

Ecuadorian Fisheries and the U.S. MMPA Imports Rule¹

May 10, 2023

I. Executive Summary

Ecuador is among the top 20 highest-volume fish exporting nations to the United States. With its sizable coastline and vast exclusive economic zone (EEZ)^{2, 3} fishing is a major industry in Ecuador. Ecuador is the largest harvester of shrimp and the second largest harvester of tuna in the world⁴. In 2020 Ecuador exported 167,899 metric tons of fish products to the United States valued at US\$1,011,188,022,⁵ and these fish exports to the United States represent 1.02% of Ecuador's 2020 GDP⁶. Ecuador's largest export product to the United States is warm water shrimp, followed by tuna. The country's industrial fishing fleet is comprised of around 550 vessels, and the artisanal fishing fleet is comprised of around 35,500 vessels.

In 2018, Ecuador's Ministry of Environment identified fishing gear interactions as the principal threat to the country's marine mammals⁷. Although long-term monitoring actions and varied conservation efforts have been conducted by NGOs and under RFMOs along Ecuador's coast, the government has done little to address marine mammal interactions. Current and accurate information about marine mammal populations and bycatch numbers in Ecuador is extremely limited. Under the Inter-American Tropical Tuna Commission and the Agreement on the International Dolphin Conservation Program, detailed marine mammal bycatch information from the industrial tuna purse seine fishery is collected. However, very little data or even acknowledgement of bycatch exists in governmental records outside of this fishery.

Under the U.S. Marine Mammal Protection Act (MMPA), the U.S. government "shall ban" all seafood imports caught with fishing gear that kills or seriously injures marine mammals "in excess of United States standards."⁸ To implement the requirement, NMFS issued the MMPA Imports Rule,⁹ setting out standards that nations must demonstrate to continue exporting fish to the United States after December 31, 2023. Under the Rule, Ecuador must apply for and receive a "comparability finding" from the National Marine Fisheries Service, which is essentially a determination that Ecuador's bycatch and bycatch program meets U.S. standards.¹⁰

¹ Primary author: Elizabeth Stears. For questions contact Sarah Uhlemann at suhlemann@biologicaldiversity.org

² Stanford Center for Ocean Solutions 2020

³ MSPglobal: International Guide on Marine/Maritime Spatial Planning - UNESCO Digital Library n.d.

⁴ Stanford Center for Ocean Solutions 2020

⁵ NOAA Fisheries n.d.

⁶ GDP (Current US\$) - Fiji | Data n.d.

⁷ Ambiente and Rosero 2018; Ministerio del Ambiente 2018.

⁸ 16 U.S.C. § 1371(a)(2).

⁹ 81 Fed. Reg. 54,415 (Aug. 16, 2016).

¹⁰ 50 C.F.R. § 216.24(h)(6).

This report provides an assessment of Ecuador's fisheries, its marine mammal populations, potential bycatch issues, and Ecuador's legal regime related to bycatch, as applied to the MMPA Imports Rule. Overall, based on publicly available information, Ecuador does not meet this burden for its export fisheries. While Ecuador bans intentional killing of marine mammals during fishing, Ecuador does not provide for marine mammal surveys for all stocks; may not require an adequate fisheries register; does not maintain adequate regulatory requirements for bycatch, including requiring mitigation measures or bycatch monitoring for all export fisheries; and does not calculate potential biological removal (PBR) levels. As such, Ecuador will likely be unable to demonstrate that serious injury and mortality from each export fishery do not exceed PBR.

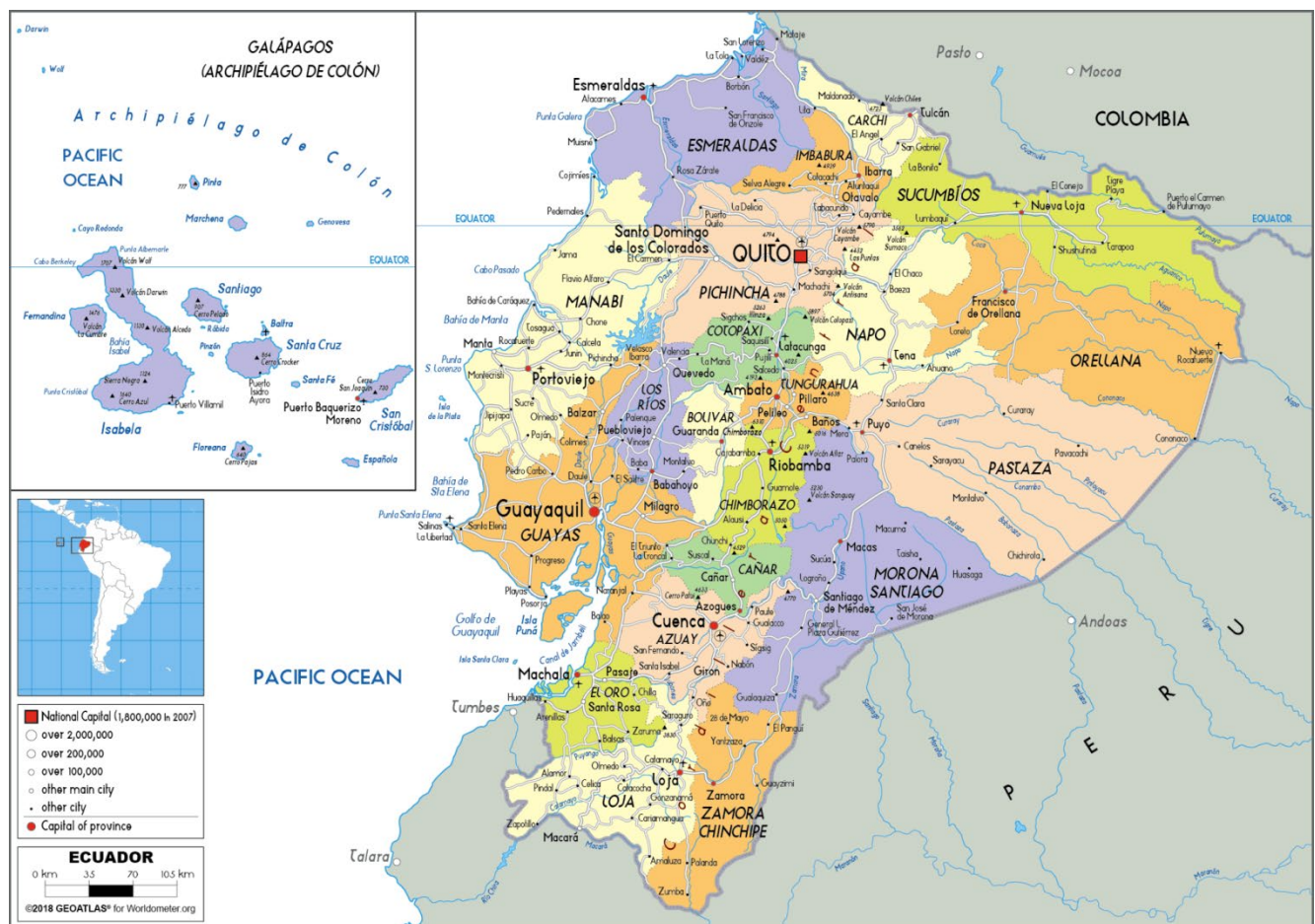


Figure 1. Map of Ecuador. Source: <https://www.worldometers.info/maps/ecuador-political-map/>

II. Export Fisheries

As detailed below, tuna and other industrial fisheries and numerous small-scale fisheries operate in Ecuador's offshore and nearshore waters. Both have been identified as potential

sources of cetacean bycatch at the local and regional scales.^{11, 12, 13, 14} Although the industrial tuna fishery is regulated by the Inter-American Tropical Tuna Commission (IATTC), very little attention or oversight is given to Ecuador’s small-scale (artisanal) fishing industries.^{15, 16}

A. U.S. Imports

NMFS lists 12 export fisheries and 7 exempt fisheries for Ecuador in the 2020 LOFF. Ecuador is the largest harvester of shrimp and the second largest harvester of tuna in the world.¹⁷ In 2020 Ecuador exported 167,899 metric tons of fishery products to the United States valued at US \$1,011,188,022¹⁸ (Table 1). Ecuador’s largest export product to the U.S. in 2020 by both volume and value was warm water shrimp. Shrimp was followed by tuna and dolphinfish (also known as dorado). Fishery exports to the United States represent 1.02% of Ecuador’s 2020 GDP.¹⁹

The country’s industrial fishing fleet is comprised of around 549 vessels,²⁰ and the artisanal fishing fleet is comprised of around 35,500 vessels.²¹ In 2020, Ecuador reported 3,123 vessels/licenses operating in the Ecuadorian EEZ that export to the United States.²² According to the 2020 List of Foreign Fisheries (LOFF), Ecuadorian export fisheries use several different gear types, including longlines; traps; set gillnets; gillnets and entangling nets; trawls; trammel nets; purse seines; and passive surface nets.²³

Year	Volume (kg)	Value (USD)	Edible Code
2020	1,202,870	\$1,214,976	Not Edible
2020	166,696,263	\$1,009,973,046	Edible
	2020 Total: 167,899,133	2020 Total: \$1,011,188,022	
2021	752,969	\$753,450	Not Edible
2021	185,221,345	\$1,316,429,964	Edible
	2021 Total: 185,974,314	2021 Total: \$1,317,183,414	

¹¹ J. Alava, Barragan, and Denkinger 2012

¹² CPPS-PNUMA 2007

¹³ Reeves, McClellan, and Werner 2013

¹⁴ Alava et al. 2019

¹⁵ Félix et al. 2015

¹⁶ Alava et al. 2019

¹⁷ Stanford Center for Ocean Solutions 2020

¹⁸ NOAA Fisheries, n.d.

¹⁹ “GDP (Current US\$) - Ecuador Data” n.d.

²⁰ Ministerio de Produccion, Comercio Exterior, Inversiones y Pesca 2021

²¹ Stanford Center for Ocean Solutions 2020

²² NOAA Fisheries, 2020

²³ NOAA Fisheries 2020

Table 1. Ecuador’s 2020 and 2021 Fishery exports to the United States.²⁴

B. Industrial Fisheries

The Ecuadorian industrial fleet operated with 549 vessels in 2021.²⁵ Economically, the tuna fishery is the most valuable in Ecuador. Ecuador has the largest tuna fleet in the tropical southeastern Pacific with 108 vessels with cargo capacity between 50 and 1700 tons. Ecuador’s purse-seine fleet comprises around 40% of the total number of purse-seine ships authorized to fish for tunas in the eastern Pacific Ocean. The Ecuadorian industrial tuna fleet operates both within its Economic Exclusive Zone (EEZ) and international waters.^{26, 27}

A sizeable industrial purse seine fishery targeting small pelagics also operates primarily in coastal waters, many focused in the Gulf of Guayaquil.²⁸ This fishery mainly targets mackerel, frigate tuna, herring, corbata, sardine, and anchoveta.²⁹ As of 2016, 20% of Ecuador’s fishery exports were from the small pelagics fishery, including for both the fishmeal and fish oil industry and canned or frozen fish.³⁰

Ecuador’s industrial tuna fleet is subject to Ecuadorian laws as well as the oversight of the IATTC. The IATTC has instituted fishing quotas and a “Dolphin Safe” program for tuna. This program aims to reduce dolphin bycatch in the purse seine fishing nets of industrial tuna fisheries either in offshore zones (EEZ or international waters) or within coastal fishing grounds through the use of Dolphin Mortality Limits (DMLs).³¹ Under the MMPA, for a nation to export yellowfin tuna caught by large purse seine vessels greater than 400 short tons in size in the eastern tropical Pacific Ocean, NMFS must issue an affirmative finding that a nation is complying with U.S. requirements regarding dolphin-safe tuna.³² Ecuador holds such an affirmative finding, which is valid through March 31, 2025.³³

C. Artisanal or Small-Scale Fisheries

Ecuador has the largest small-scale fishing fleet, also known as an artisanal fishing fleet, in the southeastern Pacific.^{34, 35, 36, 37} Small-scale fisheries are an important socio-economic industry in coastal Ecuador. According to Herrera et al. 2013, there are 219 fish landing sites

²⁴ NOAA Fisheries, n.d.

²⁵ Ministerio de Produccion, Comercio Exterior, Inversiones y Pesca 2021

²⁶ J. J. Alava et al. 2019

²⁷ M. A. Hall, Alverson, and Metuzals 2000

²⁸ Félix et al. 2021.

²⁹ FisheryProgress.org, Ecuador small pelagics – purse seine. Available at <https://fisheryprogress.org/fip-profile/ecuador-small-pelagics-purse-seine>

³⁰ Peacock 2018

³¹ J. J. Alava et al. 2019

³² 50 C.F.R. § 216.24(f) (6), (8)

³³ Fisheries 2021

³⁴ Castro et al. 2020

³⁵ Alava, Lindop, and Jacquet 2015

³⁶ Martínez-Ortiz et al. 2015

³⁷ Comisión Permanente del Pacífico Sur (CPPS) 2010

along Ecuador's coast. These sites include well-established ports with large fleets of over a thousand vessels, as well as small ports with a half dozen vessels³⁸.

Small-scale fishing occurs along the mainland coast and the Galapagos Islands. While there is no single definition of artisanal fisheries, classifications are usually made based on vessel size and gear used. In Ecuador, the most common artisanal fishing vessels are small boats with 2–3 crew and 20–50 horsepower outboard motors. Long wooden canoes for 3–4 crew and 10 meter wooden or fiberglass open boats with 75–100 horsepower outboard motors are also common.³⁹ Generally, these boats take between one and four hauls per fishing trip and fish between 10–120 nautical miles from the coast.

The artisanal fishing fleet primarily uses three types of fishing gear: surface and bottom gillnets; surface and bottom longlines; and purse seines.⁴⁰ The artisanal fleet that targets large pelagic fish such as common dolphinfish, several tuna species, billfish species, groupers, snappers, pacific bearded brotula, and sharks primarily uses longline and surface gillnets.^{41, 42}

The interaction of small cetaceans with artisanal fisheries is recognized as one of the largest conservation problems on the globe.⁴³ In Ecuador, these interactions include collisions with boats; changes of behavior due to tourism; direct mortality due to entanglements; and critically, bycatch from fisheries.⁴⁴

The scientific community has described small-scale fisheries within Ecuador as a cause of entanglements, strandings, and bycatch of marine mammals during the last three decades.^{45, 46} Yet very little governmental or regulatory attention has been focused on assessing or mitigating marine mammal bycatch caused by Ecuadorian small-scale fisheries. Official fishery statistics do not distinguish between subsistence and commercial catches within the artisanal fleets. Further, concerns have been raised by the Cámara Nacional de Pesquería that Ecuador's small pelagic fisheries have not been well-managed and that lack of control for these high-value fisheries means that they are “very prone to states of overfishing”.⁴⁷

Without this differentiating data, it is difficult to ascertain which marine mammal bycatch records within the Ecuadorian artisanal fishing industry are potentially related to U.S. imports.

³⁸ Herrera et al. 2013

³⁹ Alava et al. 2019

⁴⁰ Félix et al. 2021

⁴¹ Alava et al. 2019

⁴² Castro et al. 2020

⁴³ CPPS 2010

⁴⁴ CPPS 2010

⁴⁵ Alava et al. 2019

⁴⁶ Alava, Barragan, and Denkinger 2012

⁴⁷ Anastacio 2022

1. Artisanal fishers' associations

There is no documentation of how many artisanal fishers operate in Ecuador. Estimates from 2009 and 2011 ranged from 25,783 to 80,000 fishers respectively.^{48, 49} Organized artisanal fishers belong predominantly to the National Federation of Fishing Associations (FENACOPEC)—an organization created in 1989 that fishing authorities acknowledge as representing the artisanal fishing sector. Government programs aimed at artisanal fisheries are often implemented through the FENACOPEC. However, in a 2015 study, most artisanal fishers who were interviewed had no formal affiliation with the association.⁵⁰

The business and processing structure of smaller fishing companies and artisanal fishers is less understood than large industrial fisheries. This is partially because artisanal fisheries often rely on multiple other entities to process, market, and export their goods.⁵¹ Because of the multiple parties involved in this production method, tracking products from specific fishers, permits, or fisheries is difficult.

D. Fishery Gear

1. Gillnets

The presence of cetacean bycatch, especially in gillnet catches, has long been recognized. Gillnets are the primary gear responsible for cetacean mortality worldwide.^{52, 53, 54, 55} Multiple different types of gillnets are used by artisanal fishermen in Ecuador. In 2013, an estimated 23,000 gillnets were used in Ecuador's small-scale fishery.^{56, 57} Surface gillnets are primarily used in the central and northern coastal regions of Ecuador. Bottom gillnets are primarily used by fishermen from central and southern ports.

NMFS's 2020 LOFF lists 1585 licenses for "gillnets and entangling nets (not specified), (bottom);" 38 licenses for "set gillnets/set nets (anchored), (Bottom);" and an unknown number of licenses for 1500 vessels using "[g]illnets and entangling nets (not specified), (Surface))." The 2020 LOFF lists these various gillnet fisheries as targeting: marine crustaceans, marine shrimps, bighead tilefish, Brazilian groupers, broomtail groupers, *Brotula clarki*, chillhull sea catfish, fortune jack, God's flounder, Graery threadfin seabass, longfin yellowtail, olive grouper, Pacific harvestfish, Pacific mutton hamlet, *Paralabrax* spp, polla drum, Red Sea catfish, rooster hind, *Schedophilus nei*, snappers, snooks, speckled flounder, specklefin cusk-eel, starry grouper, toothed flounder, weakfishes, Atlantic redfishes, catfishes, cornetfish, croakers/drums, ocean whitefish, *Penaeus* shrimps, South Pacific hake, Titi shrimp, *Trachypenaeus* shrimps, whiteleg

⁴⁸ FENACOPEC 2009

⁴⁹ Herrera et al. 2013

⁵⁰ Félix et al. 2015

⁵¹ Stanford Center for Ocean Solutions 2020

⁵² Anderson 2014

⁵³ MRAG 2012

⁵⁴ Kiszka et al. 2009

⁵⁵ IWC 2019

⁵⁶ Félix et al. 2015

⁵⁷ Herrera et al. 2013

shrimp, zebra shrimp, yellowfin tuna, bigeye tuna, black skipjack, common dolphinfish, eastern Pacific bonito, escolar, Indo-Pacific sailfish, marlins, Pacific sierra, skipjack tuna, striped marlin, swordfish, and wahoo.

