA			
ITEM	TONS	%	US $ (X1000)	%
White fish fresh	7,764.78	31.1	65,320.73	34.6
White fish meat	10,073.28	40.3	80,014.87	41.3
Tilapia	7,151.69	28.6	43,662.98	24.1
TOTAL	**24,989.75**	**100.00**	**188,998.58**	**100.00**

According to bycatch studies carried out in Ecuador, the artisanal longline fishery does not have marine mammal bycatch, but it does interact with sea turtles and seabirds (Coello et al., 2011; Andraka et al., 2013). In contrast, several studies indicate that gillnets, particularly those set on the surface for large pelagic fish, have the highest bycatch rates (Félix and Samaniego, 2004; Castro and Rosero, 2010; Félix et al., 2011; Herrera et al., 2013).

Canned fish in tomato sauce and oil. These products come from the industrial small pelagic purse seine fleet. The main species include thread herring (*Opisthonema spp.*) and mackerel (*Scomber japonicus*) (Prado, 2009; González and Solis, 2010). No bycatch studies have been conducted in this fishery, but it is presumed that occasionally marine mammals are caught.

Others. This category includes different species of fish, mollusks and crustaceans in different forms (whole, parts or live) from both industrial and artisanal fisheries. Volumes of these products are low.

In summary, of the five categories of seafood exports to the USA, for the purposes of this study three of them are considered low priority (shrimp, tuna and others) and two are high priority (whitefish and sardines in tomato sauce).

8.3. Exporters of seafood to the USA

Fifty-four companies exported whitefish to the USA between January 2013 and June 2014, most of which are based in Manta and Guayaquil (Figure 11). There are at least 10 coastal cities where plants and exporting companies are located. The list of companies currently exporting whitefish to the USA is shown in Appendix 8.

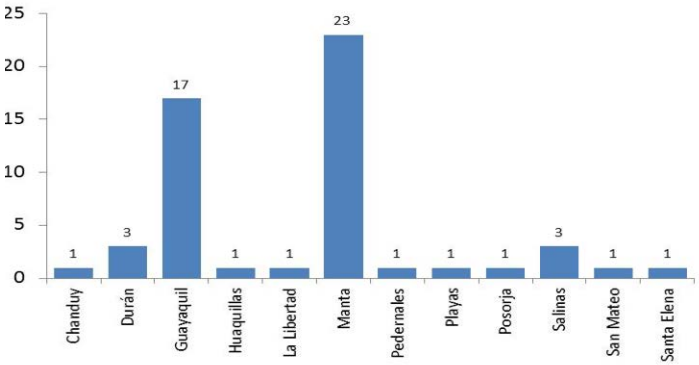

Figure 11. Number of companies that exported whitefish to the USA by port of origin for the period January 2013-May 2014.

With regard to canned sardine/mackerel, 16 companies exported these products to the USA in the same period (Figure 12). These companies are located mainly in Manta and Guayaquil, and a few in Salinas and Posorja. The complete list of exporting companies is shown in Appendix 9.

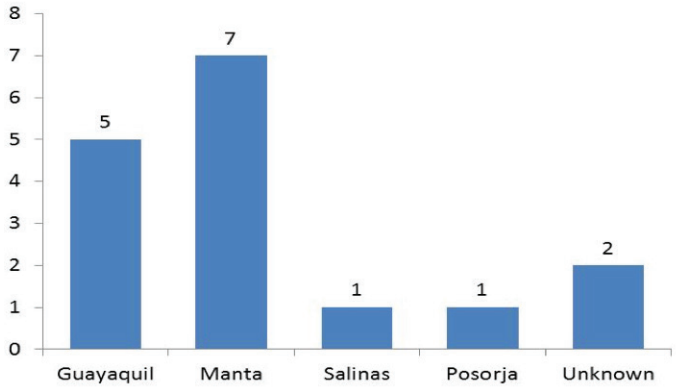

Figure 12. Number of companies that exported sardine/mackerel in tomato sauce to the USA by port of origin for the period January 2013-May 2014.

8.4. Fieldwork

8.4.1. Team selection and training

A team of four field data collectors was selected based on their expertise in fisheries, biology, or community development (Figure 13).

Figure 13. Team members during the field phase of the training process.

Prior to beginning field data collection, the team social scientist led an interactive training workshop and pilot field interviews in two fishing villages on the central coast of Ecuador: San Rosa and Anconcito. Training materials and group discussion covered information about the purpose and scope of the project, ethics, analytical rigor, effective communication, particular interview questions, interviewee recruitment, data documentation, methodological transparency, and planned integration of multiple information sources. Questionnaires were modified following pilot interviews.

8.4.2. Questionnaire design

Two semi-structured questionnaires were designed for interviews, one for fishermen to describe their fishing experiences and perceptions in relation to marine mammals, and another for fishermen or others with fishing-related experience (e.g., boat owners, port administrators, scientists and authorities), to describe more generalized port characteristics and activities, including with respect to marine mammals. Most interviews lasted about 20-45 minutes. Questionnaires included closed and open questions on:

- Contextual information about the interview
- Experience in fisheries
- Port, fleet, gear, and fishing activities information
- Personal perceptions about marine mammals
- Interactions with whales, dolphins and sea lions in the last 12 months, including species identifications
- Changes over time in fishing and bycatch
- Prospects for future collaboration in bycatch mitigation
- Uses and markets
- Additional comments
- Interviewer notes on trustworthiness of the information collected.

8.4.3. Sampling frame

Because a randomized sample is virtually impossible to obtain in existing field conditions, the completed interviews do not represent a randomized or fully stratified sample of the Ecuadorian fleet as a whole. Instead, a nested sampling frame selected field interviewees through purposive criteria, including: 1) species export status, 2) prior knowledge of potential gear interactions with marine mammals, 3) gear usage per port, 4) geographic representation, 5) travel time and associated costs, and 5) access to prospective interviewees. Interviewers visited 21 ports, in four of five coastal provinces, focusing on ports with high use of gillnets and purse seines, given that background reports indicated those gears had higher marine mammal bycatch rates. The resulting sample was also more concentrated in the central portion of the Ecuadorian coast. Interviewers selected most individual interviewees opportunistically, often approaching them as they conducted shoreside vessel and gear maintenance to inquire of their willingness to participate in the study. Interviewing purse seiners proved more challenging than interviewing gillnetters, however, resulting in a disproportionately small sample of purse seiners. Although some small, artisanal boats interchange small purse-type seines with other gear, often working at easily accessible beach sites, there exists a distinct fleet of mid-size purse seine vessels. Many of these crews and owners conduct their shoreside operations in enclosed, private areas without public access, and were not necessarily responsive to interview inquiries. A much larger, industrial scale fleet also exists in Ecuador, including those harvesting for fish meal. The sample also included these vessels.

Most interviews were conducted between August 1 and November 30, 2014 (120 days). When feasible, permission was also asked of fishermen to audio-record the interview with a small digital device for purposes of documentation. Overall, fishermen were open to being interviewed, though often crew directed interviewers toward boat owners or captains.

Images of ten species of cetaceans reported previously as bycatch in Ecuador were shown to interviewees at the end of the interview if they reported having suspected or known interactions of marine mammals with fisheries. Then fishermen were asked to identify the species involved during the interview. In order to reduce potential misreporting, interviewers asked for specific characteristics of cetaceans such as coloration patterns, behavior, form of the head, etc.

Answers reported here were tallied on a per interview basis, regardless of the number of people present. In some instances, not all questions were asked, or not all answers were provided.

8.4.4. Ports surveyed

Interviewers visited 21 ports during this study in four of five coastal provinces of Ecuador. As noted above, criteria to focus interview effort included ports with a larger proportion of gear of interest as identified earlier (gillnets and purse seine) and a balance between travel logistics and available funds. A summary is shown in Table 10.

Table 10.

Ports visited during the study period and size of the total fleet. Source: Coello et al. (2013).

PORT	PROVINCE	POSITION	PORTFLEET (BOATS)
Pedernales	Manabí	0° 4'25.00"N, 80° 4'29.07"W	55
Bahía	Manabí	0°37'30.53"S, 80°25'28.58"W	12
Jama	Manabí	0°10'47.88"S, 80°17'15.48"W	329
Cojimíes	Manabí	0°21'53.54"N, 80° 2'14.01"W	209
Chorrera	Manabí	0° 2'44.96"N, 80° 4'52.57"W	82
San Vicente	Manabí	0°36'5.03"S, 80°24'18.24"W	111
San Jacinto	Manabí	0°46'57.89"S, 80°30'59.90"W	100
Crucita	Manabí	0°51'55.20"S, 80°32'6.70"W	56
Jaramijó	Manabí	0°56'55.04"S, 80°38'1.96"W	89
Manta	Manabí	0°56'42.87"S, 80°43'26.71"W	848
San Mateo	Manabí	0°57'37.32"S, 80°49'39.68"W	628
Puerto Cayo	Manabí	1°20'51.03"S, 80°44'8.98"W	140
Machalilla	Manabí	1°29'33.37"S, 80°47'39.46"W	40
Puerto López	Manabí	1°32'24.28"S, 80°48'30.57"W	300
Santa Rosa	Santa Elena	2°12'34.26"S, 80°57'0.04"W	1410
La Libertad	Santa Elena	2°13'17.63"S, 80°54'48.97"W	58
Anconcito	Santa Elena	2°19'44.45"S, 80°53'24.38"W	600
Chanduy	Santa Elena	2°24'4.66"S, 80°41'26.62"W	342
Posorja	Guayas	2°42'28.83"S, 80°14'33.26"W	250
Puerto Bolívar	El Oro	3°16'14.62"S, 80° 0'1.82"W	1545

8.5. Results of field data collection

8.5.1. Completed interviews

A total of 194 questionnaire-based interviews were completed during the study period, 179 using the fishermen form and 15 using the port form (Table 11). In most interviews only one person was answering questions but in almost half the cases (43%) more than one person was involved, at least as a passive observer. The total number of persons who were exposed to the interviews as participants or direct observers was more than 340. Crucita was the port with the highest number of interviews followed by Puerto Bolívar, Santa Rosa, Machalilla and Puerto López.

Table 11.

Number of interviews by type, location, and month during the study period August-November 2014.

	FISHERMEN				PORT				
PORTS	AUG	SEP	OCT	NOV	AUG	SEP	OCT	NOV	TOTAL
Anconcito	2		6				3		11
Bahía		3							3
Chanduy			2				3		5
Chorrera						1			1
Cojimíes			8				1		9
Crucita	10			11		1			22
Jama			10						10
Jaramijó	6			3		1			10
La Libertad	2								2
Machalilla	10	5	3						18
Manta	10								10
Pedernales		8							8
Posorja			5						5
Puerto Bolívar		2	9	10					21
Puerto Cayo	10	1							11
Puerto López	7	2		9					18
San Jacinto	2								2
San Mateo	1								1
San Vicente		3							3
Salango			6						6
Santa Rosa	3		10				5		18
Total/month	**63**	**24**	**59**	**33**	**0**	**3**	**12**	**0**	**194**

8.5.2. Fishing gear

Interviewees were asked about the fishing gear they used during the past 12 months. Of 173 responses, in 128 cases (74%) fishermen responded that they used only one general type of gear (gillnet, purse seine, hooks, trawl, other), while in 45 cases they used two different general gear types (26%) (Figure 14). Accounting for variations within general gear types, such as surface and deep-water gillnets, 65 fishermen responded using more than one gear within the last 12 months.

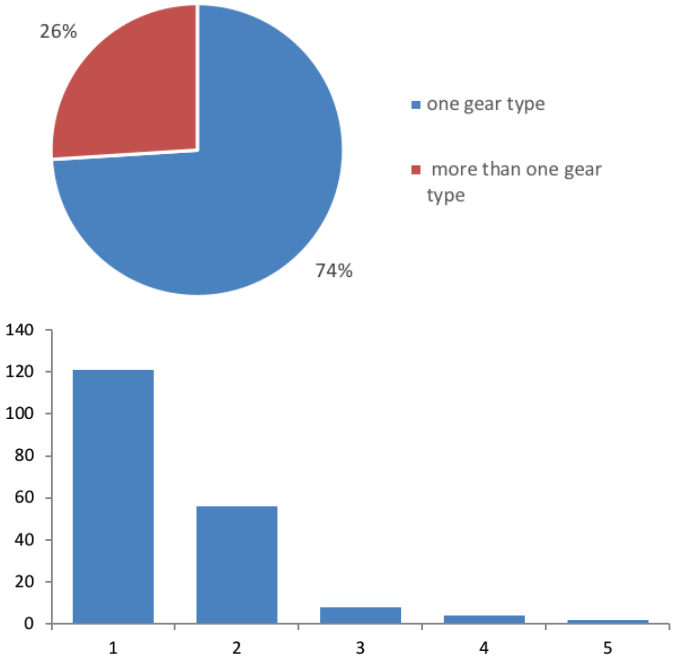

Figure 14. Number of fishing gear used by fishermen in the last 12 months.

The most common fishing gear used by interviewed fishermen (as intended according to sample design) was gillnets (surface and bottom) (54%) then longlines, purse seines (including both artisanal risos and industrial scale), and beach nets. Other gear less frequently used were trawl nets and handlines.

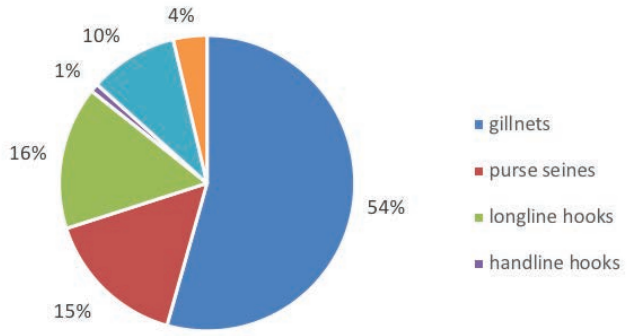

Figure 15. Proportion of each fishing gear used by interviewees (n=191) in the last 12 months.

8.5.3. Interactions with marine mammals

Several questions were asked of fishermen related to marine mammal bycatch. The first series concerned their perception of the three marine mammal types: whales, dolphins and sea lions. Interviewers asked fishermen if, in the context of fishing operations, they perceive these animals as beneficial, a difficulty, both, or neither, and for what reasons. Interviewers asked fishermen what their perceptions are of these animals aside from fishing considerations. They also asked questions about frequency of bycatch, changes in bycatch rates, uses of marine mammals, ideas to reduce bycatch, mammal species identifications, and other non-mammal species bycatch. Interview results are analyzed in this section.

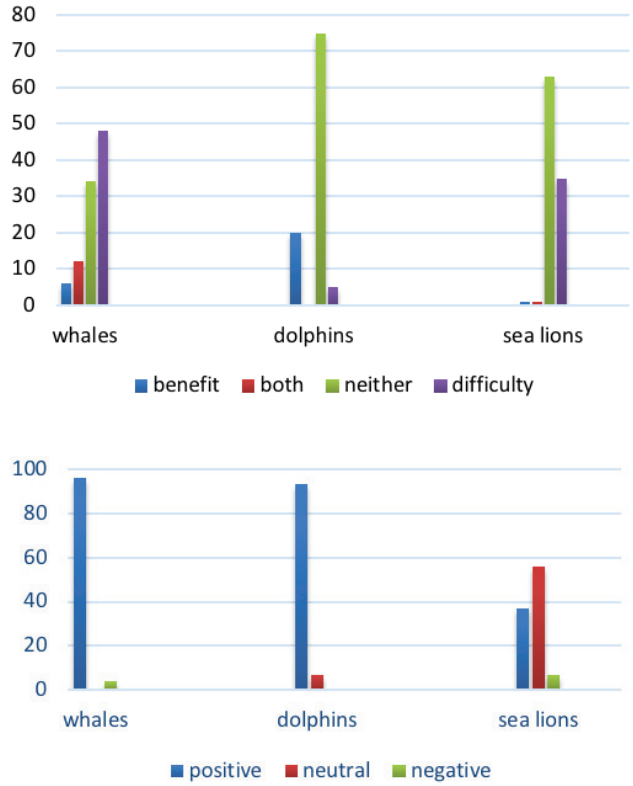

Figure 16. Perception of marine mammals by fishermen in terms of fishing operations (above) and non-fishing considerations (below). Data are shown as proportions.

8.5.3.1 Whales

In the case of whales, among 172 interviews, 82 (48%) of interviews stated that they are only a difficulty, 10 (6%) stated that they are only a benefit, 21 (12%) stated that they are both benefit and difficulty, and 59 (34%) stated that they are neither.

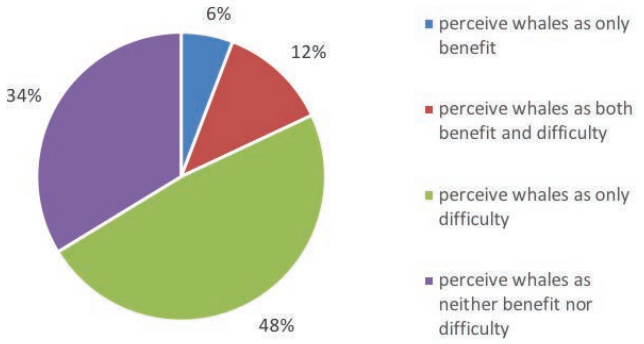

Figure 17. Interviewee perceptions of whales from a fishing perspective.

Among 123 reasons provided, 73 (59.3%) mentioned costly damage to or loss of nets, 10 mentioned the danger of collisions or interference with boats, 10 (5.8%) mentioned the benefit that fish can be found near whales, and 2 (1.6%) mentioned a sense of awe or environmental responsibility. Twenty-nine mentioned tourism, some as a present or past benefit, but also including 14 (11.3%) who regretted that tourism was a past benefit but is no longer, due to restrictions on whale watching trips.

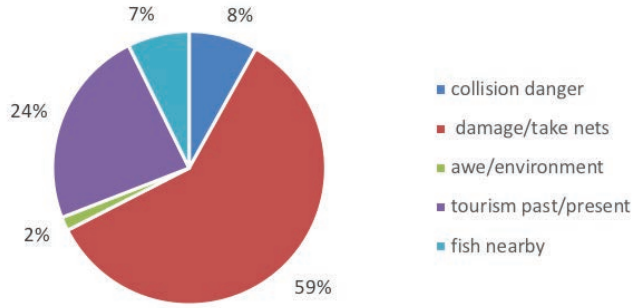

Figure 18. Interviewee rationales explaining fishing-related perceptions of whales, positive and negative.

When asked about their perceptions of whales from a non-fishing perspective, among 71 responses, 29 (41%) expressed appreciation or awe for whales' beauty, peacefulness, intrinsic environmental value, or companionship at sea; 39 (55%) concerned the economic or social value to tourism; and 3 (4%) noted danger of collisions with boats.

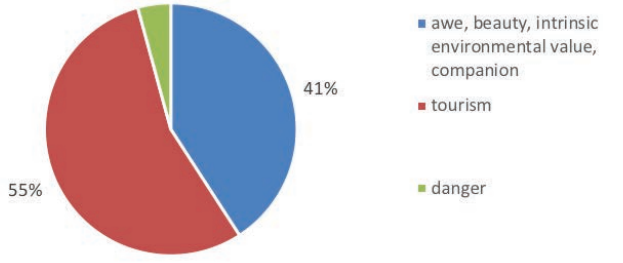

Figure 19. Interviewee rationales for non-fishing-related perceptions of whales, positive and negative.

8.5.3.2 Dolphins

In the case of dolphins, among 175 interviews conveying perceptions from a fishing perspective, 133 (76%) stated that they are neither beneficial nor a difficulty, 36 (20.5%) stated that they are a benefit, 8 (4.5%) stated them to be a difficulty, but of these, 2 (1%) stated that they are only a minor difficulty.

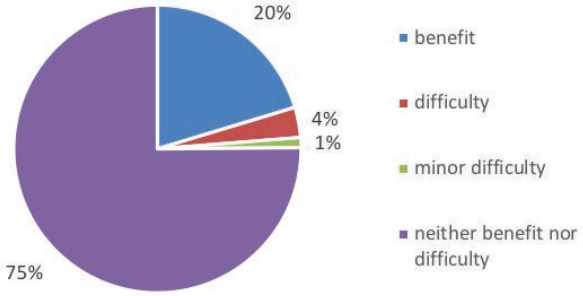

Figure 20. Interviewee perceptions of dolphins from a fishing perspective.

Ninety-five interviews included specific comments about dolphins in relation to fishing. Of these, 30 (31.5%) explained that dolphins are helpful because they attract fish, alert fishermen to where fish are, provide a guide for fishermen in navigation, or even intentionally assist them, such as in rough weather. Six (20%) noted that dolphins attract tourism. Four (1.3%) said dolphins sometimes take fish from longlines or steal bait.

Among these 95 interviews with specific comments, 8 (8.4%) said that dolphins sometimes get entangled in nets and one said they can steal nets. Among these, 9 (9.4%) conveying entanglement as a problem, 3 (3.1%) noted that the dolphins sometimes die by drowning or if their fin is cut while disentangling. One noted that small dolphins cry like people when they are too weak to disentangle themselves.

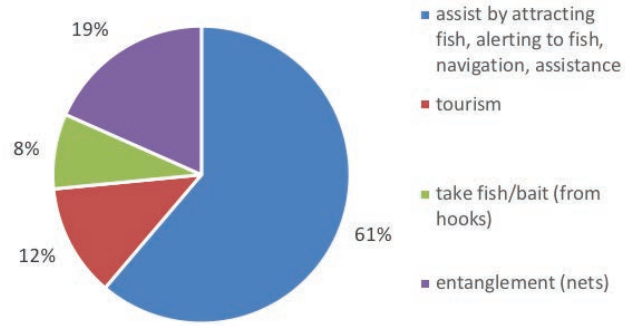

Figure 21. Interviewee rationales explaining fishing-related perceptions of dolphins, positive and negative.

In commenting about dolphins aside from specific fishing issues, of 46 comments, 3 (6.5%) were apparently neutral, referring to tourism or dolphin habits, and 41 (89%) were positive, saying that dolphins are pretty, entertaining, playful, smart, companions or friends, like humans, that fishermen like to feed them, or that they should be helped to disentangle when caught and should not be hunted. Two (4.3%) were positive, referring to tourism. Three were neutral, referring to their location or past history.

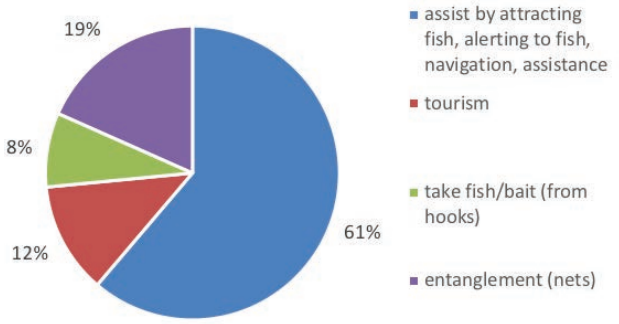

Figure 22. Interviewee rationales explaining non-fishing-related perceptions of dolphins, positive and negative.

8.5.3.3. Sea lions

In the case of sea lions, among 172 interviews conveying perceptions from a fishing perspective, 109 (63%) stated that they are neither beneficial nor a difficulty, 60 (35%) stated they are a difficulty, 1 (0.6%) stated that they are a benefit, and 1 (0.6%) stated that they are both a benefit and a difficulty.

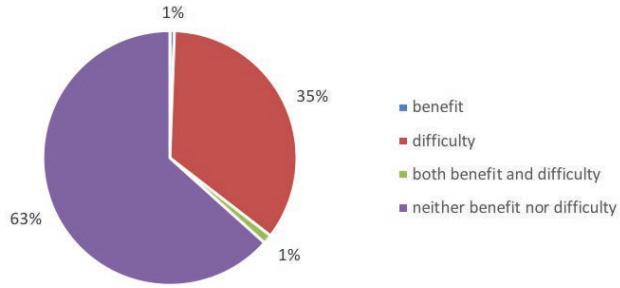

Figure 23. Interviewee perceptions of sea lions from a fishing perspective.

Seventy-one interviews included specific comments about sea lions in relation to fishing. Sixty-four (90%) interviews expressed that sea lions eat fish, including after it had been already ensnared by fishing gear, often damaging the catch sufficiently to have minimal market value, and/or that sea lions damage fishing gear in this process. These concerns were expressed across gear types. Seven (10%) expressed different sentiments, such as that sea lions steal bait, are a benefit to fishing or tourism, or are only a problem elsewhere.