NMFS's seafood trade database confirms that many of these species targeted by Ecuador's gillnet fisheries are imported into the United States, including Ecuador's primary exports to the United States by both volume (kg) and value in U.S. dollars: shrimp, followed by tuna, then dolphinfish.⁵⁸

A study was conducted between 2009 and 2010 in Ecuador to assess the bycatch of turtles, marine mammals, sharks, and birds within the Ecuadorian artisanal gillnet fleet. More than 500 sets of surface gillnet fisheries that target large pelagics were monitored between 35 and 100 miles offshore. Forty-three individuals were caught from four species. This equates to bycatch occurring in 8% of net sets. The entanglement of these species was primarily found in the upper (69%) and central (30%) parts of the net, while the catch of target species occurred in the central part of the net (54%) and lower part (21%). Similar results were seen in the bycatch of turtles. These results suggest that submerging gillnets a further few meters may reduce the incidental catch and mortality of cetaceans within the gillnet pelagic fleet.⁵⁹

A further study was carried out between May and September in 2012 and 2013 to determine the impact of cetacean bycatch by the artisanal surface gillnet fleets based in the main artisanal fishing ports of Ecuador. During the fishing operations, six species of cetaceans were caught. In addition, humpback whales were associated with 29 incidents of broken nets.⁶⁰

2. Longlines

Longlines are also prevalent in Ecuador's small-scale fisheries, representing approximately 20% of the country total maritime fisheries fleet.⁶¹ As of 2013, an estimated 11,500 longlines were used in Ecuador.^{62, 63} Ecuador has 22 longliners registered with the IATTC.⁶⁴ Observer coverage on industrial longline vessels greater than 20 meters in length averages around 5%.⁶⁵ The longline fisheries registered with the IATTC do not have a mandatory observer program, nor do they have complete or credible reported bycatch data.⁶⁶ Given the limited observer coverage on industrial longliners and the lack of observer coverage within the artisanal longline fisheries, recorded cetacean bycatch numbers are low. There have been recorded interactions between bottlenose and spotted dolphins with Ecuadorian longline fisheries.^{67, 68, 69} Actual cetacean bycatch in Ecuadorian longline fisheries is likely higher, as

⁵⁸ NOAA Fisheries 2020

⁵⁹ Instituto Nacional de Pesca Ecuador and Comisión Permanente del Pacífico Sur 2017

⁶⁰ Rosero 2019.

⁶¹ Plan de Accion Nacional para la Conservacion y el Manejo del Recurso Dorado en Ecuador (PAN Dorado)

⁶² Félix et al. 2015

⁶³ Herrera et al. 2013

⁶⁴ Stanford Center for Ocean Solutions 2020

⁶⁵ Stanford Center for Ocean Solutions 2020

⁶⁶ IATTC 2021

⁶⁷ Félix et al. 2018; Castro Briones 2019.

⁶⁸ Stanford Center for Ocean Solutions 2020

⁶⁹ Félix et al. 2015

cetacean interactions with longline gear have been recorded globally for decades.^{70, 71, 72, 73} Cetaceans, particularly odontocetes (toothed whales), are thought to be attracted to longline gear and the associated boats because of the opportunity to consume bait and the fish that are attracted to the bait.⁷⁴

NMFS's 2020 LOFF lists one license for bottom longlines and 277 licenses for midwater pelagic, and surface longlines. The 2020 LOFF lists the target species of these various longline vessels as Patagonian toothfish, bigeye tuna, black marlin, common dolphinfish, escolar, marlins, ppah, skipjack tuna, swordfish, tunas nei, various sharks, and wahoo. NMFS's seafood trade database confirms that many of the species targeted by Ecuador's longline fisheries are imported into the United States, including two of Ecuador's largest exports to the United States by both volume (kg) and value in U.S. dollars: tuna, then dolphinfish.⁷⁵

3. Purse Seine

Ecuador's tuna purse-seine fleet comprises around 40% of the total number of purse-seine ships authorized to fish for tunas in the eastern Pacific Ocean. The IATTC classifies purse seiners with a capacity greater than 363 cubic meters as Class VI boats, which must have observers on board for all trips.⁷⁶ The IATTC tuna purse seine fishery experiences high numbers of cetacean bycatch annually given that certain dolphin species are intentionally encircled in an effort to locate large yellowfin tuna. The IATTC reported 729 incidental dolphin mortalities in 2021 throughout all IATTC vessels.⁷⁷ This number is within the 5,000-dolphin mortality limit set by the IATTC. Due to the lack of country-specific bycatch data reported by the IATTC, the percentage of this bycatch attributed to Ecuadorian vessels is unclear. We encourage NMFS to assess this dolphin mortality limit as it pertains to Ecuadorian waters.

Ecuador also has a sizeable purse seine fishery for small pelagics that contributes substantially to Ecuador's fishery exports. This fishery mainly targets mackerel, frigate tuna, herring, corbata, sardine, and anchoveta.⁷⁸ As of 2016, 20% of Ecuador's fishery exports were from the small pelagics fishery, including for both the fishmeal and fish oil industry and canned or frozen fish.⁷⁹ Marine mammal interactions have been observed in this purse seine fishery, including interactions with South American sea lions, bottlenose dolphins, spotted dolphins, and fur seals. South American sea lions had the "highest interaction rates" with the fishery.⁸⁰

NMFS's 2020 LOFF lists an unknown number of licenses for 113 midwater purse seine vessels that fish in the EEZ, coastal waters, high seas, Peru's EEZ, eastern tropical Pacific

⁷⁰ Gilman et al. 2006

⁷¹ Baird & Gorgone, 2005

⁷² Forney, 2004

⁷³ Ashford et al., 1996

⁷⁴ Gilman et al., 2006

⁷⁵ NOAA Fisheries 2020

⁷⁶ Stanford Center for Ocean Solutions 2020

⁷⁷ AIDCP/IRP July 2022

⁷⁸ FisheryProgress.org, Ecuador small pelagics – purse seine. Available at <https://fisheryprogress.org/fip-profile/ecuador-small-pelagics-purse-seine>

⁷⁹ Peacock 2018

⁸⁰ (Gabriela et al. 2021

Ocean, and the Inter-American Tropical Tuna Commission area. The 2020 LOFF also lists five licenses for seven midwater purse seine vessels that fish in the EEZ, Cook Islands, Kiribati, central and western Pacific Ocean, Kiribati’s EEZ, and the Western Central Pacific Fisheries Commission area. These two purse seine fisheries target bigeye tuna, skipjack tuna, wahoo, yellowfin tuna, bigeye tuna, black marlin, blue marlin, dorado, great barracuda, rainbow runner, and striped marlin. Tuna is one of Ecuador’s largest exports to the United States by both volume (kg) and value (USD).⁸¹

III. Exempt Fisheries

The 2020 LOFF lists Ecuador’s midwater tuna purse seine fisheries as Exempt Fisheries. We believe this is incorrect. NOAA defines Exempt Fisheries as those “that have no known or a remote likelihood of marine mammal bycatch and are exempt from instituting a regulatory program.” The purse seine tuna fisheries the IATTC manages have high numbers of documented interactions with and bycatch of marine mammals, therefore these fisheries cannot qualify as “Exempt”. The IATTC reported 679 incidental dolphin mortalities across the fleet in 2020. Despite having this data, Ecuador failed to provide its own IATTC ships’ bycatch numbers to NMFS prior to preparation of the LOFF. The 2020 LOFF lists the “marine mammal species/stock and annual average mortality estimates” as “STOCK NOT SPECIFIED” and/or “UNKNOWN” for these fisheries.⁸²

IV. Marine Mammals in Ecuador’s Waters

Marine mammal conservation and bycatch reduction is challenging in Ecuador for multiple reasons. Ecuadorian scientists note the nation has “huge knowledge gaps” around abundance estimates, population structure, and the impact of anthropogenic threats such as fishing bycatch, collisions with ships, and pollution.⁸³ Ecuador lacks population estimates for most marine mammals in their waters. Neighboring nations of Chile and Peru also lack comprehensive marine mammal estimates, so little data exist on migratory species.^{84, 85} Table 2 lists the marine mammals recorded in Ecuadorian waters and their global IUCN status. While some are listed as species of “least concern” at the global level, stocks within Ecuador may nonetheless be threatened.

Common Name (English)	Common Name (Spanish)	Scientific Name	IUCN Status
Galápagos fur seal	Lobo fino de Galápagos	<i>Arctocephalus galapagoensis</i>	Endangered

⁸¹ NOAA Fisheries 2020

⁸² NOAA Fisheries 2020

⁸³ (Félix 2017)

⁸⁴ (Félix et al. 2021)

⁸⁵ (Instituto Nacional de Pesca Ecuador and Comisión Permanente del Pacífico Sur 2017)

Sei whale	Ballena sei o boba	<i>Balaenoptera borealis</i>	Endangered
Blue whale *	Ballena azul	<i>Balaenoptera musculus</i>	Endangered
Sperm whale † *	Cachalote	<i>Physeter macrocephalus</i>	Endangered
Galápagos sea lion *	Lobo marino de Galápagos	<i>Zalophus wollebaeki</i>	Endangered
Fin whale	Ballena de aleta	<i>Balaenoptera physalus</i>	Vulnerable
Eastern spinner dolphin *	Delfin tornillo	<i>Stenella longirostris orientalis</i>	Vulnerable
Antarctic minke whale	Ballena minke Antártica	<i>Balaenoptera bonaerensis</i>	Near Threatened
False killer whale*	Falsa orca	<i>Pseudorca crassidens</i>	Near Threatened
Short-beaked common dolphin † *	Delfin común de rostro corto	<i>Delphinus delphis</i>	Least Concern
Bryde's whale	Ballena de Bryde	<i>Balaenoptera edeni</i>	Least Concern
Pygmy killer whale †	Orca pigmae	<i>Feresa attenuata</i>	Least Concern
Short-finned pilot whale*	Ballena piloto de aleta corta	<i>Globicephala macrorhynchus</i>	Least Concern
Risso's dolphin †	Delfin de Risso	<i>Grampus griseus</i>	Least Concern
Pygmy sperm whale *	Cachalote pigmeo	<i>Kogia breviceps</i>	Least Concern
Dwarf sperm whale †	Cachalote enano	<i>Kogia sima</i>	Least Concern

Fraser's dolphin	Delfin de Fraser	<i>Lagenodelphis hosei</i>	Least Concern
Humpback whale † *	Ballena jorobada	<i>Megaptera novaeangliae</i>	Least Concern
Blainville's beaked whale	Ballena picuda de Blainville	<i>Mesoplodon densirostris</i>	Least Concern
South American sea lion	Lobo marino sudamericano	<i>Otaria flavescens</i>	Least Concern
Melon-headed whale	Ballena cabeza de melon	<i>Peponocephala electra</i>	Least Concern
Pantropical spotted dolphin *	Delfin manchado	<i>Stenella attenuata</i>	Least Concern
Striped dolphin	Delfin listado	<i>Stenella coeruleoalba</i>	Least Concern
Spinner dolphin *	Delfin tornillo	<i>Stenella longirostris</i>	Least Concern
Rough-toothed dolphin	Delfin de dientes rugosos	<i>Steno bredanensis</i>	Least Concern
Bottlenose dolphin † *	Bufo	<i>Tursiops truncatus</i>	Least Concern
Cuvier's beaked whale †	Zifio de Cuvier	<i>Ziphius cavirostris</i>	Least Concern
Ginkgo-toothed beaked whale	Ballena picuada de ginko	<i>Mesoplodon ginkgodens</i>	Data Deficient
Killer whale / orca *	Orca	<i>Orcinus orca</i>	Data Deficient

Table 2. Marine mammals recorded in Ecuadorian waters off the mainland and Galápagos Islands.^{86, 87}

† Species that have a published record of bycatch.⁸⁸

* Listed on the 2020 NOAA List of Foreign Fisheries as Marine Mammal Interactions or Co-occurrence (by Group, Species or Stock) for Ecuador.⁸⁹

Additionally, in Ecuador, coastal, offshore, and Galapagos ecotypes of bottlenose dolphins have been identified, as well as resident bottlenose dolphin populations, including populations in the Gulf of Guayaquil and Puntilla de Santa Elena.⁹⁰

V. Bycatch

A. Documented Bycatch

In 2018, NMFS described Ecuador as an exporting nation with large numbers of small gillnet, purse seine, and trawl vessels causing marine mammal bycatch. NMFS further described Ecuador as having “good” data and a “high” overall risk of marine mammal bycatch.⁹¹ While we agree Ecuador has a high risk of marine mammal bycatch, we disagree with the quality of Ecuador’s information. The 2020 LOFF lists the “marine mammal species/stock and annual average mortality estimates” for Ecuador as “0” (zero), “STOCK NOT SPECIFIED,” and/or “UNKNOWN” for every export fishery.⁹²

In Ecuador, fishing bycatch has severe direct and indirect impacts on marine mammals.^{93, 94, 95, 96, 97, 98, 99, 100} Three types of fishing gear have been most directly associated with marine mammal bycatch: surface gillnets set primarily for pelagic fish; longlines of different lengths also targeting pelagic fish; and purse seines targeting various tuna species and schooling fish.^{101, 102, 103, 104} A report published for the Ecuadorian Ministry of the Environment and Undersecretary of Marine and Coastal Management stated that “[t]he interaction of small

⁸⁶ Alava et al. 2019

⁸⁷ Félix et al. 2015

⁸⁸ Félix et al. 2015

⁸⁹ NOAA Fisheries, 2020

⁹⁰ Castro and Félix 2021

⁹¹ 83 Fed. Reg. 11,703 (Mar. 16, 2018)

⁹² NOAA Fisheries 2020

⁹³ Castro and Rosero 2010

⁹⁴ Félix et al. 1997

⁹⁵ Van Waerebeek et al. 1997

⁹⁶ Alava et al. 2005

⁹⁷ Alava, Barragán, and Denkinger 2012

⁹⁸ Alava et al. 2019

⁹⁹ Jiménez et al. 2018

¹⁰⁰ Ambiente and Rosero 2018

¹⁰¹ Castro et al. 2020

¹⁰² Castro and Rosero 2010

¹⁰³ Alava, Barragán, and Denkinger 2012

¹⁰⁴ Alava et al. 2019

cetaceans with fishing gear is considered one of the biggest marine conservation problems in the world.”¹⁰⁵

Studies on marine mammal bycatch in Ecuador’s fisheries primarily began in the early 1990s,^{106, 107, 108, 109, 110} mostly focused on the pelagic gillnet fishery. These studies reported that these gillnets caught several small cetacean species, including the IUCN-vulnerable common dolphin, as well as the spotted dolphin, bottlenose dolphin, pygmy sperm whale, and short-finned pilot whale (Table 3). Bycatch, entanglement, and stranding of large marine mammals such as sperm whales and humpback whales have also been recorded along Ecuador’s mainland coasts since the 1990s.^{111, 112, 113, 114}

A 1993 study assessed the mortality of cetaceans in gillnets at two artisanal ports: Santa Rosa and Puerto López. The Santa Rosa sample of vessels caught 177 dolphins, with between 21 and 39 dolphins per boat, equaling an annual average per boat of 29.5. The average capture rate per trip was 0.10. The average capture rate from boats that were carrying observers was 0.28, which is 2.7 times higher than the vessels without observers. Ninety percent of the marine mammal bycatch were common dolphins, 7% were short-finned pilot whales, 0.6% were dwarf sperm whales, and 1% were unidentified dolphins. When these mortality rates are extrapolated to match the estimated number of trips for the entire Santa Rosa fleet, the annual mortality rate of cetaceans in Santa Rosa would be 1,150 dolphins on ships with no observers and 3,157 on ships with observers.

In the same study, the fleet sampled in Puerto López reported 40 bycaught dolphins, with the number per vessel varying from 2 to 12. The average capture rate per trip was 0.03, which was similar to the rate reported from vessels with observers. The bycaught species were 67.5% common dolphin, 17.5% short-finned pilot whale, 10% spotted dolphin, and 5% unidentified dolphin. Using the estimated number of trips for the Puerto López fleet, an estimated 156 dolphins were bycatch in Puerto López in 1993.^{115, 116} Based on this study, a subsequent 2010 paper estimated the annual mortality of dolphins and toothed whales across Ecuador’s artisanal fleet was around 17,000 animals.¹¹⁷

More recent studies show that cetacean bycatch continues in Ecuadorian waters. In 2009, a study was conducted to assess small cetacean interaction with artisanal fisheries in three ports along the Machalilla National Park: Puerto López, Salango, and Machalilla. The study monitored 185 vessels that use gillnets and purse seines (target species were not identified). In 52 trips made with gillnets from Puerto López, 7 individual marine mammals were documented as

¹⁰⁵ Ambiente and Rosero 2018

¹⁰⁶ Van Waerebeek et al. 1997

¹⁰⁷ J. J. Alava et al. 2019

¹⁰⁸ Félix et al. 1997

¹⁰⁹ Félix et al. 2011

¹¹⁰ Alava et al. 2019

¹¹¹ Alava et al. 2019

¹¹² Félix et al. 1997

¹¹³ Félix et al. 2011

¹¹⁴ Alava et al. 2019

¹¹⁵ Felix and J. Samaniego 1994

¹¹⁶ CPPS 2010

¹¹⁷ Félix et al. 2007

bycatch: two bottlenose dolphins, one dwarf sperm whale, two Risso’s dolphins, and two spotted dolphins. All this bycatch occurred from surface gillnets with a 5-inch mesh eye. This resulted in an estimated average mortality rate of 0.07 cetaceans per day.^{118, 119} Compared to the 1993 study of the same port, the rate of bycatch in the artisanal fleet from Puerto López nearly doubled, from 0.03 to 0.07.

An additional study was conducted between 2009 and 2010 in Ecuador to assess the bycatch of turtles, marine mammals, sharks, and birds within the Ecuadorian artisanal gillnet fleet. More than 500 sets of surface gillnet fisheries that target large pelagics were monitored between 35 and 100 miles offshore. Four species of cetaceans were caught; the most frequent bycatch of marine mammal species was the common dolphin.¹²⁰ In total, 43 individual marine mammals were caught, equating to the bycatch of a cetacean in 8% of gillnet sets.¹²¹ The entanglement of bottlenose dolphins has also been reported in the Gulf of Guayaquil and has been identified as the main cause of the species’ population decline in the area.^{122, 123, 124} Common dolphins make up 70 to 90% of dolphin bycatch in Ecuadorian waters.¹²⁵ Existing studies suggest that incidence of small cetacean bycatch in Ecuador ranges between 0.07 and 0.86 dolphins each day (Figure 2).^{126, 127}

Marine mammal interactions have also been observed recently in Ecuador’s small pelagics purse seine fishery. This is an economically important export fishery within Ecuador. A 2021 report described the initial results of a new observer program for the fishery and identified interactions with four species of marine mammals: South American sea lions, bottlenose dolphins, spotted dolphins, and fur seals. The report notes that South American sea lions had the “highest interaction rates” with the fishery.¹²⁸ While there were no marine mammal mortalities reported, the sample size was small and level of interactions concerning.

Common Name	Scientific Name	Industrial Fishery Gear Types	Small-Scale Fishery Gear Types	Source
Common dolphin	<i>Delphinus delphis</i>	—	Gillnet	Félix et al. 2021; Haase and Félix

¹¹⁸ Ambiente and Rosero 2018

¹¹⁹ CPPS 2010

¹²⁰ Coello et al. 2011

¹²¹ Instituto Nacional de Pesca Ecuador and Comisión Permanente del Pacífico Sur 2017

¹²² Félix and Burneo 2020

¹²³ Félix et al. 2017

¹²⁴ Félix et al. 2021

¹²⁵ Coello et al. 2011

¹²⁶ Alava et al. 2019

¹²⁷ Castro and Rosero 2010

¹²⁸ Gabriela et al. 2021

Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	—	Gillnet	1994; Van Waerebeek et al. 1997; Castro and Rosero 2010; Félix et al. 1997; Coello et al. 2011; Alava, Barragán, and Denking 2012; Alava et al. 2005; Félix et al. 2011; Félix, Castro, and Laake 2011; Félix et al. 2017
Risso's dolphin	<i>Grampus griseus</i>	—	Gillnet	
Dwarf sperm whale	<i>Koiga sima</i>	—	Gillnet	
Humpback whale	<i>Megaptera novaeangliae</i>	—	Gillnet	
Sperm whale	<i>Physeter macrocephalus</i>	Purse seine	Gillnet	
Spotted dolphin	<i>Stenella attenuata</i>	—	Gillnet	
Bottlenose dolphin	<i>Tursiops truncatus</i>	—	Gillnet, Longline	
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	—	Gillnet	

Table 3. Species of marine mammals reported as interacting with and/or bycatch in both industrial and small-scale fisheries in Ecuador.

Despite this evidence of bycatch, a comprehensive assessment of marine mammal bycatch in Ecuador has not been conducted either nationwide or for most export fisheries. A few partial monitoring programs led by NGOs have been conducted in four harbors along the Ecuadorian coast.^{129, 130}

¹²⁹ Castro and Rosero 2010

¹³⁰ Coello et al. 2011

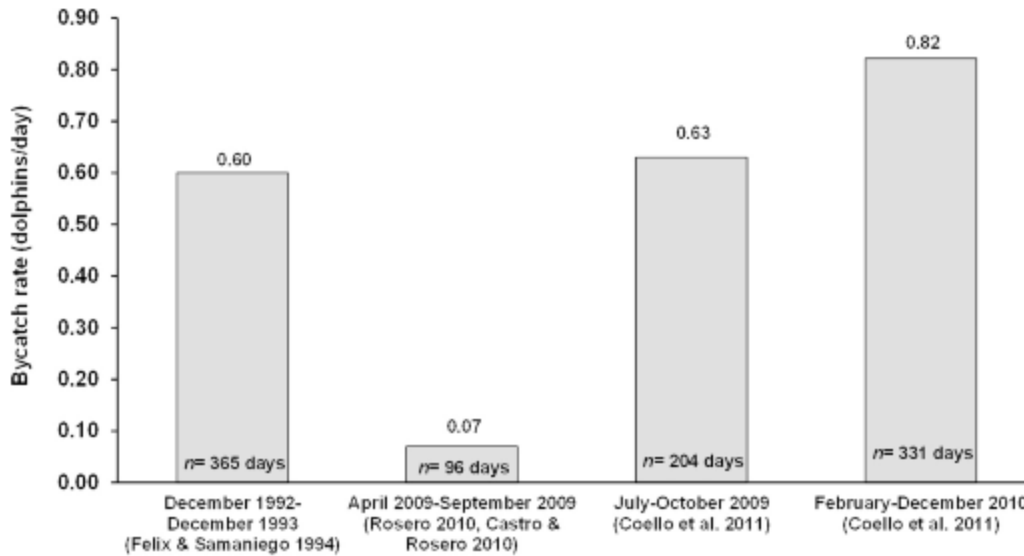


Figure 2. ^{131, 132} Daily rate of small cetacean bycatch (dolphins/day) based on assessments of small-scale fisheries and their interactions with cetaceans. ¹³³

B. Strandings

A stranded animal is one found on the shore of a body of water, whether alive or dead, unable to return by itself to its natural environment. Causes of strandings can include disoriented, injured animals; sick, single pups; or victims of human actions or natural disasters. ¹³⁴

Marine mammal strandings offer crucial information on marine mammal distributions and populations. ¹³⁵ While the cause of marine mammal strandings can be hard to determine, identifying patterns in marine mammal strandings is crucial for identifying regions that require increased monitoring, research, and/or regulation. ¹³⁶

Evidence suggests that interactions with fishing operations may be a common source of marine mammal strandings and mortality in Ecuador. There have been two major publications with records of stranding of mammals along the continental coast of Ecuador in the periods 1987–1995 and 1996–2009. These publications reported 196 cases of stranded marine mammals belonging to the orders Cetacea (13 species) and Carnivora (2 species). Sixty-five percent of these strandings were reported in Santa Elena, just north of the Gulf of Guayaquil. In 23% of the total cases, the primary cause of the stranding was related to human activities. Twenty-five cases

¹³¹ Alava et al. 2019

¹³² Coello et al. 2011

¹³³ These studies were conducted in fishing harbors along the Ecuadorian coast, including Santa Rosa and Puerto Lopez, Puerto Lpez, Machalilla and Salango (Machalilla National Park). The bycatch rate was calculated as the total estimated number of dolphins caught by the entire small-scale fleet from monitored fishing communities and divided by the exact number of surveyed days, as reported in each study. Figure taken from J. J. Alava et al. 2019.

¹³⁴ Ambiente and Rosero 2018

¹³⁵ Ministry of Environment, Forest and Climate Change, 2021

¹³⁶ Dudhat et al., 2021a

were attributed to fishing interactions and seven to collisions with boats. The species with the highest incidence of strandings within these studies were humpback whale (27.5%), common dolphin (12.3%), South American sea lion (12.3%), bufeo (10.14%), and spotted dolphin (9.42%).¹³⁷ In another highly publicized case, an estimated 50 bottlenose dolphins died in the Galapagos after being trapped in a fishing net in 2002¹³⁸.

The Ministry of the Environment established a “Protocol de Respuesta a Varamientos de Especies Marinas en Ecuador,” or Protocol of Response to Stranding of Marine Species, in 2018. The protocol aims to (1) define the actions to be followed by the cooperating organizations to establish responsibilities during stranding care; (2) determine the minimum technical and operations requirements for assistance and transfer of stranded or entangled species to Centers Authorized Rescue; (3) design a mechanism for adequate decision-making and dissemination of the information during the stranding; and (4) establish the Ecuadorian Network for Response to Stranding and Rescue of Marine species (cetaceans, pinnipeds, sea turtles, whale sharks, and manta rays).¹³⁹ While the protocol is important for rescuing stranded or entangled species, it does not reduce the occurrence of bycatch of marine mammals.

C. Fish Aggregating Devices (FADs)

Fish Aggregating Devices (FADs) are structures floating at the surface of the ocean that fishers place to attract pelagic fish, including tropical tuna species such as skipjack, yellowfin, and bigeye tuna. They are often made of buoys or floats tethered to the ocean floor with concrete blocks. FADs are often used by recreational, artisanal, industrial, and commercial fisheries.^{140, 141, 142, 143} The international tropical tuna purse-seine fisheries fleet maintains as many as 121,000 FADs worldwide. In addition to the target pelagic fish, other marine species such as sharks, sea turtles, and marine mammals aggregate around FADs and are sometimes entangled and killed in the devices.^{144, 145, 146, 147} While the use of FADs is known and managed by the IATTC, the emerging use of FADs that are baited with bycaught or otherwise dead marine mammals has recently been identified in Ecuador’s artisanal fisheries.

Researchers and NGOs have raised concerns about incidentally captured and/or intentionally killed cetaceans and pinnipeds being used as bait in FADs.^{148, 149, 150, 151} NMFS also

¹³⁷ Ambiente and Rosero 2018

¹³⁸ Palacios, Salazar, and Day 2004

¹³⁹ Ambiente and Rosero 2018

¹⁴⁰ C. Castro et al. 2020

¹⁴¹ J. J. Castro, Santiago, and Santana-Ortega 2002

¹⁴² C. Castro et al. 2020

¹⁴³ Fonteneau, Chassot, and Bodin 2013

¹⁴⁴ C. Castro et al. 2020

¹⁴⁵ Murua et al. 2016

¹⁴⁶ Dagorn et al. 2013

¹⁴⁷ M. Hall and Roman 2013

¹⁴⁸ 85 Fed. Reg. 63,527, 63,537–38 (Oct. 8, 2020)

¹⁴⁹ Félix et al. 2021

¹⁵⁰ Castro et al. 2020

¹⁵¹ Jiménez et al. 2018

noted the FAD issue as a concern in 2020.¹⁵² In a study of artisanal fisheries in coastal Ecuador from 2009 to 2019, researchers identified 31 individual marine mammals of 6 (possibly 7) different species used as bait for FADs. The individuals found stranded onshore or floating nearshore were only added to the study if they were wrapped in fish netting, lines, or buoys “with clear indications that they had been handled by people and were not simply the result of accidental entanglement in fishing gear.”¹⁵³ The species most frequently associated with FADs in the study was the South American sea lion (80.6%). Small cetaceans were also used as bait, including one pan-tropical spotted dolphin, one short-finned pilot whale, one pygmy killer whale, and one unidentified small dolphin. Two large cetaceans, including a sperm whale, and humpback whale, were also found floating at sea that artisanal fishers likely used as opportunistic FAD bait.¹⁵⁴

Other FAD cases outside of the Castro et al. 2020 study have been reported. In November 2009, a newspaper reported that 17 sea lions, 1 sperm whale, and 1 sea turtle were found dead on the beaches between Cojimies and Pedernales with signs of use in improvised FADs. In another case, seven sea lions, a short-finned pilot whale, and three unidentified sea turtles were found attached to FAD equipment such as weights and floats. Five of the sea lions were tied to the same structure, while the other two were found detached along the same beach.¹⁵⁵ Because of the decayed nature of the carcasses found in these various cases and studies, researchers could not conclude if the mammals were intentionally killed for bait or if previously bycaught animals were used.

Ecuador does not definitively prohibit the use of marine mammals as bait. As detailed below, Ecuador’s Organic Fisheries Law appears to prohibit the intentional, direct take of marine mammals, but the provision does not address use of marine mammals incidentally caught. The law states that carrying out activities “intentionally in interaction with a marine mammal, sea turtle, or whale shark” is a serious offense.¹⁵⁶ Article 153 of the law further prohibits the capture, transportation, transshipment, landing, processing, and marketing of certain marine or aquatic fauna. However, the law directs the National Environmental Authority to determine the list of species that fall under this protection and procedures for non-compliance.¹⁵⁷ We were unable to identify any such list or procedures. While this Article could protect marine mammals, until these species lists and procedures are developed, Article 153 does not protect marine mammals from being used as bait.

In response to reports of marine-mammal-baited FADs, NMFS noted in issuing the LOFF that Ecuador’s laws prohibit intentional killing of marine mammals; however, NMFS stated that the agency “will consult with Ecuador regarding this fishery.”¹⁵⁸ Since 2013 the IATTC recommended the use of non-entangling FADs as a measure to minimize bycatch and entanglements of susceptible marine fauna.¹⁵⁹

¹⁵² Fed. Reg. 85 63,527, 63,539 (Oct. 8, 2020)

¹⁵³ C. Castro et al. 2020

¹⁵⁴ C. Castro et al. 2020

¹⁵⁵ C. Castro et al. 2020

¹⁵⁶ Organic Fisheries Law, Art. 213(e)

¹⁵⁷ Registro Oficial de Ecuador 2020

¹⁵⁸ 85 Fed. Reg. 63,527 (Oct. 8, 2020)

¹⁵⁹ Murua et al. 2016

D. The Galapagos

The waters surrounding the Galapagos Islands are renowned for their unique ecosystems and biological diversity. The Galapagos Islands are located about 1,000 km west of mainland Ecuador. The archipelago has 234 islands and islets with a total of 7,985 km² landmass.

Whales have special status in the Galapagos, as they are protected under the 1990 Resolution No. 196. The Resolution declared the Galapagos Marine Reserve as a “whale sanctuary” and the rest of Ecuador’s territorial waters and EEZ as a “whale refuge,” prohibiting any activity that threatens the lives of these marine mammals, including direct hunting. However, the extent of the protection is unclear because bycatch and interactions with fisheries are not addressed, nor is it clear whether protections extend to all cetaceans, including dolphins.¹⁶⁰

The Galapagos Special Law (GSL) was enacted in 1998.^{161, 162, 163} The GSL designated the Galapagos archipelago and surrounding open ocean as a multiple-use marine reserve of nearly 138,000 km², known as the Galapagos Marine Reserve (GMR).¹⁶⁴ Between 1998 and 2002, further protections were added in the Reserve regarding fishing access, including the extension of the boundaries of the Reserve to 74 km from the outer islands, the prohibition of industrial fishing within the Reserve, and the allocation of fishing permits exclusively to local artisanal fishers. As with the rest of Ecuador, there are no artisanal fishery regulations in the Galapagos that pertain directly to marine mammals.¹⁶⁵

A large number of fish species are harvested in the Galapagos. The most prominent fisheries are for spiny lobsters, Galapagos groupers, and yellowfin tuna. In 2017, yellowfin tuna landings in the Galapagos were 196 tons, with 30% transported to mainland Ecuador and the remaining 70% consumed within the Galapagos. These Galapagos landings represented only 0.002% of the total yellowfin tuna catch recorded in Ecuador during the same year.¹⁶⁶ However, total Galapagos fishery landings are likely underestimated because some are not monitored by the Galapagos National Park Service. There is no systematic monitoring system for bycatch within the Galapagos based fisheries. Existing bycatch monitoring efforts have been sporadic and have primarily consisted of specific studies about the ecological impact of experimental fishing gear.¹⁶⁷

Documented cases of marine mammal entanglements in fishing gear and reports of illegal fishing within the Galapagos Marine Reserve have occurred.¹⁶⁸ These instances indicate that although protected by the special regulations of the Whale Sanctuary and the fishing regulations of the GMR, cetaceans still face risks of bycatch, stranding, and entanglement in fishing gear within the GMR. These negative interactions and deaths may be affecting populations of coastal

¹⁶⁰ Félix et al. 2015

¹⁶¹ Viteri, Obregón, and Yoshioka 2018

¹⁶² Heylings and Bravo 2007

¹⁶³ Castrejón and Charles 2013

¹⁶⁴ Viteri, Obregón, and Yoshioka 2018

¹⁶⁵ Félix et al. 2015

¹⁶⁶ Viteri, Obregón, and Yoshioka 2018

¹⁶⁷ Viteri, Obregón, and Yoshioka 2018

¹⁶⁸ Palacios, Salazar, and Day 2004

species like the bottlenose dolphin as well as other marine mammals within the delicate ecosystem of the Galapagos Islands. Without stock assessments and the documentation of bycatch, Ecuador cannot know the full impact of this problem.

Although the Galapagos contribute a small percentage of Ecuador's overall tuna landings, because Ecuador does not distinguish between subsistence and commercial catches within the artisanal fleets,¹⁶⁹ NMFS must ensure Ecuador demonstrates that all imported fishery products meet the bycatch standards of the MMPA.