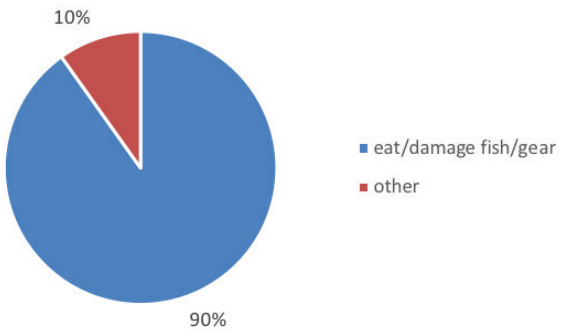

Figure 24. Interviewee rationales explaining fishing-related perceptions of sea lions, positive and negative.

Fifty-eight interviews addressed perceptions of sea lions apart from fishing. Among these, 31 (53%) were neutral, such as conveying that sea lions are locally rare, were only present in the past, or noting some incidental observation such as their behavior. Sixteen (27.5%) were positive, expressing admiration for their appearance, intelligence, or benevolence. Seven (12%) conveyed their value as tourism attractions, 4 (7%) found them dangerous or aggressive, and 3 (5%) noted that they sometimes die, such as in collisions.

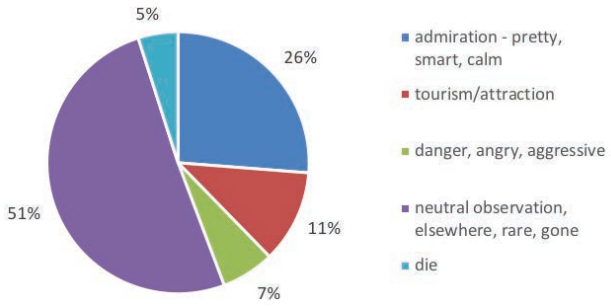

Figure 25. Interviewee rationales explaining non-fishing-related perceptions of sea lions, positive and negative.

8.5.3.4. Frequency of entanglement

Several interview questions attempted to assess the frequency of potential and observed marine mammal interactions. These included questions about the number of whales, dolphins, and sea lions observed in the last 12 months while fishing, and the number of whales, dolphins, and sea lions known to have fishing gear attached to them, including whether they were alive or dead. Answers to these questions were often incomplete or too few and variable to be reliably reported without further analysis and corroboration, but they do provide some useful indication of the potential scope of entanglement problems, and the apparent willingness of fishermen to discuss the issue.

Combining fisher and port interviews, the number of interviewees providing answers about whale observations was 174. When asked to provide an estimate of the number of whales seen in the last year, 94 stated that they see many whales, or in uncountable numbers, or weekly or daily during certain periods. Several provided a rough annual estimate, as asked, which ranged from 0-1000 and averaged at 69. Six said they see whales rarely or occasionally.

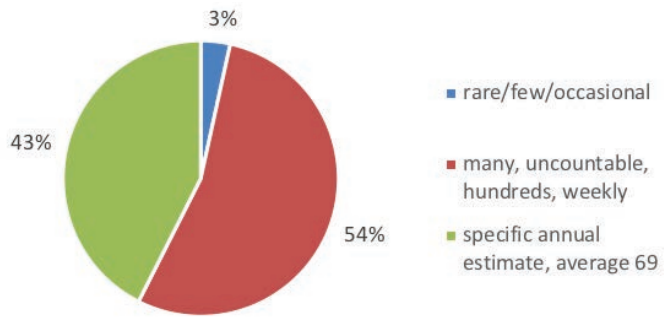

Figure 26. Percentage of interviews reporting whale sightings while fishing.

When asked about whales seen to have evidence of entanglement with fishing gear within the past 12 months, 86 interviews included pertinent answers. Of these, 47 (54.6%) said they had not seen whales with evidence of entanglement. Fifteen (17.4%) reported seeing one whale with such evidence, 6 (7%) reported seeing two, 3 (3.4%) reported seeing 3, 5 (6%) reported seeing 4 or more, 4 (5%) reported that they had only seen such instances prior to the last 12 months, and 2 (2%) replied that it is difficult to see such evidence. Details on gear type was not quantifiable or able to be determined reliably, but included mention of hooks, gillnets, and purse seines.

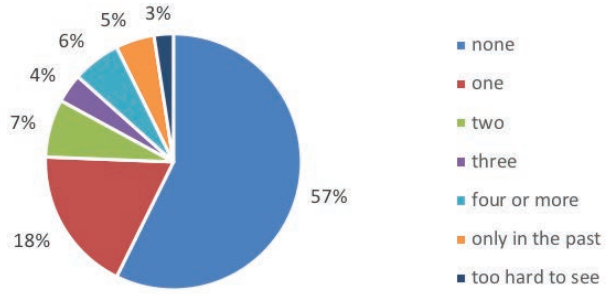

Figure 27. Number of interviews with fishermen reporting observation of whales with evidence of entanglement in the last 12 months.

With respect to dolphin sightings, 135 interviews included pertinent information. Of these, 46 (34%) reported seeing dolphins daily, 36 (27%) reported seeing them weekly, 21 (15%) reported seeing them monthly, 27 (20%) reported seeing them occasionally and 1 (1%) reported not seeing them. Because dolphins often travel in groups, precise numbers of individual dolphins were too difficult to discern.

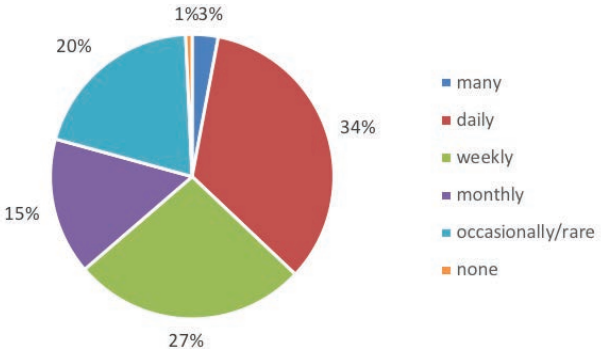

Figure 28. Number of interviews reporting dolphin sightings while fishing.

When asked about dolphins known to have evidence of entanglement with fishing gear within the past 12 months, 89 interviews had pertinent answers. Of these, 35 (39%) said they did not know of dolphins with evidence of entanglement and 4 (4.4%) only reported knowing of such instances from other boats or in the past. Fifty (56%) reported knowing of at least one dolphin with such evidence in the last 12 months. Among these, 11 (12%) specified knowledge of 1, 2 or a few, while 6 (7%) reported knowledge of "many". When asked for further details, four specified that dolphin entanglements happen frequently, daily or monthly. Of these four (5%), all had used gillnet gear and one had used longline gear. Some mentioned feeling compassion for the entangled dolphins and releasing them if alive.

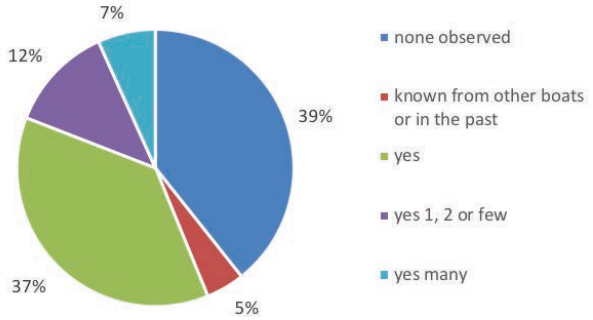

Figure 29. Number of interviews with fishermen reporting knowledge of dolphins with evidence of entanglement in the last 12 months.

With respect to sea lion sightings within the last 12 months, 116 interviews included pertinent information. Of these, 20 (17%) reported seeing sea lions daily or daily during the species seasonal occurrence, 12 (10%) reported seeing them weekly or weekly during their season, 16 reported seeing them monthly, 34 (29%) reported seeing them rarely or occasionally, and 33 (28%) reported not seeing them.

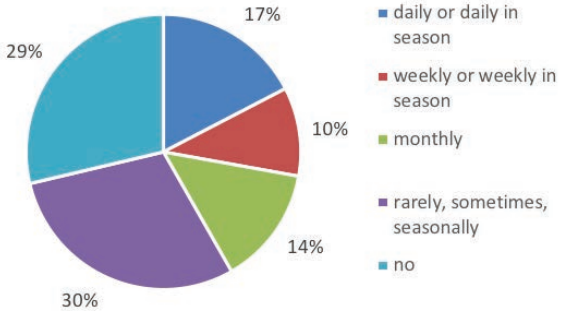

Figure 30. Number of interviews reporting sea lion sightings while fishing in the last 12 months.

When asked about sea lions known to have evidence of entanglement in fishing gear within the past 12 months, 67 interviews had pertinent answers. Of these, 51 (76%) said they knew of no sea lions with evidence of entanglement, 10 (15%) said they knew of sea lions with evidence of entanglement, or noted knowledge of one to a few a year, or in the past. Six (9%) interviews reported knowledge of sea lions entangled monthly, weekly, daily or often. These 6 represented varied boat sizes and gear types.

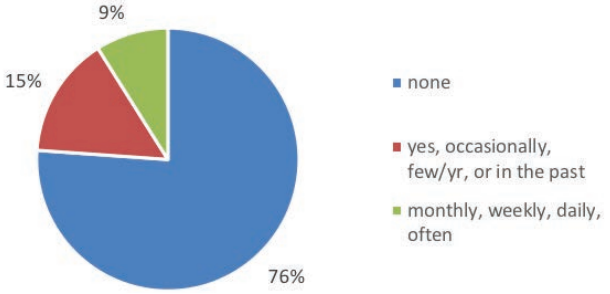

Figure 31. Number of interviews with fishermen reporting knowledge of sea lions with evidence of entanglement in the last 12 months.

8.5.3.5. Entangled species

Images of 10 species of cetaceans previously reported as bycatch in Ecuador were shown to interviewees who seemed willing to discuss particular observations. Fishermen were then asked to identify the species they had seen entangled. They were asked to identify them using the images, but also to offer any descriptions such as coloration patterns, morphology, and behavior.

Fishermen expressed confidence and willingness to identify species they had seen entangled in 99 of the interviews. In total, they identified 9 species of cetaceans. Among them, 89 interviews identified the humpback whale, 75 the bottlenose dolphin, 46 the common dolphin, 30 the spotted dolphin, 16 the pilot whale, 9 Bryde's whale, 6 the striped dolphin, 3 the orca, 2 Risso's dolphin, and 1 observed an unlisted dolphin species. Two of these species were not previously mentioned in national bycatch reports from these fisheries as bycaught species: Bryde's whale and Killer whale (Table 4). Interviewers judged the reliability of each answer on a 3-point scale, using criteria such as apparent surety of speaker and extent of descriptive detail. They conveyed an average confidence of 2.64 for the whale identifications and 2.44 for the dolphin identifications.

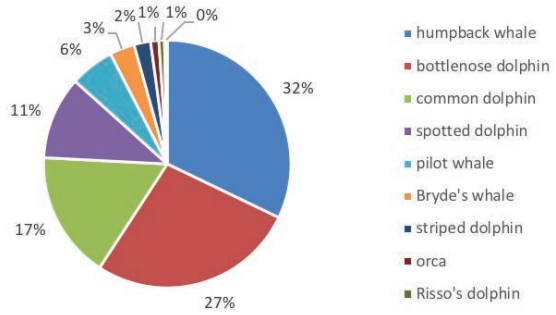

Figure 32. Species of marine mammals identified by fishermen during interviews.

8.5.3.6. Changes in bycatch rate

Fishermen were also asked if their observed rates of marine mammal abundance and entanglement have changed over the last five years. In the case of whales, among 178 interviews with pertinent responses, 100 (56%) felt abundance has increased, 60 (34%) felt the abundance has remained the same, and 18 (10%) felt abundance has declined. In the case of dolphins, among 180 responses 116 (64%) felt that abundance has remained the same, 35 (19%) felt abundance is increased, and 28 (16%) felt that abundance has decreased. In the case of sea lions, among 171 responses, 125 (73%) felt that abundance has remained the same, 34 (20%) felt that abundance has increased, and 12 (7%) felt that abundance has decreased.

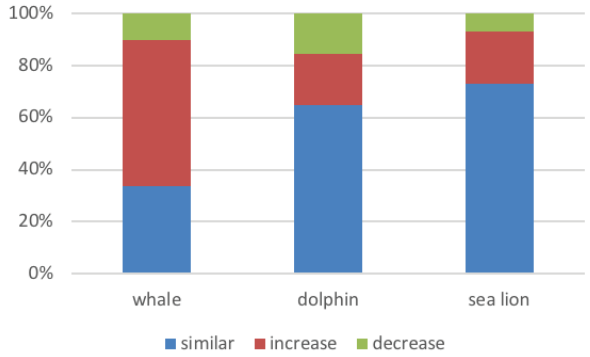

Figure 33. Perceived change in mammal presence by fishermen over past 5 years.

With respect to whale entanglements over the last 5 years, among 165 interviews with pertinent responses, 70 (42%) felt the rate has increased, 67 (41%) felt it has remained the same, and 27 (16%) felt it has decreased. Several noted that the increase in entanglements is due to an increase in the number of whales. A similar number noted that there are more nets in the water. Several mentioned efforts by fishermen to shift fishing areas or gear to avoid whales.

With respect to dolphin entanglements, over the last 5 years, among 158 interviews with pertinent responses, 109 (69%) felt that the entanglement rate has remained the same, 39 (25%) felt it has decreased, and 10 (6%) felt it has increased. Several mentioned a belief that dolphins have learned to stay away from the nets. Some mentioned a shift in fishing locations or gear, or greater efforts to release dolphins.

With respect to sea lion entanglements over the last 5 years, among 141 interviews with pertinent responses, 135 (96%) felt that the rate has remained the same, 4 (3%) felt the rate has increased, and 2 (1.4%) felt the rate has decreased.

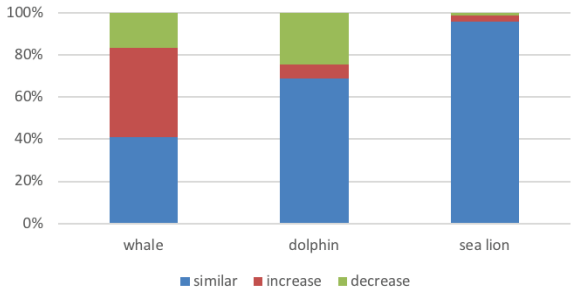

Figure 34. Perceived change in mammal entanglements by fishermen over past 5 years.

These results should consider that because mammal population ranges are often larger than local fishing areas, fishing industry observations of abundance may be of greater utility in explaining any changes in entanglement rates than as estimates of population trajectories. Further, if fishermen have increased or decreased fishing effort, their mammal sightings and entanglement rates may be cognitively difficult to isolate from fishing changes.

8.5.3.7. Uses of bycatch

The overwhelming majority of fishermen indicated that all marine mammal bycatch is discarded, and there is no market or use for them. Such answers were provided in 61 of 73 (84%) interviews with pertinent comments. A dozen (20%) interviews conveyed the belief that some boats might harvest sea lion teeth for craftwork such as jewelry, or that some boats, especially industrial scale vessels, might use bycatch as bait or a fish attractant. Some of these respondents specified, however, that these uses applied to deceased animals. Two (3.2%) interviews reported that dolphins were used as shark bait some years ago. One person reported that an industrial vessel gave dolphins to crew as food, and that dolphin oil can ameliorate bone pain. One person noted that whale vomit can be used as medicine.

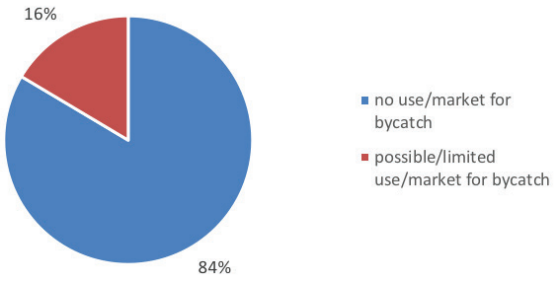

Figure 35. Interviews conveying possible uses or markets for mammal bycatch.

8.5.3.8. Ideas to reduce bycatch

Several fishermen shared some ideas to reduce bycatch. Here is summary of most suggestions:

Whales

- Use fishing gear other than gillnets
- Set nets in other locations
- Use excluding maneuvers
- Try to get them out of the purse seine net
- Echo sounders or devices for discouraging the animals to swim into nets
- Sink the net a few meters
- Use finer mesh or ropes

Dolphins

- Change fishing gear
- Do not use trawling gear
- Save dolphins when trapped
- More research
- Sink the floating line
- Fish near the mangroves (shallower areas)
- Chase dolphins away with speed boats
- Change to finer mesh

Sea lions

- More research
- Sink the floating line

Additional suggestions

- Promote the study of these species and work with fishermen to preserve them.
- More research on selective fishing gear
- Consider a closed season to protect whales and avoid costly gear damage/loss
- Set gillnets in a circle during daylight; this is more selective and reduces bycatch
- Strengthen fishing organizations.

8.5.4. Interactions with other species

Not all interviews included questions about other groups of bycaught animals, and of those asked, some offered no pertinent comments. Among the 57 interviews including pertinent information about other animals as bycatch, 29 reported turtle entanglements, but many specified that they release them; 19 reported sharks, but most noted that many have market value so are landed as catch; 18 reported manta rays, some noting that they do significant damage to gear; only 3 reported bird bycatch and some conveyed that they are easy to release; 1 reported a giant squid as bycatch.

8.5.5. Future collaboration

Fishermen were asked about their interest in future collaborations with other fishing industry members around issues related to more efficient fishing methods and new markets. The overwhelming majority (97%) expressed positive interest.

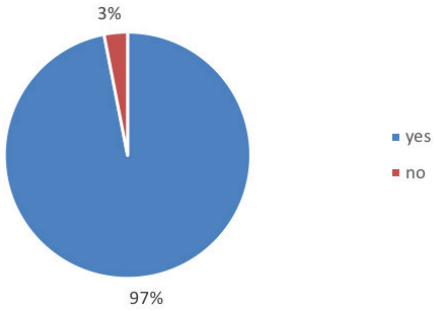

Figure 36. Interest in future collaboration around efficient fishing methods and new markets.

IX. DISCUSSION

Favorable oceanographic and environmental conditions have allowed the establishment of different fisheries in Ecuador as one of the most important economic activities in the country. As a result, Ecuador has large industrial and artisanal fishing fleets, and the largest industrial tuna fleet in the Eastern Pacific. Fishing products are for both local consumption and for export to many countries around the world, the United States being one of the most important markets. The few characterizations of small-scale fisheries carried out in Ecuador (e.g. Solis-Coello and Mendívez, 1997; Arriaga, 2002; Herrera et al., 2013) focused mainly on some socioeconomic aspects, fishing techniques, fleet and gear, but left open broader questions about fishery management.

While the country has endorsed international commitments to protect endangered marine species (e.g., Convention on Biological Diversity CBD, Convention on Migratory Species CMS, Albatrosses and Petrels Agreement, International Convention for the Protection of Sea Turtles CIT), such commitments come under the Ministry of Environment and not the fishing authorities. In addition, there are several national Action Plans for some of marine and freshwater species such as sea turtles (MAE, 2014), sharks and rays (MICIP, 2006), albatross (ACAP, 2008) and fresh water mammals (Utreras, et al., 2013). In all these plans bycatch has been identified as a priority issue, but there is lack of coordination between environmental and fisheries authorities to take effective measures to mitigate its impact (see Resolution 281, July 2011). In addition, the Ministry of the Environment does not have infrastructure for monitoring and enforcement at sea. Therefore, any future marine mammal bycatch reduction approach to be implemented in Ecuador should consider these institutional contexts and prioritize work directly with fishermen, through training and research on gear and operational issues rather than regulatory frameworks, which sometimes tend to obscure the problem (e.g., Resolution 116 on hammerhead sharks, 26 August 2013).

Origin of products exported from Ecuador to the USA

Statistics on seafood exported from Ecuador to the USA showed an increasing trend in the last five years both in volume and in economic value, reaching 115,000 tons and US$909 million in 2013. Approximately 60% of the total economic value was related to fish and shrimp produced in aquaculture facilities. The remaining 40% originated from different fisheries, including artisanal and industrial. Based on the type of products exported as categorized by Martínez (2010), statistics from the Central Bank of Ecuador, and fishermen interviewed, it is estimated that about 5,700 tons or 16% of the total value of fish exported from Ecuador to the USA in 2013 came from fisheries in which marine mammal bycatch occurs. These fisheries include artisanal gillnets (surface and bottom) and the small pelagic purse seine fishery, confirming previous studies (e.g., Félix and Samanniego, 1994; Castro and Rosero, 2010).

From the global statistics presented here, it was not possible to give precise figures about how much product is from each fishery because the fish trade and tracking the supply chain are complex. In some cases, exporters buy the product directly from artisanal fishermen because they financed the operation, but in other cases there are several dealers who do not keep detailed records of the origin of catch, impeding traceability along the supply chain prior to export. Additionally, fishermen use different gear during the year and sometimes use more than one gear simultaneously. Dealers are generally not interested whether the fish came from gillnet or longline as long as the product is exportable. Official statistics of the Central Bank of Ecuador provide information about the total export volume and type of exported product, but it is not possible to know with precision whether a product comes from longline, gillnet or purse seiner because that information does not exist or is not easy to access. Presumably, higher quality fish labeled as "fresh" comes mostly from longlines and that labeled as "frozen" would come mainly from gillnets or purse seiners. However, market demand probably influences the decision of the type of product to be exported at the processing plant. That is why secondary information was used to estimate the total fish exported and its potential to have involved marine mammal bycatch in Ecuador. This information was compiled by the association of white fish and includes information such as fish species, ports, gear, among others (Martínez, 2010). Improved product traceability is a critical objective, and some recent advances achieved in order to meet import guidelines in the EU are encouraging.

Marine mammal bycatch in longlines seems to be minimal as only one fisherman reported the case of a humpback whale entangled with this type of gear. The industrial tuna fishery was left out of the analysis because that fishery is regulated by a regional fisheries organization, the Inter-American Tropical Tuna Commission IATTC, of which both Ecuador and the United States are members. Most Ecuadorian tuna vessels carry out observers on board, so information on bycatch can be available from the IATTC Secretariat. The only other fisheries with observer programs in Ecuador are the small pelagic purse seiners and hake trawl fishery.

Marine mammal bycatch

Most of the information available in Ecuador on marine mammal bycatch has been generated by NGOs (e.g., Félix and Samaniego, 1994; Castro and Rosero, 2010); there is only one study by a governmental institution (Coello, et al., 2011). In part this is because institutions that collect information fisheries focus on target species and fishing production rather than on the impact that fisheries are causing to other taxa. However, as in the case of sharks, the capture of which is considered incidental after the issuance of Agreement 486 in 2007, implementing regulations on bycatch may not necessarily respond to the state of resource or the impact on the ecosystem, but may have an associated

political component. Under this Agreement, artisanal and industrial fishermen can keep killing as many sharks as before, but must bring their fins attached to the animals' bodies and register them at landing.

Although there are regulations prohibiting the incidental capture of sea turtles and some species of elasmobranchs such as manta rays and whale sharks, this is not the case with marine mammals. This is the situation even though whale and dolphin watching is one of the most popular activities on the coast of Ecuador. Often local newspapers call attention to stranded whales, some of them caused by entanglement, so the interaction of whales with fishing nets during the humpback whale breeding season (June to October) has some public recognition. Fishermen also expressed their concern about this fact during the interviews.

Dolphin bycatch is a bit different from that of large whales because the problem has not reached the public to the same extent. Sometimes, however, carcasses are recorded stranded on the beach with gear remains or with the tail cut (see Félix et al., 2011). Their presence does not attract as much attention as a 30-40 ton whale. Nevertheless, the information provided by fishermen during interviews and in previous studies (Félix and Samaniego, 1994; Castro and Rosero, 2010; Coello et al., 2011) indicate that dolphin bycatch is much higher than that of whales as it occurs throughout the year and may affect several species. It is not possible to know the impact of bycatch to populations of dolphins in this area because no population assessments have been made nor have identity of the stocks affected by Ecuadorian fisheries been identified. NOAA produced information regarding the abundance of dolphin species during the marine mammal evaluation program in the Tropical Eastern Pacific late last century (e.g., Wade and Gerrodette, 1993). However, this information requires updating and some gaps still persist regarding the population structure of Southeast Pacific cetacean populations.