E. Bycaught Species of Concern

1. Bottlenose Dolphins

A community of coastal bottlenose dolphins inhabits the inner estuary of the Gulf of Guayaquil, located in southwest Ecuador. Genetic studies suggest that these bottlenose dolphins constitute a distinct evolutionary unit from other offshore populations.¹⁷⁰ In 1992 the population was estimated at 637 individuals.¹⁷¹ In 2017 the population had declined by 53%.¹⁷² This dramatic population decline places this community of bottlenose dolphins at serious risk of extinction within a few decades if current stresses are not addressed.¹⁷³

This dolphin population's rapid decline has been attributed to anthropogenic sources, particularly bycatch in gillnet gear and vessel collisions.^{174, 175, 176} The most important economic activities in the Gulf of Guayaquil include shrimp aquaculture; artisanal fisheries targeting a large number of fish species, clams, and crabs; and shrimp bottom trawling. Heavy gillnet use by the artisanal fisheries occurs along the coast of the Gulf of Guayaquil. The risk of cetacean bycatch in gillnets is believed to be contributing to population declines in the Gulf.¹⁷⁷

Palisade nets are also used in the Gulf. They are a non-selective type of net in which cotton fine-meshed nets are tied to stakes enclosing banks next to the mangroves. During high tide the nets are submerged, but at low tide fish and other organisms are trapped in the shallows or stranded on the mud flats.¹⁷⁸ It is a process similar to fish weirs. Several local fishermen reported that they have helped stranded dolphins within palisade nets on numerous occasions.¹⁷⁹ The frequency of these strandings and entanglements is unknown as is the level of mortality in both palisade nets and gillnets.

¹⁶⁹ Félix et al. 2015

¹⁷⁰ Félix et al. 2017

¹⁷¹ Haase and Félix 1994

¹⁷² Félix et al. 2017

¹⁷³ Félix and Burneo 2020

¹⁷⁴ Félix and Burneo 2020

¹⁷⁵ Félix et al. 2017

¹⁷⁶ Reeves, McClellan, and Werner 2013

¹⁷⁷ Herrera et al. 2013

¹⁷⁸ Félix et al. 2017

¹⁷⁹ Félix et al. 2017

2. Humpback Whales

Bycatch of humpback whales off Ecuador is also a concern because the southeastern Pacific humpback whale population, known as Group/Stock G, breeds off Ecuador from June to September each year.^{180, 181} Breeding Group/Stock G is defined by breeding grounds on the northwestern coast of South America and southwestern Central America and feeding grounds around the Antarctic Peninsula and southern Chile.¹⁸² In 2021, the population was estimated to be around 11,786.¹⁸³ Between 2004 and 2006, it was estimated that 32 humpback whales were entangled per year in Ecuador's artisanal gillnet fishery, based on the population at the time and an entanglement rate 0.0052.¹⁸⁴ In 2012, it was reported that between 0.2% and 1.5% of the Group/Stock G humpback population is potentially bycaught in gillnets annually.^{185, 186} Applying this percentage to the 2021 population estimate, 23–176 humpback whales were bycaught that year.

The same study found a significant correlation between humpback whale bycatch and fishing in Ecuador, especially related to artisanal fishing. This suggests that as artisanal fishing increases, correlating increases in bycatch may cause critical effects on the humpback whale's breeding population. Calves in particular have been identified as most likely to become entangled in gillnets in their coastal nursing grounds.^{187, 188} Between 2009 and 2014, there were 15 entangled humpback whales reported towing fishing gear and nets within Machalilla National Park. Of the entangled humpback whales observed during the study, 60% showed signs of impeded swimming and had visible fishing nets around their fins, head, or tail. Forty percent of the observed entangled whales were beached with evidence of fishing gear on their bodies.¹⁸⁹ Incidental catch and entanglements of sperm and humpback whales have been recorded frequently in Ecuador for decades.^{190, 191, 192, 193, 194, 195, 196, 197}

¹⁸⁰ Alava, Barragán, and Denkinger 2012

¹⁸¹ Félix, Castro, and Laake 2011

¹⁸² Alava et al. 2019

¹⁸³ Alava et al. 2019

¹⁸⁴ Félix et al. 2007

¹⁸⁵ Alava, Barragan, and Denkinger 2012; Félix et al. 2011

¹⁸⁶ Alava et al. 2019

¹⁸⁷ Alava, Barragan, and Denkinger 2012

¹⁸⁸ Alava et al. 2019

¹⁸⁹ Alava et al. 2019

¹⁹⁰ Castro et al. 2020

¹⁹¹ Félix et al. 1997

¹⁹² Félix et al. 2011

¹⁹³ Alava, Barragan, and Denkinger 2012

¹⁹⁴ Alava et al. 2005

¹⁹⁵ Alava, Barragán, and Denkinger 2012

¹⁹⁶ Haase and Félix 1994

¹⁹⁷ Castro and Van Waerebeek 2019

VI. National Legislation and Regulation

A. Fisheries Legislation

Ecuador's fisheries management regime has changed significantly in the last decade. The government agency in charge of Ecuadorian fisheries management and development is the Vice Ministry of Aquaculture and Fisheries—under the Ministry of Production, Foreign Trade, Investment and Fisheries—which regulates fisheries under Ministerial Agreement No. MPCEIP-DMPCEIP-2019-0034.^{198, 199}

In April 2020, Ecuador passed *La Ley Orgánica para el Desarrollo de la Acuicultura y Pesca*, referred to in English as the Organic Fisheries Law (OFL).^{200, 201} The OFL replaced the original 1974 fisheries legislation and is now the primary legal structure for Ecuadorian fisheries.²⁰² The new law contains lofty goals, establishing a “new direction for fisheries administration, aimed at reversing the order of priorities in management” to “start[] with the ecosystem instead of the target species.”²⁰³ The law establishes a structure for fisheries management, authorizing relevant agencies to adopt measures for sustainable fishing, monitoring, and species protection. However, the statute itself lacks detailed requirements for fishery management, and while Ecuador has issued new regulations and is developing fishery-specific management plans, we were unable identify bycatch mitigation measures in Ecuadorian law.

Among its key requirements, the OFL requires a grant of authority or permit from the government for any person to “exercise . . . fishing activity.”²⁰⁴ The agency must “establish management plans” for fisheries, including management measures.²⁰⁵ Based on those permits and plans, the OFL requires vessels to carry only authorized fishing gear and fish only in authorized areas.²⁰⁶

The OFL appears to prohibit the intentional, direct take of marine mammals. The law states that carrying out activities “intentionally in interaction with a marine mammal, sea turtle, or whale shark” is a serious offense.²⁰⁷ The language likely prohibits both fishing intentionally for marine mammals and the intentional killing of marine mammals while fishing (i.e., killing marine mammals that approach aquaculture facilities).

The law also addresses “bycatch,” but it is unclear if the provisions apply to marine mammal bycatch or only non-target fish bycatch. The OFL states that the fisheries agency will

¹⁹⁸ Ministry of Production, Foreign Trade, Investments and Fisheries n.d.

¹⁹⁹ Félix et al. 2021

²⁰⁰ Stanford Center for Ocean Solutions 2020

²⁰¹ *Ley Organica para el Desarrollo de la Acuicultura y Pesca* (Organic Fisheries Law), Suplemento del Registro Oficial 187, 21-IV-2020

²⁰² FAO n.d.

²⁰³ Organic Fisheries Law, Art. 4(g)

²⁰⁴ Organic Fisheries Law, Art. 95

²⁰⁵ Organic Fisheries Law, Art. 97

²⁰⁶ Organic Fisheries Law, Art. 170, 171, 109, 113

²⁰⁷ Organic Fisheries Law, Art. 213(e)

set incidental catch limits for each fishery, and it defines both “incidental catch” and “bycatch” to mean “species and marine fauna that are captured together with directed . . . fishing.”²⁰⁸ These definitions are vague, and it is unclear whether bycatch limits apply to non-target fish and marine mammals or only non-target fish. The law further states that “commercialization” of incidentally caught species “will be allowed” if consistent with national and international requirements regarding endangered species, which suggests that the bycatch provision only applies to non-target fish. No further detail is provided.

Moreover, Article 153 of the OFL prohibits the “capture, transportation, transshipment, landing, processing, marketing of marine or aquatic fauna;” however, the OFL then states that the National Environmental Authority “will determine the list of species that fall under this protection.”²⁰⁹ We were unable to identify any list of species to which the provision applies. The law also appears to allow the fisheries agency to exempt artisanal vessels from the prohibition, as the authority is directed to “determine what kind of artisanal fishing vessels must comply with this obligation.”²¹⁰ The government is further directed to establish procedures to address non-compliance with the restriction. Until a species list is developed, Article 153 does not protect marine mammals. The law states further that the fisheries agency will coordinate with the environmental authority over “action plans” to protect marine resources “in danger of extinction,” but no further details are provided.²¹¹

The OFL also created the National Aquaculture and Fishery Information System, a large database that holds information on country-wide management of fisheries and aquaculture.²¹² Data includes statistical information on “catches [and] landings,” “[i]nformation on administrative authorizations,” and scientific research.²¹³ The OFL further establishes a “public fishing registry,” which is a publicly available database containing information regarding the persons who carry out fishing activities, including “authorizations, permits, encumbrances . . . , sanctions issued . . . [and] other . . . information” that regulations require.²¹⁴

For monitoring, the law requires that artisanal vessels must install and ensure operation of a “satellite monitoring device on their vessel” that “guarantee[s] the automatic transmission of the updated geographical position of the vessel” from departure to arrival.²¹⁵ Industrial vessels must also install and maintain operation of “at least one tracking device” approved by the relevant agency.²¹⁶

The law requires that all industrial fishing vessels must carry a fishing log onboard that complies with conditions to be established through regulations.²¹⁷ Artisanal vessels may or may not have to comply with this requirement, as the OFL states that the fisheries agency “will

²⁰⁸ Organic Fisheries Law, Art. 149, 8

²⁰⁹ Organic Fisheries Law, Art. 153

²¹⁰ Registro Oficial de Ecuador 2020

²¹¹ Organic Fisheries Law, Art. 151

²¹² Stanford Center for Ocean Solutions 2020

²¹³ Organic Fisheries Law, Art. 28

²¹⁴ Organic Fisheries Law, Art. 164

²¹⁵ Organic Fisheries Law, Art. 113

²¹⁶ Organic Fisheries Law, Art. 168

²¹⁷ Organic Fisheries Law, Art. 162

determine what kind of artisanal fishing vessels must comply with this obligation.”²¹⁸ Moreover, all industrial vessels “that the governing body determines” must install and operate “throughout the fishing trip, a registry of images, which allows detecting and recording the discard or other action of non-compliance” with relevant fishing regulations.²¹⁹ Those vessels “must deliver the registered information, at the request of” the fisheries agency.²²⁰ The OFL also states that fishing authorities will use information from the monitoring system to define fishing areas.²²¹ The law further states that monitoring and surveillance will be conducted through periodic, random inspections; technical reports from the Satellite Monitoring Center; reports from onboard observers; and fishing logs.²²²

Ecuador’s law further appears to ban some harm of whales and potentially other cetaceans, though the extent is unclear. In 1990, Ecuador issued Ministerial Agreement No. 196, which both created the Galápagos Marine Resource Reserve and deemed Ecuadorian territorial waters a whale “refuge.”^{223, 224} The Agreement further bans “all activity that threaten the lives of these marine mammals.” The extent of the ban is unclear because bycatch is not directly mentioned. It is also unclear whether “these animals” refers to all cetaceans or exclusively whales.²²⁵ In 2000, the Ministry of Environment issued Resolution No. 5, which explicitly prohibits whaling in Ecuador.²²⁶

B. Fisheries Regulations

Ecuador issued regulations to implement some of its Organic Fisheries Law in March 2022. For industrial fishing, the regulations clarify that fishing authorizations for any industrial fleet will be granted through ministerial agreements. The ministerial agreements must specify a fishing quota, target species, fishing areas, fishing modality/gear, and “conservation measures applicable to the target species and associated species or accompanying [i.e., bycaught] fauna.”²²⁷ Industrial fishers must then apply for a permit for their vessels.²²⁸ The permit must contain name of the holder; name and description of the vessel and home port; satellite device number; fishing quota; target species; fishing areas; fishing modality/gear; and “conservation measures applicable to the target species and associated species or accompanying [i.e., bycaught] fauna.”²²⁹ Artisanal fishers must also receive a permit to fish.²³⁰ The regulations provide no details regarding measures that apply to artisanal fishers.

The regulations further direct what must be contained in a fishery management plan, referred to as a National Action Plan, including setting goals and objectives; strategies for

²¹⁸ Organic Fisheries Law, Art. 162

²¹⁹ Organic Fisheries Law, Art. 172

²²⁰ Organic Fisheries Law, Art. 172

²²¹ Organic Fisheries Law, Art. 167

²²² Organic Fisheries Law, Art. 160, 161

²²³ Ministerial agreement No. 196, published in Official Register no. 458 on June 14th, 1990

²²⁴ Viteri, Obregón, and Yoshioka 2018

²²⁵ Félix et al. 2015

²²⁶ Félix et al. 2015

²²⁷ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 159

²²⁸ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 159

²²⁹ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 171

²³⁰ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 182

management, monitoring, evaluation, and reduction of the “impact on the ecosystem of the fishery;” and strategies to reduce bycatch of and interaction with threatened or protected species.²³¹

The regulations also establish what must be included in the National Aquaculture and Fisheries Information System and Public Fisheries Register.²³² Specifically, the register must contain the name and contact information for both artisanal and industrial vessels; authorized fishing vessels and their quotas; and violations by shipowners or vessels.²³³

As noted above, the OFL requires that all industrial vessels carry a fishing log,²³⁴ and the regulations establish what the log must contain. On a “daily” basis, fishers must record vessel name and identification; name of captain; port of departure; fishing gear; and for each haul, the date, geographic location, time, estimated catch by species, “discards and the fishing catch incidental,” and “marine mammals . . . with which they have had an interaction.”²³⁵ Logbooks must be delivered to fishing authorities at the time of landing.²³⁶ For artisanal vessels, the OFL only requires a logbook if the fisheries agency determines vessels must maintain one.²³⁷ Presumably, any requirement for an artisanal fishery to maintain and submit a logbook would be contained in fishery-specific ministerial agreements.

C. National Fisheries Plans and Ministerial Agreements

Under the OFL, Ecuador has developed several new National Action Plans for various fisheries, including titi shrimp, dorado, tuna, and the small pelagics purse seine fishery, as well as ministerial agreements applicable to various fisheries. The plans generally describe the fishery, including target fish, gear used, and the fleet. The plans then describe existing management measures of various ministerial agreements, establish goals and objectives, and propose additional measures to reach those goals. The regulations also require that the plans address the fishery’s impact on the ecosystem, including reducing bycatch of and interaction with threatened or protected species, though few of the plans we reviewed do so.

For example, in 2021, Ecuador’s Ministerio de la Producción, Comercio Exterior, Inversiones y Pesca issued a National Action Plan for titi shrimp (*Protrachypene precipua*) (Titi Shrimp Plan).²³⁸ The fishery, which operates primarily in and around the Gulf of Guayaquil, has both industrial and artisanal components. The industrial fishery has 40 vessels and uses trawls, while the artisanal fishery has around 1,000 vessels and uses “passive bag nets.” We believe these are largely palisade nets. The fishery produces around 7,600 tons of shrimp annually and 80% is exported, and according to the LOFF, the United States imports titi shrimp.

²³¹ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 11

²³² General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 26, 27

²³³ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 27

²³⁴ Organic Fisheries Law, Art. 162

²³⁵ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 225

²³⁶ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 225

²³⁷ Organic Fisheries Law, Art. 162

²³⁸ Viceministerio de Acuicultura y Pesca de Ecuador 2021.

The Titi Shrimp Plan lists various ministerial agreements applicable to the fishery that regulate fishing authorizations, closed times, and industrial gear specifications such as mesh size. They require “electronic logs” for the industrial trawl fishery, documenting the ship names, sets fished, and capture, including species, size, catch, and “discards” (with no mention of marine mammals).²³⁹ The plan references Ministerial Agreement No. MPCEIP-SRP-2021-0156-A of June 28, 2016, which requires compliance with the “[p]rotocol for the certification of ointment shrimp and accompanying fauna, captured with passive bag nets,” but we were unable to locate that protocol or determine whether the protocol applies to bycaught marine mammals. The Titi Shrimp Plan further states the regulatory framework for titi shrimp will be reviewed and updated, including considering new gear restrictions for “mandatory fish and sea turtle exclusion devices,” though the plan does not specify or require those restrictions. The plan sets a goal that 100% of vessels (both industrial and artisanal) will use satellite tracking systems, logbooks, and “human or virtual onboard observers.” The plan does not directly address marine mammal bycatch; its only reference to bycatch is a recommendation to study ways to decrease bycatch in artisanal nets.

As another example, the Ministerio de la Producción, Comercio Exterior, Inversiones y Pesca agency issued a National Action Plan for dorado (also called dolphinfish), one of the primary pelagic fish targets in Ecuador (Dorado Plan).²⁴⁰ The Plan does not describe the fishery but does state that longline gear is used. The Dorado Plan describes the applicable ministerial agreements, including a seasonal closure, a size limit for the target fish, and a limit of 10 small vessels boats that can be associated with a mothership. Another agreement, Agreement 204 of December 29, 2011, establishes an observer program for longline vessels, which provides a “random monitoring system and data collection in real time on at least 10% of trips made by longline fishing vessels of more than 20 meters.”²⁴¹ The agreement does not describe the observer program in detail and mentions only sea turtles, not marine mammals. The Dorado Plan sets a goal to promote education regarding “the reduction in the bycatch of non-target species” within the fishery, but it does not otherwise address bycatch or mention marine mammals.

In 2021, Ecuador issued a Pelagics National Action Plan (Pelagics Plan).²⁴² The Pelagics Plan describes the fishery as one of the most commercially important in Ecuador, with an export value of \$235 million per year. The fishery targets mackerel, pinchagua, chuhueco, bottle, round sardine, and picudillo, among other species, with Manabí, Guayas, and Santa Elena as the primary fishing ports. The industrial pelagic fishery uses purse seines, while the artisanal fishery uses a “chinchirro de playa” or beach hammock net.²⁴³ The Pelagics Plan notes that an observer program was instituted in 2019 to gather information on interactions with various species,

²³⁹ See Plan De Acción Nacional para el Manejo y la Conservación del Recurso Camarón Pomada (*Protrachypene precipua*); Agreement No. MPCEIP-SRP-2020-0085-A (ministerial agreement on titi shrimp trawl fishery)

²⁴⁰ Plan de Accion Nacional para la Conservacion y el manejo del Recurso Dorado en Ecuador (Pan dorado), 2019–2024

²⁴¹ *Id.*; Ministerial Agreement No. 204, <http://extwprlegs1.fao.org/docs/pdf/ecu111835.pdf>.

²⁴² Undersecretary of Fishery Resources (SRP) – Vice Ministry of Aquaculture and Fisheries (VAP) – Ministry of Production, Foreign Trade, Investments and Fisheries (MPCEIP). 2021. National Action Plan and Management of the Small Pelagic Fish Fishery of Ecuador / SRP-VAP-MPCEIP. Manta-Manabi-Ecuador. 54 pages, https://globalmarinecommodities.org/wp-content/uploads/2021/04/Plan-de-Accio%CC%81n-y-Manejo-Pela%CC%81gicos-Pequen%CC%83os-Ecuador_2021.pdf

²⁴³ *Id.*

including marine mammals. A 2021 report described the initial results of that program, identifying interactions with four species of marine mammals: South American sea lions, bottlenose dolphins, spotted dolphins, and fur seals. The report notes that South American sea lions had the “highest interaction rates” with the fishery.²⁴⁴ While no mortalities were recorded, the sample size was small.

The Pelagics Plan lists applicable ministerial agreements. For the industrial purse seine pelagics fishery, Ministerial Agreement No. MPCEIP-SRP-2020-0056-A establishes which fish species the fishery may catch, gear mesh size, closed periods, and a bycatch limit of 20% of the total volume captured.²⁴⁵ The agreements further require an observer program that “covers 30% of the fleet” and the installation and operation of a satellite position or monitoring device. The agreement does not directly address marine mammal bycatch. The artisanal pelagics fishery is regulated under two ministerial agreements, which set gear specifications and certain closures but do not appear to address bycatch.²⁴⁶

We note that we were unable to find any National Action Plans or ministerial agreements for gillnet fisheries within Ecuador, which cause documented bycatch.

Multiple Ecuadorian researchers have proposed mitigation strategies to reduce incidents of bycatch. These include gear modifications; acoustic pingers; seasonal reduction of fishing activities within humpback whale breeding grounds during its breeding season; restricted fishing areas; and training programs for fishers in aid and release methods for bycaught marine mammals.^{247, 248, 249, 250} However, based on our review of existing law, regulation, plans, and ministerial agreements, the Ecuadorian government has not adopted measures to limit marine mammal bycatch in its fisheries or ensure those measures are met.

D. Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals (PAMM)

In May 1984, the United Nations Environmental Program (UNEP) approved the Global Plan of Action for the Conservation, Management and Utilization of Marine Mammals (PAMM). The base objective of PAMM is to promote the effective implementation of a marine mammal policy around the globe that will conserve all species, subspecies, breeds, and populations of marine mammals and their habitats in the region. PAMM also aims to establish permanent cooperation programs—both regional and global—to increase scientific, technological, and environmental education for the conservation of marine mammals. Ecuador adopted the plan in

²⁴⁴ Gabriela et al. 2021

²⁴⁵ Ministerial Agreement No. MPCEIP-SRP-2020-0056-A, <https://camaradepesqueria.ec/wp-content/uploads/2020/08/REGULACION-PELAGICOS-PEQUENOS-MPCEIP-SRP-2020-0056-A.pdf>

²⁴⁶ Ministerial Agreement No. MAP SRP-2018-0111-A, <http://extwprlegs1.fao.org/docs/pdf/ecu184175.pdf>; MAP-SRP-2018-0236-A, No. 134 (Official Registry No. 151 of August 20, 2020), <http://extwprlegs1.fao.org/docs/pdf/ecu186502.pdf>

²⁴⁷ Reeves, McClellan, and Werner 2013

²⁴⁸ Castro and Rosero 2010

²⁴⁹ Alava, Barragán, and Denkinger 2012

²⁵⁰ Alava et al. 2005

December 1991.²⁵¹ Ecuadorian scientists and the coordinator of the Comisión Permanente del Pacífico Sur (CPPS) noted PAMM is one of the management instruments developed to protect marine mammals and prepare Ecuador for the rulings of the MMPA.²⁵²

VII. Other Regulatory Regimes

A. IATTC (Inter-American Tropical Tuna Commission)

The Inter-American Tropical Tuna Commission is a regionally focused governing body that includes member states with Pacific coastlines. The IATTC has multiple management strategies, including national fishing quotas and a “Dolphin Safe” program for tuna fisheries, aiming to reduce dolphin bycatch within nations’ EEZs and international waters.^{253, 254} Ecuador is a signatory country to the IATTC. Under the IATTC framework, Ecuador has also signed the Agreement on the International Dolphin Conservation Programme (AIDCP). Through the AIDCP, Ecuador committed to undertake measures to reduce and monitor dolphin bycatch during fishing activities of the tuna purse seine fleet.

Of the 602,000 tons of tuna caught by IATTC nations in 2020, 46% were caught by Ecuadorian ships and 64% of these tunas were landed in Ecuadorian ports.²⁵⁵ The 2020 IATTC tuna fleet was also dominated by Ecuadorian vessels, making up over 36%²⁵⁶ of the fleet with over 113 ships.²⁵⁷ Ecuador has the largest tuna fleet in the eastern tropical Pacific.²⁵⁸

As stated in section III of this report, the purse seine tuna fisheries the IATTC manages have documented, high numbers of interactions with and bycatch of marine mammals. Therefore, these fisheries do not disqualify for an “Exempt” classification under the MMPA Imports Rule, and we believe they are incorrectly categorized in the 2020 LOFF. The IATTC reported 679 incidental dolphin mortalities in 2020 (see Appendix i). This bycatch is likely underreported due to diminished number of IATTC observers onboard during the COVID-19 pandemic.²⁵⁹ Despite having this data, Ecuador apparently failed to provide this information to NMFS for inclusion in the LOFF. The 2020 LOFF lists the “marine mammal species/stock and annual average mortality estimates” for these fisheries as “STOCK NOT SPECIFIED” and/or “UNKNOWN.”²⁶⁰

²⁵¹ United Nations Environmental Program (UNEP) 1991

²⁵² Instituto Nacional de Pesca Ecuador and Comisión Permanente del Pacífico Sur 2017

²⁵³ Félix et al. 2015

²⁵⁴ Alava et al. 2019

²⁵⁵ IATTC 2021

²⁵⁶ IATTC 2021

²⁵⁷ NOAA Fisheries 2020

²⁵⁸ Félix et al. 2015

²⁵⁹ IATTC 2021

²⁶⁰ NOAA Fisheries 2020

1. Observer Coverage

IATTC Purse-Seine

Bycatch data from the IATTC purse-seine fishery is collected from three data sources: the IATTC and National Program observer data, vessel logbook data, and cannery data. The observer data provides the most detailed information pertaining to marine mammal bycatch. The observers provide detailed bycatch data by species, catch, disposition, and effort at exact fishing positions; however, only one dataset is entered per day, regardless of the number of sets a vessel makes. The vessel logbook and cannery information have very little bycatch data and focus primarily on commercial data. The cannery data describes only a broad geographic region where the fish were taken and provides bycatch information only if the marine mammal was kept in a purse-seine well during the fishing operation²⁶¹.

The IATTC requires 100% observer coverage aboard its purse seine tuna vessels over 400 tons (Class 6) (see Table 4).²⁶² The observer program on Ecuadorian ships is carried out in conjunction with the IATTC and Ecuador's Programa Nacional de Observadores Pesqueros de Ecuador (PROBECUADOR). The Ecuadorian national program has a goal of placing observers on 33% of trips made by Ecuadorian vessels, and the remaining vessels are covered by the IATTC.²⁶³

Smaller purse-seine ships (Class 1–5) are not required to carry observers.²⁶⁴ Because of the very sparse marine mammal bycatch data reported in vessel logbooks and cannery data, bycatch data from smaller vessels is extremely limited. In 2020, 76% of fishing trips made by smaller vessels were unobserved, 17% were observed through Ecuador's voluntary observer program, 5% from the National Observer program, and 2% from the IATTC observer program.²⁶⁵

Class	1	2	3	4	5	6
Metric tons	<46	46 – 91	92 – 181	182 – 272	273 – 363	>363
Short tons	<51	51 – 100	101 – 200	201 – 300	301 – 400	>400

Table 4. The IATTC purse-seine vessel classifications by carrying capacity.²⁶⁶

IATTC Longline Fishery

The longline fishery observer coverage and bycatch data with the IATTC has improved in Ecuador since the implementation of Resolution C-19-08 in 2019, which required that every

²⁶¹ IATTC 2021

²⁶² IATTC 2009

²⁶³ AIDCP 2021

²⁶⁴ IATTC 2021

²⁶⁵ IATTC 2021

²⁶⁶ Ministerio de Produccion, Comercio Exterior, Inversiones y Pesca 2021

member of the IATTC ensure 5% observer coverage for the total number of hooks or “effective days of fishing” on longline vessels greater than 20 meters.²⁶⁷

Despite the resolution, in a 2021 report, the IATTC stated that the longline observer coverage has often been less than 5% of hooks or effective days fishing from ships greater than 20 meters. Coverage from most individual Catcher/Processor crews (CPCs) was also reported as being less than the 20% recommended by the IATTC Working Group on Bycatch and Scientific Advisory Committee. The IATTC reported that the considerable variability in reporting formats of longline data and the inconsistent observer coverage has hindered the RFMOs ability to estimate bycatch associated with longlines.²⁶⁸ The data not from scientific observers are collected using the gross annual removals estimated by CPCs. The IATTC considers this data as “incomplete” or “sample data” because it is uncertain whether it is receiving all bycatch data from the longline fishery.²⁶⁹ In the 2021 meeting of the IATTC, the RFMO reported that staff were able to determine that the longline bycatch of shark species was several times higher than the number that CPCs reported since 2006.²⁷⁰ This inconsistency and inaccuracy of bycatch data brings other bycatch reports from the longline fishery into question. The IATTC stated that “[a]lthough CPCs made a tremendous effort in improving their reporting of longline observer data [since the implementation of C-19-08 in 2019], results from the analysis showed that 5% observer coverage is insufficient for estimating the total catch of the relatively data-rich yellowfin and bigeye tunas, and so catch estimates for bycatch species are likely to be less reliable given that less data are available for bycatch species.”²⁷¹

B. Agreement on the International Dolphin Conservation Program (AIDCP)

When the purse-seine fishery for tuna in the eastern tropical Pacific began in the 1960s, fishers found that their catches of tuna could be increased by setting nets around a pod of dolphins and their associated school of tunas. However, releasing the dolphins without losing the tuna catch was very difficult, resulting in the death of many dolphins. In response to the U.S. government’s application of the MMPA Imports provision, the 1992 La Jolla Agreement created an international framework to reduce dolphin mortality by instituting Dolphin Mortality Limits (DMLs) for individual ships and establishing the International Review Panel to monitor the compliance of the tuna fishing fleet. The Agreement on the International Dolphin Conservation Program (AIDCP) formalized the provisions of the La Jolla Agreement and was entered into force in 1999. Each party within the AIDCP has committed to “ensure the sustainability of tuna stocks in the eastern Pacific Ocean and to progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero.”²⁷² Each party further committed “to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem.”²⁷³

²⁶⁷ IATTC 2021

²⁶⁸ IATTC 2021

²⁶⁹ IATTC 2021

²⁷⁰ IATTC 2021

²⁷¹ IATTC 2021

²⁷² AIDCP 2021

²⁷³ AIDCP 2021

The AIDCP requires that observers are placed aboard 100% of fishing trips that purse-seine vessels take (Class 6). The coverage requirements are met by the IATTC and Ecuador's Programa Nacional de Observadores Pesqueros de Ecuador (PROBECUADOR). Exemptions can be made for vessels where it is impossible to place an observer onboard in compliance with the applicable IATTC and AIDCP rules.²⁷⁴ As of September 2021, Belize, Colombia, Costa Rica, Ecuador, El Salvador, the European Union, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, the United States, and Venezuela have ratified the Agreement.

C. Intermediary Nations and Fisheries Operating on the High Seas

Ecuador is an intermediary nation that exports processed intermediary products to the United States. However, according to the 2020 NOAA Final List of Intermediary Nations and Products, Ecuador also exports to other intermediary nations, which presents a significant risk of non-MMPA compliant fishery products from Ecuador being exported to the United States through other nations. For example, Ecuador is listed as a product source for white shrimp as an intermediary export product from Thailand.²⁷⁵

A 2022 analysis of data on Ecuadorian tuna imports, obtained from the Central Bank, National Customs Service of Ecuador (SENAE), the Public Institute of Aquaculture and Fisheries of Ecuador (IPIAP), the IATTC and the Cámara Nacional de Pesquería (CNP), found that 61% of tuna imported and processed by Ecuador “comes from international waters whose origin is poorly documented.” Records of origin were found for only 111,000 of the 308,000 tons imported declared by the CNP, and the study noted that, “only partial records of tuna fishing and imports are found in Customs, the Central Bank and the Ministry of Production”, and that what data is available is inconsistent across the institutions. Bycatch data for a variety of species, including dolphins, was also said to be “erratic or unavailable”.²⁷⁶

VIII. Assessment of Ecuador's “Comparability” Under the MMPA Imports Rule

Under the U.S. Marine Mammal Protection Act (MMPA), the U.S. government “shall ban” all fish imports caught with fishing gear that kills or seriously injures marine mammals in “in excess of United States standards.”²⁷⁷ In applying this requirement, the United States “shall insist on reasonable proof” from an exporting nation of the effects of its exporting fisheries on marine mammals, including its marine mammal bycatch.²⁷⁸

To implement this provision, NMFS issued the MMPA Imports Rule.²⁷⁹ Under the Rule, for Ecuador to continue exporting fish to the United States after December 31, 2023, Ecuador must apply for and receive a “comparability finding” from the United States, essentially a

²⁷⁴ AIDCP 2021

²⁷⁵ NOAA Fisheries 2020

²⁷⁶ Vega, F. 2022.

²⁷⁷ 16 U.S.C. § 1371(a)(2)

²⁷⁸ *Id.*

²⁷⁹ 81 Fed. Reg. 54,415 (Aug. 16, 2016)

determination that its bycatch and bycatch program for each exporting fishery meets U.S. standards.^{280, 281}

Under the Rule, for export fisheries operating within Ecuador's EEZ to receive a comparability finding, Ecuador must show:

- (1) Ecuador "[p]rohibits the intentional mortality or serious injury of marine mammals in the course of commercial fishing in the fishery;" and
- (2) For any fishery deemed an export fishery on NMFS's LOFF, Ecuador "maintains a regulatory program" for the fishery "that is comparable in effectiveness to the U.S. regulatory program."

To demonstrate a comparably effective regulatory program, Ecuador must show it maintains a program "that includes[] or effectively achieves comparable results as" the following components:

- (a) Marine mammal assessments . . . for stocks . . . that are killed or seriously injured in the fishery;
- (b) An export fishery register," listing all fishing vessels in the fishery, including time, season, gear type, and target species;
- (c) Regulatory requirements that include:
 - (i) A requirement that vessel operators report all marine mammal injury or death;
 - (ii) A requirement that fishers implement measures to reduce mortality/serious injury;
- (d) Monitoring procedures in the export fishery to estimate mortality/serious injury from the fishery and cumulatively from other export fisheries on same marine mammal stocks;
- (e) Calculation of bycatch limit for marine mammals taken in fishery. The "bycatch limit" is PBR or a "comparable scientific metric;" and
- (f) Demonstration that mortality/serious injury from the fishery (and cumulatively with other export fisheries) "[d]o not exceed the bycatch limit."

Accordingly, to achieve a comparability finding under the MMPA Imports Rule, Ecuador must demonstrate and document that it meets each of the conditions above or maintains a regulatory program that "effectively achieves comparable results," a strict standard.

²⁸⁰ 50 C.F.R. § 216.24(h)(6)

²⁸¹ 87 Fed. Reg. 63,955 (Oct. 21, 2022) (delaying deadlines)

A. Ecuador's Compliance with the MMPA Imports Rule

Based on information currently available to the public, Ecuador lacks the bycatch measures, monitoring, and data necessary to demonstrate comparability for its export fisheries outside of the IATTC.²⁸² As detailed below, Ecuador lacks data on marine mammal status and marine mammal bycatch, and while aspects of Ecuadorian legislation may be adequate under the MMPA Imports Rule, such as the apparent ban on the intentional killing of marine mammals, Ecuador lacks regulatory requirements that are comparable to the U.S. regulatory program. Therefore, unless significant improvements are made in Ecuador's marine mammal and bycatch monitoring; regulatory framework; and bycatch, we urge NMFS to ban seafood imports from Ecuador's export fisheries.