Sea lion bycatch appears to be minimal, although they can be a nuisance to fishermen, especially in ports located near the Santa Elena Peninsula (Santa Rosa and Anconcito) where a small colony of South American sea lions (*Otaria flavescens*) exists (Félix, 2002). The central part of Ecuador is the northernmost limit of distribution of the species on the Pacific side of South America. There are no breeding colonies along the Ecuadorian coast, only small resting places, and the population size is probably a fraction of that in neighboring Peru. However, problems reported by Ecuadorian fishermen are similar to those reported in other countries in South America, and relate mainly with damage to the catch and gear (e.g., Sepúlveda, et al., 2006; Goetz et al., 2008; De María et al., 2014).

Perspectives

Fishermen reported at least two additional species of marine cetaceans not previously recorded as bycatch in the coastal fleet. Their responses about an increase in whale entanglements were also consistent with scientific observations, although the reasons differed between the two sources. During interviews, many fishermen showed interest in participating in future projects to consider more efficient fishing methods and gaining access to new markets. A number had specific suggestions for technical bycatch reduction approaches to test. Currently, fishermen are already implementing measures to reduce loss caused by encounters with whales. In Santa Rosa, a fisherman told us that they are now using thinner ropes to let whales break the net instead of becoming entangled. This is a potential lead for future investigation because it shows that fishermen are aware of the problem and are seeking alternatives on their own initiative. Among their suggestions are techniques evaluated elsewhere, including the use of lines with reduced breaking strength, acoustic deterrents, submerging surface gear, using alternative gear types, and active chasing of animals away from fishing operations. Some of these present promising options for evaluation as bycatch mitigation experiments using scientifically well-designed methods and analysis in collaboration with fishermen.

The mortality of marine mammals in Ecuadorian fisheries may increase in the same magnitude as the fishing effort unless measures are taken to mitigate byctach. Several management actions have been proposed, including research, education programs for artisanal fishermen, closed seasons, changes of fishing gear and ongoing disentanglement schemes (Félix and Samaniego, 1994; Félix et al., 1997; Alava et al., 2005; Felix and Haase, 2005; Félix et al., 2011c). Some of these could be implemented on a temporary basis during the humpback whale breeding season or for specific areas with higher densities of whales. It is recommended that any proposal and/or decision must be agreed to by relevant stakeholders including fishing authorities, artisanal fishermen associations and NGOs.

The lack of research on marine mammal bycatch in Ecuador is most likely due to the small number of researchers conducting studies on marine mammals in the country. Bycatch studies on other taxonomic groups such as sea turtles and birds have been supported by internationals NGO such as WWF and Birdlife International (Birdlife, 2011; Andraka et al., 2013) but this has not been the case for marine mammals. It is necessary to have more involvement of universities and national marine institutions to create sustainable bycatch programs to generate critical information and trust between fishermen, authorities and researchers. There is interesting research being conducted in Peru to reduce the entanglement rate of small cetaceans in gillnets similar to the ones used in Ecuador by deploying pingers (Mangel et al., 2013). Similar studies should be carried out in Ecuador. Although promising in small-scale trials with some species and with some devices, the use of pingers can involve problematic issues that include relatively high costs, increased labor to maintain devices, and enforcement, which may create barriers to scaling up their use in the extensive Ecuadorian fisheries.

In the case of large whales, despite the development of successful disentanglement programs for large whales elsewhere, it has been recommended that efforts should be concentrated on trying to understand the factors involved in the entanglement and preventing them in the first place rather than rescuing affected animals (Johnson et al., 2005; Robbins and Mattila, 2001). There are two trained teams in Ecuador, in Salinas and Puerto López, with specialized disentanglement tools provided during a training workshop as part of the International Whaling Commission entanglement response program (Félix, 2013). While there is some benefit to continuing this type of training, it is even more important that support is mobilized to modifying fishing practices so that whale entanglements are avoided.

X. CONCLUSIONS

The data presented here suggest that marine mammal bycatch occurs in many Ecuadorian fisheries that export fishing products to the US. It further shows that most fishermen perceive bycatch problems to be stable or increasing over the last five years, and that fishermen are concerned about the well-being of affected animals. Fisheries in which marine mammal bycatch occurs include artisanal fisheries using gillnets, both surface and bottom, and industrial purse seine fisheries targeting small pelagic fish. Approximately 16% of fish exported to the United States from Ecuador in 2013 labeled as either frozen, fresh or canned fish came from these fisheries.

In this study, fishermen showed underutilized capacity to participate in studies to understand and reduce the current levels of bycatch, and reduce associated economic losses and other difficulties. This study was timely because fishermen have started adopting measures to reduce humpback whale bycatch that include avoiding aggregation areas and the use of thinner ropes; guidance for these measures would be highly useful. Future collaborations might focus on ports where gillnets and purse seine nets are concentrated. Studies must include the active participation of fishermen, fishing and environment authorities, NGO´s and the academic sector. This requires a strategy to engage all these stakeholders to ensure solutions are accepted and implemented. In this vein, greater collaboration between the Ecuadorian fishing and environment authorities could help find solutions to the most pressing bycatch threats involving marine mammals and other groups of animals. This should include, early on in the process, population assessments that can identify levels of bycatch that are sustainable, as well as robust co-management approaches.

XI. REFERENCES

Agreement on the Conservation of Albatrossses and Peterels (ACAP). 2008. Action Plan for Waved Albatross *Phoebastria irrorata*. Fourth Meting of Advisory Committee. Cape Town, South Africa, 22-25 August 2008.

Ministerio de Comercio Exterior, Industrialización, Pesca y Competitividad (MICIP). 2006. Plan de Acción Nacional parea conservación y manejo de tiburones de Ecuador. 44 pp.

Alava, J.J., Barragán, M.J., Castro, C., & Carvajal, R. 2005. A note on strandings and entanglements of humpback whales (*Megaptera novaeangliae*) in Ecuador. *Journal of Cetacean Research and Management* 7(2):163-168.

Alava, J.J., Barragán, M.J., & Denkinger, J. 2012. Assessing the impact on bycatch on Ecuadorian humpback whale breeding stock: a review with management recommendations. *Ocean & Coastal Management* 57:34-43.

Allison, E. H., & Horemans, B. 2006. Putting the principles of the sustainable livelihoods approach into fisheries development policy and practice. *Marine Policy* 30(6):757-766.

Andraka, S., Mug, M., Hall, M., Pons, M., Pacheco, L., Parrales, M., Rendón, L., Parga, M. L., Mituhasi, T., Segura, A., Ortega, D., Villagrán, E., Pérez, S., de Paz, C., Siu, S., Gadea, V., Caicedo, J., Zapata, L., Martínez, J., Guerrero, P., Michael, V., & Vogel, N. 2013. Circle hooks: developing better fishing practices in the artisanal longline fisheries of the Eastern Pacific Ocean. *Biological Conservation* 160:214-223.

Arriaga, O. L. 2002. Diagnóstico del sector de la pesca y acuacultura de la república del Ecuador. Unpublished report. 65 pp.

Ávila, C. A., García, C., & Bastidas, J. C. 2008. A note on the use of dolphins as bait in the artisanal fisheries off Bahía Solano, Chocó, Colombia. *Journal of Cetacean Research and management* 10(2):179-182.

Barber, R. T., & Chavez, F. P. 1983. Biological consequences of El Niño. Science 222:1203-10.

Birdlife. 2011, Albatros trask forcé, team highlight, 2011. Available from www.rspb.org.uk/Images/atf_annual_report_2011_tcm9-319048.pdf.

Brewer, J. F., & Watts, N. S. J. 2016. Mending the net: property and markets in fisheries policy for less-developed contexts. *Journal of International Wildlife Law & Policy* 19:(4):269-283.

Castro, C., & Rosero, P. 2010. Interacción de cetáceos menores con artes de pesca artesanal en el Parque Nacional Machalilla - Ecuador. P 19-26, en: Esfuerzos para mitigar el impacto de actividades pesqueras en cetáceos en los países del Pacífico Sudeste. F. Félix (Ed). Comisión Permanente del Pacífico Sur. Guayaquil, Ecuador. 40pp.

Chiluiza, D., Aguirre, W. Félix, F., & Haase, B. 1998. Varamientos de mamíferos marinos en la costa continental ecuatoriana, período 1987-1995. *Acta Oceanográfica del Pacífico*, INOCAR, Ecuador 9(1):209-217.

Coello, D., Herrera, M., Calle, M., Castro, R., Medina, C., & Chalén, X. 2011. Incidencia de tiburones, rayas, aves, tortugas y mamíferos marinos en la pesquería artesanal con enmalle de superficie en la caleta pesquera de Santa Rosa (Provincia de Santa Elena) Instituto Nacional de Pesca. Boletín Especial Año 2, Nº3. 51 pp.

Comisión Permanente del Pacífico Sur (CPPS)/Programa de las Naciones Unidas para el Medio Ambiente PNUMA. 2007. Memorias del Taller de Trabajo sobre el impacto de actividades antropogénicas en mamíferos marinos en el Pacífico Sudeste. Comisión Permanente del Pacífico Sur, Guayaquil, Ecuador. 98 pp.

Comisión Permanente del Pacífico Sur (CPPS). 2010. Esfuerzos para mitigar el impacto de actividades pesqueras en los países del Pacífico Sudeste. Comisión Permanente del Pacífico Sur, Guayaquil, Ecuador. 40 pp.

Comisión Permanente del Pacífico Sur (CPPS). 2014. Atlas sobre distribución, rutas migratorias, hábitats críticos y amenazas para grandes cetáceos en el Pacífico oriental. Comisión Permanente del Pacífico Sur - CPPS. Guayaquil, Ecuador. *Serie Estudios Regionales*, No. 1. 88 pp.

Cucalón, E. 1996. Primera Parte: Oceanografía y Sistemas Físicos. Pp 1-109. In: *Sistemas Biofísicos en el Golfo de Guayaquil*. Comisión Asesora Ambiental CAMM. Ecuador. 223 pp. (In Spanish).

d'Armengol, L., Castillo, M.P. Ruiz-Mallén, I., & Corbera, E.. 2018. A systematic review of co-managed small-scale fisheries: social diversity and adaptive management improve outcomes. *Global Environmental Change* 52:212-225.

De María, M., Barboza, F. R., & Szteren, D. 2014. Predation of South American sea lions (Otaria flavescens) on the artisanal fisheries in the Río de la Plata estuary. *Fisheries Research* 149:69-73

Félix, F. 1997. Informe nacional sobre desarrollo de metodologías para el monitoreo de la mortalidad de mamíferos marinos en Ecuador. Informe para la Comisión Permanente del Pacífico Sur (CPPS), marzo de 1997. 42 pp. CPPS/PNUMA/PSE/IE(97/13).

Félix, F. 2002. Una colonia de lobos marinos sudamericanos (*Otaria flavescens*) en Salinas, Ecuador. *Acta Oceanográfica del Pacífico*, INOCAR, Ecuador, 11(1):181-184.

Félix, F. 2013. Informe del Taller de entrenamiento sobre respuesta a eventos de enredamiento de grandes ballenas (CBI/CPPS/Ecuador), junio 27 y 28 de 2013, Salinas, Ecuador. WSPA/CI/NOAA/IWC/Ecuador/CPPS. 14 p. (Unpublished report).

Félix, F., & Haase, B. 2014. A note on the northernmost record of the Antarctic minke whale (*Balaenoptera bonaerensis*) in the Eastern Pacific. *Journal of Cetacean Research and Management* 13(3):191-194.

Félix, F., & Samaniego, J. 1994. Incidental catches of small cetaceans in the artisanal fisheries of Ecuador. Rep. *Int. Whal. Commn.* (Special Issue 15). Pp 475-480.

Félix F., & Prieto, M. 1991. Breve historia de la cetología en Ecuador y una lista de las especies registradas. Boletín Técnico FEMM, 1:10-18.Félix, F., B. Haase, J. Samaniego and J. Oechsle. 1994. New Evidence of the presence of the South American sea lion *Otaria flavescens* (Carnivora, Pinnipedia) in Ecuadorian waters. *Estudios Oceanológicos* 13:85-88.

Félix, F., Haase, B., & Samaniego, J. 1995. Primeros registros de la orca pigmea *Feresa attenuata* (Cetacea, Delphinidae) y del cachalote enano *Kogia simus* (Cetacea, Physeteridae) en Ecuador continental. *Estudios Oceanológicos* 14:77-85.

Félix, F., Haase, B., Davis, J. W., Chiluiza, D., & Amador, P. 1997. A note on recent strandings and bycatches of sperm whales (*Physeter macrocephalus*) and humpback whales (*Megaptera novaeangliae*) in Ecuador. Rep. *Int. Whal. Commn*. 47:917-919.

Félix, F., Lento, G., Davis, J., Haase, B. & Chiluiza, D. 2001. El lobo fino de Galápagos *Arctocephalus galapagoensis* en la costa continental de Ecuador, primeros registros confirmados a través de análisis morfológicos y genéticos. *Estudios Oceanológicos* 20:63-68.

Félix, F., Samaniego, J., & Haase, B. 2007. Interacciones de cetáceos con la pesquería artesanal pelágica en Ecuador. P. 50-54. En: Memorias del Taller de Trabajo sobre el Impacto de las Actividades Antropogénicas en Mamíferos Marinos en el Pacífico Sudeste, Bogotá, Colombia, 28 al 29 de noviembre de 2006. F Félix (Ed). CPPS/PNUMA. Guayaquil, Ecuador. 98 pp.

Félix, F., Bachara, W., Schwarz, N., & Haase, B. 2011a. Stranding of two Blainville's beaked whale (*Mesoplodon densirostris*) in Ecuador. *Latin American Journal of Aquatic Mammals* 9(2):174-178. http://dx.doi.org/10.5597/lajam00186.

Félix, F, Haase, B., Denkinger, J., & Falconí, J. 2011b. Varamientos de mamíferos marinos registrados en la costa continental de Ecuador entre 1996 y 2009. *Acta oceanográfica del Pacífico* 16(1):61-73.

Félix, F., Muñoz, M., Falconí, J., Boteron N., & Haase, B. 2011c. Entanglement of humpback whales in artisanal fishing gear in Ecuador. *Journal of Cetacean Research and Management* (Special Issue 3). Pp. 285-290.

FENACOPEC. 2009. Situación actual y perspectivas de los derechos de acceso de la pesca artesanal en Ecuador. Powerpoint presentation retrieved on 6 April 2014. Available from http://www.ecoceanos.cl/pesca/download/Situacion_actualperspectivas_pesca_artesanal_Ecuador.pdf.

Goetz, S. Wolff, M., Stotz, W., & Villegas, M. J. 2008. Interactions between the South American Sea lion (*Otaria flavescens*) and the artisanal fishery off Coquimbo. *ICES J. Marine Science* 65(9):1739-1747.

González, N., and Solís, E. 2010. Características biológico – pesqueras y proceso de elaboración de enlatados de la pinchagua (*Opisthonema spp*) en Ecuador. Instituto Nacional de Pesca. Ecuador. *Boletín Científico Técnico* 20(7):19-46.

Global Seabird Program/Abatros Task Force. 2012. GSP ATF Ecuador informe 2010-2011. Birdlife International/Aves y Conservación/Albatros Task Force/ Agreement on the Conservation of Albatrossses and Peterels (ACAP). Powerpoint presentation. 15 pp.

Haase, B., & Félix, F. 1994. A note on the incidental mortality of sperm whales (*Physeter macrocephalus*) in Ecuador. *Rep. Int. Whal. Commn.* (Special Issue 15). Pp. 481-483.

Herrera, M., Castro, R., Coello, D., Saa, I., & Elías, E. 2013. Puertos, caletas y asentamientos pesqueros artesanales del Ecuador Ports, covs and artisanal fishing settlements on mainland Ecuador). Instituto Nacional de Pesca, *Boletín Especial* 4(1):616 p (Vols 1 and 2).

Johnson, A., Salvador, G., Kenney, J., Robbins, J., Kraus, S., Landry, S., & Clapham, P. 2005. Fishing gear involved in entanglements of right and humpback whales. *Mar. Mammal Sci.* 21(4):635–45.

Mangel, J. C., Alfaro-Shigueto, A., Witt, M. J., Hodgson, D. J., & Godley, B. J. 2013. Using pingers to reduce bycatch of small cetaceans in Peru's small-scale driftnet fishery. Fauna & Flora International, *Oryx*, Page 1 of 12. doi:10.1017/S0030605312000658

Martínez, J. 2010. White Fish Handbook, 45 species of commercial interest. Association of White Fish Exporters of Ecuador. Third edition, 172 pp.

Merlen, G. 1995. *A field guide to the marine mammals of Galápagos*. Instituto Nacional de Pesca, Guayaquil, Ecuador. 130 pp.

Ministerio de Ambiente de Ecuador (MAE). 2014. Plan Nacional para la Conservación de las Tortugas Marinas. Guayaquil, Ecuador. 80 pp.

National Institute of Fisheries. 2014. Second meeting of the Scientific Committee of the South Pacific Regional Fisheries Management Organization. 1-7 October 2014. Honolulu, Hawaii, USA. Retrieved on December 2014 from: https://www.sprfmo.int/assets/Scientific-Committee-2nd/SC-02-Papers/SC-02-25-Ecuador-Annual-report.pdf.

National Research Council. 2008. Public participation in environmental assessment and decision making. Panel on Public Participation in Environmental Assessment and Decision Making, Thomas Dietz and Paul C. Stern, eds. Committee on the Human Dimensions of Global Change. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press. 305 pp.

Northridge, S. P. 1985. Estudio mundial de las interacciones entre mamíferos marinos y la pesca. *FAO Informe de Pesca* 251. 234 pp.

Palacios, D.M., Félix, F., Florez-González, L., Capella, J. J., Chiluiza, D., & Haase, B. 1997. Sightings of Galapagos sea lions (*Zalophus californianus wollebaeki*) on the coasts of Colombia and Ecuador. *Mammalia* 61(1):114-116.

Peralta, M. 2003. Desembarque de la pesca artesanal ecuatoriana durante el 2003. Instituto Nacional de Pesca. *Informe Técnico* 3:51-72.

Peralta, M. 2008. Desembarques de la pesca artesanal de peces pelágicos grandes y tiburones en la costa ecuatoriana durante 2008. Instituto Nacional de Pesca. *Boletín científico y Técnico* 20 (2):1-23.

Perrin, W. F., Donovan, G. P., & Barlow, J (Eds). 1994. Gillnets and Cetaceans. *Report of the nternational Whaling Commission* (Special Issue 15). Pp. 629.

Prado, M. 2009. La pesquería de peces pelágicos pequeños en Ecuador durante 2008. Instituto Nacional de Pesca. Ecuador. *Boletín Científico y Técnico* 20(4): 25 pp.

Proecuador. 2014. Evolución enero-diciembre 2013 de las exportaciones ecuatorianas. Instituto de Promoción de Exportaciones e Inversión. Ministerio de Comercio Exterior. http://comercioexterior.gob.ec/wp-content/uploads/downloads/2014/04/EXPORTACIONES-ENE-DIC-2013-vs-2012.pdf

Read A. J., Drinker, P., & Northridge, S. 2006. Bycatch of marine mammals in U.S. and global fisheries. *Conservation Biology* 20:163–169.

Reeves, R. R., McClellan, K., & Werner, T. B. 2013. Marine mammal bycatch in gillnet and other entangling net fisheries, 1990 to 2011. *Endangered Species Research* 20:71-97. doi: 10.3354/esr00481.

Robbins, J. & Mattila, D. K. 2001. Monitoring entanglements of humpback whales (*Megaptera novaeangliae*) in the Gulf of Maine on the basis of caudal peduncle scarring. Paper SC/53/NAH25 presented to the IWC Scientific Committee, July 2001, London (unpublished). 14pp. [Paper available from the Office of this Journal].

Samaniego, J. E. 2009. Programa global de aves marinas GS/ATF – Ecuador (Noviembre 2008 – octubre 2009). Final report to Birdlife International, Aves y Conservation, and Abatross Task Force. 25 pp. Unpublished.

Samaniego, J. 2011. Global seabird programme Ecuador. Final Report to Birdlife International, Aves & Conservación & Albatross task force. 5 pp. Unpublished.

Samaniego, J. 2012. Global seabird programme Ecuador (December 2011-November 2012). Final Report to Birdlife International, Aves & Conservación & Albatross task force. 4pp. Unpublished.

Samaniego, J. 2012. Global seabird programme Ecuador (November 2013-April 2014). Final Report to Birdlife International, Aves & Conservación. 6pp. Unpublished.

Secchi, E. R., Zerbini, A. N., Bassoi, M., Dalla Rosa, L., Möller, L. M., & Rocha-Campos, C. C. 1997. Mortality of franciscanas, *Pontoporia blainvillei*, in coastal gillneting in southern Brazil: 1994-1995. *Reports of the International Whaling Commission* 47:653-658.

Sepúlveda, M., Pérez, M. J., Sielfeld, W., Oliva, D., Durán, L. R., Rodríguez, L., Araos, V., & Buscaglia, M. 2006. Operational interaction between South American sea lions *Otaria flavescens* and artisanal (small-scale) fishing in Chile: Results from interview surveys and on-board observations. *Fisheries Research* 83:332-340. doi:10.1016/j.fishres.2006.10.009

Solís-Coello, P., & Mendívez, W. 1999. Puertos pesqueros artesanales de la costa ecuatoriana. Instituto Nacional de Pesca, Programa de Cooperación Técnica para la Pesca, Unión Europea. VECEPALA 92/43. Guayaquil, Ecuador. 346 pp.

Steward, K. R., Lewison, R. L., Dunn, D. C., Bjorkland, R. H., Kelez, S., Halpin, P. N., & Crowder, L. B. 2010. Characterizing fishing efforts and spatial extent of coastal fisheries. PLoS One, 5(12):e14451. doi:10.1371/journal.pone.0014451.

Subsecretaría de Recursos Pesqueros (SRP). 2015. Estadísticas globales por mes - todos los puertos. Retrieved in April 7, 2015 from http://tiburon.viceministerioap.gob.ec/tiburon-ecuador/estadisticas-globales-por-mes-todos-los-puertos-264.html.

Utreras, V., Trujillo, F., & Usma, J. S. 2013. Plan de acción para la conservación de mamíferos acuáticos de la amazonía ecuatoriana. Ministerio de Ambiente, Wildlife Conservation Society, Fundación Omacha, World Wildlife Fund. Quito, Ecuador. 72 pp.

Van Waerebeek, K., & Reyes, J. C. 1994a. Interactions between small cetaceans and Peruvian Fisheries 1988/89 and analysis of trends. *Reports of the International Whaling Commission* (Special Issue 15):495-502.

Van Waerebeek, K., & Reyes, J. C. 1994b. Post-ban small cetacean takes off Peru; A review. *Reports of the International Whaling Commission* (Special Issue 15): 503-519.

Van Waerebeek, K., Van Bressem, M., Félix, F., Alfaro, J., García, A., Chávez, L., Otón, K., Montes, D., & Bello, R. 1997. Mortality of dolphins and porpoises off Peru and southern Ecuador in 1994. *Biological Conservation* 81:43-49.

Wade, P. R., & Gerrodete, T. 1993. Estimates of cetacean abundance and distribution in the Eastern tropical Pacific. *Report of the International Whaling Commission* 43:477-493.