1. Ecuador's Ban on Intentional Killing Meets the MMPA Imports Rule.

The MMPA Imports Rule requires that, to export seafood to the United States, Ecuador must demonstrate that it “[p]rohibits the intentional mortality or serious injury of marine mammals in the course of commercial fishing in the fishery.”²⁸³ As described above, Ecuador's new Organic Fisheries Law (La Ley Orgánica para el Desarrollo de la Acuicultura y Pesca or “OFL”) appears to prohibit the intentional, direct take of marine mammals. The law states that carrying out activities “intentionally in interaction with a marine mammal” is a serious offense.²⁸⁴ The language likely prohibits both fishing intentionally for marine mammals and the intentional killing of marine mammals while fishing (i.e., killing marine mammals that approach aquaculture facilities).

Moreover, in 2021, Ecuador issued a ministerial agreement that appears to expressly “[p]rohibit the attempt of act of hunting, killing, capturing and/or persecuting any marine mammal . . . during . . . a fishing activities” for all fishing vessels—industrial or artisanal—operating within Ecuador.²⁸⁵ This directive likely satisfies the MMPA Imports Rule's requirement that nations demonstrate that they “[p]rohibit[] the intentional mortality or serious injury of marine mammals in the course of commercial fishing in the fishery.”²⁸⁶

However, given the concerns and issues associated with FADs, detailed above, NMFS should seek clarification from Ecuador on the applicability of the OLF and ministerial agreement to all fisheries exporting to the United States.

²⁸² 50 C.F.R. § 216.24(h)(6)(iii)(C)

²⁸³ 50 C.F.R. § 216.24(h)(6)(iii)(A)(1).

²⁸⁴ Organic Fisheries Law, Art. 213(e)

²⁸⁵ Acuedro Nro. MPCEIP-SRP-2021-0238-A, (Dec. 7, 2021), <https://vlex.ec/vid/mpceip-srp-2021-0238-878836913>

²⁸⁶ 50 C.F.R. § 216.24(h)(6)(iii)(A)(1).

2. Based on Publicly Available Information, Ecuador Does Not Maintain a Regulatory Program “Comparable in Effectiveness” to the U.S. Program for Bycatch

As detailed above, under the MMPA Imports Rule, Ecuador must demonstrate it “maintains a regulatory program” for each export fishery “that is comparable in effectiveness to the U.S. regulatory program,” including the five components laid out in the Rule, or that it effectively achieves comparable results as maintaining such a program.²⁸⁷

(a) Ecuador Does Not Conduct Regular Marine Mammal Assessments for All Stocks Interacting with Its Export Fisheries

The MMPA Imports Rule requires that Ecuador demonstrate it “maintains a regulatory program that provides for . . . [m]arine mammal assessments . . . for stocks . . . that are killed or seriously injured in the fishery” or that the nation achieves “comparable . . . effectiveness” to the U.S. program of annual stock assessments.²⁸⁸ It is critical that stock assessments for bycaught stocks be conducted; without this information, it is impossible to know whether bycatch is below PBR. However, Ecuador does not have a regulatory program requiring or providing for regular stock assessments, nor are regular stock assessments conducted for species bycaught in Ecuador’s fisheries.

As described above, Ecuador does not have current or accurate data relating to marine mammal stocks. While population estimates for some species and specific populations within Ecuadorian waters exist, we are not aware of any comprehensive marine mammal stock assessments for marine mammals interacting with Ecuador’s export fisheries. Ecuadorian scientists have acknowledged “huge knowledge gaps” around abundance estimates, population structure, and the impact of anthropomorphic threats on marine mammal populations in Ecuador’s waters.²⁸⁹

(b) Ecuador Requires an Export Fishery Registry But May Not Maintain All Necessary Information

The MMPA Imports Rule requires that export nations either maintain an “export fishery register” listing all fishing vessels in the fishery—including time, season, gear type, and target species—or effectively achieve comparable results.²⁹⁰

Ecuadorian law requires a fishery registry. However, it may not contain all the necessary information. The Organic Fisheries Law (OFL) established a “public fishing registry,” called the National Aquaculture and Fisheries Information System and Public Fisheries Register. The OFL requires that this publicly available database contain information regarding the persons who carry out fishing activities, including “authorizations, permits, encumbrances . . . , sanctions issued . . . [and] other . . . information.” Fishery regulations issued in 2022 further direct what

²⁸⁷ 50 C.F.R. § 216.24(h)(6)(iii)(B), (C), (D), and (E).

²⁸⁸ 50 C.F.R. § 216.24(h)(6)(iii)(C)

²⁸⁹ Félix 2017

²⁹⁰ 50 C.F.R. § 216.24(h)(6)(iii)(C)

must be included in the Register,²⁹¹ including the name and contact information for both artisanal and industrial vessels; authorized fishing vessels and their quotas; and violations by shipowners or vessels.²⁹² Neither the OFL nor the regulations expressly require that the Register include the “time, season, gear type, and target species” for all vessels, or the equivalent thereof, as the MMPA Imports Rule requires, unless that information is included as part of the permit information required under the OFL. We urge NMFS to seek clarification from Ecuador, as this information is essential for managers (and NMFS) to understand and monitor the fisheries’ operations and ultimately their bycatch. We note that Ecuador has reported some fishery information that was included in the LOFF, including the number of vessels, gear type, the target species, and FAO fishing area.

(c) Based on Publicly Available Information, Ecuador Does Not Maintain Adequate Regulatory Requirements for Bycatch

Next, under the MMPA Imports Rule, Ecuador must demonstrate it has a regulatory program that both requires marine mammal reporting and requires fishers to implement measures to reduce mortality/serious injury. As discussed below, available evidence does not support a finding that Ecuador meets either requirement for all export fisheries.

(i) Ecuador Requires Reporting of Marine Mammal Deaths and Injuries for Industrial Vessels but Does Not Appear to Require Reporting for Artisanal Vessels

The MMPA Imports Rule requires that exporting nations require that vessel operators “report all intentional and incidental mortality and injury of all marine mammals in the course of commercial fishing operations” or achieve comparable results to such a requirement.²⁹³

The OFL requires that all “industrial fishing vessels” must carry a fishing log onboard that complies with conditions to be established through regulations.²⁹⁴ Under the fishery regulations, fishers must record in the logbook on a “daily” basis: vessel name and identification and fishing gear, and for each haul, the date, geographic location, time, estimated catch by species, and “marine mammals . . . with which they have had an interaction,”²⁹⁵ among other requirements. Logbooks must be delivered to fishing authorities at the time of landing.²⁹⁶ Accordingly, Ecuadorian law appears to require industrial vessels to report marine mammal death and injury.

However, for artisanal vessels, the OFL only requires a logbook if the fisheries agency determines vessels must maintain a logbook,²⁹⁷ and the regulations do not require a logbook for these vessels. While a requirement for an artisanal fishery to maintain and submit a logbook may be contained in fishery-specific ministerial agreements, there were no such requirements in the

²⁹¹ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 26, 27

²⁹² General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 27

²⁹³ 50 C.F.R. § 216.24(h)(6)(iii)(C).

²⁹⁴ Organic Fisheries Law, Art. 162

²⁹⁵ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 225

²⁹⁶ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 225

²⁹⁷ Organic Fisheries Law, Art. 162

agreements we reviewed. We urge NMFS to require Ecuador to clarify reporting requirements for each export fishery.

(ii) Ecuador Does Not Require Fishers to Implement Measures to Reduce Mortality/Serious Injury

Next and critically, under the MMPA Imports Rule, Ecuador must maintain regulatory requirements that fishers implement measures to reduce mortality/serious injury or “effectively achieves[] comparable results” as requiring such measures.²⁹⁸

Based on information available, we were unable to identify any federal law or regulation in Ecuador clearly requiring marine mammal bycatch mitigation. While Ecuador’s law appears to allow the fisheries agency to issue such measures, we were unable to identify any marine mammal bycatch measures applicable to fisheries we reviewed.

Specifically, the OFL addresses “bycatch,” but it is unclear if the provisions apply to marine mammal bycatch or only fish bycatch. The OFL states that the fisheries agency will set incidental catch limits for each fishery and defines both “incidental catch” and “bycatch” to mean “species and marine fauna that are captured together with directed . . . fishing.”²⁹⁹ The law further states that “commercialization” of incidentally caught species “will be allowed,” consistent with national and international requirements regarding endangered species. However, the provisions do not reference marine mammals and, because the regulations address commercialization of bycatch, appear to refer to bycatch of only fish species. As also noted above, Article 153 of the OFL also prohibits the “capture, transportation, transshipment, landing, processing, marketing of marine or aquatic fauna;” however, the OFL then states that the National Environmental Authority “will determine the list of species that fall under this protection.”³⁰⁰ We were unable to identify any list of species to which the provision applies.

In 2021, Ecuador issued a ministerial agreement addressing marine mammal interactions in fishing gear. As noted above, the agreement prohibits intentional “killing, capturing and/or persecuting any marine mammal . . . during . . . fishing activities.”³⁰¹ The agreement further “prohibit[s] the retention and landing as by-catch, incidental fishing or incidental capture consisting of any species of marine mammals, captured” with fishing. It is not entirely clear what this agreement prohibits. It likely prohibits only the *retention* of marine mammals caught incidentally in fishing gear. Alternatively, it could be interpreted to prohibit *all* incidental marine mammal bycatch. However, because we were unable to identify any bycatch mitigation measures applicable to the fisheries we reviewed, it is very unlikely the agreement simply bans all bycatch and even if it did, there is no evidence of the results of such a ban.

Under Ecuador’s new fishery regulations, the fisheries agency appears to have authority to require marine mammal bycatch mitigation for industrial fishers. Under the regulations, the fishery agency must issue ministerial agreements to authorize and regulate specific fisheries, and

²⁹⁸ 50 C.F.R. § 216.24(h)(6)(iii)(C).

²⁹⁹ Organic Fisheries Law, Art. 149, 8

³⁰⁰ Organic Fisheries Law, Art. 153

³⁰¹ Acuedro Nro. MPCEIP-SRP-2021-0238-A, (Dec. 7, 2021), <https://vlex.ec/vid/mpceip-srp-2021-0238-878836913>

those agreements must contain a fishing quota, target species, fishing areas, fishing modality/gear, and “conservation measures applicable to the target species and associated species or accompanying [i.e., bycaught] fauna,” including (presumably) marine mammals.³⁰² Industrial fishers must apply for a permit for their vessels.³⁰³ The permit must also contain “conservation measures applicable to the target species and associated species or accompanying [i.e., bycaught] fauna.”³⁰⁴ Accordingly, the fisheries agency likely has authority to require marine mammal bycatch mitigation for industrial fishers through ministerial agreements and, consistent with those agreements, through permits for individual fishers. For artisanal fishing, fishers must also receive a permit to fish.³⁰⁵ The regulations provide no further detail regarding measures that apply to artisanal fishers.

Further, under the OFL, the fisheries agency must “establish management plans” for fisheries, including management measures.³⁰⁶ Under the fishery regulations, a fishery management plan must include goals; objectives; and strategies for managing, monitoring, evaluating, and reducing the “impact on the ecosystem of the fishery, as well as reduction of bycatch and interaction with threatened or protected species.”³⁰⁷ These management plans for specific fisheries reference applicable ministerial agreements.

As detailed above, Ecuador has developed several new National Action Plans for various fisheries, including plans for titi shrimp,³⁰⁸ dorado,³⁰⁹ and pelagics. The plans describe existing management measures required through various ministerial agreements and should also address the fishery’s impact on the ecosystem, including reduction of bycatch and interaction with threatened or protected species. However, as detailed above, the plans we reviewed do not contain or reference any required measures to mitigate marine mammal bycatch, although some plans reference ministerial agreements we were unable to obtain. We note that we were unable to find any National Action Plans or ministerial agreements for gillnet fisheries within Ecuador, which cause documented bycatch.

In sum, we were unable to identify any marine mammal bycatch mitigation measures in Ecuador. Under the MMPA Imports Rule, NMFS must require Ecuador to demonstrate mitigation measures in all Ecuadorian export fisheries and, if Ecuador is unable to do so, NMFS must ban seafood imports from the country.

³⁰² General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 159

³⁰³ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 159

³⁰⁴ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 171

³⁰⁵ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 182

³⁰⁶ Organic Fisheries Law, Art. 97

³⁰⁷ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 11

³⁰⁸ Viceministerio de Acuicultura y Pesca de Ecuador. 2021. Plan De Acción Nacional para el Manejo y la Conservación del Recurso Camarón Pomada (*Protrachypene precipua*). Proyecto Iniciativa Pesquerías Costeras. Programa de las Naciones Unidas para el Desarrollo (PNUD) y WWF-Ecuador. Manta, Ecuador, [https://cfi-la.org/docs/zfgt0soIVj_10-12-](https://cfi-la.org/docs/zfgt0soIVj_10-12-2021_PLAN%20DE%20ACCI%C3%93N%20NACIONAL%20CAMAR%C3%93N%20POMADA%20FINAL%20DIAGRAMADO%20CONFORMIDAD%20T%C3%89CNICA%2006-12-2021.pdf)

2021_PLAN%20DE%20ACCI%C3%93N%20NACIONAL%20CAMAR%C3%93N%20POMADA%20FINAL%20DIAGRAMADO%20CONFORMIDAD%20T%C3%89CNICA%2006-12-2021.pdf

³⁰⁹ Plan de Accion Nacional para la Conservacion y el manejo del Recurso Dorado en Ecuador (Pan dorado), 2019-2024, https://srp.produccion.gob.ec/wp-content/uploads/2021/02/PLAN-DE-ACCI%C3%93N-NACIONAL-PARA-LA-CONSERVACI%C3%93N-Y-EL-MANEJO-DEL-RECURSO-DORADO-EN-ECUADOR_compressed.pdf.

(iii) Ecuador Has Some Monitoring Procedures to Estimate Bycatch for Some but Not for All Fisheries

The MMPA Imports Rule also requires Ecuador to demonstrate it has monitoring procedures in place to estimate mortality and serious injury for each export fishery both individually and cumulatively for each stock or that the nation effectively achieves comparable results as conducting such monitoring.³¹⁰

The Ecuadorian fishery statute requires some monitoring and allows the fisheries agency to require additional monitoring. The OFL requires that all “industrial fishing vessels” must carry a fishing log onboard that complies with conditions to be established through regulations.³¹¹ Additionally, all industrial vessels “that the governing body determines” must install and operate “throughout the fishing trip, a registry of images, which allows detecting and recording the discard or other action of non-compliance” with relevant fishing regulations.³¹² Those vessels “must deliver the registered information, at the request of” the fisheries agency.³¹³ However, the OFL does not specify if this monitoring system will be collecting data on bycaught marine mammals. The law further states that monitoring and surveillance will be conducted through periodic, random inspections; technical reports from the Satellite Monitoring Center; reports on onboard observers; and fishing logs.³¹⁴ It is unclear what monitoring is required for artisanal vessels, as the OFL states that the fisheries agency “will determine what kind of artisanal fishing vessels must comply with” logbook maintenance and submission requirements.³¹⁵

As noted above, Ecuador’s fishing regulations establish what the logbook required for industrial vessels must contain. On a “daily” basis, fishers must record: vessel name and identification, name of captain, port of departure, fishing gear, and for each haul, the date, geographic location, time, estimated catch by species, “discards and the fishing catch incidental” and “marine mammals . . . with which they have had an interaction.”³¹⁶ The regulations also state that the fisheries agency “will regulate through technical regulations the monitoring, control and surveillance measures . . . applicable to each . . . fishery,”³¹⁷ and National Action Plans will address “monitoring and investigation strategies”³¹⁸.

As noted above, Ecuador has developed several new National Action Plans for various fisheries, including the shrimp, dorado, and small pelagics purse seine, as well as ministerial agreements applicable to various fisheries. Monitoring is addressed in some plans. For example, the National Action Plan for titi shrimp³¹⁹ notes that ministerial agreements require “electronic

³¹⁰ 50 C.F.R. § 216.24(h)(6)(iii)(C).

³¹¹ Organic Fisheries Law, Art. 162

³¹² Organic Fisheries Law, Art. 172

³¹³ Organic Fisheries Law, Art. 172

³¹⁴ Organic Fisheries Law, Art. 160, 161

³¹⁵ Organic Fisheries Law, Art. 162

³¹⁶ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 225

³¹⁷ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 223

³¹⁸ General Regulations to the Organic Law for the Development of Aquaculture and Fisheries, at Art. 11

³¹⁹ Viceministerio de Acuicultura y Pesca de Ecuador. 2021. Plan De Acción Nacional para el Manejo y la Conservación del Recurso Camarón Pomada (*Protrachypene precipua*). Proyecto Iniciativa Pesquerías Costeras. Programa de las Naciones Unidas para el Desarrollo (PNUD) y WWF-Ecuador. Manta, Ecuador, https://cfi-la.org/docs/zfgt0solVj_10-12-

logs” for the industrial trawl fishery, documenting capture, including species, size, catch, and “discards” (with no mention of marine mammals).³²⁰ The plan sets a goal that 100% of vessels (both industrial and artisanal) will use satellite tracking systems, logbooks, and “human or virtual onboard observers”; however, we found no ministerial agreement requiring human or virtual observers. The National Action Plan for dorado³²¹ describes an applicable ministerial agreement establishing an observer program for longline vessels, which provides a “random monitoring system and data collection in real time on at least 10% of trips made by longline fishing vessels of more than 20 meters.”³²² The agreement does not describe the observer program in detail and mentions only sea turtles, not marine mammals. The Pelagics National Action Plan³²³ notes that an observer program was instituted in 2019 to gather information on interactions with various species, including marine mammals. For the industrial purse seine pelagics fishery, the Plan references a Ministerial Agreement requiring an observer program that “covers 30% of the fleet” and the installation and operation of a satellite position or monitoring device.

In sum, for industrial vessels, Ecuador does appear to require logbook reporting of marine mammal interactions. However, logbooks are known to be unreliable as crew may lack the time and training to collect such data and may also have an economic disincentive to record accurate data.³²⁴ Logbooks have been found to underestimate and underreport marine mammal entanglement. One recent study concluded that “cetacean bycatch recorded by observers was higher than that from fisher logbooks by an average of 774% in trawls, 7348% in nets, and 1725% in hook and line gears.”³²⁵ Moreover, Ecuador also appears to require some additional monitoring, including onboard or virtual observers; however, it is unclear whether observers are monitoring for marine mammal bycatch or whether monitoring is sufficient to adequately estimate marine mammal bycatch. It is unclear what, if any, monitoring applies for most artisanal fishing. We note, however, that for fisheries covered by the IATTC, the IATTC has established a method for reporting and monitoring marine mammal bycatch incidents.

Without critical bycatch data, Ecuador cannot demonstrate that bycatch in fisheries do not exceed PBR, nor can it calculate PBR.

2021_PLAN%20DE%20ACCI%C3%93N%20NACIONAL%20CAMAR%C3%93N%20POMADA%20FINAL%20DIAGRAMADO%20CONFORMIDAD%20T%C3%89CNICA%2006-12-2021.pdf

³²⁰ See Plan De Acción Nacional para el Manejo y la Conservación del Recurso Camarón Pomada (*Protrachypene precipua*); Agreement No. MPCEIP-SRP-2020-0085-A (ministerial agreement on titi shrimp trawl fishery).

³²¹ Plan de Accion Nacional para la Conservacion y el manejo del Recurso Dorado en Ecuador (Pan dorado), 2019-2024, https://srp.produccion.gob.ec/wp-content/uploads/2021/02/PLAN-DE-ACCI%C3%93N-NACIONAL-PARA-LA-CONSERVACI%C3%93N-Y-EL-MANEJO-DEL-RECURSO-DORADO-EN-ECUADOR_compressed.pdf.

³²² *Id.*; Ministerial Agreement No. 204, <http://extwprlegs1.fao.org/docs/pdf/ecu111835.pdf>.

³²³ Undersecretary of Fishery Resources (SRP) - Vice Ministry of Aquaculture and Fisheries (VAP) - Ministry of Production, Foreign Trade, Investments and Fisheries (MPCEIP). 2021. National Action Plan and Management of the Small Pelagic Fish Fishery of Ecuador / SRP-VAP-MPCEIP. Manta-Manabi-Ecuador. 54 pages, https://globalmarinecommodities.org/wp-content/uploads/2021/04/Plan-de-Accio%CC%81n-y-Manejo-Pela%CC%81gicos-Pequen%CC%83os-Ecuador_2021.pdf.

³²⁴ Davies2002; Gilman et al. 2018

³²⁵ Basran, Jean, and Guðjón Már Sigurðsson 2021

(iv) Ecuador Has Not Published a Bycatch Limit for Its Export Fisheries

The MMPA Imports Rule requires Ecuador to calculate a bycatch limit for marine mammals taken in each fishery.³²⁶ The “bycatch limit” is PBR or a “comparable scientific metric.”³²⁷ Because Ecuador does not conduct regular surveys of all marine mammal stocks that interact with its export fisheries, it is unlikely Ecuador has calculated bycatch limits for its export fisheries, with the exception of IATTC fisheries. If it has done so, it has not published those limits.³²⁸ The IATTC and AIDCP have established a Dolphin Mortality Limit (DML) for the industrial tuna fleet. The DML for 2020 was 5,000 individuals.³²⁹

(v) Ecuador Is Unlikely to Be Able to Demonstrate that Serious Injury/Mortality from Export Fisheries Is Below the Bycatch Limit

Finally, the MMPA Imports Rule requires that Ecuador demonstrate that mortality/serious injury from the fishery and cumulatively with other export fisheries “[d]o not exceed the bycatch limit.”³³⁰

Based on our assessment, Ecuador will not be able to demonstrate that mortality/serious injury from its export fisheries “[d]o not exceed the bycatch limit.” Even if Ecuador had the data to calculate PBR, because it does not appear to adequately monitor all bycatch and has not adopted mitigation measures to limit bycatch, it will not be able to demonstrate that bycatch does not exceed PBR for each export fishery.

Moreover, in 2019, the European Union issued Ecuador a Yellow Card for its failure to address illegal, unreported, and unregulated fishing. The EU found Ecuador’s: (1) legal framework was outdated and not sufficient in conservation and management requirements, (2) law enforcement was hampered by outdated legal framework and leniency, (3) deficiencies in control of its tuna and other fisheries, and (4) deficiencies in traceability.^{331, 332} This finding opens questions as to the adequacy of Ecuador’s fishery management and enforcement.

IX. Conclusion

In sum, it is unlikely that Ecuador will be able to demonstrate that it meets the U.S. MMPA Imports Rule for the assessed export fisheries. Based on publicly available data, an export ban is appropriate for Ecuador’s non-RFMO export fisheries, unless Ecuador comprehensively demonstrates a comparable bycatch regime.

As detailed above, to continue exporting seafood to the United States, Ecuador bears the burden of demonstrating both that it bans killing and serious injury of marine mammals during commercial fishing and that it “maintains a regulatory program” for the fishery “that is

³²⁶ 50 C.F.R. § 216.24(h)(6)(iii)(C)

³²⁷ 50 C.F.R. § 216.3

³²⁸ AIDCP 2021

³²⁹ IATTC

³³⁰ 50 C.F.R. § 216.24(h)(6)(iii)(C)

³³¹ https://ec.europa.eu/commission/presscorner/detail/en/QANDA_19_6037

³³² Vega, F. 2022. <https://en.bitacoraec.com/post/tuna-fish-in-ecuador-85-come-from-open-seas>

comparable in effectiveness to the U.S. regulatory program.” This requires that Ecuador has a regulatory program including (or somehow achieving comparable effectiveness as including) stock assessments, a fishery register, marine mammal bycatch reporting, mitigation requirements, bycatch monitoring, and calculation and proof that bycatch does not exceed PBR or a comparable metric.³³³

Overall, based on publicly available information, Ecuador does not meet this burden for fisheries assessed. While Ecuador bans intentional killing of marine mammals during fishing, Ecuador does not provide for marine mammal surveys for all stocks; may not require an adequate fisheries register; based on publicly available information, does not maintain adequate regulatory requirements for bycatch, including requiring mitigation measures and bycatch monitoring for all export fisheries; or calculate PBR. As such, Ecuador will be unable to demonstrate that serious injury and mortality from each export fisheries do not exceed PBR.

We note that some ministerial agreements and other mandates directed at export fisheries not discussed here were not publicly available for our assessment. However, unless Ecuador fully demonstrates that it meets the various components of the MMPA Imports Rule as detailed herein, NMFS must not make a positive comparability finding for fisheries assessed.

References

[AIDCP/IRP. 2022. “Agreement on the International Dolphin Conservation Program, International Review Panel \(IRP\) 69TH Meeting .Phoenix, Arizona, USA 25 July 2022.](https://www.iattc.org/GetAttachment/e4264923-962d-4a91-9c59-603403f430e8/Meeting-IRP-69%20report)
<https://www.iattc.org/GetAttachment/e4264923-962d-4a91-9c59-603403f430e8/Meeting-IRP-69%20report>

Alava, JJ, Maria Jose Barragan, and Judith Denkinger. 2012. “Assessing the Impact of Bycatch on Ecuadorian Humpback Whale Breeding Stock: A Review with Management Recommendations.” 2012.
<https://www.sciencedirect.com/science/article/abs/pii/S0964569111001852>.

Alava, Juan José, María José Barragán, Cristina Castro, and Raúl Carvajal. 2005. “A Note on Strandings and Entanglements of Humpback Whales (Megaptera Novaeangliae) in Ecuador,” 6.

Alava, Juan José, Maria José Barragán, and Judith Denkinger. 2012. “Assessing the Impact of Bycatch on Ecuadorian Humpback Whale Breeding Stock: A Review with Management Recommendations.” *Ocean & Coastal Management* 57 (March): 34–43.
<https://doi.org/10.1016/j.ocecoaman.2011.11.003>.

Alava, Juan José, Alasdair Lindop, and Jennifer Jacquet. 2015. *Marine Fisheries Catch Reconstructions for Continental Ecuador: 1950-2010*. <https://doi.org/10.13140/2.1.1150.5447>.

Alava, Juan José, Bradley Tatar, Maria José Barragán P., Cristina Castro, Patricia Rosero, Judith Denkinger, Pedro Jiménez Veintimilla, Raúl Carvajal, and Jorge Samaniego. 2019. “Mitigating

³³³ 50 C.F.R. § 216.24(h)(6)(iii)(C).

Cetacean Bycatch in Coastal Ecuador: Governance Challenges for Small-Scale Fisheries.” *Marine Policy* 110 (November): 1–9. <https://doi.org/10.1016/j.marpol.2017.05.025>.

Ambiente, Ministerio, and Patricia Rosero. 2018. *PROTOCOLO DE RESPUESTA A VARAMIENTOS DE ESPECIES MARINAS EN ECUADOR*. Ministerio del Ambiente.

Anastacio, J., 2022. La producción de harina de pescado demanda seguridad jurídica y sostenibilidad. <https://camaradepesqueria.ec/la-produccion-de-harina-de-pescado-demanda-seguridad-juridica-y-sostenibilidad/>

Ashford, J.R., Rubilar, P.S. and Martin, A.R., 1996. Interactions between cetaceans and longline fishery operations around South Georgia. *Marine Mammal Science*, 12(3), pp.452-457.

Baird, R.W. and Gorgone, A.M., 2005. False Killer Whale Dorsal Fin Disfigurements as a Possible Indicator of Long-Line Fishery Interactions in Hawaiian Waters1. *Pacific Science*, 59(4), pp.593-601.

Brownell, Robert, RR Reeves, AJ Read, Brian Smith, Peter Thomas, K Ralls, M Amano, et al. 2019. “Bycatch in Gillnet Fisheries Threatens Critically Endangered Small Cetaceans and Other Aquatic Megafauna.” *Endangered Species Research* 40 (December): 285–96. <https://doi.org/10.3354/esr00994>.

Castrejón, Mauricio, and Anthony Charles. 2013. “Improving Fisheries Co-Management through Ecosystem-Based Spatial Management: The Galapagos Marine Reserve.” *Marine Policy* 38 (March): 235–45. <https://doi.org/10.1016/j.marpol.2012.05.040>.

Castro Briones, E. 2019. La pesca de pelágicos grandes con palangre de superficie en el Océano Pacífico Oriental: Análisis espacial, caracterización y variabilidad interanual de las capturas extraídas por la flota del Ecuador Masters thesis. Master of Science en Gestión Pesquera Sostenible otorgado por la Universidad de Alicante. 75 pp. https://rua.ua.es/dspace/bitstream/10045/112565/1/TFM_EDWIN_XAVIER_CASTRO_BRIONES_FINAL.pdf

Casto, Cristina, and Félix, Fernando. 2021 Identifying conservation areas and habitat preferences of bottlenose dolphins *Tursiops truncatus* in the Central Coast of Ecuador. IWC SC/68C/SM/14. Available at: https://www.pacificwhale.org/wp-content/uploads/2021/06/2021-Castro-y-Felix-Identity-Preference-Areas-for-bottlenose-dolphins-in-Ecuador-SC_68C_SM_14.pdf

Castro, Cristina, and Patricia Rosero. 2010. “Internación de Cetáceos Menores Con Artes de Pesca Artesanal En El Parque Nacional Machalilla - Ecuador.” *Pacific Whale Foundation & Universidad Central Del Ecuador*.

Castro, Cristina, and Koen Van Waerebeek. 2019. “Strandings and Mortality of Cetaceans Due to Interactions with Fishing Nets in Ecuador 2001- 2017.” International Whaling Commission.

Castro, Cristina, Koen Van Waerebeek, Diana Cárdenas, and Juan José Alava. 2020. “Marine Mammals Used as Bait for Improvised Fish Aggregating Devices in Marine Waters of Ecuador, Eastern Tropical Pacific.” *Endangered Species Research* 41 (March): 289–302. <https://doi.org/10.3354/esr01015>.

Castro, Jose J, Jose A Santiago, and Ana T Santana-Ortega. 2002. “A General Theory on Fish Aggregation to Floating Objects: An Alternative to the Meeting Point Hypothesis,” no. 11: 255–77.

Coello, Dialhy, Marco Herrera, Marco Calle, and Rómulo Castro. 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.” *Boletín Especial* 2. Instituto Nacional de Pesca.

CPPS-PNUMA. 2007. “Memorias del Taller de Trabajo sobre el impacto de las actividades antropogénicas en mamíferos marinos en el Pacífico Sudeste.” Guayaquil, Ecuador: Comisión Permanente del Pacífico Sur. http://protectedspeciesobserver.com/uploads/4/8/3/6/48362305/010.impactos_antropogenicos_mamiferos_marinos.pdf.

Dagorn, Laurent, Kim N. Holland, Victor Restrepo, and Gala Moreno. 2013. “Is It Good or Bad to Fish with FADs? What Are the Real Impacts of the Use of Drifting FADs on Pelagic Marine Ecosystems?” *Fish and Fisheries* 14 (3): 391–415. <https://doi.org/10.1111/j.1467-2979.2012.00478.x>.

Dudhat, S., Pande, A., Nair, A., Mondal, I., & Kuppasamy, S. (2021). *Spatio-temporal analysis identifies hotspots of marine mammal strandings along the Indian coastline: Implications for developing a National Marine Mammal Stranding Response and Management policy*

FAO. 2018. *The State of World Fisheries and Aquaculture 2018: Meeting the Sustainable Development Goals*. The State of World Fisheries and Aquaculture (SOFIA) 2018. Rome, Italy: FAO. <https://www.fao.org/documents/card/en/c/I9540EN/>.

———. n.d. “Ecuador Ley Orgánica Para El Desarrollo de La Acuicultura y Pesca.” FAOLEX Database. Food and Agriculture Organization of the United Nations. Accessed December 23, 2021. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC195714/>.

Fvlix et al. 2015. “Implementation of the Marine Mammal Bycatch Assessment Project in Ecuador.” Report to NOAA’s Office of International Affairs to the Consortium for Wildlife Bycatch Reduction Award Number NA13NMF4690151. Boston, USA: New England Aquarium.

Félix, Fernando. 2017. “Diversity of Marine Mammals in Ecuador, Species, Population and Main Threats.” Presented at the Taller Sobre la Interacción de Mamíferos Marinos con Pesquerías y Las Potenciales Implicaciones Para el Comercio de Productos Pesqueros con Estados Unidos, Guayaquil, Ecuador.

Félix, Fernando, and S Burneo. 2020. “Imminent Risk of Extirpation for Two Bottlenose Dolphin Communities in the Gulf of Guayaquil, Ecuador | Marine Science.” 537010. *Frontiers*. <https://www.frontiersin.org/articles/10.3389/fmars.2020.537010/full>.

Félix, Fernando, Andrea Calderón, Michelle Vintimilla, and Rosa A. Bayas-Rea. 2017. “Decreasing Population Trend in Coastal Bottlenose Dolphin (*Tursiops Truncatus*) from the Gulf of Guayaquil, Ecuador.” *Aquatic Conservation: Marine and Freshwater Ecosystems* 27 (4): 856–66. <https://doi.org/10.1002/aqc.2763>.

Félix, Fernando, Cristina Castro, and Jeffrey L. Laake. 2011. “Abundance and Survival Estimates of the Southeastern Pacific Humpback Whale Stock from 1991–2006 Photo-Identification Surveys in Ecuador.” *J. Cetacean Res. Manage.*, 301–7. <https://doi.org/10.47536/jerm.vi.303>.

Félix, Fernando, Ben Haase, David Davis, and Paola Amador. 1997. “A Note on Recent Strandings and Bycatches of Sperm Whales (*Physeter Macrocephalus*) and Humpback Whales (*Megaptera Novaeangliae*) in Ecuador.” SC/48/O 14. Guayaquil, Ecuador: Rep. International Whaling Commission. https://d1wqtxts1xzle7.cloudfront.net/45281057/A_note_on_recent_strandings_and_bycatche20160502-6630-g853ek-with-cover-page-v2.pdf?Expires=1639955518&Signature=DJ0AGz011VFR7wu7jtaPhrdtgbmWIBfwsUYjJsVOiaqYzytdx4Ogt2y5XPX6N5a7tOY7oddO4UJa1Irc1CBniS0RpCGCjMUH~roGxepy1ng0uaO~jnmWPkbY2KbSeCwJtlRoGGR-ziuRjcIUuA2KGwO39yAZBr4rGyTfMT9zl78HJm1xAXmpEEBmsD8034LQwaa9WXgze1-03fB~ufJ9Sicd9cKRIS1Tv3VFIPkkqhvuMqmNDtx3dufoLwRjAltBJDE1KQWsKA0jQwyRwg7ou-z0d40UyePU7MdQvQxL3FPfNtB--5M9ZKPdvdBifHvB6jnm~~XqjTiNE8PtxoUpA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA.

Félix, Fernando, Jeffrey C. Mangel, Joanna Alfaro-Shigueto, Luis Alberto Cocas, Jorge Guerra, María José Pérez-Alvarez, and Maritza Sepúlveda. 2021. “Challenges and Opportunities for the Conservation of Marine Mammals in the Southeast Pacific with the Entry into Force of the Us Marine Mammal Protection Act.” *Regional Studies in Marine Science*, October, 102036. <https://doi.org/10.1016/j.rsma.2021.102036>.