APPENDIX 1

AUTHORIZED INDUSTRIAL FLEET (Source: Vice Ministry of Fisheries)

	NOMBRE B/P	ARMADOR	PUERTO DE REGISTRO	PERMISO DE PESCA			ESLORA Mtrs.	T.R.N.	ESPECIE CAPTURA	ARTE DE PESCA
1	ALASKA	GALDECUN S.A.	MANTA	DCRP-231-AT	30/10/2012	29/10/2012	30,44	60,00	ATUN	RED DE CERCO
2	ALDO (EX-ATUNMANTA)	ATUNMANTA S.A.	MANTA	DCRP-137-AT	17/10/2012	16/10/2013	47,85	201,87	ATUN	RED DE CERCO
3	ALEJANDRA	ATUN ESTRIBELA S.A.	MANTA	DGP-008-AT	21/03/2012	20/03/2013	42,03	154,92	ATUN	RED DE CERCO
4	ALESHKA	ELVAYKA S.A.	MANTA	UPAP-2012-085-AT		Feb. 2013	56,93	152,77	ATUN	RED DE CERCO
5	ALESSIA	ELVAYKA S.A.	MANTA	DRP-2012-084-AT		Feb. 2013	56,90	267,00	ATUN	RED DE CERCO
6	ALINA	TRANSMARINA C.A.	MANTA	DGP-036-AT	22/02/2012	22/02/2013	53,85	232,00	ATUN	RED DE CERCO
7	ALIZE	IDEAL CIA. LTDA.	MANTA	DGP-153-AT	07/06/2012	06/06/2013	51,50	243,00	ATUN	RED DE CERCO
8	AMALIA	EUROFISH S.A.	MANTA	DGP-169-AT	14/11/2011	13/11/2012	64,29	449,48	ATUN	RED DE CERCO
9	AMALIS	TUNAPESCA S.A.	GUAYAQUIL	UPAP-2012-101-AT		Mar. 2013	36,87	76,74	ATUN	RED DE CERCO
10	ANAIS	ALBITUNA S.A.	MANTA	DGP-118-AT	11/04/2012	10/04/2013	36,58	132,05	ATUN	RED DE CERCO
11	ANDREA	ALCELSA S.A.	GUAYAQUIL	UPP-2012-200-AT		Sep. 2013	33,95	94,25	ATUN	RED DE CERCO
12	ARIETE	RUXTEL S.A.	GUAYAQUIL	UPAP-2012-099-AT		Mar. 2013	46,00	215,68	ATUN	RED DE CERCO
13	BALBINA	DELIPESCA C.A	MANTA	DGP-143-AT	17/05/2012	16/05/2013	30,17	76,70	ATUN	RED DE CERCO
14	BETTY ELIZABETH	PESDEL S.A.	MANTA	DGP-049-AT	07/05/2012	12/02/2013	31,02	69,00	ATUN	RED DE CERCO
15	CABO MARZO	HASLYNN CIA. LTDA.	MANTA	DGP-171-AT	16/11/2011	16/11/2012	68,83	1641,81	ATUN	RED DE CERCO
16	CAP. BERNY B.	BUEHS BOWEN DANIEL R.	MANTA	DRP-2012-057-AT		Feb. 2013	65,10	454,00	ATUN	RED DE CERCO
17	CAP. PROSPERO Z	ZAMORA MENDOZA ROBIN JEFFERSON	MANTA	DCRP-219-AT	03/10/2012	02/10/2013	31,75	59,45	ATUN	RED DE CERCO
18	CAP. TINO B.	FRESH FISH DEL ECUADOR	MANTA	DGP-091-AT	26/03/2012	25/03/2013	34,98	103,41	ATUN	RED DE CERCO
19	CARMEN D	XUK S. A.	MANTA	DRP-2012-056-AT		Feb. 2013	44,42	210,00	ATUN	RED DE CERCO
20	CHARO	CONS. ISABEL ECUATORIANA S.A.	MANTA	DGP-084-AT	16/03/2012	15/03/2013	86,79	715,00	ATUN	RED DE CERCO
21	CHASCA	INDUSTRIA ATUNERA S.A	MANTA	DGP-144-AT	17/05/2012	16/05/2013	39,87	145,50	ATUN	RED DE CERCO
22	CHIARA	EUROFISH S.A.	MANTA	DCRP-235-AT	13-Nov-12	30-Oct-13	56,52	301,55	ATUN	RED DE CERCO
23	CIUDAD DE PORTOVIEJO	PROVIPACIF S.A.	MANTA	DGP-085-AT	19/03/2012	18/03/2013	47,90	189,90	ATUN	RED DE CERCO
24	CLAUDIA L	FOLITOP S.A.	MANTA	DRP-2012-058-AT		Feb. 2013	45,70	230,00	ATUN	RED DE CERCO
25	DAIICHI MARU Nº 25	TRANSMARINA C.A.	MANTA	DGP-037-AT	22/02/2012	22/02/2013	46,75	122,96	ATUN	RED DE CERCO
26	DANILO C	PESCIMERA S.A.	MANTA	DGP-046-AT	22/02/2012	21/02/2013	26,05	50,70	ATUN	RED DE CERCO
27	DIANA MARIA	JUANLO S.A.	GUAYAQUIL	DGP-075-AT	12-Abr-11	11-Abr-12	36,66	69	ATUN	RED DE CERCO
28	DOMENICA L	LUMITOP S.A.	GUAYAQUIL	DRP-2012-080-AT		Feb. 2013	34,59	96,15	ATUN	RED DE CERCO
29	DON ALVARO	GEOPAXI S.A.	MANTA	DGP-048-AT	23/02/2012	22/02/2013	34,47	93,49	ATUN	RED DE CERCO
30	DON ANTONIO	TUNAFISH S.A.	MANTA	DGP-033-AT	22/02/2012	22/02/2012	38,91	97,38	ATUN	RED DE CERCO
31	DON BARTOLO	ATUNPACIFICOSA	MANTA	DGP-024-AT	08/06/2012	12/03/2013	50,04	175,00	ATUN	RED DE CERCO
32	DON MARIO	AGUASPROFUNDAS S.A	MANTA	DGP-093-AT	26/03/2012	25/03/2013	50,43	194,97	ATUN	RED DE CERCO
33	DON RAMON	DELIPESCA S.A.	MANTA	DGP-132-AT	24/04/2012	23/04/2013	77,30	584,00	ATUN	RED DE CERCO
34	DOÑA MARUJA	ATUNPACIFICOSA	MANTA	DGP-083-AT	16/03/2012	15/03/2013	45,50	163,70	ATUN	RED DE CERCO
35	DOÑA NANCY	BARREIRO CUENCA ZAIRA YADIRA	GUAYAQUIL	DGP-057-AT	01/06/2012	22/03/2013	35,94	62,50	ATUN	RED DE CERCO
36	DOÑA ROGE	ATUNPACIFICOSA	MANTA	DGP-025-AT	16/02/2012	01/01/2012	56,97	292,00	ATUN	RED DE CERCO
37	DOÑA TULA	PACIFICTUNA S.A.	MANTA	DGP-076-AT	09/03/2012	08/03/2013	48,00	208,80	ATUN	RED DE CERCO
38	DRENNEC	N.I.R.S.A. S.A.	POSORJA	DRP-2012-069-AT		Feb. 2013	80,50	554,63	ATUN	RED DE CERCO
39	EASTERN PACIFIC	FISHECUADOR S.A.	GUAYAQUIL	UPAP-2012-100-AT		Mar. 2013	42,59	198,71	ATUN	RED DE CERCO
40	EILLEN MARIE	GEOPAXI S.A.	MANTA	DGP-214-AT	28/09/2012	27/09/2013	36,34	106,55	ATUN	RED DE CERCO
41	EL CONDE	B&B TUNE SUPPLIERS S.A.	MANTA	DGP-044-AT	23/02/2012	22/02/2013	33,33	74,00	ATUN	RED DE CERCO
42	ELIZABETH F	N.I.R.S.A. S.A.	POSORJA	DRP-2012-072-AT		Feb. 2013	51,52	260,77	ATUN	RED DE CERCO
43	ESMERALDA C	TXOPITUNA ECUADOR CIA. LTDA.	MANTA	DGP-098-AT	28/03/2012	27/03/2013	78,75	590,00	ATUN	RED DE CERCO
44	ESTHERCHO	TXOPITUNA ECUADOR CIA. LTDA.	MANTA	DCRP-232-AT	01-Nov-12	31-Oct-13	51,6	437	ATUN	RED DE CERCO
45	FERNANDITO	DELIPESCA S.A	MANTA	DCRP-172-AT	23/07/2012	22/07/2013	27,81	51,25	ATUN	RED DE CERCO
46	FIORELLA L	ANILISA S.A.	MANTA	DRP-2012-059-AT		Feb. 2013	39,46	137,80	ATUN	RED DE CERCO
47	FLORENTINO	IMPORTEQ S.A.	GUAYAQUIL	DGP-058-AT	29/02/2012	28/02/2013	107,50	1.118,08	ATUN	RED DE CERCO
48	FORTICA	PESQUERA BETTY C PESBEC S.A.	MANTA	DCRP-220-AT	03/10/2012	02/10/2013	33,28	77,00	ATUN	RED DE CERCO
49	GABRIELA A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-077-AT		Feb. 2013	41,60	114,12	ATUN	RED DE CERCO
50	GINNO D	PESCADEGFER CIA. LTDA.	MANTA	DGP-092-AT	26/03/2012	25/03/2013	53,45	243,00	ATUN	RED DE CERCO
51	GLORIA A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-074-AT		Feb. 2013	50,60	192,01	ATUN	RED DE CERCO
52	GLORIA C	PESCIMERA S.A.	MANTA	DGP-045-AT	23/02/2012	22/02/2013	31,85	87,56	ATUN	RED DE CERCO
53	GUAYATUNA DOS	GUAYATUNA S.A.	GUAYAQUIL	DRP-2012-044-AT		Feb. 2013	77,30	649,00	ATUN	RED DE CERCO
54	GUAYATUNA UNO	GUAYATUNA S.A.	GUAYAQUIL	DRP-2012-046-AT		Feb. 2013	77,30	649,00	ATUN	RED DE CERCO
55	IGNACIO MAR I	TUNAEXPORT S.A	MANTA	DGP-146-AT	18/05/2012	17/05/2013	49,50	176,00	ATUN	RED DE CERCO
56	JO LINDA	EUROFISH S.A.	MANTA	DGP-195-AT	07-Sep-12	06-Sep-13	40,47	127,45	ATUN	RED DE CERCO
57	JOSE ARMANDO	EMPATECSA	MANTA	DGP-082-AT	16/03/2012	15/03/2013	56,94	235,06	ATUN	RED DE CERCO
58	JULIA D	DELIPESCA S.A.	MANTA	DGP-131-AT	24/04/2012	23/04/2013	62,20	331,48	ATUN	RED DE CERCO
59	KILLA	INDUSTRIA ATUNERA S.A	MANTA	DGP-147-AT	21/05/2012	20/05/2013	39,87	145,50	ATUN	RED DE CERCO
60	LIZI	ATUNMAR S.A.	MANTA	DGP-138-AT	07/05/2012	21/02/2013	67,29	346,00	ATUN	RED DE CERCO
61	LJUBICA M	MATAROSA S.A.	MANTA	DGP-042-AT	23/02/2012	22/02/2013	32,93	97,07	ATUN	RED DE CERCO
62	LUCIA T	AGUASPROFUNDAS S.A	MANTA	DCRP-094-AT	17/08/2012	16/10/2012	52,52	260,74	ATUN	RED DE CERCO
63	LUCY	INEPACA C.A.	MANTA	DGP-014-AT	26/01/2012	25/01/2013	31,80	86,53	ATUN	RED DE CERCO
64	MALULA	ANILISA S.A.	MANTA	DRP-2012-061-AT		Feb. 2013	55,17	300,00	ATUN	RED DE CERCO
65	MARIA DEL MAR A	NIRSA S.A.	POSORJA	DCRP-165-AT	25/06/2012	25/08/2012	80,10	663,00	ATUN	RED DE CERCO
66	MARIA FATIMA	LIFINSA S.A.	GUAYAQUIL	UPP-2012-178-AT		Abr. 2013	32,40	119,45	ATUN	RED DE CERCO
67	MARIA JOSE	SENZER S.A.	MANTA	DGP-030-AT	16/02/2012	16/02/2013	60,04	358,08	ATUN	RED DE CERCO
68	MARIELLA	ALCELSA S.A.	MANTA	UPP-2012-218-AT		Oct. 2013	69,66	367,82	ATUN	RED DE CERCO
69	MARTINA C (EX-ELIZABETH CINCO)	PESDEL S.A.	MANTA	DGP-031-AT	07/05/2012	16/02/2013	72,10	447,00	ATUN	RED DE CERCO
70	MARY LYNN	IDELMAR S.A.	MANTA	DGP-161-AT	27/09/2012	13/06/2013	33,46	70,77	ATUN	RED DE CERCO
71	MEDJUGORJE	PESQUERA JADRAN S.A.	MANTA	DGP-075-AT	09/03/2012	08/03/2013	60,28	298,65	ATUN	RED DE CERCO
72	MILAGROS A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-068-AT		Feb. 2013	76,12	547,78	ATUN	RED DE CERCO
73	MILENA A	NIRSA S.A.	POSORJA	DCRP-216-AT	28/09/2012	27/09/2013	62,17	355,61	ATUN	RED DE CERCO
74	MILENA A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-053-AT		Jun. 2012	62,17	380,65	ATUN	RED DE CERCO
75	MIRY ANN D	AGROL S.A.	MANTA	DGP-080-AT	15/03/2012	14/03/2013	50,04	205,06	ATUN	RED DE CERCO
76	MONTECRISTI	INEPACA C.A.	MANTA	DGP-012-AT	26/01/2012	25/01/2013	39,94	435,34	ATUN	RED DE CERCO
77	MONTENEME	IDEAL CIA. LTDA.	MANTA	DGP-032-AT	16/02/2012	16/02/2012	54,60	292,54	ATUN	RED DE CERCO
78	NORTH QUEEN	SHELLFISH S.A.	MANTA	UPAP-2012-086-AT		Feb. 2013	35,87	90,84	ATUN	RED DE CERCO
79	OCEAN LADY	PESCIMERA S.A.	MANTA	DGP-055-AT	27/02/2012	26/02/2013	33,60	84,45	ATUN	RED DE CERCO
80	PACIFIC TUNA	GEOPAXI S.A.	MANTA	DCRP-226-AT	10/10/2012	13/10/2013	55,45	303,72	ATUN	RED DE CERCO
81	PANAMA TUNA	GUAYATUNA S.A.	POSORJA	DRP-2012-045-AT		Feb. 2013	115,58	1.320,37	ATUN	RED DE CERCO
82	PANCHITO L	MAGRISACORP S.A.	MANTA	DRP-2012-062-AT		Feb. 2013	55,16	282,22	ATUN	RED DE CERCO
83	RAFA A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-078-AT		Feb. 2013	41,73	112,92	ATUN	RED DE CERCO
84	REINA DEL MAR	GEOPAXI S.A.	MANTA	DGP-074-AT	09/03/2012	08/03/2013	53,96	333,17	ATUN	RED DE CERCO
85	RICKY A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-071-AT		Feb. 2013	67,30	380,22	ATUN	RED DE CERCO
86	ROBERTO A	N.I.R.S.A. S.A.	POSORJA	DRP-2012-076-AT		Feb. 2013	41,60	114,12	ATUN	RED DE CERCO
87	ROCIO	ATUNPACIFICOSA	MANTA	DGP-078-AT	13/03/2012	13/06/2013	71,50	482,61	ATUN	RED DE CERCO
88	RODOLFO X	VANICCI S.A.	GUAYAQUIL	DGP-125-AT	18/04/2012	17/04/2013	51,65	233,77	ATUN	RED DE CERCO
89	ROMEO	VELEZ ESCOBAR CAMILA T.	MANTA	DGP-090-AT	23/03/2012	22/05/2013	24,08	44,16	ATUN	RED DE CERCO
90	ROSA F	N.I.R.S.A. S.A.	POSORJA	DRP-2012-075-AT		Feb. 2013	51,65	233,77	ATUN	RED DE CERCO
91	ROSSANA L	DELFITEC S.A.	MANTA	DRP-2012-063-AT		Feb. 2013	55,17	300,00	ATUN	RED DE CERCO
92	SAN ANDRES	CONS. ISABEL ECUATORIANA S.A.	MANTA	DGP-108-AT	05/04/2012	04/04/2013	78,00	658,00	ATUN	RED DE CERCO
93	SANSUM RANGER	DELIPESCA S.A.	MANTA	DCRP-188-AT	23/08/2012	22/08/2013	65,14	553,70	ATUN	RED DE CERCO
94	SOUTHERN QUEEN	MANACRIPEX CIA. LTDA	MANTA	DRP-2012-087-AT		Feb. 2013	36,80	90,65	ATUN	RED DE CERCO
95	TARQUI	INEPACA C.A.	MANTA	DGP-013-AT	21/03/2012	20/03/2013	31,80	162,22	ATUN	RED DE CERCO
96	UGAVI	PESQUERA UGAVI S.A.	MANTA	DRP-2012-065-AT		Feb. 2013	81,00	599,00	ATUN	RED DE CERCO
97	UGAVI DOS	UNIOCEAN S.A.	MANTA	DRP-2012-066-AT		Feb. 2013	77,44	649,00	ATUN	RED DE CERCO
98	VIA SIMOUN	N.I.R.S.A. S.A.	POSORJA	DRP-2012-070-AT		Feb. 2013	69,00	467,93	ATUN	RED DE CERCO
99	YELISAVA	PESQUERA YELISAVA.S.A	GUAYAQUIL	DGP-016-AT	16/02/2012	14/02/2012	50,40	302,00	ATUN	RED DE CERCO
100	YOLANDA L	INFRIPESCA C.A.	MANTA	DRP-2012-081-AT		Feb. 2013	30,83	108,99	ATUN	RED DE CERCO
101	ZALBIDEA J	LARRABIDE ECUADOR CIA. LTDA.	MANTA	DGP-015-AT	27/01/2012	26/01/2013	62,70	330,32	ATUN	RED DE CERCO

APPENDIX 2

AUTHORIZED SMALL PELAGIC PURSE SEINE FLEET IN 2014 (Source: Vice Ministry of Fisheries)

	NOMBRE B/P	ARMADOR	PUERTO DE REGISTRO	PERMISO DE PESCA			ESLORA Mtrs.	T.R.N.	ESPECIE CAPTURA	ARTE DE PESCA
1	5 HERMANOS	ALVIA ALONZO FRANK FERNANDO	MANTA	DGP-022-PPP	01/02/2012	31/01/2013	17,50	19,90	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
2	ADRIATIC II	PESQUERA SANADELSA S.A.	GUAYAQUIL	UPP-2012-172-PP		Abr. 2013	34,31	83,94	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
3	ALZOMAR	ZAMBRANO ORBE AIDA	MANTA	DGP-041-PPP	22/02/2012	23/06/2012	23,65	38,24	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
4	ALZOMAR	ZAMBRANO ORBE AIDA LIDUVINA	MANTA	DGP-151-PPP	06/06/2012	05/06/2013	23,65	37,95	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-525-2012)
5	ANA PAULINA I	NICOTDIV S.A.	GUAYAQUIL	UPP-2012-206-PP		Dic. 2012	22,87	25,93	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
6	ANA ROSITA	PEÑA GARCIA VILMA MERCEDES	SANTA ROSA	DCRP-139-PPP	28/09/2012	31/12/2012	11,70	3,74	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
7	ANDY	HERACLITO DELFIN ESPINOZA GARCIA	MANTA	DGP-163-PPP	26/06/2012	25/06/2013	18,00	21,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
8	ANDY II	ORTIZ QUIÑONEZ RITTER DOMINGO	MANTA	DGP-101-PPP	28/03/2012	27/03/2013	20,80	27,63	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-629-2012)
9	ANGEL	VARGAS LOPEZ NIDIA	MANTA	DGP-126-PPP	29/10/2012	31/12/2012	19,50	27,72	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-522-2012)
10	ANGEL JUNIOR	KEMPES S.A.	GUAYAQUIL	DGP-190-PPP	30/12/2012	01/03/2012	17,29	18,58	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
11	NGEL JUNIOR (EX SAN JORGE	ORMAZA LOOR JOSE D.	GUAYAQUIL	DGP-167-PPP	10/08/2012	28/09/2012	20,00	19,88	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
12	ANGEL JUNIOR II	REYES CASTILLO ERICK ALEXANDER	GUAYAQUIL	DCRP-144-PPP	28/09/2012	31/12/2012	12,54	7,23	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
13	ANGEL JUNIOR V	KEMPES S.A.	ANCONCITO	DRP-168-PPP	16/02/2012	28/09/2012	17,36	13,92	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
14	ARCANGEL GABRIEL	NAVARRO DEMERA VICENTE GABRIEL	MANTA	DCRP-178-PPP	01/08/2012	01/11/2012	19,82	15,28	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-548-2012)
15	ARIANNA	PRODUCEDCORP S.A.	GUAYAQUIL	UPP-2012-174-PP		Abr. 2013	28,96	102,27	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
16	BARBARA MARINA	AVILA SALTOS JOHN	ESMERALDAS	DCRP-196-PPP	13/09/2012	31/12/2012	17,50	13,60	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-643-2012)
17	BORIS ALEXANDER	KORTRADE S.A.	CHANDUY	DRP-2012-079-PP		Feb. 2013	25,42	42,90	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
18	B-Z-JOHN	ESPINALES GONZALEZ JOHNNY	POSORJA	DCRP-204-PPP	28/09/2012	31/12/2012	15,20	8,76	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-706-2012)
19	CAMPITO	CAMPOVERDE MEJIA EDUARDO PILAR	SALINAS	DGP-187-PPP	28/09/2012	28/12/2012	26,45	31,77	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
20	CAPLINA 9	AQUABRISAS C.A.	CHANDUY	UPP-2012-170-PP		Abr. 2013	25,85	46,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
21	CARLITOS I	PACIFICOPESCA S.A.	MANTA	DGP-124-PPP	12/04/2012	11/04/2013	23,77	28,80	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
22	CARLOS FABRICIO II	ESPINAL BENITEZ ENRIQUE EUGENIO	MANTA	DGP-066-PPP	27/03/2012	26/03/2013	19,00	26,24	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-482-2012)
23	CARLOS MIGUEL	ESPINAL BENITEZ MILTON	MANTA	DGP-065-PPP	30/03/2012	29/03/2013	15,95	13,47	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-524-2012)
24	CAVINKO I	EMP. PESQUERA POLAR S.A.	SALANGO	UPP-2012-169-PP		Abr. 2013	30,85	69,87	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
25	CESAR ADAN	FRANKLIN DAGOBERTO BAQUE LUCAS	MANTA	DGP-007-PPP	18/01/2012	17/01/2013	13,95	5,99	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
26	COATEPEC I	EMP. PESQUERA POLAR S.A.	SALANGO	UPP-2012-213-PP		Dic. 2012	30,35	70,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
27	CONCHITA I	FRANCO BRIONES CARLA ALEJANDRA	ESMERALDAS	DCRP-174-PPP	28/09/2012	31/12/2012	19,50	32,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-661-2012)
28	CONCHITA V	FRANCO BRIONES CARLOS JAVIER	ESMERALDAS	DGP-020-PPP	01/02/2012	01/02/2012	19,65	31,12	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
29	CRISTIN	MENDOZA VALENCIA EDITH VERONICA	MANTA	DGP-111-PPP	28/09/2012	31/12/2012	17,80	16,93	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-587-2012)
30	DANIEL ANGEL	DELGADO RIVERA DANIEL A.	MANTA	DGP-189-PPP	24/08/2012	31/12/2012	19,90	27,67	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-532-2012)
31	DANIEL SANTOS	PINZON PALADINES GERMANIA	MANTA	DGP-130-PPP	19/04/2012	18/04/2013	19,08	6,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-410-2012)
32	DANIELA	AVILA SALTOS JOHN	ESMERALDAS	DRP-207-PPP	28/09/2012	28/12/2012	16,84	21,56	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
33	DARWIN ENRIQUE	RIVERA RIVAS BLANCA	MANTA	DGP-067-PPP	27/03/2012	26/03/2013	17,00	13,39	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-436-2012)
34	DAVID ARMANDO	TRADEMOR S.A.	CHANDUY	DRP-2012-055-PP		Feb. 2013	28,25	46,24	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
35	DEMARCO I	PESQUERA SANADELSA S.A.	GUAYAQUIL	UPP-2012-153-PP		Abr. 2013	37,00	111,05	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
36	DICMAR 2	BARCIA RODRIGUEZ DIOCLES	MANTA	DCRP-179-PPP	02/10/2012	31/12/2012	14,55	5,78	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-699-2012)
37	DIEGO ARMANDO	MIRFISH S.A.	CHANDUY	DRP-2012-034-PP		Dic. 2012	24,54	52,66	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
38	DIJAYMAR I	DIJAYMAR S.A.	SALINAS	DCRP-199-PPP	13/09/2012	31/12/2012	20,00	25,12	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-652-2012)
39	DIJAYMAR II	DIJAYMAR S.A.	SALINAS	DCRP-198-PPP	13/09/2012	31/12/2012	19,80	20,15	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-704-2012)
40	DIJAYMAR III	DIJAYMAR S.A.	GUAYAQUIL	DCRP-197-PPP	13/09/2012	31/12/2012	23,50	46,76	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-651-2012)
41	DON ALFREDO	CHAMAIDAN DOLORES MARIA	POSORJA	UPP-2012-217-PP		Abr. 2013	12,50	5,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
42	DON ARMANDO I	FAUSMAR S.A.	CHANDUY	UPP-2012-205-PP		Dic. 2012	31,09	77,42	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
43	DON CIRILO	REYES BENITEZ MARIA ANGELINA	GUAYAQUIL	DGP-127-PPP	18/04/2012	17/04/2013	20,85	26,04	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
44	DON DANIEL	QUIJUE MERO RAMON ARQUIMIDES	MANTA	DGP052-PPP	24/02/2012	23/02/2012	19,00	17,04	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
45	DON EDUARDO	SOLORCAMP S.A.	POSORJA	DCRP-212-PPP	28/09/2012	31/12/2012	16,40	8,06	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
46	DON ENRIQUE	DELGADO BENITEZ DANIEL	MANTA	DGP-116-PPP	10/04/2012	11/04/2013	14,00	7,10	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-536-2012)
47	DON ENRIQUE II	BENITEZ VERA MARGARITA DE LOS SANTOS	MANTA	DGP-039-PPP	22/02/2012	22/02/2013	14,52	7,39	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
48	DON FAUSTO I	IND. PESQUERA JUNIN S.A.	CHANDUY	UPP-2012-133-PP		Mar. 2013	36,46	152,41	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
49	DON FAUSTO III	IND. PESQUERA JUNIN S.A.	CHANDUY	DRP-2012-067-PP		Feb. 2013	36,48	156,10	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
50	DON FAUSTO V	IND. PESQUERA JUNIN S.A.	CHANDUY	UPP-2012-134-PP		Mar. 2013	36,48	111,72	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
51	DON GENARO	GONZALEZ MONTALVAN AUGUSTO	MANTA	DGP-191-PPP	24/08/12	31/12/2012	18,87	19,14	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-635-2012)
52	DON GUIDO JR.	CEVALLOS CASTILLO VICTOR GONZALO	MANTA	DGP-001-PPP	05/10/2012	31/12/2012	10,87	4,82	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-606-2012)
53	DON JOSE	PALACIOS DELGADO JULIO MIGUEL	MANTA	DGP-009-PPP	23/01/2012	23/01/2013	22,85	32,33	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
54	DON JULIO	VASQUEZ FLORES JULIO ALBERTO	MANTA	DGP-162-PPP	22/06/2012	21/06/2013	20,75	24,49	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
55	DON JULIO II	VASQUEZ FLORES JULIO A.	MACHALILLA	DCRP-222-2012	05/10/2012	31/12/2012	21,52	16,22	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-517-2012)
56	DON LITTER	ESPINAL RIVERA DARWIN DANIEL	MANTA	DGP-068-PPP	27/03/2012	26/03/2013	19,90	27,69	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-473-2012)
57	DON MAGEREGGER	GOMEZ VILCHEZ JULIO E.	LA LIBERTAD	UPP-2012-145-PP		Mar. 2013	18,14	20,84	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
58	DON MANUEL	BARCIA FLORES MANUEL JESUS	MANTA	DGP-209-PPP	28/09/2012	27/09/2013	15,56	8,07	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-516-2012)
59	DON MILTON	ARCENTALES MERO EULOGIO	MANTA	DGP-100-PPP	28/03/2012	27/03/2013	16,30	15,09	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-520-2012)
60	DON MORO	SANTOS RODRIGUEZ TEOFILO	ANCONCITO	UPAP-2012-094-PP		Mar. 2013	7,70	2,43	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
61	DON OSWALDO	GOMEZ ROSALES OSWALDO	MANTA	DGP-103-PPP	28/03/2012	28/12/2012	16,75	19,27	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-542-2012)
62	DON OSWALDO I	GOMES ROSALES OSWALDO	CHANDUY	UPP-2012-147-PP		Mar. 2013	22,15	40,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
63	DON OSWALDO II	GOMEZ ROSALES HUGO RENE	CHANDUY	DGP-188-PPP	29/12/2011	28/12/2012	19,90	31,79	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
64	DON PEDRO II	BARCIA TOMALA DIOMEDES	MANTA	DGP-047-PPP	22/02/2012	22/02/2013	20,20	18,05	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
65	DON ROLAND	TORRES CHANCAY ROLANDO	LIBERTAD	UPP-2012-152-PP		Mar. 2013	16,20	15,54	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
66	DON VERA I	AUXILIO DICIFREDO VERA	MANTA	DCRP-213-PPP	28/09/2012	31/12/2012	21,00	34,16	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
67	DON WACHO	ELIZALDE BECERRA GALO HIPOLITO	PUERTO BOLIVAR	DGP-142-PPP	17/05/2012	16/05/2013	11,78	5,82	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
68	DONA LETI	ESPINALES GONZALEZ JHONNY EDGAR	ESMERALDAS	DGP-183-PPP	15/08/2012	15/10/2012	24,00	29,17	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-054-2012)
69	DUSTY DAWN	PROMARVI S.A.	GUAYAQUIL	UPP-2012-204-PP		Dic. 2012	28,32	41,48	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
70	ELIZABETH I	BALON COLON WASHINGTON	MANTA	DCRP-221-PPP	05/10/2012	31/12/2012	20,92	23,18	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-662-2012)
71	ERICK RAMON	BALON QUIMIS MAXIMO A.	MANTA	DCRP-006-PPP	28/09/2012	31/12/2012	14,50	9,84	PECES PELAGICOS PEQUEÑOS	RED DE CERCO(Placa DGP-593-2012)
72	ERIK ALEXANDER	PERYMAR S.A	MANTA	DGP-134-PPP	25/04/2012	24/04/2013	21,52	21,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-433-2012)
73	ESMERALDA I	N.I.R.S.A. S.A.	POSORJA	DRP-2012-030-PP		Dic. 2012	36,43	97,35	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
74	ESTRELLA DEL MAR	MOLINA CEVALLOS CESAR	MANTA	DGP-077-PPP	08/03/2012	08/06/2012	23,75	29,10	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
75	ESTRELLA DEL MAR	MOLINA CEVALLOS CESAR A.	MANTA	DGP-152-PPP	06/06/2012	07/03/2013	23,75	29,10	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-426-2012)
76	FAUSTO IV	NANCORO S.A.	CHANDUY	DRP-2012-022-PP		Dic. 2012	37,58	83,92	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
77	GALAPAGOS	PESQUERA CENTROMAR S.A.	CHANDUY	UPP-2012-164-PP		Abr. 2013	34,40	81,64	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
78	GORDITO I	CALDERON PEÑA ROSA EDILIA	MANTA	DGP-025-PPP	06/01/2012	26/10/2012	18,20	20,09	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
79	GUAYAMAR II	ROMERO SANCHEZ EMERITA R.	GUAYAQUIL	DCRP-201-2012	28/09/2012	28/12/2012	17,80	20,90	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
80	GUAYAS	PESQUERA CENTROMAR S.A.	CHANDUY	UPP-2012-132-PP		Mar. 2013	37,30	75,87	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
81	ISABELA II	SARDIBELLA S.A.	GUAYAQUIL	UPP-2012-176-PP		Abr. 2013	31,25	67,12	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
82	J. B.	BALON TIGRERO LOCADIO	SANTA ROSA	UPP-2012-149-PP		Sep. 2012	14,15	8,16	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
83	J. B. II	CRISTOBAL ORRALA ROSA J.	POSORJA	UPP-2012-148-PP		Mar. 2013	21,77	30,14	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
84	JESUS DE NAZARETH	RIVERA ROCHE JACINTA G.	PTO. BOLIVAR	DGP-175-PPP	25/07/2012	28/09/2012	14,05	9,55	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
85	JESUS DEL GRAN PODER	SANCHEZ MEJIA LUIS ALBERTO	SALANGO	DGP-119-PPP	17/02/2012	17/05/2012	14,32	8,24	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
86	JESUS SOBRE LAS AGUAS	RIVERA ROCHE JACINTA G.	PTO. BOLIVAR	UPP-2012-186-PP		Jun. 2013	14,90	12,38	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
87	JOEL	AVILA SALTOS JOHN	ESMERALDAS	DGP-206-PPP	28/09/2012	28/12/2012	21,27	20,27	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
88	JORGE LUIS	MERO GONZALEZ LUIS	PALMAR	UPP-2012-146-PP		Mar. 2013	15,80	20,16	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
89	JOSE ARMANDO	FAUSMAR S.A.	CHANDUY	DRP-2012-031-PP		Dic. 2012	29,90	64,28	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
90	JOSE JEAN PIERRE	JOSE INTRIAGO CALDERON	MANTA	DGP-026-PPP	07/02/2012	07/04/2012	21,00	34,16	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
91	JOSE JEAN PIERRE	INTRIAGO CALDERON JOSE MANUEL	MANTA	DGP-016-PPP	31/01/2012	30/01/2013	19,45	27,56	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
92	JOSEMED	CEVALLOS MENDOZA JOSE TEMISTOCLE	SALINAS	DGP-019-PPP	01/02/2012	01/04/2012	17,00	5,45	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
93	JOSSELYN	BORBOR RIVERA OSCAR	POSORJA	UPP-2012-120-PP		Mar. 2013	20,00	18,50	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
94	JOUVER FABIAN	BARCIA FLORES RAMON FLORESMILO	MANTA	DGP-133-PPP	26/06/2012	31/12/2012	19,72	18,37	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-743-2012)
95	JUAN CARLOS	PESQUERA UGLAN S.A.	POSORJA	DRP-2012-049-PP		Feb. 2013	22,70	47,56	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
96	JUAN DANIEL	DELGADO BENITEZ DANIEL	MANTA	DCRP-193-PPP	24/08/2012	31/12/2012	17,00	10,60	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-531-2012)

97	JUAN EL BAUTISTA	INTRIAGO ZAMBRANO CARLOS FABIAN	MANTA	DGP-181-PPP	03/10/2012	31/12/2012	17,50	12,56	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-580-2012)
98	JUAN PABLO	GARCIA LUCAS PABLO ELIAS	MANTA	DGP-136-PPP	25/07/2012	31/12/2012	22,16	46,42	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-522-2012)
99	JUAN PABLO 2	GARCIA LUCAS PABLO ELIAS	MANTA	DGP-135-PPP	25/07/2012	31/12/2012	21,14	32,23	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-584-2012)
100	JULY	GONZABAY TOMALA NICANOR	PALMAR	UPP-2012-119-PP		Mar. 2013	15,97	14,48	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
101	LA CARIDAD DEL COBRE	BARCIA QUIMIZ JULIO CESAR	MACHALILLA	UPP-2012-183-PP		Abr. 2013	16,92	13,92	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
102	LA CARIDAD DEL COBRE Nº 2	BARCIA QUIMIZ JULIO CESAR	SALINAS	DGP-104-PPP	05/04/2012	04/04/2013	19,60	14,94	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
103	LAMANTEPEC I	EMP. PESQUERA POLAR S.A.	SALANGO	UPP-2012-214-PP		Dic. 2012	30,23	70,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
104	LEONARDO	SOLIS MARIA PIEDAD ANGELICA	MANTA	DCRP-187-PPP	20/08/2012	31/12/2012	20,75	19,60	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-431-2012)
105	LIBERTAD	PESQUERA CENTROMAR S.A.	CHANDUY	UPP-2012-167-PP		Abr. 2013	36,64	62,31	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
106	LOLY	QUIJIJE PILLIGUA MARIA FLORES	MANTA	DCRP-215-PPP	28/09/2012	31/12/2012	12,58	4,42	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-629-2012)
107	LOS 4 HERMANOS	BARCIA BARCIA JAVIER F.	MACHALILLA	UPP-2012-173-PP		Abr. 2013	18,50	17,47	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
108	LOS REYES	REYES TELLO FABIAN A.	MANTA	DGP-159-PPP	13/06/2012	12/06/2013	17,00	16,70	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-682-2012)
109	LUIS ANTONIO	VALENCIA MERO AURA MARIBEL	MANTA	DGP-072-PPP	08/03/2012	07/03/2013	19,30	12,25	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-738-2012)
110	LUIS ANTONIO II	MERO VALENCIA GLORIA PASCUALA	MANTA	DGP-073-PPP	08/03/2012	07/03/2013	21,00	29,61	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-728-2012)
111	M. CRISTINA	N.I.R.S.A. S.A.	POSORJA	DRP-2012-048-PP		Feb. 2013	36,30	104,18	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
112	MARIA EDUARDA	CALAFATINHO RIBEIRO CELSO	GUAYAQUIL	DGP-105-PPP	01/10/2012	31/12/2012	20,00	24,94	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-481-2012)
113	MARIA ESPERANZA	CEVALLOS MENDOZA JOSE T.	POSORJA	UPP-2012-202-PP		Dic. 2012	18,30	15,28	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
114	MARIA MONSERRATE I	PARRALES MERO PLACIDO SOLON	SALINAS	DCRP-167-PPP	16/10/2012	04/07/2013	14,40	9,14	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-681-2012)
115	MARIA MONSERRATE II	MORAN TOMALA NICOLAS DANIEL	MANTA	DCRP-168-PPP	16/10/2012	26/06/2013	20,73	22,06	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-675-2012)
116	MARIA VIOLETA	VILLALBA PINO LUIS FELIPE	LA LIBERTAD	UPP-2012-192-PP		Dic. 2012	19,10	15,72	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
117	MARISOL	LOPEZ FREIRE VIRGILIO ROSENDO	MANTA	DCRP-180-PPP	22/10/2012	31/12/2012	17.44	18,80	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-488-2012)
118	MARYAN	BARCIA PARRALES DIOGENES A.	MACHALILLA	UPP-2012-184-PP		Abr. 2013	21,60	26,82	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
119	MELINA	CEVALLOS MENDOZA JOSE	POSORJA	DCRP-201-PPP	20/09/2012	31/12/2012	17,44	12,93	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-729-2012)
120	MI ANGEL	JOFFRE MERO BRIONES	ESMERALDAS	DGP-149-PPP	31/05/2012	30/06/2012	18,18	17,28	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-642-2012)
121	MI CHANO	LOOR SABANDO MIGUEL IGNACIO	ESMERALDAS	DGP-017-PPP	01/02/2012	31/01/2013	18,20	27,75	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
122	MI CHANO I	LOOR SABANDO MIGUEL IGNACIO	ESMERALDAS	DCRP-173-PPP	24/07/2012	23/09/2012	18,93	17,28	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-642-2012)
123	MI DOLOROSA	CALDERON MERO LUBER JOSELITO	MANTA	DGP-070-PPP	28/03/2012	27/03/2013	19,43	14,93	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-569-2012)
124	MI ROSITA	DELGADO RIVERA FREDDY	MANTA	DCRP-049-PPP	24/08/2012	31/12/2012	15,45	25,62	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-537-2012)
125	MICHAEL ANDRES	BALON QUIMIS MAXIMO A.	MANTA	DCRP-005-PPP	28/09/2012	31/12/2012	10,52	1,30	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-438-2012)
126	MIKIKO	BANCHON CRESPIN JORGE	POSORJA	UPP-2012-210-PP		Dic. 2012	21,05	14,69	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
127	MILLENNIUM	ROPOLASA S.A.	POSORJA	DCRP-186-PPP	27/08/2012	31/12/2012	20,40	31,80	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-467-2012)
128	NATALIA I	FRANCO LUCAS HERNAN ALFREDO	MANTA	DGP-018-PPP	01/02/2012	31/01/2013	16,05	13,14	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
129	NEPTUNO	AQUABRISAS S.A.	GUAYAQUIL	UPP-2012-171-PP		Abr. 2013	25,05	69,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
130	NICOLE	ULTRATRADING S.A.	CHANDUY	UPP-2012-168-PP		Abr. 2013	36,48	111,72	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
131	NILAHUE	AQUABRISAS S.A.	LA LIBERTAD	DRP-2012-038-PP		Dic. 2012	30,91	67,12	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
132	NIÑA TAHIZ	GONZALEZ PINARGOTE CRISTOBAL	MANTA	DRP-2011-257-PPP	04/10/2012	31/12/2012	15,30	5,40	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-552-2012)
133	NUEVA ESPERANZA	GONDI S.A.	MANTA	DGP-170-PPP	28/09/2012	31/12/2012	30,20	58,31	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-629-2012)
134	ORLIC I	EMP. PESQUERA POLAR S.A.	SALANGO	DRP-2012-028-PP		Dic. 2012	30,23	70,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
135	PABLO VICENTE	JUEZ BERMUDEZ MAXIMO J.	SANTA ROSA	DCRP-204-PPP	25/09/2012	31/12/2012	21,08	29,72	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-541-2012)
136	PATILLO	GONDY S.A.	MANTA	DCRP-171-PPP	28/09/2012	31/12/2012	31,13	58,35	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-629-2012)
137	PAULA	ARANA ECHEVER NESTOR TOMAS	ESMERALDAS	DCRP-192-PPP	24/08/2012	31/12/2012	24,15	59,88	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-731-2012)
138	PEDRO ANDRES	PESQUERA UGLAN S.A.	CHANDUY	UPP-2012-190-PP		Jun. 2013	27,85	41,26	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
139	PEDRO PABLO G	INTRIAGO CALDERON GUSTAVO	MANTA	DCRP-086-PPP	22/08/2012	31/12/2012	16,62	17,17	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-434-2012)
140	PERLA DEL PACIFICO	DELGADO RIVERA JUAN MIGUEL	MANTA	DCRP-190-PPP	24/08/2012	31/12/2012	17,64	19,90	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-540-2012)
141	POLAR I	EMP. PESQUERA POLAR S.A.	SALANGO	DRP-2012-002-PP		Dic. 2012	37,75	87,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
142	POLAR II	EMP. PESQUERA POLAR S.A.	SALANGO	DRP-2012-003-PP		Dic. 2012	37,75	87,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
143	POLAR IX	EMP. PESQUERA POLAR S.A.	GUAYAQUIL	UPP-2012-130-PP		Mar. 2013	32,15	78,40	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
144	POLAR VIII	EMP. PESQUERA POLAR S.A.	GUAYAQUIL	DRP-2012-004-PP		Dic. 2012	32,15	78,40	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
145	POSORJA	PESQUERA CENTROMAR S.A.	CHANDUY	UPP-2012-193-PP		Dic. 2012	30,00	62,76	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
146	PUMANQUE	AQUABRISAS S.A.	LA LIBERTAD	UPP-2012-199-PP		Dic. 2012	30,91	67,13	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
147	RAMON ENRIQUE	QUIJIJE MERO RAMON ARQUIMIDES	MANTA	DGP-051-PPP	25/02/2012	24/02/2013	17,62	18,20	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
148	RAQUELITA	ROMERO SANCHEZ EMERITA R.	SALINAS	DRP-2011-253-PPP	04/10/2012	31/12/2012	20,22	30,04	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-468-2012)
149	RICHARD	TIRCIO RODRIGUEZ CARLOS	POSORJA	DRP-2012-083-PP		Feb. 2013	19,00	19,81	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
150	ROSA AURORA	DELGADO RIVERA DANIEL	MANTA	DCRP-211-PPP	28/09/2012	31/12/2012	19,40	25,23	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
151	ROSA MARIA	DELGADO RIVERA DARWIN	MANTA	DGP-169-PPP	13/07/2012	31/12/2012	19,85	6,29	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-578-2012)
152	UBEN ANDRES (EX REY DAVID	REIRA ACOSTA ROQUE FABRICIO Y SUGEY IN	MANTA	DCRP-227-PPP	10/10/2012	31/12/2012	15,82	10,69	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-656-2012)
153	SALINAS	PESQUERA CENTROMAR S.A.	CHANDUY	UPP-2012-166-PP		Abr. 2013	30,10	46,10	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
154	SAN FERNANDO II	DELGADO BENITEZ LORENZO	MANTA	DGP-115-PPP	09/04/2012	08/04/2013	18,27	15,06	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-504-2012)
155	SAN JORGE	FRIOMAR & SHARK OCEAN S.A.	POSORJA	DCRP-208-PPP	28/09/2012	28/12/2012	16,75	9,24	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
156	SAN LUIS I	ALVIA ALONZO LUIS EUGENIO	MANTA	DGP-182-PPP	18/04/2012	19/12/2012	12,28	4,33	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
157	SAN LUIS II	LOZANO CORDOVA TOMAS	MANTA	DCRP-200-PPP	17/09/2012	31/12/2012	16,50	12,40	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-594-2012)
158	SAN LUIS III	ALCIVAR MURILLO ADOLFO LEONEL	MANTA	DCRP-177-PPP	01/08/2012	21/10/2012	19,00	22,67	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-570-2012)
159	SAN LUIS III	ALCIVAR MURILLO ADOLFO L.	MANTA	UPP-2012-215-PP		Dic. 2012	19,00	64,15	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
160	SAN LUIS IV	ALVIA ALONZO LUIS EUGENIO	MANTA	DGP-128-PPP	24/04/2012	23/04/2013	19,80	19,20	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
161	SAN LUIS V	ALVIA ALONZO LUIS EUGENIO	MANTA	DGP-113-PPP	05/04/2012	04/04/2013	21,22	15,01	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-547-2012)
162	SAN MIGUEL	MERO DELGADO ALEJANDRO	MANTA	DGP-112-PPP	05/04/2012	04/04/2013	18,05	19,70	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-725-2012)
163	SAN PEDRO I	CAMPOVERDE PONCE JUAN	SALINAS	DCRP-185-PPP	17/08/2012	31/12/2012	20,55	24,94	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-430-2012)
164	SAN PEDRO III	BARCIA TOMALA DIOMENES ALBERTO	MANTA	DGP-230-PPP	29/10/2012	31/12/2012	20,87	21,20	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-733-2012)
165	SAN VICENTE	CASTRO MEJIA WIGTON EULAGIO	MANTA	DCRP-003-PPP	03/10/2012	31/12/2012	17,95	23,93	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-607-2012)
166	SANTA BARBARA	CHICHANDA BRIONES EDSON S.	POSORJA	DCRP-218-PPP	02/10/2012	31/12/2012	18,10	23,14	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-529-2012)
167	SANTA MARTHA II	ELIZALDE BECERRA GALO HIPOLITO	MANTA	DGP-140-PPP	14/05/2012	13/05/2013	13,83	9,91	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
168	SIEMPRE EL COLORADO I	VELEZ MERO FELIX	MANTA	DCRP-228-PPP	11/10/2012	31/12/2012	16,15	13,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-440-2012)
169	SIEMPRE FRANKLIN	ARCENTALES ARCENTALES CALIXTO JAVIER	MANTA	DGP-150-PPP	04/06/2012	03/06/2013	16,98	14,48	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
170	SIMON BOLIVAR	ELIZALDE BECERRA GALO HIPOLITO	MANTA	DGP-141-PPP	14/05/2012	13/05/2013	13,72	12,83	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
171	SORAYA	ARANA MARIANA SEFERINA	MANTA	DCRP-021-PPP	28/09/2012	31/12/2012	23,45	48,52	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-441-2012)
172	SOTO	CEVALLOS MENDOZA JOSE T.	MANTA	UPP-2012-198-PPP		Dic. 2012	16,50	15,30	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
173	TIBURON I	PALACIOS DELGADO JULIO MIGUEL	MANTA	DGP-010-PPP	23/01/2012	22/01/2013	21,90	45,68	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
174	TITANIC I	MENDOZA VELIZ SANTO HOMERO	LA LIBERTAD	DCRP-064-PPP	28/09/2012	31/12/2012	22,70	51,38	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-629-2012)
175	TUNA I	TUNAEXPORT S.A.	MANTA	DGP-145-AT	18/05/2012	18/05/2013	45,10	107,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
176	TUNA II	ATUNEXPORT S.A.	MANTA	DGP-089-AT	30/03/2012	29/03/2013	54,25	132,51	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
177	TUNGURAHUA	TIRCIO BAIDAL CARLOS	POSORJA	DRP-2012-082-PP		Feb. 2013	19,65	18,65	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
178	USUMACINTA I	EMP. PESQUERA POLAR S.A.	SALANGO	DRP-2012-005-PP		Dic. 2012	25,02	62,37	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
179	V. B.	BALON TIGRERO LOCADIO	SANTA ROSA	UPP-2012-150-PP		Mar. 2013	14,72	12,90	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
180	V. B. II	BALON SUAREZ JULIO CESAR	SANTA ROSA	UPP-2012-151-PP		Mar. 2013	18,67	19,03	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
181	VIOLETA ANAHI	KORTRADE S.A.	CHANDUY	DRP-2012-026-PP		Dic. 2012	25,75	52,00	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
182	VIOLETITA I	NANCORO S.A.	CHANDUY	DRP-2012-027-PP		Dic. 2012	31,85	54,27	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
183	VIOLETITA II	PEANDRES S.A.	CHANDUY	DRP-2012-006-PP		Dic. 2012	39,27	87,27	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
184	VIRGEN DE LAS ANGUSTIAS	VASQUEZ TOMALA MAXIMA EDITH	SANTA ROSA	DRP-2012-016-PP		Dic. 2012	15,43	5,29	PECES PELAGICOS PEQUEÑOS	RED DE CERCO
185	VIRGEN DEL MAR	BARCIA RAMOS DIOGENES	SANTA ROSA	DRP-2011-278-PP	06/06/2012	24/11/2012	12,00	12,01	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-484-2012)
186	WALTER JAVIER	BALCAZAR GUAILLAS MAXIMO L.	PTO. BOLIVAR	DCRP-182-PPP	14/08/2012	28/09/2012	10,65	3,93	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-406-2012)
187	WALTER RAMON	BARCIA FLORES WILDER ARQUIMIDES	MACHALILLA	DGP-114-PPP	13/06/2012	26/03/2013	16,97	10,57	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-439-2012)
188	WIMPER G	GONZALES PINARGOTE EUSTACIO WIMPER	MANTA	DGP-123-PPP	15/08/2012	15/10/2012	23,26	38,62	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-743-2012)
189	XCELLENT IV	ROMERO SANCHEZ EMERITA R.	GUAYAQUIL	DGP-063-PPP	28/09/2012	31/12/2012	15,16	10,46	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-575-2012)
190	YOLE II	ARCENTALES MERO EULOGIO	MANTA	DGP-099-PPP	28/03/2012	27/03/2013	17,00	10,60	PECES PELAGICOS PEQUEÑOS	RED DE CERCO (Placa DGP-519-2012)

APPENDIX 3

AUTHORIZED LONGLINE FLEET IN 2014 (Source: Vice Ministry of Fisheries)

	NOMBRE B/P	ARMADOR	PUERTO DE REGISTRO	PERMISO DE PESCA			ESLORA Mtrs.	T.R.N.	ESPECIE CAPTURA	ARTE DE PESCA
1	ADONAY VIII	PONCE ARCENTALES MANUEL ANTONIO	MANTA	DGP-176-PPG	13/08/2012	12/08/2013	19,92	21,54	PECES PELAGICOS GRANDES	PALANGRE
2	AGNIESZKA	ISIMARE S.A.	MANTA	DGP-160-PPG	13/06/2012	12/06/2013	28,05	22,53	PECES PELAGICOS GRANDES	PALANGRE
3	ARCA DE NOE I	MERO ARCENTALES EDWAR ALEXIS	MANTA	DGP-095-PPG	26/03/2012	25/03/2013	21,50	37,47	PECES PELAGICOS GRANDES	PALANGRE
4	ARCA DE NOE IV	MERO MERO ALFONSO	MANTA	DGP-097-PPG	27/03/2012	26/05/2013	20,90	22,06	PECES PELAGICOS GRANDES	PALANGRE
5	ARCA DE NOE V	ARCENTALES MERO NANCY EULALIA	MANTA	DGP-106-PPG	05/04/2012	04/04/2013	20,30	27,35	PECES PELAGICOS GRANDES	PALANGRE
6	ARCA DE NOE VI	MERO ARCENTALES ROBERTH ALONSO	MANTA	DGP-107-PPG	05/04/2012	04/04/2013	22,00	28,95	PECES PELAGICOS GRANDES	PALANGRE
7	CONQUISTA	MONTENEGRO FRANCO VICTOR HUGO	MANTA	DGP-062-PPG	05/03/2012	06/12/2012	23,80	30,74	PECES PELAGICOS GRANDES	PALANGRE
8	CONQUISTA 2	PUENTES SANCHEZ ALCIRA	MANTA	DGP-087-PB	22/03/2012	21/03/2013	15,05	14,63	PECES PELAGICOS GRANDES	PALANGRE
9	DON JAIME II	MANTUANO FLORES JAIME ESTEDIO	MANTA	DGP-054-PPG	27/02/2012	26/02/2013	20,60	37,87	PECES PELAGICOS GRANDES	PALANGRE
10	DON PEPE	RODRIGUEZ FIERRO JOSE VICENTE	MANTA	DCRP-202-PPG	24/09/2012	23/09/2013	21,77	47,88	PECES PELAGICOS GRANDES	PALANGRE
11	DONOSTYA	SEGUNDO AGUSTIN MERO RODRIGUEZ	MANTA	DGP-225-PPG	09/10/2012	09/11/2012	23,00	33,58	PECES PELAGICOS GRANDES	PALANGRE
12	GENMARY	REYES ZAMBRANO JOSE LUIS	MANTA	DGP-060-PPG	03/05/2012	02/05/2013	23,50	27,58	PECES PELAGICOS GRANDES	PALANGRE
13	GRAND KNIGHT	FLOTACORP S.A.	GUAYAQUIL	DRP-2012-001-PG		Dic. 2012	40,80	195,00	PECES PELAGICOS GRANDES	PALANGRE
14	GREGORIO IV	ESPINOZA GARCIA HERACLITO DELFIN	MANTA	DGP-135-PPG	26/04/2012	25/04/2013	19,00	22,18	PECES PELAGICOS GRANDES	PALANGRE
15	JACK MAR	ESPINOZA GARCIA DELFIN HERACLITO	MANTA	DGP-154-PPG	07/06/2012	06/06/2013	19,20	19,54	PECES PELAGICOS GRANDES	PALANGRE
16	JHONKA	SORNOZA ALAVA JOSE JACINTO	MANTA	DGP-043-PPG	23/02/2012	22/02/2013	21,00	28,33	PECES PELAGICOS GRANDES	PALANGRE
17	LAURA DEL MAR	SALTOS GARCIA JOSE REMBERTO	MANTA	DCRP-184-PPG	16/08/2012	15/10/2012	19,00	14,64	PECES PELAGICOS GRANDES	PALANGRE
18	MI NEGRO	DELGADO ZAVALACESAR	MANTA	DGP-088-PB	22/03/2012	21/03/2013	20,60	22,65	PECES PELAGICOS GRANDES	PALANGRE
19	PEDALEX	PILLIGUA IDUARTE PEDRO CORNELIO	MANTA	DGP-059-PPG	01/03/2012	28/02/2013	21,85	22,97	PECES PELAGICOS GRANDES	PALANGRE
20	PILIMAN	ALARCON HOLGUIN JIMMY LEONIDAS	MANTA	DGP-040-PB	22/02/2012	21/02/2013	19,75	30,95	PECES PELAGICOS GRANDES	PALANGRE
21	REY DE ARCA	ALFONSO MERO MERO	MANTA	DGP-136-PPG	26/04/2012	25/04/2013	23,40	39,93	PECES PELAGICOS GRANDES	PALANGRE
22	REY PILIMAN	ALARCON MONTALVAN LEONIDAS ELEUTERIO	MANTA	DGP-050-AT	22/02/2012	22/02/2013	19,35	27,39	PECES PELAGICOS GRANDES	PALANGRE
23	ROSITA	CEDEÑO PARRALES JORGE ANTONIO	MANTA	DGP-024-PB	02/02/2012	01/02/2012	18,00	21,85	PECES PELAGICOS GRANDES	PALANGRE
24	SANTA ROSA	CUZME LOPEZ JUAN EVARISTO	MANTA	DGP-056-PPG	16/04/2012	28/02/2013	19,32	16,76	PECES PELAGICOS GRANDES	PALANGRE
25	SIEMPRE OLAYITA	PARRALES MARRASQUIN ISIDRO MAURO	MANTA	DGP-081-PPG	15/03/2012	14/03/2013	21,00	21,63	PECES PELAGICOS GRANDES	PALANGRE
26	VOLUNTAD DE DIOS	HERRERA PERALTA JONATHAN R.	MANTA	DGP-027-PPG	13/02/2012	13/04/2012	28,20	33,64	PECES PELAGICOS GRANDES	PALANGRE
	NOMBRE B/P	**ARMADOR**	**PUERTO DE REGISTRO**	**PERMISO DE PESCA**			**ESLORA Mtrs.**	**T.R.N.**	**ESPECIE CAPTURA**	**ARTE DE PESCA**
1	ALTAR 10	TUNAFLEET S.A.	MANTA	DGP-119-AT	12/04/2012	11/04/2013	53,61	174,59	ATUN	PALANGRE
2	ALTAR 11	TRANSMARINA C.A.	MANTA	DGP-034-AT	22/02/2012	22/02/2012	55,45	196,57	ATUN	PALANGRE
3	ALTAR 21	TRANSMARINA C.A.	MANTA	DGP-035-AT	22/02/2012	22/02/2013	48,00	147,30	ATUN	PALANGRE
4	ALTAR 6	TUNAFLEET S.A.	MANTA	DGP-121-AT	12/04/2012	11/04/2013	53,51	173,00	ATUN	PALANGRE
5	ALTAR 8	TUNAFLEET S.A.	MANTA	DGP-120-AT	12/04/2012	11/04/2013	53,51	173,10	ATUN	PALANGRE
6	HALCYON No 1	MEGAOCEAN S.A.	MANTA	DRP-2012-060-AT		Feb. 2013	45,06	132,41	ATUN	PALANGRE
	NOMBRE B/P	**ARMADOR**	**PUERTO DE REGISTRO**	**PERMISO DE PESCA**			**ESLORA Mtrs.**	**T.R.N.**	**ESPECIE CAPTURA**	**ARTE DE PESCA**
1	ALVAREZ CABRAL	CAM. DEL MAR COBUS S.A.	GUAYAQUIL	UPP-2012-125-ANG		Dic. 2012	20,42	23,01	ANGUILAS	PALANGRE CON NASA
2	NAMI I	MARMONTESAN S.A.	MANTA	DCRP-109-ANG	05/09/2012	20/11/2012	18,10	7,49	ANGUILA	PALANGRE CON NASA
3	NAMI II	MARMONTESAN S.A.	MANTA	DCRP-110-ANG	05/09/2012	20/11/2012	17,76	6,45	ANGUILA	PALANGRE CON NASA
4	PATRICIA	CAM. DEL MAR COBUS S.A.	GUAYAQUIL	UPP-2012-189-ANG		Dic. 2012	21,34	26,00	ANGUILAS	PALANGRE CON NASA

APPENDIX 4

AUTHORIZED ASSOCIATED FOREIGNER FLEET AND POLE AND CANE FLEET IN 2014 (Source: Vice Ministry of Fisheries)

NOMBRE B/P	BANDERA	MATRICULA	PERMISO DE PESCA	ACUERDO EMITIDO	ACUERDO CADUCIDAD	T.R.B	T.R.N.	EMPRESA ASOCIADA	ARTE DE PESCA
DELIA	PANAMA	INTERNAC {2322}	20/10/2011 AL 02/09/2012			708	287	NIRSA	RED DE CERCO
EL DORADO	COLOMBIA	INTERNAC {13503}	28/06/2012 AL 07/06/2012	Nº 78 JUN 07-2011	JUN 07-2013	417	172.3	INEPACA C.A.	RED DE CERCO
TUNAMAR	PANAMA	192-01-11-03-A	09/01/201 AL 08/01/2013	Nº 24 FEB 24-2011	FEB 23-2014	1098,2	386	PESPESCA	RED DE CERCO
JULIE L	PANAMA	INTERNAC {19521}	02/05/2012 AL 24/04/2013	Nº 24 FEB 26-2012	FEB26-2015	1125	726,5	TECOPESCA C.A.	RED DE CERCO
TUNAPESCA	PANAMA	INTERNAC {26498}	02/05/2012 AL 24/04/2013	Nº 25 FEB 25-2012	FEB 25-2014	1040	312	TECOPESCA C.A.	RED DE CERCO
TIUNA	PANAMA	INTERNAC {18280}	04/05/2012 AL 03/05/2013	Nº 190 DIC 07-2011	DIC 07-2014	1329	598	SEAFMAN	RED DE CERCO
GUAYMAS	MEXICO	INTERNAC {18722}				490	162,54		RED DE CERCO

	NOMBRE B/P	ARMADOR	MATRÍCULA	PUERTO DE REGISTRO	PERMISO DE PESCA		ESLORA Mtrs.	T.R.N.	ESPECIE CAPTURA	ARTE DE PESCA
1	DON AUGUSTO	PINTO LOPEZ GEORGE A.	P -04-00050	MANTA	DRP-258-AT	31/12/2009	20.05	22.36	ATUN	CAÑA Y LINEA
2	DON FERNANDO	BENITEZ BENITEZ FELIX FERNANDO	P-04-0090	MANTA	DGP-088-AT	31/12/2009	22.65	25.07	ATUN	CAÑA Y LINEA
3	MARIA EMILIA	SALTOS ROLDAN BLANCA ISORA	P-04-0115	MANTA	DGP-178-AT	31/12/2009	22.27	37.64	ATUN	CAÑA Y LINEA
4	SONIA	LOPEZ BAILON JOSE AUGUSTO	P-04-00015	MANTA	DGP-059-AT	31/12/2009	22.71	29.46	ATUN	CAÑA Y LINEA

	NOMBRE B/P	ARMADOR	MATRÍCULA	PUERTO DE REGISTRO	PERMISO DE PESCA		ESLORA Mtrs.	T.R.N.	ESPECIE CAPTURA	ARTE DE PESCA
1	TATSUMI	DE GENNA PABLO RENZO FRANSLESCO	P-04-00362	MANTA	DGP-076-CP	31/12/2009	51.30	183.83	CAMARON ROJO DE PROFUNDIDAD	TRAMPAS

APPENDIX 5

NUMBER, CHARACTERISTICS OF ARTISANAL GILLNETS AND LONGLINES USED IN ECUADOR (Source: Herrera et al., 2011)

GILLNET			LENGTH (M)		HEIGHT (M)		MESH SIZE (MM)			LONGLINE			SOURCE
TYPE	NUMBER OF GEAR	GEAR MATERIAL**	MIN	MAX	MIN	MAX	MIN	MAX	MAIN TARGET FISH/ SHELLFISH SPECIES	TYPE	NUMBER OF GEAR	MAIN TARGET SPECIES	
Surface	301	PA-PAm	400	650	3	5.4	101	127	tuna, sierra, bonito	Surface	888	Tuna, marlin, swordfish, sharks, mahi-mahi	Herrera et al. (2003)
bottom	3458	PAm	415	1400	2	8	63	203	bass, catfish, mullet, red snapper, shrimp				
bottom multiple	172								shrimp	Bottom	1174	bass, pargo, rays, catfish, robalo, brotula	
Surface	1740	PA-PAm	1120	1120	7	7	127	152	tuna, sierra, bonito	Surface	4040	Tuna, marlin, swordfish, sharks, mahi-mahi, wahoo	Herrera et al. (2003)
bottom	2035	PAm	180	1350	1	8	89	203	bass, catfish, mullet, red snapper, small sharks, shrimps	Midwater	250	miramelindo	
bottom multiple	1149	PA	420	420	0.84	0.84	50	50	bass, catfish, mullet, red snapper, shrimps	Bottom	747	bass, pargo, hake, rays, catfish, robalo, brotula	
Surface	1819	PA	425	1400	8	8	127	127	tuna, sierra, bonito	Surface	2100	Tuna, marlin, swordfish, sharks, mahi-mahi, wahoo	Herrera et al. (2003)
bottom	2139	PAm	680	1440	1.4	1.7	89	127	bass, catfish, mullet, red snapper, small sharks	Midwater	1250	miramelindo	
bottom multiple	2219	PA	220	1200	0.9	0.9	50	50	bass, catfish, mullet, red snapper, small sharks, shrimps	Bottom	456	bass, pargo, hake, rays, catfish, robalo, brotula	
surface	120												Herrera et al. (2003)
bottom	3567	PA-PAm	835	1200	0.8	4.5	70	140	bass, catfish, mullet, red snapper, pompano, shrimp				
bottom multiple	1125	PA	804	804	0.7	0.7	50	50	shrimp	Bottom	405	bass, pargo, hake, rays, catfish, robalo, brotula	
surface	1075								tuna, sierra, bonito				
bottom	2059	PAm	400	1150	1.4	2.8	53	101	bass, catfish, mullet, red snapper, pompano, shrimp	Bottom	93	bass, pargo, hake, rays, catfish, robalo, brotula	Herrera et al. (2003)
	20919										11403		

*Includes only those boats large enough to carry a gillnet (with motor)

**Material: PA= polyamide multifilament, Pam= polyamide monofilament

APPENDIX 6.

PUBLISHED STUDIES ON MARINE MAMMALS AND OTHER MARINE VERTEBRATES IN ECUADOR (1992-2011).

NO	DATE OF STUDY	PORT	TYPE OF STUDY	FISHING GEAR	SPECIES MM AS BYCATCH	BYCATCH RATE/ FINDINGS	REFERENCE
1	1992-1993	Santa Rosa and Puerto López	MM bycatch, interview and trips with observers	artisanal gillnets 10-15 cm	*Delphinus delphis, Stenella attenuata, Kogia sima, Globicephala sp*	217 dolphins caught during 2764 trips (64 with observers and the rest based on surveys at port) (86% De de). Baycatch rate (dolphins/boat/trip), Santa Rosa: 0.1042 ±0.012 (SE); Puerto López: 0.038 ± 0.007 (SE). Total catch estaimated by port, Santa Rosa: 1,150 (CI 95% 874-1,426); Puerto López 156 (CI 95% 99-213).	Félix and Samaniego (1994)
2	1987-1994	Central and south Ecuador	Strandings	artisanal gillnets 10-15 cm	*Physeter macrocephalus*	11 from 20 cases showed rest of fishing gear	Haase and Félix (1994)
3	1997	National report	review techniques to assess cetacean bycatch	artisanal gillnets 10-15 cm	several species (see Félix and Samaniego)		Félix (1997)
4	1994-1996	Central and south Ecuador	Strandings	artisanal gillnets 10-15 cm and probably purse seiner	*Physeter macrocephalus*	6 of 8 sperm whales had rests of fishing gear. Two of 7 humpback had rest of gear, one of them probably from industrial origin.	Félix et al. (1997)
5	Oct-Dic 1994	Puerto Bolívar	MM bycatch, interviews at port	artisanal gillnets 4-5 inch, nylon monofilament 5 cm and long lines	*Tursiops truncatus*	357 sample boat/days. 1 dolphin caught in a gillnet 10-15 cm. Daily catch (157 boats/day) was 0.0064 + 0.0064 (SE) dolphins/ boat/day. Mortality at port estimated at 227 dolphins.	Van Waerebeek et al. (1997)
6	1987-1995	Coast of Ecuador	Strandings	Unknown	*Delphinus delphis, Megaptera novaeangliae, Physeter macrocephalus*		Chiluiza et al (1998)
7	1994-2002	central coast of Ecuador	Strandings	artisanal gillnets 10-15 cm	*Megaptera novaeangliae*	stranding rate: 1.55 individuals per year (95% CI: 0.27,2.83; range: 1-4). Proportion of strandings due to bycatch 0.286 (95% CI: 0.105,0.533). preliminary mortality rate of 0.035(95% CI: 0.019,0.055), including both unknown and anthropogenic causes is estimated for this stock.	Alava et al 2005

NO	DATE OF STUDY	PORT	TYPE OF STUDY	FISHING GEAR	SPECIES MM AS BYCATCH	BYCATCH RATE/ FINDINGS	REFERENCE
8	1992-2006	Central and south Ecuador	review and entanglement rate	artisanal gillnets 10-15 cm	*Delphinus delphis, Globicephala sp., Kogia sima, Megaptera novaeangliae, Stenella attenuata*	Dolphin mortality estimated to be 17,000 dolphins a year in the country, and annual entanglement rate of humpback whales at 32 (CI 95% 28-39)	Félix et al (2007)
9	2009	Puerto López, Machailla and Salango	cetacean bycatch	artisanal gillnets 15 cm, purse seiner and long line	*Grampus griseus, Kogia sima, Stenella attenuata, Tursiops truncatus*	7 dolphins caught in 185 tripswith observers: 52 boats using gillnets, 125 purse seiners, 6 longlines and 1 with line. Bycach rate 0.07 dolphins/ day in boats using gillnets.	Castro and Rosero (2010)
10	2004-2007	Salinas	Rate of entanlement at sea	artisanal gillnets 10-15 cm	*Megaptera novaeangliae*	816 sightings at sea (1929 whales), 11 whales entangled with different severity. Average annual entanglement rate estimated at 0.0057.	Félix et al (2011a)
11	1996-2009	Coast of Ecuador	Strandings	Unknown	*Delphinus delphis, Globicephala marcrohynchus, Kogia sima, Megaptera novaeangliae, Physeter macrocephalus, Stenella attenuata, Tursiops truncatus, Ziphius cavirostris*	Authors identified bycatch as most probably primary cause of death. Criteria = fishing gear around the body or tail cut.	Félix et al (2011b)
12	2009-2010	Santa Rosa	bycatch multiple species. All trips with observers	artisanal gillnets 10-15 cm	*MM: Delphinus delphis, Globicephala macrorhynchus, Stenella sp, Tursiops truncatus. Sea turtles: Lepidochelis olivacea, Chelonia mydas, Dermochelis coriacea and Eretmochelys imbricata.* Sharks (7 species) rays (5 species).	255 fishing trips with observers in 18 months. 43 dolphins caugth in 537 sets of 11 hours (86% De de). Rate=0.08 dolphins/set. Port mortality estimated to be 129 dolphins (2009) and 272 (2010).	Coello et al. (2011)
13	2000-2009	Central and south Ecuador	Entanglement rate	artisanal gillnets 10-15 cm	*Megaptera novaeangliae*	Mortality estimated 15-33 whales a year	Álava et al (2012)

APPENDIX 7

Major fish species exported as white fish, main fishing ports where this product is landed and gear deployed.

SG= surface gillnet; BG=bottom gillnet; SLL= surface long line; BLL= bottom long line; HL= hand line; PS= purse seine; TN= Trawl net; H= harpoon; SF= sport fishing; BS= beach bag. Source: Martínez (2010)

ENGLISH NAME	SPANISH NAME	SCIENTIFIC NAME	PORT	FISHING GEAR									
				SG	BG	SLL	BLL	HL	PS	TN	H	SF	BS
Yellowfin tuna	Atún Aleta Amarilla	*Thunnus albacares*	Esmeraldas, San Mateo, Manta, Santa Rosa, Anconcito	x		x		x	x			x	
Big eye tuna	Atún Ojo Grande	*Thunnus obesus*	Esmeraldas, San Mateo, Manta, Santa Rosa, Anconcito	x		x		x	x				
Olive grouper	Bacalao	*Epinephelus cifuentesi*	Galápagos, esmeraldas, Manta, Puerto López				x	x					
Tripletail	Berrugate	*Lobotes surinamensis*	Limones, Puná, Posorja, Pto. Bolívar	x			x	x	x	x			
Bighead fish	Cabezudo	*Cautolatilus affinis*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar	x	x		x	x		x			
Torpedo sand perch	Camotillo	*Diplectrum maximum*	Esmeraldas, Manta, Puerto López, Santa Rora	x			x	x		x			
Peruvian moonfish	Carita	*Selene peruviana*	Esmeraldas, Los Arenales, Manta, Machalilla, San Pedro, Santa Rosa, Engabao	x	x				x	x			
Broomtail grouper	Cherna	*Mycteroperca xenarcha*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar				x	x		x	x	x	
Bigscale goatfish	Chivito	*Pseudupeneus grandiscuamis*	Esmeraldas, Los Arenales, Manta, Machalilla, San Pedro, Santa Rosa, Engabao	x	x					x			
Rooster hind	Colorado	*Epinephelus acanthistius*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar				x	x		x			
Weakfish	Corvina	*Cynoscion squamipinnis*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar	x	x		x	x		x			
Cachema weakfish	Corvina	*Cynoscion phoxocephalus*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar	x	x		x	x		x			

ENGLISH NAME	SPANISH NAME	SCIENTIFIC NAME	PORT	FISHING GEAR									
				SG	BG	SLL	BLL	HL	PS	TN	H	SF	BS
Stolzmanns Weakfish	Corvina de escama	*Cynoscion stolzmanni*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar	x	x		x	x		x		x	
Pacific bearded brotula	Corvina de roca	*Brotula clarkae*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar				x			x			
Whitefin weakfish	Corvina Plateada	*Cynoscion albus*	Esmeraldas, San Mateo, Manta, Santa Rosa, Anconcito	x			x	x		x		x	
Polla drum	Corvina rabo amarillo	*Umbrina xanti*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x				x	x			x
Common dolphinfish	Dorado	*Coryphaena hippurus*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar	x		x		x	x			x	
Lumptail searobin	Gallineta	*Prionatus stephanophrys*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x		x		x	x			
Longfin yellowtail	Huayaype	*Seriola rivoliana*	Esmeraldas, Manta, Pto. Lopez, Santa rosa, Anconcito					x	x	x	x	x	
Speckled flounder	Lenguado	*Paralichthys woolmani*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar	x	x								
Flathead grey Mullet	Lisa	*Mugil cephalus*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao	x	x			x	x	x			x
Chilean hake	Merluza	*Merluccius gayi peruanus*	Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar				x	x	x	x			
Spotted grouper	Mero	*Epinephelus analogus*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar				x	x		x			
Escolar/Black oil fish	Miramelindo	*Lepidocybium flavobrunneum*	Esmeraldas, Los Arenales, Manta, Machalilla, San Pedro, Santa Rosa, Engabao	x		x							

ENGLISH NAME	SPANISH NAME	SCIENTIFIC NAME	PORT	FISHING GEAR									
				SG	BG	SLL	BLL	HL	PS	TN	H	SF	BS
Peruvian mojarra	Mojarra	*Diapterus peruvianus*	Esmeraldas, Los Arenales, Manta, Machalilla, San Pedro, Santa Rosa, Engabao		x				x	x			x
Star-studded grouper	Murico	*Epinephelus niphobles*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar				x	x		x			
Pacific harvestfish	Pampano	*Perilus medius*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x				x	x			
Pacific red snapper	Pargo liso	*Lutjanus peru*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x		x	x	x				
Spotted rose snapper	Pargo lunajero	*Lutjanus guttatus*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x		x	x	x				
Rock seabass	Perela	*Paralabrax callaensis*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao				x	x		x			
Swordfish	Pez espada	*Xiphias gladius*	Esmeraldas, Manta, San Mateo, Lopez, Santa Rosa, Salinas, Anconcito	x		x		x			x	x	
Spottedtail angler	Pez sapo	*Lophiodes caulinaris*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x					x			
Mexican barracuda	Picuda	*Sphyraena ensis*	Esmeraldas, Manta, Pto. Lopez, Santa rosa, Anconcito					x	x	x			x
Ino- pacific blue marlin	Picudo blanco	*Makaira mazara*	Esmeraldas, Manta, San Mateo, Lopez, Santa Rosa, Salinas, Anconcito	x		x					x	x	
Striped marlin	Picudo Gacho	*Tetrapturus audax*	Esmeraldas, Manta, San Mateo, Lopez, Santa Rosa, Salinas, Anconcito	x				x			x	x	
Splittail bass	Ravijunco	*Hemanthias peruanus*	Esmeraldas, Tonchigue, Muisne, el Matal, Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar			x		x		x			

ENGLISH NAME	SPANISH NAME	SCIENTIFIC NAME	PORT	FISHING GEAR									
				SG	BG	SLL	BLL	HL	PS	TN	H	SF	BS
White snook	Robalo	*Centropomus viridis*	Esmeraldas, Manta, San Mateo, Lopez, Santa Rosa, Salinas, Anconcito, Engabao		x			x		x		x	x
Yellowstripe grunt	Roncador	*Haemulopsis axillaris*	Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x					x			
Pacific sierra	Sierra	*Scomberomorus sierra*	Esmeraldas, Manta, Pto. Lopez, Santa rosa, Anconcito	x				x	x	x			x
Brassy grunt	Teniente	*Orthopristis chalceus*	Jaramijo, Manta, San Mateo. Pto. Lopez, Santa Rosa, Anconcito, Pto. Bolivar		x		x	x		x			
Blue shark	Tiburón aguado	*Prionace glauca*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao	x		x						x	
Pelagic tresher	Tiburón rabón	*Alopias pelagicus*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao	x		x							
Shortfin mako	Tiburón tinto	*Isurus oxyrinchus*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao	x		x						x	
Tallfin croaker	Torno	*Micropogonias altipinnis*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao		x	x				x			
wahoo	Wahoo	*Acanthocybium solandri*	Esmeraldas, Los Arenales, Manta, Machalilla, Pto. López, Puná, Posorja, costa Continental, Galápagos, San Pedro, Santa Rosa, Engabao	x		x		x	x			x	
				23	19	12	19	29	17	30	5	13	6

APPENDIX 8

Companies that exported white fish to USA during the period January 2013-May 2014. Source: Central Bank of Ecuador.

COMPANY NAME	CITY
ADOLFOPEZ S.A.	La Libertad
AGROL S.A.	Manta
ALOR S.A.	Manta
BAJAÑA LINO JULIO CESAR	Guayaquil
CARDENAS FALLU AGUSTIN PABLO	Guayaquil
CARPEFRESMANTA S.A.	Manta
CEPROMAR S.A.	Guayaquil
COMERCIAL PESQUERA CRISTIANSEN S.A.	Durán
CONSULTORES INDUSTRIALES Y PRODUCTOS DEL MAR S.A.	Manta
CORINTOCORP SA	Salinas
DAGER PESCA BIEN S.A. DAGPES	Guayaquil
DIMAWORK S.A.	Guayaquil
DOCAPES, PESCADOS CAMARONES Y MARISCOS S	Salinas
ECUANAUTICA S.A.	Guayaquil
EMPACADORA ALKRISTO DEL MAR S.A. EMPALMAR	Manta
EMPACADORA BILBO S.A.	Manta
EMPREDE S.A.	Guayaquil
EXPALSA EXPORTADORA DE ALIMENTOS S.A.	Durán
EXPANSIONCORP S.A.	Guayaquil
EXPOTUNA S.A.	Guayaquil
FRESCODEGFER S.A.	Manta
FRIGOLAB SAN MATEO CIA. LTDA.	San Mateo
FRIGOLANDIA C.A.	Guayaquil
GALAPESCA S.A.	Manta
GOLD FISH AND SHRIMP S.A. UONE	Santa Elena
GONDI S.A.	Manta
HECTIDEL S.A.	Guayaquil
IND.DE ENLATADOS ALIMENTICIOS CIA. LTDA.	Manta
LEDCOSTA S.A	Guayaquil
MADEPACIF S.A.	Manta
MARISCOS DE EXPORTACION MARDEX C.LTDA.	Manta
MOBIL FISH S.A.	Manta
MOLINA RODRIGUEZ MARIA DE LOURDES	Manta
MULTIEMPRESAS TESLA S.A.	Salinas
NATLUK S.A.	Playas
NEGOCIOS INDUSTRIALES REAL NIRSA S.A.	Guayaquil
OCEANFISH S.A.	Manta
PACFISH S.A.	Guayaquil
PCC CONGELADOS Y FRESCOS C.A.	Huaquillas
PESCADOS Y MARISCOS DEL PACIFICO S.A. PESMARPAC	Manta
PESCARDEG S.A.	Manta
PESNUSAN CIA.LTDA	Manta
PESPESCA C.A.	Manta

COMPANY NAME	CITY
PHILLIPS SEAFOOD OF ECUADOR C.A.	Guayaquil
PRODEX CIA. LTDA.	Pedernales
PRODUCTOS PERECIBLES Y MARISCOS PROPEMAR S.A.	Manta
PRODUMAR S.A.	Durán
PROMAROSA-PRODUC. DEL MAR STA. ROSA	Chanduy
SALICA DEL ECUADOR S.A.	Posorja
SOUTH PACIFIC SEAFOOD S.A. SOPASE	Guayaquil
TECNICA Y COMERCIO DE LA PESCA C.A. TECOPESCA	Manta
TRANSCITY S.A.	Guayaquil
TRANSMARINA C.A.	Manta
ZHOU JIECHANG	Manta

APPENDIX 9.

Companies that exported sardine/mackerel in tomato sauce to USA, period January 2013-May 2014. Source: Central Bank of Ecuador.

COMPANY NAME	CITY
COMUMAP S.A.	Guayaquil
CONSERVAS ISABEL ECUATORIANA S.A.	Manta
ECUAMINOT S.A.	Salinas
ECUANAUTICA S.A.	Guayaquil
EUROFISH S.A.	Manta
GONDI S.A.	Manta
IND.DE ENLATADOS ALIMENTICIOS CIA. LTDA.	Manta
MARKFISH S.A.	Manta
NEGOCIOS INDUSTRIALES REAL NIRSA S.A.	Guayaquil
PRODUCTOS DEL MAR SANCHEZ PROMARSAN CIA.LTDA.	Manta
PROMOPESCA S.A.	Manta
PROYIMAR S.A.	Guayaquil
SALICA DEL ECUADOR S.A.	Posorja
TRADEXMEGA S.A.	Guayaquil
VASQUEZ ORTIZ EDGAR GUILLERMO	ND
ZAMBRANO GUERRERO CARLOS ENRIQUE	ND

APPENDIX 10

Brewer, Jennifer, Tim Werner, Fernando Félix, Javier Unibazo, Rodrigo Hucke-Gaete, Alexandra Apolinario, and Roberto Medina. 2014. Field protocol for international marine mammal bycatch project. Consortium for Wildlife Bycatch Reduction, New England Aquarium, Boston USA.

These materials should only be used or adapted with appropriate training and research design, integrating both social and biological sciences. J. Brewer is generally available to provide additional information and assistance at jennifer.brewer@unh.edu.

Cuestionario – PUERTO - Ecuador

[Parte I. Información sobre la entrevista]

Fecha, puerto, sitio [playa, muelle, casa, etc.]:
[¿Comó se encontró o seleccionó a esta persona?]
Entrevistador/es, asistente/s:
Número/s de código entrevistado/s:
Todas las preguntas se refieren a los últimos 12 meses, a menos que se indique lo contrario

[Parte II. Datos personales]

1. [¿Cuántas personas se entrevistan aquí, en esta entrevista?]
2. ¿En el último año, y antes de eso, cuáles son sus trabajos, oficios, o relaciones con la actividad pesquera? [Si es un grupo, enumere por cada categoría, dando cuenta que algunas personas tienen más de un oficio.]

(Año)	(Carrera)	
___	___	Capitán de bote de pesca
___	___	Tripulación de bote de pesca (no capitán)
___	___	Propietario (o co-propietario) de bote de pesca quien también pesca
___	___	Propietario (o co-propietario) de bote de pesca quien no pesca
___	___	Otro empleado de negocio pesquero (quien no pesca y no es propietario – especifique)
___	___	Comprador y vendedor de pescado (podría ser en el puerto, u otros distribuidores)
___	___	Abastecedor de pesquería (botes, desembarcamento, aparatos, etc. - especifique)
___	___	Miembro de una familia de pescadores (quien no pesca)
___	___	Oficial de una organización pesquera (especifique)
___	___	Representante de ONG u organización sin fines lucros (especifique)
___	___	Representante de gobierno (especifique)
___	___	Turismo costero (especifique)
___	___	Otros (especifique)

[Caracterización general de otras personas presentes pero no entrevistadas y al parecer escuchando, como el número de familiares, compañeros de trabajo, vecinos]:

3. ¿En total, aproximadamente cuántos años de experiencia como pescador tiene Ud.? [Si es grupo, registre todas las respuestas.]
4. ¿Aparte de ser pescador o no, aproximadamente cuántos años de experiencia tiene Ud. con otros trabajos relacionado a la pesca, el mar, u otros recursos naturales (por ejemplo, en la lista arriba)? ¿Puede ofrecer más detalles? [Si es un grupo, registre todas las respuestas.]

[Parte III. Preguntas sobre este puerto & flota]

1. ¿Cuántos botes (de cualquier tamaño) pescan activamente en este puerto el último año?
2. ¿Cuál es la longitud de los botes en este puerto? ¿El más pequeño? ¿El mayor? ¿Hay diferentes grupos por tamaño? ¿Y en este caso, aproximadamente cuántos botes hay en cada grupo?
3. ¿Qué artes de pesca usan estos botes? ¿anzuelos? ¿Redes de enmalle? ¿Redes de cerco móvil? ¿Redes de cerco costeras? ¿Espinel? ¿Otras? ¿Hay diferentes grupos por tipos de arte? ¿Y en este caso, cuántos botes en cada grupo?

   ¿De estos artes, cuál es el tamaño típico por bote (para entender aproximadamente el esfuerzo pesquero -- por ejemplo, el tamaño de las redes de arrastre y redes de cerco, o los números de anzuelos por línea y líneas por barco, o el tamaño y el número de espineles por bote.)

¿Aproximadamente cuántos botes utilizaron cada tipo de arte en el último año (dando cuenta que algunos usan más de un tipo de arte)?

4. ¿Qué especies de peces capturan estos botes?

   ¿Las especies han cambiado en los últimos cinco años?
   ¿Si es así, por qué?

   ¿En cuales meses del año pescan con cuales artes de pescas?
   ¿Los meses de pesca han cambiado en los últimos cinco años?
   ¿Si es así, por qué?

5. ¿En el último año, cuál es el área donde se pesca desde este puerto? ¿Cuál es la distancia al oeste, sur, norte, y este? [En algunos sitios "este" seria la costa litoral, pero en otros sitios puede ser relevante registrar aguas estuarios, bahías, etc. Si es grupo, registre la pauta agregada.]

6. ¿Ha cambiado esta área, con respecto a años anteriores? ¿Está pescando más lejos de la costa o más cerca? ¿Más al oeste, norte, sur, o este?

   ¿Si ha cambiado, por qué? [Si es grupo, registre la variedad de respuestas.]

7. ¿En el próximo año o el siguiente, Ud. supone que estas características de la flota en este puerto serán más o menos lo mismo, o hay razones para esperar cambios en el numero o tamaño de los botes o las artes típicas (como por la abundancia de peces, fondos, reglamentos, etc.)?

8. ¿Los botes en el puerto pertenecen a diferentes grupos formales o informales, como cooperativas o sindicatos? ¿En este caso, cuáles diferencias existen entre los grupos? ¿Cómo se llaman? ¿Aproximadamente cuántos pertenecen a cada grupo?

   ¿Hay botes que no pertenecen a uno de estos grupos, y si es así, cuántos?
   ¿A cuál grupo pertenece el suyo?

9. ¿Aproximadamente cuántos botes son propiedad de personas o empresas propietaria de un bote con sus artes y motor?

   ¿Aproximadamente cuántos son propiedad de personas o empresas propietaria de más de un bote?
   ¿Aproximadamente a cuántos invierten finanzas varias personas (en el bote, el arte y el motor)?

10. ¿En cuáles horas del día se realiza las actividades pesqueras de este puerto?

[Parte IV. Percepciones personales*]

Las siguientes preguntas consideran si - desde la perspectiva de su experiencia en pesquerías - ciertos animales son beneficios, dificultades, o ninguno para pescadores. [Si es grupo, indique el número de entrevistados que seleccionó cada opción, y también registrar toda la gama de respuestas cualitativas.]

1. ¿En su experiencia en pesquería las ballenas, piensa en ellas como: beneficio, dificultad, o ninguno?

   ¿En qué aspectos o maneras son beneficio o dificultad?

   ¿Aparte de las consideraciones de pesca, qué piensa Ud. de las ballenas por lo general?

2. ¿En su experiencia pesquería, si piensa en los delfines, piensa en ellos como beneficio, dificultad, o ninguno?

   ¿En qué aspectos o maneras son beneficio o dificultad?

   ¿Aparte de las consideraciones de pesca, qué piensa Ud. de los delfines por lo general?

3. ¿En su experiencia pesquería, si piensa en los lobos marinos, piensa en ellos como beneficio, dificultad, o ninguno?

   ¿En qué aspectos o maneras son beneficio o dificultad?

   ¿Aparte de las consideraciones de pesca, qué piensa Ud. de los lobos marinos por lo general?

[4. Identificaciones]

[Instrucciones:

Dependemos en su discernimiento para distinguir entre las dos situaciones, para decidir pedir o no pedir las identificaciones en alguna entrevista, y para explicarnos qué nivel de confianza tienes en las identificaciones. (Este nivel de confianza es APARTE del nivel que se nota al fin de la entrevista.)]

a. Tengo aquí dibujos de especies de ballenas.
   ¿Tiene algún idea cuales de estos Ud. ha visto enredados, mientras está pescando desde este puerto?

¿Cuáles son las características que Ud. ha visto más claramente para identificar? Por ejemplo: forma del cuerpo, forma de la aleta, forma de la cabeza, color, comportamiento, u otras. ¿Específicamente? ¿O ninguna?

[Comentario del entrevistador sobre su nivel de confianza en las identificaciones de ballenas:

3 = creo que es más o menos fiable
2 = neutral, no sé
1 = creo que no es fiable
¿Por que?]

b. Tengo aquí dibujos de especies de delfines.
¿Tiene algún idea cuales de estos Ud. ha visto enredados, mientras está pescando desde este puerto?

¿Cuáles son las características que Ud. ha visto más claramente para identificar? Por ejemplo: forma del cuerpo, forma de la aleta, forma de la cabeza, color, comportamiento, u otras. ¿Específicamente? ¿O ninguna?

[Comentario del entrevistador sobre su nivel de confianza en las identificaciones de delfines:

3 = creo que es más o menos fiable
2 = neutral, no sé
1 = creo que no es fiable
¿Por que?]

Parte V. El futuro]

1. ¿En el futuro, le interesa Ud. colaborar con pescadores para discutir e investigar nuevos métodos de pesca más eficientes o para mercados nuevos?

   [Para personas interesadas, registre los contactos en otro papel - correo electrónico, teléfono, y dirección]

2. Tiene Ud. ideas sobre innovaciones útiles para reducir interacciones entre artes de pesca y:

   ¿ballenas? ¿y si es así, los quiere describir?

   ¿delfines? ¿y si es así, los quiere describir?

   ¿lobos marinos? ¿y si es así, los quiere describir?

[Parte VI. (Opcional) Usos y mercados*]

1. En este puerto, de los delfines capturados por causalidad o a propósito, qué fracción más o menos Ud. estima (como todos, ningunos, mitad, cuarto, menos) son

   ¿desechados sin uso personal o el valor comercial?

   ¿algunas partes son usadas por familiares o vecinos? ¿Qué sectores de la flota serían?

   ¿se venden algunas partes? ¿Qué sectores de la flota serían? ¿Para qué uso y destino?

2. En este puerto, de los lobos marinos capturados por causalidad o a propósito, qué fracción más o menos Ud. estima (como todos, ningunos, mitad, cuarto, menos) son

   ¿desechados sin uso personal o el valor comercial?

   ¿algunas partes son usados por familiares o vecinos? ¿Qué sectores de la flota serían?

   ¿se venden algunas partes? ¿Qué sectores de la flota serían? ¿Para qué uso y destino?

[VII. Otro]

¿Quiere dar algún comentario adicional, observaciones, opiniones o consejos al equipo de este proyecto?

¿Si no lo ha hecho ya, quiere dar su información de contacto – correo electrónico, teléfono, dirección?

¿Hay otras personas con quienes me recomienda Ud. que yo hable?

¿Y sabe cómo contactarlas? ¿Prefiere que yo mencione su nombre o no?

IX. Notas de entrevistador/a

1. ¿Qué nivel de confianza tienes en las repuestas en esta entrevista?

   5 = creo que toda la información es fiable
   4 = sospecho que la mayoría de la información central es fiable
   3 = neutral, no sé
   2 = sospecho que hay errores
   1 = creo que hay errores importantes
   ¿Por qué opinas así?

2. ¿Hay unas frases, palabras, o parrafos illustrativos cuales podemos usar en reportes o publicaciones? ¿Sabes donde estan en la grabacion?

3. ¿Cualquieras observaciones, teorías, o sugerencias o preguntas nuevas tienes?

Cuestionario – PESCADOR - Ecuador

[Parte I. Información sobre la entrevista]

Fecha, puerto, sitio [playa, muelle, casa, etc.]:
[¿Comó se encontró o seleccionó a esta persona?]
Entrevistador/es, asistente/s:
Número/s de código entrevistado/s:
Todas las preguntas se refieren a los últimos 12 meses, a menos que se indique lo contrario

[Parte II. Experiencia en pesquerías]

1. [¿Cuántas personas se entrevistan aquí?]
2. ¿En los últimos 12 meses, y antes de eso, cuáles son sus trabajos, oficios, o relaciones con la industria pesquera?

[Si es un grupo, enumere por cada categoría, dando cuenta que algunas personas tienen más de un oficio.]

(Año) (Carrera)

___ ___ Capitán de bote de pesca
___ ___ Tripulación de bote de pesca (no capitán)
___ ___ Propietario (o co-propietario) de bote de pesca quien también pesca
___ ___ Propietario (o co-propietario) de bote de pesca quien no pesca
___ ___ Otro empleado de negocio pesquero (quien no pesca y no es propietario - especifique)
___ ___ Comprador y vendedor de pescado (podría ser en el puerto u otros distribuidores)
___ ___ Abastecedor de pesquería (botes, estibador, aparatos, etc. - especifique)
___ ___ Miembro de una familia de pescadores (quien no pesca)
___ ___ Oficial de una organización pesquera (especifique)
___ ___ Representante de ONG u organización sin fines lucros (especifique)
___ ___ Representante de gobierno (especifique)
___ ___ Turismo costero (especifique)
___ ___ Otros (especifique)

[Caracterización general de otras personas presentes pero no entrevistadas y al parecer escuchando, como el número de familiares, compañeros de trabajo, vecinos]:

3. ¿Cuántos años de experiencia tiene Ud. como pescador?

[Si es grupo, registre todas las respuestas.]

4. ¿Ha pescado Ud siempre desde este puerto, o también de otros? ¿Cuáles?
5. ¿En los últimos 12 meses, aproximadamente de qué tamaños eran los barcos en los cuáles Ud. pescó?
   ¿Y antes que eso?
6. ¿En los últimos 12 meses, cuáles artes de pesca usó Ud.?
   ¿Y antes que eso?
7. ¿En los últimos 12 meses, cuáles especies o tipos de pescado capturó Ud.?
   ¿Y antes que eso?
8. ¿En los últimos 12 meses, cuál es el área donde pesca Ud.? ¿Cuál es la distancia al oeste, sur, norte, y este?

[Parte III. Percepciones personales*]

Las siguientes preguntas consideran si - desde la perspectiva de su experiencia como pescador - ciertos animales son beneficios, dificultades, o ninguno.

[Si es grupo, indique el número de entrevistados que seleccionó cada opción, y también registrar toda la gama de respuestas cualitativas. Si Ud. sabe que alguno de estos animales no existen en esta zona, puede omitirlos.]

1. ¿Desde su perspectiva como pescador, cuando piensa en las ballenas, las ve como beneficio, dificultad, o ninguno?
   ¿En qué aspectos o maneras son beneficio o dificultad?
   ¿Aparte de las consideraciones de pesca, qué piensa Ud. de las ballenas por lo general?

2. ¿Desde su perspectiva como pescador, cuando piensa en los delfines, los ve como beneficio, dificultad, o ninguno?

¿En qué aspectos o maneras son beneficio o dificultad?

¿Aparte de las consideraciones de pesca, qué piensa Ud. de los delfines por lo general?

3. ¿Desde su perspectiva como pescador, cuando piensa en los lobos marinos, los ve como beneficio, dificultad, o ninguno?

¿En qué aspectos o maneras son beneficio o dificultad?

¿Aparte de las consideraciones de pesca, qué piensa Ud. de los lobos marinos por lo general?

[Parte IV. Interacciones en los último 12 meses*]

Las preguntas siguientes se refieren a sus observaciones de animales marinos en los últimos 12 meses.

[Si es posible, solicite y registre datos adicionales sobre estas observaciones, especialmente interacciones pesqueras. Si Ud. opina que el año pasado no es un período de tiempo apropiado, puede añadir otro, con una explicación. Si es un grupo, indique aproximadamente cuántos entrevistados están de acuerdo con cada respuesta, incluyendo opiniones de minorías.]

1. Ballenas

¿En los últimos 12 meses, durante sus actividades de pesca, aproximadamente cuántas ballenas vivas vio Ud. en el mar?

¿Entre ellas, cuántas no tenían ninguna evidencia aparente de artes de pesca adjuntos o enredados (como redes, cabos)?

¿Y cuántas tenían evidencia aparente de interacciones con artes de pesca (como redes, cabos)? (incluso arte de su bote mismo, otro bote, o de origen desconocido.)

¿Puede describir más detalles sobre estas observaciones, por ejemplo sitio de pesca?

¿En los último 12 meses, durante sus actividades de pesca, aproximadamente cuántas ballenas muertas vió en el mar?

¿Entre ellas, cuántas no tenían ninguna evidencia aparente de artes de pesca alrededor o estaban enredadas (como redes, cabos)?

¿Y cuántas tenían evidencia aparente de interacciones con artes de pesca (como redes, cabos)? (Incluso arte de su bote mismo, otro bote, o de origen desconocido.)

¿Puede describir más detalles sobre esto, por ejemplo sitio de ocurrencia?

2. Delfines

¿En los últimos 12 meses, durante sus actividades de pesca, con qué frecuencia aproximadamente vió Ud. delfines vivos en el mar? (cada día, cada semana, cada mes, ocasionalmente)

¿En los últimos 12 meses, sabe Ud. que si han quedado enredados delfines en artes de pesca?

¿Con que frecuencia aproximadamente en un bote típico como el suyo?
(cada día, cada semana, cada mes, ocasionalmente)

¿Puede describir más detalles sobre esto, por ejemplo sitio de ocurrencia?

3. Lobos marinos

¿En los últimos 12 meses, durante sus actividades de pesca, con qué frecuencia aproximadamente vio Ud. lobos marinos vivos en el mar? (cada día, cada semana, cada mes, ocasionalmente)

¿En los últimos 12 meses, sabe Ud. si han quedado enredados lobos marinos en artes de pesca?

¿Con que frecuencia aproximadamente en un bote típico como el suyo?
(cada día, cada semana, cada mes, ocasionalmente)

¿Puede describir más detalles sobre esto, por ejemplo sitio de ocurrencia?

[4. Identificaciones]

[Instrucciones: Dependemos en su discernimiento para distinguir entre las dos situaciones, para decidir pedir o no pedir las identificaciones en alguna entrevista, y para explicarnos qué nivel de confianza tienes en las identificaciones. (Este nivel de confianza es APARTE del nivel que se nota al fin de la entrevista.)]

a.Tengo aquí dibujos de especies de ballenas.

¿Tiene algún idea cuales de estos Ud. ha visto enredados, mientras está pescando desde este puerto?

¿Cuáles son las características que Ud. ha visto más claramente para identificar? Por ejemplo: forma del cuerpo, forma de la aleta, forma de la cabeza, color, comportamiento, u otras. ¿Específicamente? ¿O ninguna?

[Comentario del entrevistador sobre su nivel de confianza en las identificaciones de ballenas:

3 = creo que es más o menos fiable
2 = neutral, no sé
1 = creo que no es fiable
¿Por que?]

b.Tengo aquí dibujos de especies de delfines.

¿Tiene algún idea cuales de estos Ud. ha visto enredados, mientras está pescando desde este puerto?

¿Cuáles son las características que Ud. ha visto más claramente para identificar? Por ejemplo: forma del cuerpo, forma de la aleta, forma de la cabeza, color, comportamiento, u otras. ¿Específicamente? ¿O ninguna?

[Comentario del entrevistador sobre su nivel de confianza en las identificaciones de delfines:

3 = creo que es más o menos fiable
2 = neutral, no sé
1 = creo que no es fiable
¿Por que?]

[Parte V. Cambio en el tiempo*]

1. ¿En los últimos cinco años, ha habido algún cambio en la frecuencia de avistamiento de ballenas? ¿Ha aumentado? ¿Ha bajado? ¿Es igual?
2. ¿Y en la frecuencia de avistamiento de delfines?

   ¿Ha aumentado? ¿Ha bajado? ¿Es igual?
3. ¿De lobos marinos?

   ¿Ha aumentado? ¿Ha bajado? ¿Es igual?
4. ¿En los últimos cinco años, hubo algún cambio en la frecuencia de enredamiento de ballenas?

   ¿Ha aumentado? ¿Ha bajado? ¿Es igual?

   ¿En este caso, por qué cree Ud. que ha cambiado? ¿Cambios en las poblaciones de ballenas? ¿Cambios en el comportamiento de las ballenas? ¿Cambios en las especies objetivos de pesca? ¿Cambios en las áreas de pesca? ¿Cambios en el uso de artes de pesca? ¿Cambios en la tecnología de botes pesqueros?
5. ¿En los últimos cinco años, hubo algún cambio en la frecuencia de enredamiento de delfines?
   ¿Ha aumentado? ¿Ha bajado? ¿Es igual?

   ¿En este caso, por qué cree Ud. que ha cambiado? ¿Cambios en las poblaciones de delfines? ¿Cambios en el comportamiento de los delfines? ¿Cambios en las especies objetivos de pesca? ¿Cambios en las áreas de pesca? ¿Cambios en el uso de artes de pesca? ¿Cambios en la tecnología de botes pesqueros?
6. ¿En los últimos cinco años, ha habido algún cambio en la frecuencia de enredamiento de lobos marinos? ¿Ha aumentado? ¿Ha bajado? ¿Es igual?

   ¿En este caso, por qué cree Ud. que ha cambiado? ¿Cambios en las poblaciones de lobos marinos? ¿Cambios en el comportamiento de los lobos marinos? ¿Cambios en las especies objetivos de pesca? ¿Cambios en las áreas de pesca? ¿Cambios en el uso de artes de pesca? ¿Cambios en la tecnología de botes pesqueros?

[Parte VI. El futuro]

1. ¿En el futuro, le interesa Ud. colaborar con pescadores para discutir e investigar nuevos métodos de pesca más eficientes o para mercados nuevos?

   [Para personas interesadas, registre los contactos en otro papel - correo electrónico, teléfono, y dirección]
2. Tiene Ud. ideas sobre innovaciones útiles para reducir interacciones entre artes de pesca y:

   ¿ballenas? ¿y si es así, los quiere describir?

   ¿delfines? ¿y si es así, los quiere describir?

   ¿lobos marinos? ¿y si es así, los quiere describir?

[VII. (Opcional) Usos y mercados*]

1. En este puerto, de los delfines capturados por causalidad o a propósito, qué fracción más o menos Ud. estima (como todos, ningunos, mitad, cuarto, menos) son

   ¿desechados sin uso personal o el valor comercial?

   ¿algunas partes son usadas por familiares o vecinos? ¿Qué sectores de la flota serían?

   ¿se venden algunas partes? ¿Qué sectores de la flota serían? ¿Para qué uso y destino?

2. En este puerto, de los lobos marinos capturados por causalidad o a propósito, qué fracción más o menos Ud. estima (como todos, ningunos, mitad, cuarto, menos) son:

   ¿desechados sin uso personal o el valor comercial?

   ¿algunas partes son usados por familiares o vecinos? ¿Qué sectores de la flota serían?

   ¿se venden algunas partes? ¿Qué sectores de la flota serían? ¿Para qué uso y destino?

[VIII. Opcional]

1. ¿Tiene algún comentario adicional sobre interacciones con aves, tortugas, tiburones? (Estos no son el enfoque primario del proyecto, pero algunos pescadores nos han mencionado).

[IX. Otro]

¿Quiere dar algún comentario adicional, observaciones, opiniones o consejos al equipo de este proyecto?

¿Si no lo ha hecho ya, quiere dar su información de contacto – correo electrónico, teléfono, dirección?

¿Hay otras personas con quienes me recomienda Ud. que hable?

¿Y sabe cómo contactarlas? ¿Prefiere que yo mencione su nombre o no?

[X. Notas de entrevistador/a

1.¿Qué nivel de confianza tienes en las repuestas en esta entrevista?

5 = creo que toda la información es fiable
4 = sospecho que la mayoría de la información central es fiable
3 = neutral, no sé
2 = sospecho que hay errores
1 = creo que hay errores importantes
¿Por qué opinas así?

1. ¿Hay unas frases, palabras, o parrafos illustrativos cuales podemos usar en reportes o publicaciones? ¿Sabes donde estan en la grabacion?
2. ¿Cualquieras observaciones, teorías, o sugerencias o preguntas nuevas tienes?]

Questionnaire – PORT – Ecuador (English translation)

[Part I. Interview information]

Date, port, location (beach, wharf, house, etc.):
Interviewer/s:
[Indicate names of interviewee/s on a separate list and assign code number/s]
Code number of interviewee/s:
All questions refer to the most recent 12 months, unless indicated otherwise

[Part II. Personal information]

1. [How many people in this interview?]
2. In this past year, and before, what were your jobs, positions, or relationships with fishing activities? [If it is a group, note the number per category, realizing some people may hold more tan one position.]

(Year) (Position)

___ ___ Fishing boat captain
___ ___ Fishing boat crew (non captain)
___ ___ Owner (or co-owner) of a fishing boat and also personally fishing
___ ___ Owner (or co-owner) of a fishing boat but not personally fishing
___ ___ Other employee of a fishing-related business (but not fishing and not owner – specify)
___ ___ Buyer and seller of fish (could be in the port or elsewhere)
___ ___ Fishing supplier (boats, wharfage, gear, etc. - specify)
___ ___ Member of a fishing family (but not personally fishing)
___ ___ Official of a fishing organization (specify)
___ ___ Representative of a NGO or non-profit organization (specify)
___ ___ Government representative (specify)
___ ___ Coastal tourism (specify)
___ ___ Other (specify)

[General description of other people present but not interviewed but apparently listening, such as numnber of family memners, co-workers, neighbors]:

3. In total, about how many years of fishing experience do you have? [If it is a group, record all answers.]
4. Apart from fishing or not, about how may years of experience do you have with other jobs related to fishing, the ocean, or other natrual resources (for example, in the list above)? Can you offer more details? [If a group, record all answers.]

[Part III. Questions about the port and fleet]

1. ¿How many boats (of what size) have been actively fishing from this port in the past year?
2. What is the length of boats in this port? Smallest? Largest? Are there different size groups? If so, about how many boats in each group?
3. What fishing gear do these boats use? Hooks? Gillnets? Purse seines? Beach seines? Longline? Others? Are there different gear groups? If so, how many boats in each group?

   Of these gears, what quantity or size is typical per boat (to understand roughly the fishing effort – for example, the size of trawls and purse seines, or numbers of hooks per line and lines per boat, or the size and number of longlines per boat)?

   About how many boats used each gear type in the past year (realizing some more more than one gear)?
4. What species do these boats catch?

   Have the species changed in the last five years?
   If so, why?

   In which months of the year do they fish with which gears?
   Have the fishing months changed in the last five years?
   If so, why?
5. In the past year, what is the area fished from this port? What is the distance to the west, south, north, east? [In some locales, "east" will be the shoreline, but in other locales it may be estuaries, bays, etc. If this is a group, record the total area.]

6. Have the fishing áreas changed from past years? Is the fishing farther from the coast or closer? More to the west, north, south, east?

   If it has changed, why? [If this is a group, record the range of answers.]

7. In the coming two years, do you think these characteristics of the fleet in this port will be more or less the same, or is there reason to expect changes in the number or size of boats, or in typical gear (such as due to fish abundance, finances, regulations, etc.?

8. Do the boats in this port belong to different formal or informal groups, such as cooperatives or unions? If so, what differences exist among the groups? What are they called? About how many in each group?

   Are there boats that don't belong to any of these groups, and if so, how many?

   What group does your boat belong to?

9. Approximately how many boats are property of individuals or businesses with one boat (with fishing gear and engine)?

   Approximately how many are property of individual sor businesses with more tan one boat?

   Approximately how many involve financial investments from various people (in the boat, gear, and engine)?

10. In what hours of the day do fishing activities take place from this port?

[Part IV. Personal perceptions]

The following questions consider if, from the perspecive of your experience in fisheries, certain animals are beneficial, difficulties, or neither for fishermen. [If it is a group, record the number of interviewees that select each option, and also record the range of qualitative answers.]

1. In your fishing experience, do you think of whales as: benefit, dificulty, o neither?

   In what ways are they benefit or difficulty?

   Apart from fishing considerations, what do you think of whales in general?

2. In your fishing experience, do you think of dolphins as benefit, dificulty, or neither?

   In what ways are they benefit or difficulty?

   Apart from fishing considerations, what do you think of dolphins in general?

3. In your fishing experience, do you think of sea lions as benefit, dificulty, or neither?

   In what ways are they benefit or difficulty?

   Apart from fishing considerations, what do you think of sea lions in general?

[4. Identifications]

[Instructions:

We rely on your discretion to decide if it is appropriate or not to ask for species identifications in each interview, and to explain your level of confidence in the identifications. (This level of confidence is SEPARATE from the level that you note at the end of the interview.)]

a. I have here drawings of whale species.

Do you have an idea which of these you have seen entangled while fishing from this port?

What are the characteristics that you have seen most clearly to make this identification? For example: body shape, fin shape, head shape, color, behavior, or other. Specifically? Or none?

[Interviewer assessment of level of confidence in whale identification:

3 = I think it is more or less reliable
2 = neutral, I don't know
1 = I think it is not reliable
Why?]

b. I have here drawings of dolphin species.

Do you have an idea which of these you have seen entangled while fishing from this port?

What are the characteristics that you have seen most clearly to make this identification? For example: body shape, fin shape, head shape, color, behavior, or other. Specifically? Or none?

[Interviewer assessment of level of confidence in dolphin identification:

3 = I think it is more or less reliable
2 = neutral, I don't know
1 = I think it is not reliable
Why?]

[Part V. Future]

1. In the future, are you interested in collaborating with other fishermen to discuss and investigate new methods of more efficient fishing or new markets?

   [For interested persons, record their contacts on another paper – e-mail, phone, address]

2. Do you have ideas about ways to reduce interactions between fishing gear and whales? If so, please describe them?

   For dolphins? If so, please describe them?

   For sea lions? If so, please describe them?

[Part VI. (Optional) Uses and markets *]

1. In this port, when dolphins are caught by accidento or on purpose, roughly what fraction do you estimate (such as all, none, half, quarter, less) are

   discarded without any personal use or comercial value?

   some parts used by families or neighbors? From what fleet sectores would that be?

   some parts sold? From what fleet sectors would that be? For what use and purpose?

2. In this port, when sea lions are caught by accidento or on purpose, roughly what fraction do you estimate (such as all, none, half, quarter, less) are

   discarded without any personal use or comercial value?

   some parts used by families or neighbors? From what fleet sectores would that be?

   some parts sold? From what fleet sectors would that be? For what use and purpose?

[VII. Other]

Do you want to give any additional comments, observations, opinions or advice to this project team?

If you haven't done it yet, do you want to give your contact information – e-mail, phone, address?

Are there other people you recommend I talk to?

Do you know how to contact them? Do you prefer that I mention your name or not?

IX. Interviewer notes

1. What level of confidence do you have in the answers in this interview?

   5 = I believe all the information is reliable
   4 = I suspect the majority of the central information is reliable
   3 = Neutral, I don't know
   2 = I suspect there are errors
   1 = I believe there are important errors
   Why?

2. Are there descriptive phrases, words, or paragraphs that we could use in reports or publications? Do you know where these are in the audio recording?

3. Do you have any other observations, theories, suggestions, or new questions?

Questionnaire – FISHER – Ecuador (English translation)

[Part I. Interview information]

Date, port, location (beach, wharf, house, etc.):
[How did you find or choose this interviewee?]
Interviewer/s, assistants:
Code number of interviewee/s:
All questions refer to the most recent 12 months, unless indicated otherwise

[Part II. Fishing experience]

1. [How many people in this interview?]
2. In this past year, and before, what were your jobs, positions, or relationships with fishing activities? [If it is a group, note the number per category, realizing some people may hold more than one position.]

(Year) (Position)

___ ___ Fishing boat captain
___ ___ Fishing boat crew (non captain)
___ ___ Owner (or co-owner) of a fishing boat and also personally fishing
___ ___ Owner (or co-owner) of a fishing boat but not personally fishing
___ ___ Other employee of a fishing-related business (but not fishing and not owner – specify)
___ ___ Buyer and seller of fish (could be in the port or elsewhere)
___ ___ Fishing supplier (boats, wharfage, gear, etc. - specify)
___ ___ Member of a fishing family (but not personally fishing)
___ ___ Official of a fishing organization (specify)
___ ___ Representative of a NGO or non-profit organization (specify)
___ ___ Government representative (specify)
___ ___ Coastal tourism (specify)
___ ___ Other (specify)

[General description of other people present but not interviewed but apparently listening, such as number of family members, co-workers, neighbors]:

3. In total, about how many years of fishing experience do you have? [If a group, record all answers.]
4. Have you always fished from this port, or also from others? Which?
5. In the past 12 months, roughly what size boats have you fished from?

   And before?
6. In the past 12 months, what fishing gears have you used?

   And before?
7. In the last 12 months, what species or types of fish have you caught?

   And before?
8. In the last 12 months, what is the area you have fished? How far to the west, south, north, east?

[Part III. Personal perceptions *]

The following questions consider if, from your perspective as a fisherman, certain animals are benefits, difficulties, or neither.

[If it is a group, record the number of interviewees that select each option, and also record the range of qualitative answers. If you know some of these animals don't exist in this área, you can skip them.]

1. From your perspective as a fisherman, when you think of whales, do you see them as a benefit, difficulty, or neither?

   In what ways are they a benefit or difficulty?

   Apart from fishing considerations, what do you think of whales in general?
2. From your perspective as a fisherman, when you think of dolphins, do you see them as a benefit, difficulty, or neither?

   In what ways are they a benefit or difficulty?

Apart from fishing considerations, what do you think of dolphins in general?

3. From your perspective as a fisherman, when you think of sea lions, do you see them as a benefit, difficulty, or neither?

   In what ways are they a benefit or difficulty?

   Apart from fishing considerations, what do you think of sea lions in general?

[Part IV. Interactions in the past 12 months*]

The following questions refer to your observations of marine animals in the most recent 12 months.

[If possible, seek and record additional facts about these observations, especially fishery interactions. If you think the past year is not an appropriate time period, you can add another, with explanation. It it is a group, indicate approximately how many interviewees agree with each answer, including minority opinions.]

1. Whales

In the past 12 months, during your fishing activities, approximately how many whales have you seen in the ocean?

Among those, how many did not have any apparent evidence of attached or entangled fishing gear (like net, rope)?

And how many had apparent evidence of interactions with fishing gear (like nets, ropes)? (including gear from your boat, other boats, or of unknown origin.)

Can you describe more details about these observations, for example the fishing location?

In the past 12 months, during your fishing activities, approximately how many dead whales have you seen in the ocean?

Among these, how many did not have any apparent evidence of attached or entangled fishing gear (like net, rope)?

And how many had apparent evidence of fishing gear interactions (like nets, rope)? (including gear from your boat, other boats, or of unknown origin.)

Can you describe more details about these observations, for example the location?

2. Dolphins

In the past 12 months, during your fishing activities, approximately how often did you see live dolphins in the ocean? (each day, week, month, occasionally)

In the past 12 months, do you know if some dolphins have been entangled in fishing gear?

Approximately how often with a typical boat like yours?
(each day, week, month, occasionally)

Can you describe more details about this, for example the location?

3. Sea lions

In the past 12 months, during your fishing activities, approximately how often did you see live sea lions in the ocean? (each day, week, month, ocassionally)

In the past 12 months, do you know if some sea lions have been entangled in fishing gear?

Approximately how often with a typical boat like yours?
(each day, week, month, occasionally)

Can you describe more details about this, for example the location?

[4. Identifications]

[Instructions:

We rely on your discretion to decide if it is appropriate or not to ask for species identifications in each interview, and to explain your level of confidence in the identifications. (This level of confidence is SEPARATE from the level that you note at the end of the interview.)]

a. I have here drawings of whale species.

Do you have an idea which of these you have seen entangled while fishing from this port?

What are the characteristics that you have seen most clearly to make this identification? For example: body shape, fin shape, head shape, color, behavior, or other. Specifically? Or none?

[Interviewer assessment of level of confidence in whale identification:

3 = I think it is more or less reliable
2 = neutral, I don't know
1 = I think it is not reliable
Why?]

b. I have here drawings of dolphin species.
Do you have an idea which of these you have seen entangled while fishing from this port?

What are the characteristics that you have seen most clearly to make this identification? For example: body shape, fin shape, head shape, color, behavior, or other. Specifically? Or none?

[Interviewer assessment of level of confidence in dolphin identification:

3 = I think it is more or less reliable
2 = neutral, I don't know
1 = I think it is not reliable
Why?]

[Part V. Change over time *]

1. In the last five years, has there been a change in the frequency of whale sightings?

   Has it increased? Decreased? Is it the same?

2. And the frequency of dolphin sightings?

   Has it increased? Decreased? Is it the same?

3. And for sea lions?

   Has it increased? Decreased? Is it the same?

4. In the last five years, has there been a change in the frequency of whale entanglements?

   Has it increased? Decreased? Is it the same?

   In this case, why do you think it has changed? Changes in whale populations? Changes in whale behavior? Changes in fishing target species? Changes in fishing area? Changes in fishing gear use? Changes in fishing boat technology?

5. In the last five years, has there been a change in the frequency of dolphin entanglements?

   Has it increased? Decreased? Is it the same?

   In this case, why do you think it has changed? Changes in dolphin populations? Changes in dolphin behavior? Changes in fishing target species? Changes in fishing area? Changes in fishing gear use? Changes in fishing boat technology?

6. In the last five years, has there been a change in the frequency of sea lion entanglements?

   Has it increased? Decreased? Is it the same?

   In this case, why do you think it has changed? Changes in sea lion populations? Changes in sea lion behavior? Changes in fishing target species? Changes in fishing area? Changes in fishing gear use? Changes in fishing boat technology?

Part VI. Future]

1. In the future, are you interested in collaborating with other fishermen to discuss and investigate new methods of more efficient fishing or new markets?
   [For interested persons, record their contacts on another paper – e-mail, phone, address]

2. Do you have ideas about ways to reduce interactions between fishing gear and whales? If so, please describe them?

   For dolphins? If so, please describe them?

   For sea lions? If so, please describe them?

[Part VII. (Optional) Uses and markets *]

1. In this port, when dolphins are caught by accidento or on purpose, roughly what fraction do you estimate (such as all, none, half, quarter, less) are

   discarded without any personal use or commercial value?

   some parts used by families or neighbors? From what fleet sectores would that be?

   some parts sold? From what fleet sectors would that be? For what use and purpose?

2. In this port, when sea lions are caught by accidento or on purpose, roughly what fraction do you estimate (such as all, none, half, quarter, less) are

   discarded without any personal use or commercial value?

   some parts used by families or neighbors? From what fleet sectores would that be?

   some parts sold? From what fleet sectors would that be? For what use and purpose?

[VII. Other]

Do you want to give any additional comments, observations, opinions or advice to this project team?

If you haven't done it yet, do you want to give your contact information – e-mail, phone, address?

Are there other people you recommend I talk to?

Do you know how to contact them? Do you prefer that I mention your name or not?

IX. Interviewer notes

1. What level of confidence do you have in the answers in this interview?

   5 = I believe all the information is reliable
   4 = I suspect the majority of the central information is reliable
   3 = Neutral, I don't know
   2 = I suspect there are errors
   1 = I believe there are important errors
   Why?

2. Are there descriptive phrases, words, or paragraphs that we could use in reports or publications? Do you know where these are in the audio recording?
3. Do you have any other observations, theories, suggestions, or new questions?