Félix, Fernando, Mercedes Muños, Jéssica Falconí, Natalia Acosta, and Ben Haase. 2011. “Entanglement of Humpback Whales in Artisanal Fishing Gear in Ecuador.” *Journal of Cetacean Research and Management*, Special Issue (January): 285–90. <https://doi.org/10.47536/jerm.vi.308>.

Félix, Fernando, Oscar Vasconez, Ruby Centeno, and Juan Romero. 2018. “View of Tough Life: The Case of a Young Coastal Common Bottlenose Dolphin Repeatedly Entangled.” *Latin American Journal of Aquatic Mammals* 13 (1–2): 9–14. <https://doi.org/10.5597/lajam00243>.

Félix, F., J. Samaniego & B. Haase. 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 p.

Félix, F., & Samaniego, J. (1994). Incidental catches of small cetaceans in the artisanal fisheries of Ecuador. *Reports of the International Whaling Commission*, 15(Special Issue), 475-480

FENACOPEC. 2009. “Situación Actual y Perspectivas de Los Derechos de Acceso de La Pesca Artesanal En Ecuador.” 2009. <https://docplayer.es/20780434-Situacion-actual-y-perspectivas-de-los-derechos-de-acceso-de-la-pesca-artesanal-en-ecuador.html>.

Fisheries, NOAA. 2021. “Tuna/Dolphin Embargo Status Update | NOAA Fisheries.” NOAA. National. January 11, 2021. <https://www.fisheries.noaa.gov/national/marine-mammal-protection/tuna-dolphin-embargo-status-update>.

Fonteneau, Alain, Emmanuel Chassot, and Nathalie Bodin. 2013. “Global Spatio-Temporal Patterns in Tropical Tuna Purse Seine Fisheries on Drifting Fish Aggregating Devices (DFADs): Taking a Historical Perspective to Inform Current Challenges.” *Aquatic Living Resources* 26 (1): 37–48. <https://doi.org/10.1051/alr/2013046>.

Forney, K.A., 2004. Estimates of cetacean mortality and injury in two US Pacific longline fisheries, 1994-2002.

Gabriela, P., et al. Interaction of seabirds, turtles, marine mammals and elasmobranchs with the small pelagic fishery off the mainland coast of Ecuador during 2020.

Gilman, E., Brothers, N., McPherson, G. and Dalzell, P., 2006. A review of cetacean interactions with longline gear. *J. Cetacean Res. Manage.*, 8(2), pp.215-223.

GDP (Current US\$) - Fiji | Data.” n.d. Accessed January 15, 2022. <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=FJ>.

Guayas Park Rangers Release a Bottlenose Dolphin Trapped in Fishing Nets – Ministry of the Environment, Water and Ecological Transition.” n.d. Accessed February 20, 2022. <https://www.ambiente.gob.ec/guardaparques-de-guayas-liberan-a-un-delfin-nariz-de-botella-atrapado-en-redes-de-pesca/>.

Haase, Ben, and Fernando Félix. 1994. “A Note on the Incidental Mortality of Sperm Whales (*Physeter Macrocephalus*) in Ecuador.” *Rep Int Whale Comm Spec Issue*, no. 15: 481–83.

Hall, Martin A., Dayton L. Alverson, and Kaija I. Metuzals. 2000. “By-Catch: Problems and Solutions.” *Marine Pollution Bulletin*, Seas at the Millennium: an Environmental Evaluation, 41 (1): 204–19. [https://doi.org/10.1016/S0025-326X\(00\)00111-9](https://doi.org/10.1016/S0025-326X(00)00111-9).

Hall, Martin, and Marlon Roman. 2013. “Bycatch and Non-Tuna Catch in the Tropical Tuna Purse Seine Fisheries of the World - ProQuest.” *FAO Fisheries and Aquaculture Technical Paper*, no. 568.

<https://www.proquest.com/docview/1463255656?parentSessionId=pDjCVHT%2B9IPyNGLQ65g2FQTY9K8ICds5cl9s%2FQnq7jc%3D&pq-origsite=summon&accountid=14793>.

Herrera, Marco, Romulo Castro, Dialhy Coello Salazar, Esteban Elias, and Ingrid Saa. 2013. “Puertos, Caletas y Asentamientos Artesanales En La Costa Continental Del Ecuador.” *Boletín Especial Del Instituto Nacional de Pesca* Año 4 No. 1 (January): 616.

Heylings, P., and M. Bravo. 2007. “Evaluating Governance: A Process for Understanding How Co-Management Is Functioning, and Why, in the Galapagos Marine Reserve.” *Ocean & Coastal Management*, The Galapagos Islands and the Archipelago of San Andres, 50 (3): 174–208. <https://doi.org/10.1016/j.ocecoaman.2006.09.003>.

IATTC. 2009. “Vessel Capacity Class Definitions Related to the Requirement for Carrying an On-Board Observer.” 21st Meeting of the Parties Document MOP-21-07. Agreement on the International Dolphin Conservation Program. IATTC. https://www.iattp.org/Meetings/Meetings2009/IATTC-80/AIDCP-21/Docs/_English/MOP-21-07_Vessel%20capacity%20class%20definitions%20related%20to%20the%20requirement%20for%20carrying%20an%20on%20board%20observer.pdf.

———. 2019. “Inter-American Tropical Tuna Commission 94th Meeting.” 23 Resolution C-19-08. https://www.iattp.org/PDFFiles/Resolutions/IATTC/_English/C-19-08-Active_Observers%20on%20longliners.pdf.

———. 2021. “Report on the Tuna Fishery, Stocks and Ecosystem in the Eastern Pacific Ocean in 2020.” Document IATTC-98-01. 98th Meeting. Inter-American Tropical Tuna Commission. https://www.iattp.org/Meetings/Meetings2021/IATTC-98a/Docs/_English/IATTC-98a-01_The%20fishery%20and%20status%20of%20the%20stocks%202020.pdf.

Instituto Nacional de Pesca Ecuador and Comisión Permanente del Pacífico Sur. 2017. “Taller Sobre La Internación de Mamíferos Marinos Con Pesquerías y Las Potenciales Implicaciones Para El Comercio de Productos Pesqueros Con Estados Unidos 14 de Septiembre de 2017, Guayaquil, Ecuador.” <http://cpps.dyndns.info/cpps-docs-web/planaccion/docs2017/septiembre-mm/Informe%20del%20Taller%20mamiferos%20marinos%20y%20comercio%20con%20USA.pdf>.

Jiménez, Pedro J, Juan José Alava, Cristina Castro, Jorge Samaniego, and Patricia Fair. 2018. “Stranding of Small Cetaceans with Missing Fins Raises Concerns on Cetacean Conservation in Ecuador: Bycatch or Targeted Fisheries?,” 4.

Martínez-Ortiz, Jimmy, Alexandre M. Aires-da-Silva, Cleridy E. Lennert-Cody, and Mark N. Maunder. 2015. “The Ecuadorian Artisanal Fishery for Large Pelagics: Species Composition and Spatio-Temporal Dynamics.” Edited by George Tserpes. *PLOS ONE* 10 (8): e0135136. <https://doi.org/10.1371/journal.pone.0135136>.

Ministerio de Produccion, Comercio Exterior, Inversiones y Pesca. 2021. “Register of Industrial Fishing Vessels - Undersecretary of Fisheries Resources.” 2021.

<https://srp.produccion.gob.ec/registro-nacional-de-embarcaciones/registro-de-embarcaciones-pesqueras-industriales/>.

Ministry of Production, Foreign Trade, Investments and Fisheries. n.d. “Legal Regulations for the Creation of the Undersecretariat of Fisheries Resources - Ministry of Production, Foreign Trade, Investments and Fisheries.” Accessed December 29, 2021.

<https://www.produccion.gob.ec/normativa-legal-de-creacion-de-la-subsecretaria-de-recursos-pesqueros/>.

“MSPglobal: International Guide on Marine/Maritime Spatial Planning - UNESCO Digital Library.” n.d. Accessed December 29, 2021.

<https://unesdoc.unesco.org/ark:/48223/pf0000379196>.

Murua, Jefferson, Dave Itano, Martin Hall, Laurent Dagorn, Gala Moreno, and Victor Restrepo. 2016. “ADVANCES IN THE USE OF ENTANGLEMENT-REDUCING DRIFTING FISH AGGREGATING DEVICES (DFADS) IN TUNA PURSE SEINE FLEETS.” 2016–08.

Washington, D.C, USA: International Seafood Sustainability Foundation.

NOAA Fisheries. 2020. “2020 Final List of Foreign Fisheries (LOFF),” 217.

Peacock, S. 2018. Fishery Assessment Methodology and Template Report: Ecuador Small Pelagic. Available at: [https://www.marin-trust.com/sites/marintrust/files/2021-11/FINAL%20DRAFT%20-](https://www.marin-trust.com/sites/marintrust/files/2021-11/FINAL%20DRAFT%20-%20Ecuador%20small%20pelagic%20fishery%20initial%20IFFO%20RS%20IP%20assessment.pdf)

[%20Ecuador%20small%20pelagic%20fishery%20initial%20IFFO%20RS%20IP%20assessment.pdf](https://www.marin-trust.com/sites/marintrust/files/2021-11/FINAL%20DRAFT%20-%20Ecuador%20small%20pelagic%20fishery%20initial%20IFFO%20RS%20IP%20assessment.pdf)

Plan de Acción Nacional para la Conservación y el Manejo del Recurso Dorado en Ecuador (PAN Dorado) Desembarque, composición de tallas y proporción sexual del dorado *Coryphaena hippurus* capturado en aguas del Océano Pacífico Suroriental: Flota pesquera del Ecuador. April 2022. Ministerio de Producción, Comercio Exterior, Inversiones y Pesca.

<https://www.produccion.gob.ec/wp-content/uploads/2022/04/REPORTE-TECNICO-DESEMBARQUE-TALLAS-Y-PROPORCION-SEXUAL-DEL-DORADO-FINAL.pdf>

———. n.d. “US Trade in Fishery Products.” NOAA. <https://www.fisheries.noaa.gov/foss>.

Palacios, D. M., S. K. Salazar, and D. Day. 2004. “Cetacean Remains and Strandings in the Galápagos Islands, 1923-2003.” *Latin American Journal of Aquatic Mammals*, 127–50.

<https://doi.org/10.5597/lajam00058>.

Reeves, Rr, K McClellan, and Tb Werner. 2013. “Marine Mammal Bycatch in Gillnet and Other Entangling Net Fisheries, 1990 to 2011.” *Endangered Species Research* 20 (1): 71–97.

<https://doi.org/10.3354/esr00481>.

Registro Oficial de Ecuador. 2020. *LEY ORGÁNICA PARA EL DESARROLLO DE LA ACUICULTURA Y PESCA. AN-SG-2020-0155-O*.

https://www.tfc.com.ec/uploads/noticia/adjunto/667/LEY_ORG%C3%81NICA_PARA_EL_DESARROLLO_DE_LA_ACUICULTURA_Y_PESCA.pdf.

Rosero, P. 2019. Pesca incidental de cetáceos con redes de enmalle de superficie en Ecuador. In: Mamalia Aequatorialis. Boletín científico de la Asociación Ecuatoriana de Mastozoología. No. 1 December 2019. ISSN 2697-3286. pp 51-59.

Stanford Center for Ocean Solutions. 2020. “The Outlaw Ocean: An Exploration of Policy Solutions to Address Illegal Fishing and Forced Labor in the Seafood Industry.” Stanford Center for Ocean Solutions (COS) and the Stanford Law School (SLS). <https://oceansolutions.stanford.edu/outlaw-ocean-report> and <https://law.stanford.edu/courses/policy-practicumthe-outlaw-ocean/>.

United Nations Environmental Program (UNEP). 1991. “Plan for Action for the Conservation of Marine Mammals in the Southeast Pacific (PAMM).” United Nations.

Van Waerebeek, Koen, Marie-Françoise Van Bressem, Fernando Félix, Joanna Alfaro-Shigueto, Aquiles García-Godos, Laura Chávez-Lisambart, Karina Ontón, David Montes, and Ruth Bello. 1997. “Mortality of Dolphins and Porpoises in Coastal Fisheries off Peru and Southern Ecuador in 1994.” *Biological Conservation* 81 (1–2): 43–49. [https://doi.org/10.1016/S0006-3207\(96\)00152-8](https://doi.org/10.1016/S0006-3207(96)00152-8).

Vega, F., 2022. “Tuna fish in Ecuador: 85% comes from the open seas”. Bitacora ambiental. November 10, 2022. <https://en.bitacoraec.com/post/tuna-fish-in-ecuador-85-come-from-open-seas>

Viteri, C, P Obregón, and J Yoshioka. 2018. “Business Plan to Support the Improvement of the Yellowfin Tuna (*Thunnus Albacares*) Small-Scale Fishery in the Galapagos Marine Reserve, Ecuador.” Ecuador: Conservation International. https://www.fao.org/fileadmin/user_upload/common_oceans/docs/OPP-CI-BC.pdf.

WCPFC. 2021. “About WCPFC | WCPFC.” 2021. <https://www.wcpfc.int/about-wcpfc>.

XIII. Appendix

Appendix i. Screenshot of IATTC 2021 report (IATTC 2021)

Table L-1. Incidental dolphin mortalities in numbers of individuals (Num) and average weights in metric tons (t) by stock in the eastern Pacific Ocean caused by the large vessel purse-seine fishery with a carrying capacity >363 t from 1993–2020. Data for 2020 are considered preliminary.

Tabla L-1. Mortalidades incidentales de delfines, en número de individuos (Núm.) y peso promedio en toneladas (t), por población, en el océano Pacífico oriental ocasionadas por la pesquería cerquera de buques grandes con una capacidad de acarreo >363 t de 1993-2020. Los datos de 2020 se consideran preliminares.

Year	<i>Stenella attenuata</i>				<i>Stenella longirostris</i>				<i>Delphinus delphis</i>						Other dolphins	
	Offshore ¹				Spinner				Northern		Common Central		Southern			
	Northeastern		Western-southern		Eastern		Whitebelly									
Num	Wt	Num	Wt	Num	Wt	Num	Wt	Num	Wt	Num	Wt	Num	Wt	Num	Wt	
1993	1,112	56.3	773	44.4	725	34.4	437	22.5	139	9.1	230	15.1	0	0.0	185	8.0
1994	847	42.9	1,228	70.6	828	39.3	640	32.9	85	5.6	170	11.1	0	0.0	298	12.0
1995	952	48.2	859	49.4	654	31.0	436	22.4	9	<1	192	12.6	0	0.0	173	13.0
1996	818	41.4	545	31.3	450	21.3	447	23.0	77	5.0	51	3.3	30	2.0	129	5.0
1997	721	36.5	1,044	60.0	391	18.5	498	25.6	9	<1	114	7.5	58	3.8	170	14.0
1998	298	15.1	341	19.6	422	20.0	249	12.8	261	17.1	172	11.3	33	2.2	100	8.0
1999	358	18.1	253	14.5	363	17.2	192	9.9	85	5.6	34	2.2	1	<1	62	4.0
2000	295	14.9	435	25.0	275	13.0	262	13.5	54	3.5	223	14.6	10	<1	82	5.0
2001	592	30.0	315	18.1	470	22.3	374	19.2	94	6.2	205	13.4	46	3.0	44	<1
2002	435	22.0	203	11.7	403	19.1	182	9.4	69	4.5	155	10.2	3	<1	49	3.0
2003	288	14.6	335	19.3	290	13.8	170	8.7	133	8.7	140	9.2	97	6.4	39	3.0
2004	261	13.2	256	14.7	223	10.6	214	11.0	156	10.2	97	6.4	225	14.7	37	<1
2005	273	13.8	100	5.8	275	13.0	108	5.6	114	7.5	57	3.7	154	10.1	70	3.0
2006	147	7.4	135	7.8	160	7.6	144	7.4	129	8.4	86	5.6	40	2.6	45	2.0
2007	189	9.6	116	6.7	175	8.3	113	5.8	55	3.6	69	4.5	95	6.2	26	<1
2008	184	9.3	167	9.6	349	16.6	171	8.8	104	6.8	14	<1	137	9.0	43	3.0
2009	266	13.5	254	14.6	288	13.7	222	11.4	109	7.1	30	2.0	49	3.2	21	<1
2010	170	8.6	135	7.8	510	24.2	92	4.7	124	8.1	116	7.6	8	<1	15	<1
2011	172	8.7	124	7.1	467	22.1	139	7.1	35	2.3	12	<1	9	<1	28	2.0
2012	151	7.6	187	10.8	324	15.4	107	5.5	49	3.2	4	<1	30	2.0	18	0.0
2013	158	8.0	145	8.3	303	14.4	111	5.7	69	4.5	0	0.0	8	<1	7	<1
2014	181	9.2	168	9.7	356	16.9	183	9.4	49	3.2	13	<1	9	<1	16	<1
2015	191	9.7	158	9.1	196	9.3	139	7.1	43	2.8	21	1.4	12	<1	5	<1
2016	127	6.4	111	6.4	243	11.5	89	4.6	82	5.4	36	2.4	9	<1	5	<1
2017	85	4.3	183	10.5	266	12.6	95	4.9	26	1.7	9	<1	16	1.0	3	<1
2018	99	5.0	197	11.3	252	12.0	205	10.5	41	2.7	1	<1	18	1.2	6	<1
2019	104	5.3	220	12.7	269	12.8	143	7.4	25	1.6	3	<1	2	<1	12	<1
2020	105	5.3	154	8.9	251	11.9	138	7.1	1	<1	17	1.1	3	<1	20	1.1
Total	9,579	485.2	9,141	525.6	10,178	482.7	6,300	323.9	2,226	145.8	2,271	148.8	1,102	72.2	1,708	94.8

¹Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins