

South Korean Fisheries and the U.S. MMPA Imports Rule¹

September 11, 2023

I. Executive Summary

The Republic of Korea, also known as South Korea, produced 3.71 million metric tons (mt) of fishery products in 2020, valued at 8.7582 trillion won (roughly 6.8 billion USD).² Shallow-sea aquaculture, including for seaweed, is the largest means of fishery product production in South Korea.³ Although South Korea is a net importer of seafood, it also has a substantial export market. In 2020, the United States imported 18,820 mt of fishery products, valued at 166 million USD from South Korea. The 2020 List of Foreign Fisheries (LOFF) from the National Marine Fisheries Service (NMFS) includes 151 South Korean export fisheries with 61 listed as exempt.

South Korean waters are highly biodiverse, and fishing gear entanglement threatens numerous species, including the heavily bycaught minke whale and endangered finless porpoise. Bycatch occurs in South Korean fisheries, and the allowed sale of bycaught marine mammal meat has created an economic incentive for fishers to intentionally catch, or neglect to release marine mammals bycaught in their nets, also known as commercial bycatch.

Under the 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.”⁴ To implement the requirement, the National Marine Fisheries Service (NMFS) issued the MMPA Imports Rule,⁵ setting out standards that nations must demonstrate to continue exporting fish to the United States after December 31, 2023. Under the Rule, South Korea must have already applied for and receive a “comparability finding” from NMFS, which is essentially a determination that South Korea’s bycatch and bycatch program meets U.S. standards.⁶

This report provides a brief assessment of South Korea’s export fisheries, its marine mammal populations, potential bycatch issues, and South Korea’s legal regime related to bycatch, as applied to the MMPA Imports Rule.

Finding current information about marine mammal populations, bycatch numbers, and fishing regulations for South Korea is difficult, likely because this information is lacking but potentially also due to translation issues. However, our examination of available data indicates that South Korea’s current bycatch and bycatch management likely does not meet the requirements of the MMPA Imports Rule. These current policies and practices include: the commercialization of marine mammal bycatch in South Korean whale meat markets; a lack of standardized bycatch monitoring programs for fisheries outside of Regional Fishery Management

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² (Statistics Korea 2021)

³ (USDA, 2022)

⁴ 16 U.S.C. § 1371(a)(2).

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

⁶ 50 C.F.R. § 216.24(h)(6).

Organizations (RFMOs); a lack of marine mammal population monitoring, and a lack of regulatory measures requiring specific bycatch mitigation measures.



Figure 1. Map of South Korea's Exclusive Economic Zone (EEZ).⁷

II. South Korea's Export Fisheries

South Korea's seafood production totaled 3.71 million metric tons (mt) in 2020. This total can be broken down into 932,000 mt from adjacent waters, 2.3 million mt from shallow sea aquaculture, 437,000 mt from distant waters, and 34,000 mt from inland waters.⁸ Shallow-sea aquaculture produces 62% of Korea's seafood, while 25% comes from fishing in adjacent waters (Figure 2).⁹

⁷ ("Marine Regions · South Korean Exclusive Economic Zone (EEZ)" n.d.)

⁸ (United States Department of Agriculture Foreign Agriculture Service and Global Agriculture Information Network 2021)

⁹ (United States Department of Agriculture Foreign Agriculture Service and Global Agriculture Information Network 2021)

(Unit: ton, million won, %)

Year		2015	2016	2017	2018	2019	2020	Percent change (2020/2019)
By fishery type								
Total	Production	3,337,383	3,269,432	3,724,711	3,770,057	3,860,969	3,712,518	-3.8
	Production value	7,257,465	7,476,747	8,566,871	8,608,418	8,366,328	8,758,203	4.7
Coastal and offshore fisheries	Production	1,058,319	907,580	926,941	1,011,536	911,852	932,308	2.2
	Production value	3,702,306	3,635,893	4,014,056	4,136,066	3,957,149	4,366,896	10.4
Shallow sea aquaculture	Production	1,667,872	1,872,400	2,315,775	2,249,605	2,410,040	2,309,271	-4.2
	Production value	2,123,938	2,345,544	2,960,015	2,880,673	2,805,298	2,903,050	3.5
Distant waters fisheries	Production	578,137	454,053	445,726	473,589	503,795	437,005	-13.3
	Production value	1,023,738	1,077,763	1,134,303	1,130,697	1,119,096	1,044,178	-6.7
Inland waters fisheries	Production	33,055	35,400	36,270	35,326	35,282	33,935	-3.8
	Production value	407,482	417,547	458,497	460,982	484,785	444,080	-8.4

Figure 2. The weight (in tons) and monetary value (in wons) of South Korea's fishery production in 2020. Figure from (Statistics Korea 2021).

Year	Volume (kg)	Value (USD)
2020	18,820,276	\$166,095,352
2019	20,817,408	\$171,424,163
2018	20,329,815	\$166,946,738
2017	21,890,851	\$188,956,529
2016	25,809,682	\$167,958,190

Table 1. The volume and monetary value of fishery imports to the United States from South Korea¹⁰.

South Korea's largest export to the United States by volume in 2020 was "seaweed and other algae fit for human consumption" followed by frozen toothfish, then non species-specific frozen fish products. Other major exports to the United States include mackerel, crab, tuna, and pollock.¹¹

According to the 2020 List of Foreign Fisheries (LOFF), South Korea's "Export" fisheries used several different gear types, including: longlines; hanging aquaculture; trawls; pots/traps; gillnets and entangling nets; anchovy dragnets; octopus pots; pound nets; purse seines; stow nets; and unknown gear. South Korea has also listed multiple gear types for their

¹⁰ (NOAA Fisheries, n.d.)

¹¹ (Calderan & Leaper, 2017)

“Exempt” fisheries, including: Aquaculture; Lift nets; Jigs; barriers, fences, etc.; mosquito nets; Midwater trawls; Purse seines; Danish seines; Set longlines; Angling, and Diving.¹²

Many of South Korea’s gear types are considered a high risk for the bycatch of marine mammals, including gillnets, purse seines, and trawls (Figure 3).¹³ These three gear types not only have the potential to catch large numbers of marine mammals, but the potential for mortality is also very high due to the length of time the gear is submerged or otherwise fished.¹⁴ Scientific studies have concluded that bycatch in gillnets is the greatest threat to marine mammals, especially the 13 small cetaceans presently listed as Critically Endangered on the IUCN Red List.^{15,16,17,18}

Gear type	Risk priority	Considerations
Gillnet	High	All types, including drift, set, anchored, and trammel, are generally high risk for all species of marine mammals.
Trawl	High	Bottom or mid-water. Risk can vary depending on the speed of the trawl and size of the opening, with higher risk associated with faster tow speeds and wider trawl mouths.
Purse seine	High	Risk is variable, but can be high particularly if there is intentional encirclement, such as of dolphin schools in the eastern tropical Pacific or if the fishery targets fish that are also marine mammal prey, leading to inadvertent capture of marine mammals.
Trap/pot	Medium	Risk is species dependent. Buoy lines from trap/pot gear can be a high risk for large whales, such as right and humpback whales, and in the United States there is bycatch of bottlenose dolphins in some pot gear. Additionally, some pinnipeds can become entangled and drown after entering pots.
Longline	Medium	Bottom or pelagic. Many species can be captured, but higher risk is mainly associated with species that frequently depredate catch (e.g., pilot whales, sperm whales, killer whales, false killer whales).
Fyke (trap) net	Medium	Can pose substantial risk for species like harbor porpoises and seals.
Dredge	Low	Though similar to trawling, lower tow speed and narrow opening usually leads to low risk.
Hook and line	Low	Includes trolling. There are reports of bycatch with what are likely depredate sea lions, dolphins, and killer whales.
Demersal seines	Low	Includes Danish and Scottish seines.
Pound net	Low	There are reports of interactions with some dolphin species and harbor porpoises.
Cast and ring net	Low	
Jigs	Low	
Handline	Low	

Figure 3. Priority level for data collection for different fishing gear types, based on likely risk for marine mammal bycatch. Figure from (Wade et al. 2021).

A. Potential Errors in the 2020 List of Foreign Fisheries (LOFF)

The 2020 LOFF lists South Korea’s midwater tuna Danish seine and surface purse seine fisheries as Exempt Fisheries. Based on the data available to our organizations, we believe this is incorrect. NOAA defines an Exempt fishery as “fisheries 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 managed by the Western and Central Pacific Fisheries Commission (WCPFC) and the Indian Ocean Tuna Commission (IOTC) have reported interactions and bycatch of marine mammals, therefore these fisheries should not be given an

¹² (NOAA Fisheries 2020)

¹³ (Wade et al. 2021)

¹⁴ (Wade et al. 2021)

¹⁵ (Wade et al. 2021)

¹⁶ (Brownell et al. 2019)

¹⁷ (Anderson 2014)

¹⁸ (IWC 2019)

“Exempt” classification. Despite having information about marine mammal interactions and bycatch, South Korea failed to provide this information as it pertains to its IOTC and WCPFC ships in the LOFF.¹⁹

Another potential error in the LOFF is that South Korea’s IATTC Pacific bluefin tuna purse seine fishery is not listed. South Korea reported 542 metric tons of retained catch of Pacific bluefin tuna with purse seine fishing gear in 2019 to the IATTC.²⁰ Despite this, South Korea did not list their purse seine fishery, and only listed their longline fishery under the IATTC in the 2020 LOFF.²¹

III. South Korea’s Marine Mammals

More than 35 marine mammal species are known to occur in Korean waters.²² Of the 29 species that have been assessed by the International Union for Conservation of Nature (IUCN), five species are Endangered including the sei whale (*Balaenoptera borealis*), blue whale (*Balaenoptera musculus*), North Pacific right whale (*Eubalaena japonica*), Western gray whale (*Eschrichtius robustus*), and narrow-ridged finless porpoise (*Neophocaena asiaeorientalis*) (Table 2). Three additional species are Vulnerable including the fin whale (*Balaenoptera physalus*), Northern fur seal (*Callorhinus ursinus*), and sperm whale (*Physeter macrocephalus*). One species, the Japanese sea lion (*Zalophus japonicus*) was declared extinct in the 1970’s. The remaining species are listed as Near Threatened (four species), Least Concern (14 species), and Data Deficient (two species).²³

A vessel-based survey was carried out in the East Sea between April 26 and May 11, 2020, in order to improve information on spatial distribution and abundance of cetaceans in that area; six species were sighted including minke whales, common dolphins, Pacific white-sided dolphins, Risso’s dolphins, false killer whales and Dall’s porpoise as well as sightings of unidentified cetaceans.

Data on marine mammal populations in South Korean waters is generally lacking. Although limited research has been done through sight surveys, bycatch studies, and stranding reports for some species, stock surveys are not conducted systematically for marine mammal management.²⁴ This lack of information poses a significant barrier to the conservation and management of marine mammals, including species that South Korea has designated as protected under the Conservation and Management of Marine Ecosystems Act (Table 2).^{25,26}

¹⁹ (NOAA Fisheries 2020)

²⁰ (IATTC 2021)

²¹ (NOAA Fisheries 2020)

²² (Song 2014)

²³ (IUCN, 2023)

²⁴ (Song 2016a)

²⁵ (Song 2018)

²⁶ (Song 2016a)

Table 2. The IUCN status, stock estimates, and protected status of South Korean marine mammals.²⁷

Common Name	Scientific Name	IUCN Status	IUCN Stock Assessments of Mature Individuals	Marine Protected Species under Korea's Conservation and Management of Marine Ecosystems Act ²⁸
Minke whale	<i>Balaenoptera acutorostrata</i>	Least Concern	200,000 (Global) 7,600 (Korean Waters) ²⁹	No
Sei whale	<i>Balaenoptera borealis</i>	Endangered	50,000 (Global)	Yes
Bryde's whale	<i>Balaenoptera edeni</i>	Least Concern	80,000 (Global)	Yes
Blue Whale	<i>Balaenoptera musculus</i>	Endangered	5,000-15,000 (Global)	Yes
Fin Whale	<i>Balaenoptera physalus</i>	Vulnerable	100,000 (Global)	Yes
Northern Fur Seal	<i>Callorhinus ursinus</i>	Vulnerable	650,000 (Global)	Yes
North Pacific right whale	<i>Eubalaena japonica</i>	Endangered	83 (Global)	Yes
Stellar Sea Lion	<i>Eumetopias jubatus</i>	Near Threatened	81,327 (Global)	Yes
Western Gray whale	<i>Eschrichtius robustus</i>	Endangered	102-144 (Global) Possibly extinct in Korean waters.	Yes
Long-beaked common dolphin	<i>Delphinus capensis</i>	Data Deficient	Data Deficient	No
Short-beaked common dolphin	<i>Delphinus delphis</i>	Least Concern	1.4 million (Western pacific)	No

²⁷ (IUCN, 2023)

²⁸ (Marine Environment Information Portal n.d.)

²⁹ (Song 2011)

			off Japan)	
Shortfinned pilot whale	<i>Globicephala macrorhynchus</i>	Least Concern	Data deficient (global), 53,609 (Japanese waters)	No
Risso's Dolphin	<i>Grampus griseus</i>	Least Concern	83,300 (Waters off of Japan)	No
Ribbon Seal	<i>Histiophoca fasciata</i>	Least Concern	183,000 (Global)	Yes
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	Least Concern	900,000 (Global)	No
Humpback whale	<i>Megaptera novaeangliae</i>	Least Concern	84,000 (Global)	Yes
Stejneger's beaked whale	<i>Mesoplodon stejnegeri</i>	Near Threatened	Data Deficient	No
Finless porpoise	<i>Neophocaena asiaeorientalis</i>	Endangered	21,532 (Korean waters)	Yes
Killer whale (Orca)	<i>Orcinus orca</i>	Data Deficient	Data Deficient	Yes
Spotted seal/ Largha seal	<i>Phoca largha</i>	Least Concern	350,000 (Global)	Yes
Harbor porpoise	<i>Phocoena phocoena</i>	Least Concern	1 million (Global)	No
Dall's porpoise	<i>Phocoenoides dalli</i>	Least Concern	1.2 million	No
Sperm whale	<i>Physeter macrocephalus</i>	Vulnerable	360,000 (Global)	Yes
Ring Pattern Seal	<i>Pusa hispida</i>	Least Concern	1,500,000 (Global)	Yes
False killer whale	<i>Pseudorca crassidens</i>	Near Threatened	16,668 (Western North Pacific)	Yes
Indo-Pacific bottlenose dolphin	<i>Tursiops aduncus</i>	Near Threatened	Data Deficient	Yes

Bottlenose dolphin	<i>Tursiops truncatus</i>	Least Concern	750,000 (Global)	Yes
Japanese Sea Lion	<i>Zalophus japonicus</i>	Extinct	0	Yes
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Least Concern	100,000 (Global)	No

Table 2. The IUCN status, stock estimates, and protected status of South Korean marine mammals.³⁰

IV. Bycatch in South Korea's Export Fisheries

The survival of many marine mammals in South Korea is threatened by fishing bycatch. The Cetacean Research Institute of South Korea's National Institute of Fisheries Science (NIFS) has acknowledged this problem and stated in 2018 that it is necessary to reduce bycatch to conserve cetaceans.³¹

The Cetacean Research Institute issued a report in 2018 analyzing data of the most bycaught species from 2011 to 2017 based on Korean Coast Guard data.³² This same data was used to report to the International Whaling Commission (IWC).³³ The most commonly bycaught species include the endangered finless porpoise (*Neophocaena asiaeorientalis*), common dolphin (*Delphinus delphis*), common minke whale (*Balaenoptera acutorostrata*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*). In this report, 12,262 cetaceans were documented as bycatch in Korean waters with an annual average of 1,752 individuals (Figure 4).^{34,35,36} The most frequently caught species varied by location. In the Yellow and South Seas, the main species bycaught was finless porpoise. In the East Sea, the common minke whale, common dolphin, and Pacific white-sided dolphin were reported most frequently (Figure 4)^{37,38} (Figure 5).^{39,40} The most common gear type resulting in bycatch of these four species were stow nets, set nets, gill nets, pots, and trawl nets (Table 3).^{41,42} In 2015, an endangered North Pacific right whale was caught in sea mussel spat lines and was disentangled and released.^{43,44} Trends from

³⁰ (IUCN, 2023)

³¹ (S. Lee et al. 2018)

³² (S. Lee et al. 2018)

³³ (Hyun 2018)

³⁴ (S. Lee et al. 2018)

³⁵ (Hyun 2018)

³⁶ (S. Lee et al. 2018)

³⁷ (S. Lee et al. 2018)

³⁸ (Hyun 2018)

³⁹ (S. Lee et al. 2018)

⁴⁰ (Hyun 2018)

⁴¹ (S. Lee et al. 2018)

⁴² (Hyun 2018)

⁴³ (Young 2015)

⁴⁴ (Bath et al. 2023)

2011-2017 have remained consistent through 2019, the most current data available through South Korea’s reports to the IWC. In 2019, 1,701 cetaceans were bycaught in Korean waters (Table 3).⁴⁵

NIFS reported in 2023 that it initiated research to reduce the bycatch of marine mammals in Korean fisheries, including stow net, trap, set net and trawl fisheries and that a bycatch reduction mechanism had been tested in stow net fisheries. There was no marine mammal bycatch documented during the monitoring of 282 stow net vessels equipped with this device. NIFS is now conducting research on a zipper-type mechanism which allows nets to be opened under the waterline to enable trapped animals to escape. Bycatch in the red crab pot/trap fishery has been examined, and the characteristics of materials used in the lines from these traps is being analyzed as there was zero bycatch reported in that fishery. Additionally, in May of 2023, the Ministry of Oceans and Fisheries issued an “urgent” tender notification, calling for a “business operator to undertake research services to reduce the bycatch of marine mammals in mussel farms.”⁴⁶ The LOFF has identified these mussel farms as export fisheries, and indicated that the species of concern is the endangered Western North Pacific right whale.

Suborder	Scientific name	Common name	Korean name	2011	2012	2013	2014	2015	2016	2017	Total	(%)
Mysticeti	<i>Balaenoptera physalus</i>	Fin whale	참고래				1		1		2	0.02
	<i>Megaptera novaeangliae</i>	Humpback whale	흑등고래	1		1					2	0.02
	<i>Balaenoptera brydei</i>	Bryde's whale	브라이드고래	1						1	2	0.02
	<i>Balaenoptera acutorostrata</i>	Common minke whale	밍크고래	86	74	51	50	87	94	69	511	4.17
Odontoceti	<i>Orcinus orca</i>	Killer whale	범고래			1	1			1	3	0.02
	<i>Tursiops truncatus</i>	Common bottlenose dolphin	큰돌고래		4			9	2	13	28	0.23
	<i>Tursiops aduncus</i>	Indo-Pacific bottlenose dolphin	남방큰돌고래	1				3			4	0.03
	<i>Pseudorca crassidens</i>	False killer whale	흑범고래				3			8	11	0.09
	<i>Grampus griseus</i>	Risso's dolphin	큰머리돌고래	1	1	2	2		1	1	8	0.07
	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	돌쇠고래			1			1		2	0.11
	<i>Delphinus delphis</i>	Common dolphin	참돌고래	266	329	357	496	428	391	652	2,919	23.81
	<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	낮돌고래	22	28	17	27	32	111	140	377	3.07
	<i>Neophocaena asiaeorientalis</i>	Narrow-ridged finless porpoise	상괘이	714	2,207	1,435	1,144	1,633	694	464	8,291	67.62
	<i>Phocoena phocoena</i>	Harbour porpoise	쇠돌고래	26	10	15	8	23	4		86	0.70
<i>Phocoenoides dalli</i>	Dall's porpoise	까치돌고래			1	1		1		3	0.02	
	<i>Unidentified sp.</i>	Unidentified	미분류고래류	11			2				13	0.11
Total				1,129	2,654	1,880	1,735	2,215	1,300	1,349	12,262	100

⁴⁵ (IWC and South Korea 2020)

⁴⁶ See <https://www.mof.go.kr/doc/ko/selectDoc.do?menuSeq=379&bbsSeq=13&docSeq=51063>

Figure 4. Number and species of bycaught cetaceans in Korean waters from 2011 to 2017. Chart from (S. Lee et al. 2018).

Common name	Yellow Sea	South Sea	East Sea	Unknown
Narrow-ridged finless porpoise	7,034	1,133	119	5
Common dolphin	0	8	2,911	-
Common minke whale	60	70	381	-
Pacific white-sided dolphin	0	0	377	-
Others	11	22	131	-
Total	7,105	1,233	3,919	5

Figure 5. Number of commonly bycaught species in the sea areas surrounding South Korea from 2011 to 2017. Chart and data from (S. Lee et al. 2018).

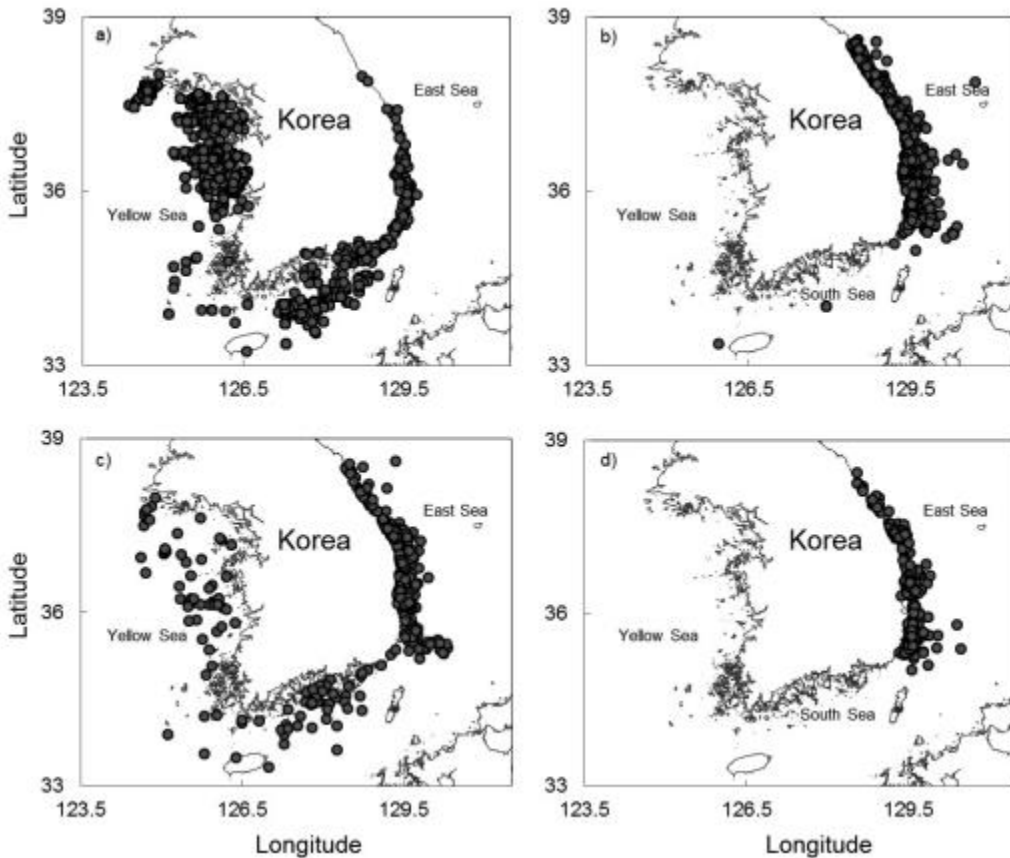


Figure 6. Locations of bycaught animals by species from 2011 to 2017. a) Narrow-ridged porpoise (*Neophocaena asiaeorientalis*), b) Common dolphin (*Delphinus delphis*), c) Common minke whale (*Balaenoptera acutorostrata*), d) Pacific white-sided dolphin (*Lagenorhynchus obliquidens*). Chart and data from (S. Lee et al. 2018).

Common name	Stow net	Set net	Gill net	Pots	Trawl
Narrow-ridged finless porpoise	6,736	37	402	14	932
Common dolphin	0	1,080	1,409	374	15
Common minke whale	40	215	95	133	11
Pacific white-sided dolphin	0	18	340	10	4
Total	6,776	1,350	2,246	531	962

Figure 7. Number of the most common bycaught cetacean species in Korean waters by fishing gear type from 2011 to 2017. Chart from (S. Lee et al. 2018)

Table 3. Bycaught large and small cetaceans reported to the IWC by South Korea for 2019.⁴⁷

Species	Gear	Location	Total	% of Total
Common minke whale	Gillnets	East sea	9	0.5%
Common minke whale	Traps	East sea	28	1.6%
Common minke whale	Pots	East sea	15	0.9%
Common minke whale	Gillnets	East China Sea	1	0.1%
Common minke whale	Traps	East China Sea	3	0.2%
Common minke whale	Gillnets	Yellow Sea	2	0.1%
Common minke whale	Traps	Yellow Sea	1	0.1%
Bryde's whale	Traps	East China Sea	1	0.1%
Humpback whale	Gillnets	East sea	1	0.1%
Common bottlenose dolphin	Gillnets	East sea	2	0.1%
Dall's porpoise	Gillnets	East sea	1	0.1%
Risso's dolphin	Pots	East sea	3	0.2%

⁴⁷ (IWC and South Korea 2020)

Indo-Pacific finless porpoise	Gillnets	East sea	8	0.5%
Pacific white-sided dolphin	Gillnets	East sea	69	4.1%
Indo-Pacific finless porpoise	Stow Nets	East China Sea	1	0.1%
Pacific white-sided dolphin	Traps	East sea	6	0.4%
Pacific white-sided dolphin	Pots	East sea	10	0.6%
Indo-Pacific finless porpoise	Pots	East China Sea	1	0.1%
Pacific white-sided dolphin	Midwater Trawls	East sea	44	2.6%
Common dolphin	Gillnets	East sea	162	9.5%
Common dolphin	Traps	East sea	126	7.4%
Indo-Pacific finless porpoise	Gillnets	Yellow Sea	21	1.2%
Common dolphin	Traps	East sea	11	0.6%
Common dolphin	Unknown	East sea	1	0.1%
Indo-Pacific finless porpoise	Traps	Yellow Sea	1173	69.0%
Common dolphin	Longlines	East sea	1	0.1%
Total			1701	

Table 3. Bycaught large and small cetaceans reported to the IWC by South Korea for 2019.⁴⁸

⁴⁸ (IWC and South Korea 2020)

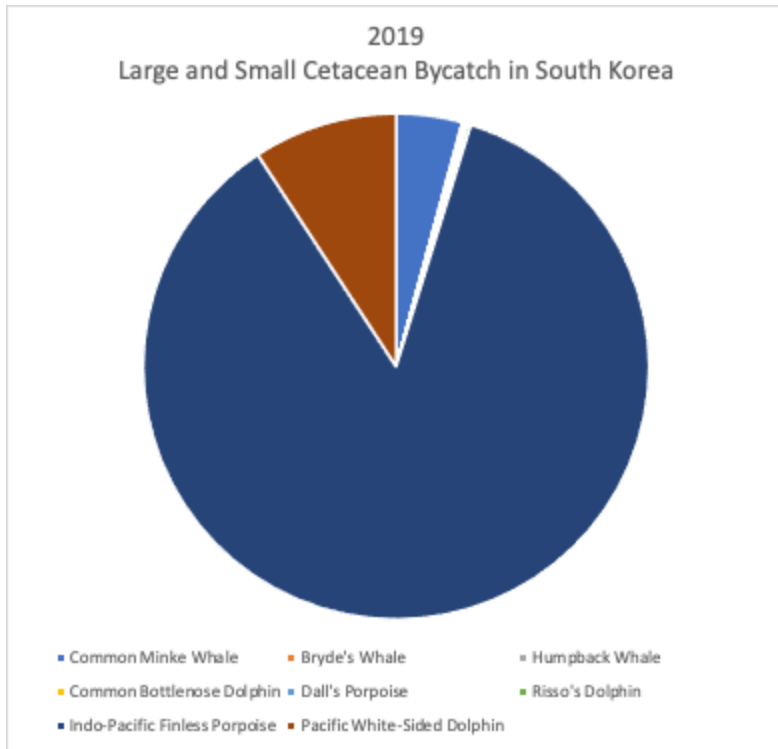


Figure 8. Species of large and small cetaceans bycaught in South Korea in 2019 reported to the IWC.

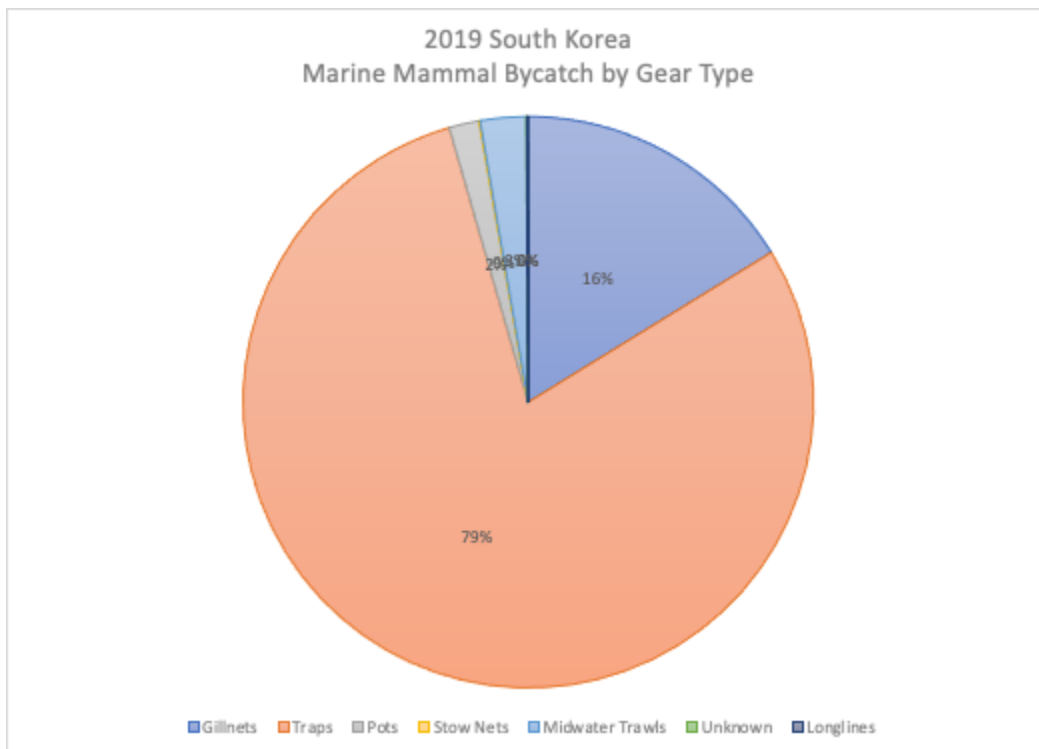


Figure 9. 2019 large and small cetacean bycatch reported to the IWC from South Korea by gear type.

A. Commercial Bycatch in South Korea

In South Korea, commercial and subsistence whaling are both illegal. However, domestic sales of cetacean products such as skin, blubber and red meat are allowed if they are the result of bycatch.^{49,50} The South Korean government has stated that marine mammals taken as fisheries bycatch must be returned to the sea if found alive. If the individual is dead, it must be buried or consumed by local people. These rules have been commonly interpreted to mean that fishermen are legally allowed to land cetaceans only when they have died due to bycatch.^{51,52}

On landing, bycaught cetaceans are visually inspected by the Korean Coast Guard or marine police to determine if the whale has been deliberately killed by violent means. If the cause of death indicates drowning (net marks or scoring on the body), meat from the bycaught individual may enter the marketplace. The regional prosecutor determines the legality of bycatch based on the inspection reports.^{53,54, 55}

The high levels of cetacean bycatch in Korean waters have allowed a cetacean product market to thrive, especially in the east coast cities of Pohang, Ulsan, and Busan.⁵⁶ Whale meat is considered a local delicacy, and minke whale meat is especially valuable on the market due to its preferred flavor.⁵⁷ The price for a large minke whale in South Korea peaked at more than 100,000 USD in 2004 and fell to around 30,000 USD in 2014.^{58,59} The commercial value of minke whale provides a significant economic incentive to catch marine mammals and let the whales drown. The income from one minke whale may equal more than 50% of a fisher's average income.⁶⁰ Minke whale meat has become so desirable in South Korean markets that the price of minke whale meat is roughly 60 times that of narrow-ridged finless porpoise meat, another commonly bycaught species. This strong economic incentive not only encourages fishers to catch minke whales, but it also encourages fishers and merchants to disguise other forms of marine mammal meat as minke whale meat, therefore continuing demand for bycaught meat from many cetacean species.⁶¹ From 2012-2015, a study collected genetic samples from whale meat being sold as minke whale meat in restaurants and markets in Seoul, Ulsan, Busan and Pohang. Results showed that 52% of the sampled meat labeled as minke whale was indeed from minke whale, while 26% was from the narrow-ridged finless porpoise, and 22% was from the

⁴⁹ (MacMillan and Jeonghee 2011)

⁵⁰ (M. Kim et al. 2020)k

⁵¹ (Endo et al. 2007)

⁵² (MacMillan and Jeonghee 2011)

⁵³ (MacMillan and Jeonghee 2011)

⁵⁴ (Kang and Phipps 2000)

⁵⁵ (Song 2016b)

⁵⁶ (MacMillan and Jeonghee 2011)

⁵⁷ (S.-M. Lee et al. 2019)

⁵⁸ (Smith et al. 2014)

⁵⁹ (MacMillan and Jeonghee 2011)

⁶⁰ (Smith et al. 2014)

⁶¹ (S.-M. Lee et al. 2019)

common dolphin. All three of these species are commonly bycaught species in South Korean waters.⁶²

Research indicates that there is illegal, intentional killing of marine mammals occurring in South Korean waters that is likely driven by economic incentives for selling whale meat. South Korean NGOs believe that some fishers deliberately set their nets in areas where whales and dolphins are more likely to be caught, noting that some fishers have caught whales or dolphins repeatedly.⁶³ In a study regarding illegal fishing and working conditions in the South Korean fisheries, 18 fishers (30% of the total interviewed) described being a part of illegal fishing and the intentional catching of protected marine species such as dolphins, seals, and walrus, to extract their teeth and meat⁶⁴. Police interviews also suggested that deliberate drowning may be occurring but are unable to establish the intentionality of the drowning from a visual inspection⁶⁵.

The market for whale meat in South Korea is not monitored in a unified way, making it difficult to assemble data on market demands and the price of whale products. In 2010, most minke whale bycatch meat was sold to 10 wholesalers who buy whales at auctions arranged by fishery cooperatives. Confiscated meat from illegal whaling is sometimes also sold at the same auctions, with revenues going directly to the National Treasury.⁶⁶ It is believed that dolphin and other marine mammal meat is sold or consumed at a smaller, more localized scale.⁶⁷

Evidence, including molecular monitoring of whale meat markets in Korea, shows a mismatch between whale meat reported as bycatch and the volume of meat offered for sale.^{68,69} Researchers believe that these ‘official’ reports underrepresent the true scale of the bycatch problem and likely represent half of the true level of cetacean commercial bycatch, while the remainder of the meat is believed to be the result of illegal whale meat being sold.^{70,71,72,73} Interviews with local stakeholders in South Korea suggest that illegal and unreported catch of minke whales may be even larger than the legal bycatch.^{74,75} Between 2014 and 2018, more than 53 marine mammals were illegally caught by an estimated 30 illegal whaling vessels in Korean

⁶² (S.-M. Lee et al. 2019)

⁶³ (MacMillan and Jeonghee 2011)

⁶⁴ (Environmental Justice Foundation (EJF) 2020)

⁶⁵ (MacMillan and Jeonghee 2011)

⁶⁶ (MacMillan and Jeonghee 2011)

⁶⁷ (MacMillan and Jeonghee 2011)

⁶⁸ (Lukoschek et al. 2009)

⁶⁹ (M. Kim et al. 2020)

⁷⁰ (M. Kim et al. 2020)

⁷¹ (Baker et al. 2006)

⁷² (Lukoschek et al. 2009)

⁷³ (Smith et al. 2014)

⁷⁴ (MacMillan and Jeonghee 2011)

⁷⁵ (Smith et al. 2014)

waters.^{76,77} In another instance, over 700kg of whale meat disguised as shark meat entered the market in 2018.^{78,79}

B. Minke Whale Bycatch in South Korea

Minke whales are widely distributed in most oceans in the world, including the waters surrounding Korea. There are two stocks of minke whales in the western North Pacific Ocean, J stock and O stock. Whales of the J stock migrate northward in the summer season and southward in the winter season for breeding. Minke whales are also commonly found along the continental shelves in the East Sea of Korea. Research on minke whales in Korean waters is limited, and although population estimates have been made, very little is known about their distribution and movement through the EEZ. Despite being considered the most abundant baleen whale in Korean waters, minke whales, especially the J stock population, are at serious risk due to bycatch.^{80,81,82,83}

Minke whales are killed by bycatch, ship strike, and illegal catch in Korean waters, with the largest percentage of anthropomorphic mortalities coming from bycatch in the fishing industry.^{84,85} As discussed above, the market demand for commercial cetacean bycatch meat, especially minke whale meat, has created an incentive for fishers to catch and kill minke whales.⁸⁶

Minke whale bycatch in Korean waters appears to be above Potential Biological Removal (PBR). Song (2011) estimated the PBR for minke whales at 52.5 individuals using the minimum population estimate of 5,247 individuals. An estimated 827 minke whales were bycaught from 1999 to 2003,⁸⁷ for an annual death average of 165.4 whales. Another study reports that 1131 minke whales were reported as bycatch from 1996-2008⁸⁸, with an annual average of 87 individuals. Based off of this PBR and the bycatch data from these studies, the bycatch mortality of minke whales in Korean waters exceeded estimated PBR between 1999 and 2008.⁸⁹ In 2020, South Korea also exceeded this estimated PBR with 59 bycaught minke whales.⁹⁰

South Korea has listed minke whale bycatch in numerous export fisheries in the 2020 LOFF, including but not limited to fisheries using: bottom trawls; bottom fish pots/fish traps;

⁷⁶(M. Kim et al. 2020)

⁷⁷(B. Lee 2019)

⁷⁸(M. Kim et al. 2020)

⁷⁹(Y. Kim 2018)

⁸⁰(Song 2016b)

⁸¹(Song 2011, 11)

⁸²(Lukoschek et al. 2009)

⁸³(Smith et al. 2014)

⁸⁴(Song 2011)

⁸⁵(Song 2016b)

⁸⁶(Smith et al. 2014)

⁸⁷(Baker et al., 2007)

⁸⁸(Lukoschek et al. 2009)

⁸⁹(Song 2011)

⁹⁰(IWC and South Korea 2020)

midwater gillnets and entangling nets; bottom gillnets; midwater stow nets; anchored gillnets and set nets; midwater pound nets; as well as “unknown/ not provided” gear types. Numerous other fisheries with varying gear types list the common minke whale as a species they interact with, but with an “UNKNOWN” average mortality estimate.

C. Finless Porpoise Bycatch in South Korea

The Endangered narrow-ridged finless porpoise (*Neophocaena asiaorientalis*) primarily inhabits shallow waters of the western Pacific Ocean from the Taiwan Strait to northern China, Korea, and northern Honshu in Japan, as well as the Yangtze River.⁹¹ It is a designated protected species in Korea due to population declines (Table 2).⁹² The population size dropped from around 36,000 individuals to 13,000 between 2004 and 2011.⁹³ An additional 7,869 individuals were killed between 2011 and 2016.⁹⁴ While the Ministry of Ocean and Fisheries designated the Finless Porpoise as a Marine Protected Species on 29 September 2016, 792 cases of bycatch were still reported in 2018.⁹⁵ Eighty-three percent (83%) of bycaught finless porpoises in Korean waters between 2011-2017 were caught in stow nets.^{96,97}

D. Marine Mammal Strandings in South Korea

A total of 295 cetaceans were found stranded in South Korea in 2017. Six species were reported by the Cetacean Research Center including common minke whale, Pacific white-sided dolphin, finless porpoise, common dolphin, Blainville's beaked whale, an unidentified beaked whale, and Indo-Pacific bottlenose dolphin (Table 4).

⁹¹ (Wang and Reeves, 2017)

⁹² (G.-H. Lee et al. 2022)

⁹³ (M. Kim et al. 2020)

⁹⁴ (Heo, 2017 as cited in Kim et al., 2020)

⁹⁵ (Ministry of Oceans and Fisheries, 2019 as cited in Kim et al. 2020)

⁹⁶ (G.-H. Lee et al. 2022)

⁹⁷ (S. Lee et al. 2018)

Table 4. The number of stranded individuals in Korean waters in 2017, as reported by the Cetacean Research Center to the International Whaling Commission.⁹⁸

Species	East Sea	Yellow Sea
Common minke whale (<i>Balaenoptera acutorostrata</i>)	2	1
Pacific white-sided dolphin (<i>Lagenorhynchus obliquidens</i>)	1	0
Finless porpoise (<i>Neophocaena phocaenoides</i>)	79	181
Common dolphin (<i>Delphinus delphis</i>)	21	0
Blainville's beaked whale (<i>Mesoplodon densirostris</i>)	0	1
Unidentified beaked whale (<i>Unid. Ziphiid</i>)	0	1
Indo-Pacific bottlenose dolphin (<i>Tursiops aduncus</i>)	0	8

Table 4. The number of stranded individuals in Korean waters in 2017, as reported by the Cetacean Research Center to the International Whaling Commission.⁹⁹

E. Bycatch in Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) Convention Area

South Korea has been a member of CCAMLR since 1985, and currently has eleven vessels operating in the Convention Area, the most of any CCAMLR member. Eight vessels engage in fishing for toothfish and three for krill. As of 2020 CCAMLR requires 100% observer coverage of all fishing vessels operating within the Convention Area.

In 2019, the CCAMLR Scientific Committee reported 2 seal mortalities in longline fisheries, while 3 seals were killed by fishing gear in krill fisheries. In 2021, a UK observer on board a Norwegian krill vessel reported the deaths of 3 juvenile humpback whales. Further, 60 Antarctic fur seals (*Arctocephalus gazella*) were caught by six krill vessels, resulting in 16 known deaths. These deaths occurred despite requirements for krill trawlers to be equipped with a marine mammal exclusion device.

⁹⁸ (Hyun 2018)

⁹⁹ (Hyun 2018)

Due to concerns over the increased levels of marine mammal mortality in the krill fishery, CCAMLR’s Scientific Committee convened the Working Group on Incidental Mortality associated with fishing for the first time in eleven years. CCAMLR-SC has further reached out to the IWC and requested the IWC Scientific Committee to provide feedback on bycatch, and an intersessional group has been formed particular to address issues related to data needs, possible gear modifications and, in the longer term, advising vessel operators as to how to minimize the risk of whale entrapments.

F. Regional Fishery Management Organizations (RFMOs)

South Korea is a member of eighteen RFMOs, including the IOTC, IATTC, WCPFC, ICCAT and CCAMLR.¹⁰⁰

1. Indian Ocean Tuna Commission (IOTC)

South Korea is a member of the Indian Ocean Tuna Commission (IOTC) RFMO. While the IOTC does report catch estimates and has implemented some bycatch related regulations, the data reports for marine mammal bycatch are extremely poor and patchy.^{101,102}

The IOTC Working Party on Ecosystems and Bycatch (WPEB) recommended that data on marine mammal interactions with IOTC fisheries be collected and reported by participating fisheries to the IOTC.¹⁰³ Despite this recommendation, the underreporting of bycatch at the IOTC remains a serious problem. Since 2010, the IOTC has developed a regional observer plan to monitor its tuna fisheries and their bycatch. This plan requires 5% observer coverage.^{104,105} As stated in the IOTC’s Working Party on Data Collection and Statistics’ 2020 report, “Most levels of reporting of (industrial fisheries) observer coverage are below those recommended by the Commission (i.e., a minimum of 5% of the total number of fishing operations shall be covered by scientific observers).” In addition, there is little to no observer data collected for artisanal fisheries within the IOTC.¹⁰⁶ South Korea has established an observer program for both its longline and purse seine fishery within the IOTC. However, Korea’s longline fisheries had not reached 5% by 2019, and more current data is unavailable. Korea’s purse seine fishery met the IOTC’s recommended 5% observer coverage for 2016-18 but there was no data submitted in 2019 (Table 5).

The IOTC WPEB is also responsible for monitoring and assessing the stock status of its bycatch species. So far, there are very few estimates of the impact of tuna fishing on the populations of bycaught species, and there is a critical need for marine mammal experts and scientific analyses in future reports. The WPEB strongly encourages the involvement of the

¹⁰⁰ (USITC, 2021)

¹⁰¹ (Herrera & García Horcajuelo, 2018)

¹⁰² (IWC, 2019)

¹⁰³ (IOTC, 2019)

¹⁰⁴ (*Data and Statistics* / IOTC, n.d.)

¹⁰⁵ (*Working Party on Ecosystems and Bycatch (WPEB)* / IOTC, n.d.)

¹⁰⁶ (IOTC Working Party on Data Collection and Statistics, 2020)

marine mammal scientific community in their reports and meetings, but successful collaborations have yet to be fully established.

a. IOTC Purse Seine and Longline Tuna Fishery Bycatch

South Korea has collected records of interactions and mortalities of marine mammals within the nation’s IOTC purse seine and longline tuna fisheries through national scientific observer programs and log sheets. In their 2020 IOTC report, Korea stated that “when marine mammals and whale sharks are observed during fishing operation, fishing vessels shall stop all the operations until they have been released safely.”¹⁰⁷ The same report to the IOTC listed two spinner dolphins as bycatch in 2015 in the purse seine fisheries and one unidentified species of marine mammal as bycatch in the longline fishery in 2016.¹⁰⁸ The data was collected from national scientific observers and fishing vessels. All other years between 2015 and 2019 were listed as having zero reports of marine mammal bycatch. Despite understanding some of the marine mammals that their IOTC tuna fisheries interact with, Korea failed to submit any data related to marine mammals under their IOTC fisheries in the 2020 LOFF.¹⁰⁹

b. IOTC Observer Coverage

Korea started its scientific observer program for ‘distant water fisheries’ in 2002. The National Institute of Fisheries Science is responsible for the program. Before receiving certification, observers must pass two tests: one on technical terms of fisheries and biology, and the other on species identification. In 2020 Korea had 55 certified scientific observers. Observers collect IOTC-required information such as vessel and gear characteristics, setting and catch details, and interactions with ecological relevant species (including marine mammals). The annual observer coverage in Korean tuna longline and purse seine fisheries within the IOTC can be seen in Table 5.¹¹⁰

Fishery	2015	2016	2017	2018	2019
Longline	4.3%	4.3%	5.9%	4.0%	4.7%
Purse seine	2.5%	7.8%	8.4%	17.%	N/A

Table 5. Percent annual observer coverage by Korean tuna longline and purse seine fisheries for 2015-2019. Based on data provided by Korea to the IOTC report. Purse seine percentages does not include the coverage implemented by regional observer programs.¹¹¹

2. Inter-American Tropical Tuna Commission (IATTC)

¹⁰⁷ (S. I. Lee et al. 2020)

¹⁰⁸ (S. I. Lee et al. 2020)

¹⁰⁹ (NOAA Fisheries 2020)

¹¹⁰ (S. I. Lee et al. 2020)

¹¹¹ (S. I. Lee et al. 2020)

The IATTC is a regionally focused governing body which includes member states with Pacific coastlines. The IATTC has multiple management strategies including national fishing quotas and a “Dolphin Safe” program for tuna fisheries to address the dolphin bycatch within the EEZ, international waters and in the coastal fishing grounds.^{112,113} South Korea is a member of the IATTC but not a member of the Agreement on the International Dolphin Conservation Program (AIDCP), which is implemented by the IATTC.

The IATTC reported that marine mammals, especially spotted dolphins (*Stenella attenuata*), spinner dolphins (*S. longirostris*), and common dolphins (*Delphinus delphis*), are frequently associated with yellowfin tuna in IATTC fisheries. Purse seine fishing vessels often intentionally set their nets around herds of dolphins and the associated yellowfin tuna, and then release the dolphins while retaining the tunas. The incidental mortality of dolphins was high during the initial years of the IATTC but declined substantially in the early 1990s.¹¹⁴ In 2020, the marine mammal stock with the highest incidental mortality within the IATTC fisheries was the eastern spinner (n=251), followed by the western-southern spotted (n=154), whitebelly spinner (n=138), and northeastern spotted dolphins (n=105). Common dolphins were also impacted by the IATTC fisheries, with 21 mortalities.¹¹⁵ The IATTC’s reported incidental dolphin mortalities in the eastern Pacific Ocean caused by the large vessel purse-seine fishery can be seen in Table 6 and Figure 10.

South Korea reported two “Dolphins nei” as “discarded or released species during an observer trip in the IATTC convention area in 2018.¹¹⁶ Beyond this report, we could not locate individual nation bycatch reports from the IATTC. Korea did not report any marine mammal species or bycatch data to the 2020 LOFF under its IATTC Longline tuna fishery.

a. IATTC Purse-Seine

Bycatch data from the IATTC purse-seine fishery is collected from three data sources: the IATTC observer data, the 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. The vessel logbook and the cannery information have very little bycatch data and focus primarily on commercially important data. The logbook includes the exact fishing positions but only one dataset is entered per day, regardless of the number of sets made by the vessel. The cannery data provides only a broad geographic region where the fish were taken. The cannery data provides bycatch information only if the marine mammal was kept in a purse-seine well during the fishing operation.¹¹⁷ Purse seiners with a capacity greater than 363 cubic meters are considered Class VI boats by the Inter-American Tropical Tuna Commission (IATTC) and are required to have observers on board for all trips.¹¹⁸ The IATTC tuna purse seine fishery experiences high numbers

¹¹² (Felix et al. 2015)

¹¹³ (Alava et al. 2019)

¹¹⁴ (IATTC 2021)

¹¹⁵ (IATTC 2021)

¹¹⁶ (IATTC Scientific Advisory Committee 2022)

¹¹⁷ (IATTC 2021)

¹¹⁸ (Stanford Center for Ocean Solutions 2020)

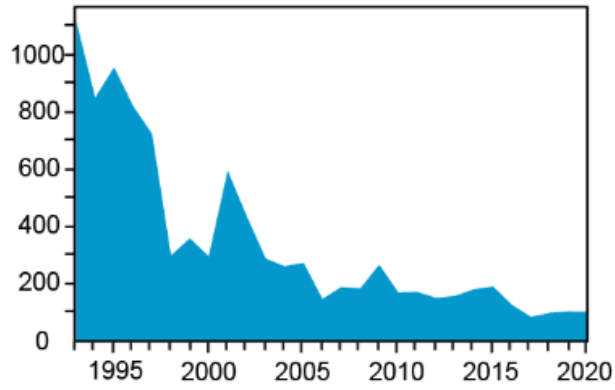
of cetacean bycatch annually. The IATTC reported 679 incidental dolphin mortalities in 2020.¹¹⁹ This number is within the 5,000-dolphin mortality limit set by the IATTC. We encourage NMFS to assess this dolphin mortality limit as it pertains to IATTC waters.

Year	<i>Stenella attenuata</i>		<i>Stenella longirostris</i>		<i>Delphinus delphis</i>			Other dolphins	Total
	Northeastern	Western-Southern	Eastern	White belly	Northern	Common Central	Southern		
2015	191	158	196	139	43	21	12	5	765
2016	127	111	243	89	82	36	9	5	702
2017	85	183	266	95	26	9	16	3	683
2018	99	197	252	205	41	1	18	6	819
2019	104	220	269	143	25	3	2	12	778
2020	105	154	251	138	1	17	3	20	689
Total	756	1023	1477	809	218	87	60	51	4481

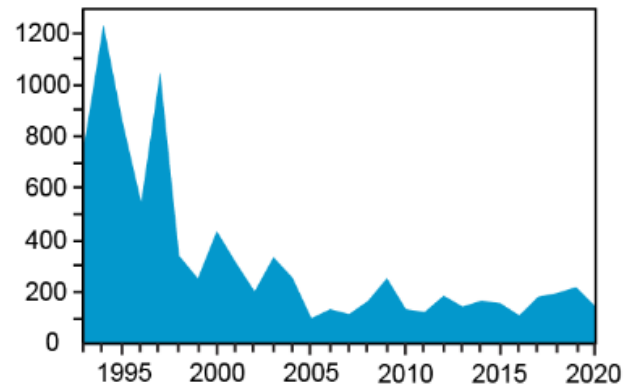
Table 6. The number of incidental dolphin mortalities by stock in the eastern Pacific Ocean caused by the large vessel purse-seine fishery with a carrying capacity >363 t from 2015-2020. Data for 2020 were considered preliminary at the time the report was released. Data from (IATTC 2021).

¹¹⁹ (AIDCP 2021)

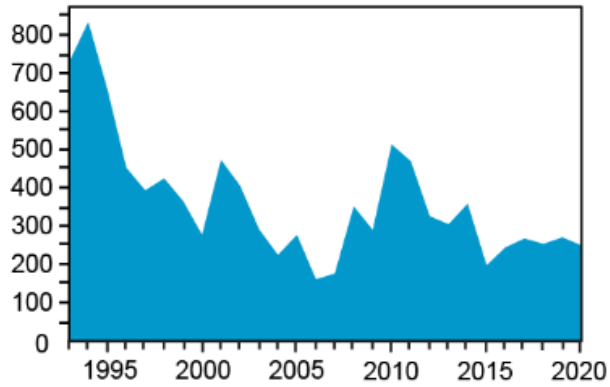
Northeastern spotted dolphin
Delfin manchado nororiental



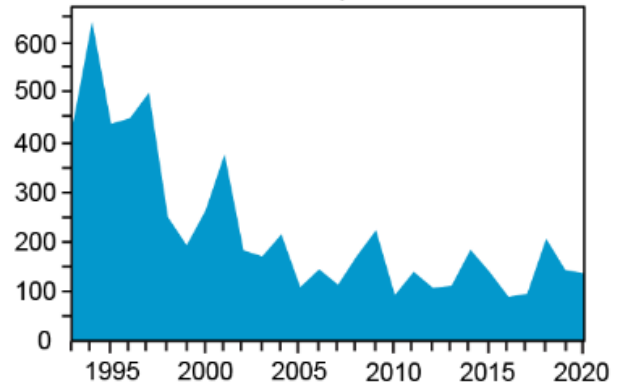
Western-southern spotted dolphin
Delfin manchado occidental-sureño



Eastern spinner dolphin
Delfin tornillo oriental



Whitebelly spinner dolphin
Delfin tornillo panza blanca



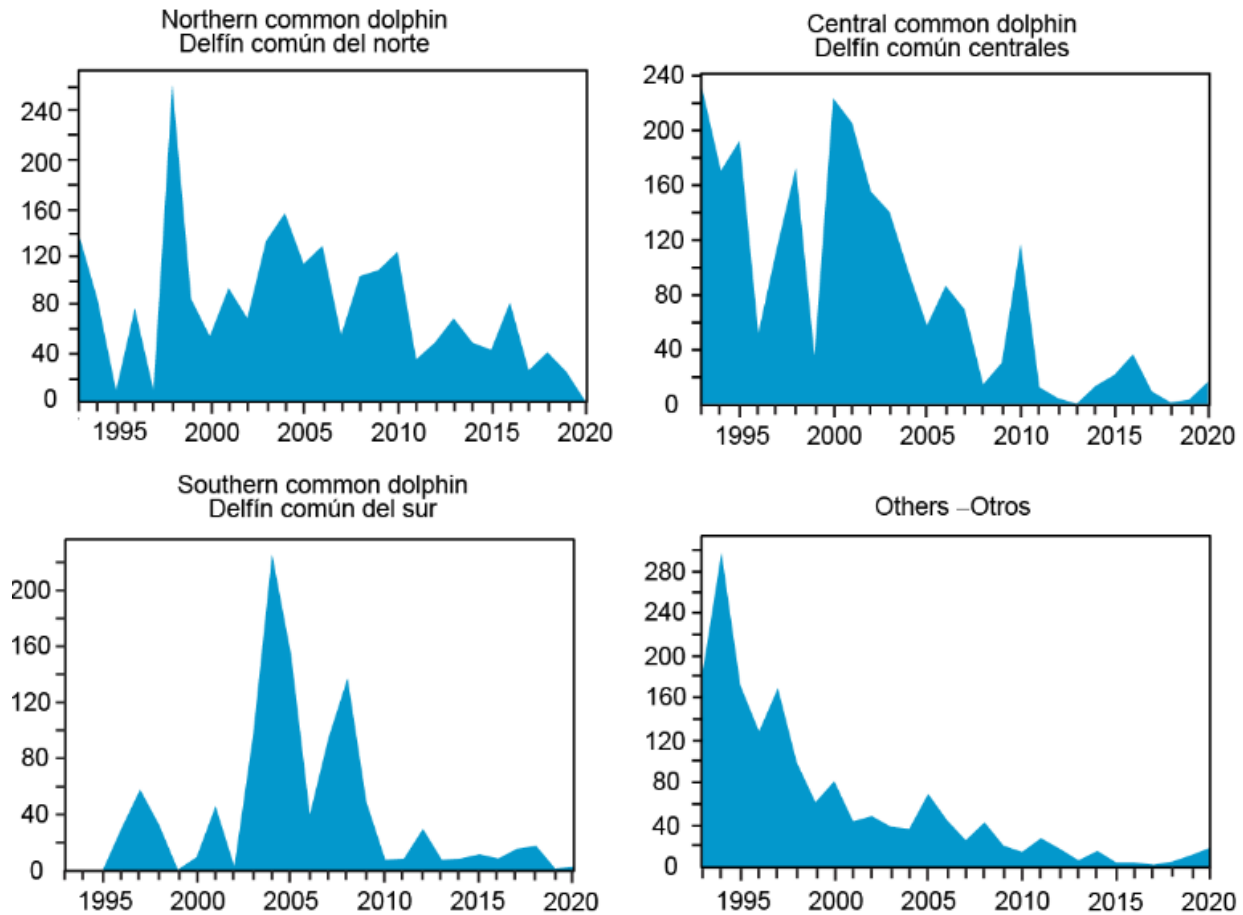


Figure 10. Estimated number of incidental dolphin mortalities by observers onboard large purse-seine IATTC vessels 1993-2020. Figure from (IATTC 2021).

The IATTC requires 100% observer coverage aboard its purse seine tuna vessels over 400 tons (Class 6).¹²⁰ Smaller purse-seine ships (Class 1-5) are not required to carry observers.¹²¹ Because marine mammal bycatch data collected by vessel logbooks and cannery data is limited, there is little to no bycatch data from smaller vessels.

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 7. The IATTC purse-seine vessel classifications by carrying capacity.¹²²

¹²⁰ (IATTC 2009)

¹²¹ (IATTC 2021)

¹²² (Ministerio de Produccion, Comercio Exterior, Inversiones y Pesca 2021)

b. IATTC Longline Fishery

The longline fishery observer coverage and bycatch data with the IATTC has improved since Resolution C-19-08 in 2019 which mandated that every member and cooperating non-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.¹²³ However, 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. Most catcher/processor crew (CPC) coverage was also reported as being less than the 20% coverage recommended by the IATTC Working Group on Bycatch and the Scientific Advisory Committee.

South Korea reported no interactions or bycatch of marine mammals in their 2021 Annual Scientific Observer Report for their tuna longline fishery in the Antigua Convention Area.¹²⁴ The IATTC has noted that the considerable variability in reporting formats of longline data and the inconsistent observer coverage has hindered the RFMO’s ability to estimate the IATTC longline’s bycatch.¹²⁵ The data that does not come from scientific observers is collected using the gross annual removals estimated by each CPC. The IATTC considers this data as “incomplete,” or “sample data” because the IATTC is uncertain whether it is receiving all bycatch data from the longline fishery.¹²⁶ 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 reported by the longline CPCs since 2006.¹²⁷ This inconsistency and inaccuracy of bycatch data within the longline data brings other bycatch reports from the longline fishery into question. The IATTC stated:

“Although 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.”¹²⁸

3. Western and Central Pacific Fisheries Commission (WCPFC)

South Korea is a member of the WCPFC. Historically, the Korean distant water tuna longline fishery has primarily fished in the high seas and the waters within coastal states in the South Pacific Ocean.¹²⁹ More specifically, 140 degrees east to 170 degrees west. Korea’s longline efforts are normally operating further north in the central and eastern Pacific Ocean than the purse seine fishery. In 2018-2020, the longline fishery focused on 170 degrees east to 160 degrees west of 15 degrees north - 15 degrees south.¹³⁰ South Korea reported having 26 purse

¹²³ (IATTC 2021)

¹²⁴ (IATTC Scientific Advisory Committee 2022)

¹²⁵ (IATTC 2021)

¹²⁶ (IATTC 2021)

¹²⁷ (IATTC 2021)

¹²⁸ (IATTC 2021)

¹²⁹ (S. I. Lee et al. 2021, 1)

¹³⁰ (S. I. Lee et al. 2021, 1)

seine vessels and 99 longline fishery vessels in its fleet in 2020 (Figure 11). In the 2020 LOFF, South Korea listed 28 purse seine vessels and 100 longline vessels in the WCPFC fleet.¹³¹ The average annual tuna catch in the western and central Pacific Ocean by both gear types of Korean tuna fisheries was 298,149mt for 2016-2020. The total reported catch in 2020 was 279.688mt.¹³² The average catch from the purse seine fishery was 271,961 mt from 2016-2020 and the average catch from the longline fishery was 26,188 mt from 2016-2020.¹³³

Year	GRT class by gear									
	Longline					Purse seine				
	Total	0-50	51-200	201-500	500+	Total	0-500	501-1,000	1,001-1,500	1,500+
2016	96	0	1	95	0	25	0	7	14	4
2017	96	0	1	95	0	26	0	7	15	4
2018	97	0	1	96	0	27	0	6	15	6
2019	97	0	1	96	0	26	0	5	15	6
2020	99	0	1	98	0	26	0	5	15	6

Figure 11. Number of South Korean vessels, by gear and size, active in the WCPFC Convention Area 2016-2020.¹³⁴

Korea reports marine mammal bycatch to the WCPFC.¹³⁵ The data were compiled from onboard logbooks and/or collected by scientific observers. In 2020, 20 whales were encircled by purse seine nets (Figure 14).¹³⁶ South Korea reported that when marine mammals were observed during purse seine fishing operations, their vessels stopped rolling net until each marine mammal was released safely.¹³⁷ No record in the 2021 Annual Report to the Commission was made as to what was done to the marine mammals that were found dead, or died, within the purse seine nets. Generally, observer coverage within WCPFC fisheries is low, and one report noted that “the catch estimates for the WCPFC Convention Area as a whole, are unlikely to be reliable and should be viewed in that context.”¹³⁸

South Korea’s scientific observer program for fisheries outside of Korea’s EEZ was started in 2002. The National Institute of Fisheries Science (NIFS) is responsible for implementing the observer program. Korea had a total of 61 scientific observers at the time the 2021 report was submitted to the WCPFC.¹³⁹

¹³¹ (NOAA Fisheries 2020)

¹³² (S. I. Lee et al. 2021, 1)

¹³³ (S. I. Lee et al. 2021, 1)

¹³⁴ (S. I. Lee et al. 2021, 1)

¹³⁵ (S. I. Lee et al. 2021, 1)

¹³⁶ (S. I. Lee et al. 2021, 1)

¹³⁷ (S. I. Lee et al. 2021, 1)

¹³⁸ (Peatman & Nicol, 2020)

¹³⁹ (S. I. Lee et al. 2021, 1)

Year	Gear	Logsheet coverage (%)	Observer coverage (%)
2016	Purse seine	100	100
	Longline	100	6.9
2017	Purse seine	100	100
	Longline	100	4.14
2018	Purse seine	100	100
	Longline	100	6.3
2019	Purse seine	100	100
	Longline	100	7.1
2020	Purse seine	100	*
	Longline	100	3.8

* WCPFC Commission agreed to suspend the requirements for observer coverage on purse seine vessels and at-sea transshipment due to COVID-19 pandemic.

Figure 12. Estimated annual coverage of operational catch/effort and observer data for the Korean WCPFC fisheries by gear, active in the WCPFC Convention Area, 2016-2020. Figure from (Lee et al. 2021).

The WCPFC is responsible for assessing its impact on non-target species. The WCPFC has implemented Conservation and Management Measures (CMMs) related to scientific observer programs and bycatch. Resolution 2005-03 asks operators “where practicable, to avoid catching non-target fish species that are not retained.” Observers are asked to record all species caught and all discards.¹⁴⁰ Specific CMMs related to seabirds, sea turtles, and oceanic whitetip sharks are addressed to all fisheries, while marine-mammal specific CMMs exist only for the industrial purse seine fishery.¹⁴¹ The WCPFC introduced guidelines within WCPFC18-2021-26 for best handling practices of marine mammals, specifically cetaceans, for purse seine and longline vessels fishing for tuna and tuna-like species in the Western Central Pacific Ocean.¹⁴² These guidelines were developed with reference to the U.S. Best Practices for Safe Handling and Release of Cetaceans. These best practices are currently pending revisions as a new CCM, 2021-23.¹⁴³

a. WCPFC Longline Fishery Observer Coverage and Bycatch

WCPFC members (CCMs) and cooperating non-members (CNMs) are required to have 5% observer coverage of their longline fleets.¹⁴⁴ In 2019 (the last available data), the South Korea longline fleet within the WCPFC had 100% log sheet coverage and 7.1% onboard

¹⁴⁰ (Western and Central Pacific Fisheries Commission 2018)

¹⁴¹ (Western and Central Pacific Fisheries Commission 2018)

¹⁴² (“Draft. The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean” 2021)

¹⁴³ (“Draft. The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean” 2021)

¹⁴⁴ (Williams, Pilling, and Nicol 2021)

observer coverage.¹⁴⁵ In 2019, the longline fleet had 100% log sheet coverage but only 3.8% onboard observer coverage (Figure 12).¹⁴⁶

The five marine mammals most commonly bycaught or ‘interacting’ with WCPFC longline fisheries are the false killer whale, toothed whales, bottlenose dolphins, rough-toothed dolphins and Risso’s dolphins. Three instances of baleen whales being caught in WCPFC longline fisheries were reported but the animals were released alive.¹⁴⁷ South Korea submitted an itemized estimate of bycatch by the Korean fisheries in the WCPFC Convention Area, 2016-2020 (Table 8). South Korea reported no interactions with marine mammals in its WCPFC fleet.¹⁴⁸

Year	Number of bycatch incidents by species in purse seine fishery			
	False Killer whale	Humpback whale	Pygmy killer whale	Other whales
2016	D:0 A:1	-	-	-
2017	D:0 A:3	D:1 A:2	D:0 A:1	D:0 A:6
2018	-	-	D:0 A:7	D:0 A:12
2019	D:0 A:12	-	D:0 A:7	D:0 A:24
2020	D:0 A:13	-	-	D:0 A:7

Table 8. Annual estimated catch or encounter of marine mammal species by the Korean fisheries in the WCPFC Convention Area, 2016-2020. (D=Dead, A=Alive)¹⁴⁹

Within the entire WCPFC Convention Area, 266 marine mammals interacted with WCPFC longline gear, as reported by observers, and were found alive from 2015-2020. In the same timeframe, 56 marine mammals were found dead in the longline fishing gear and 10 were reported with an unknown status.¹⁵⁰

¹⁴⁵ (Lee et al., 2021)

¹⁴⁶ (S. I. Lee et al. 2021, 1)

¹⁴⁷ (Williams, Pilling, and Nicol 2021)

¹⁴⁸ (S. I. Lee et al. 2021, 1)

¹⁴⁹ (S. I. Lee et al. 2021)

¹⁵⁰ (Williams, Pilling, and Nicol 2021)

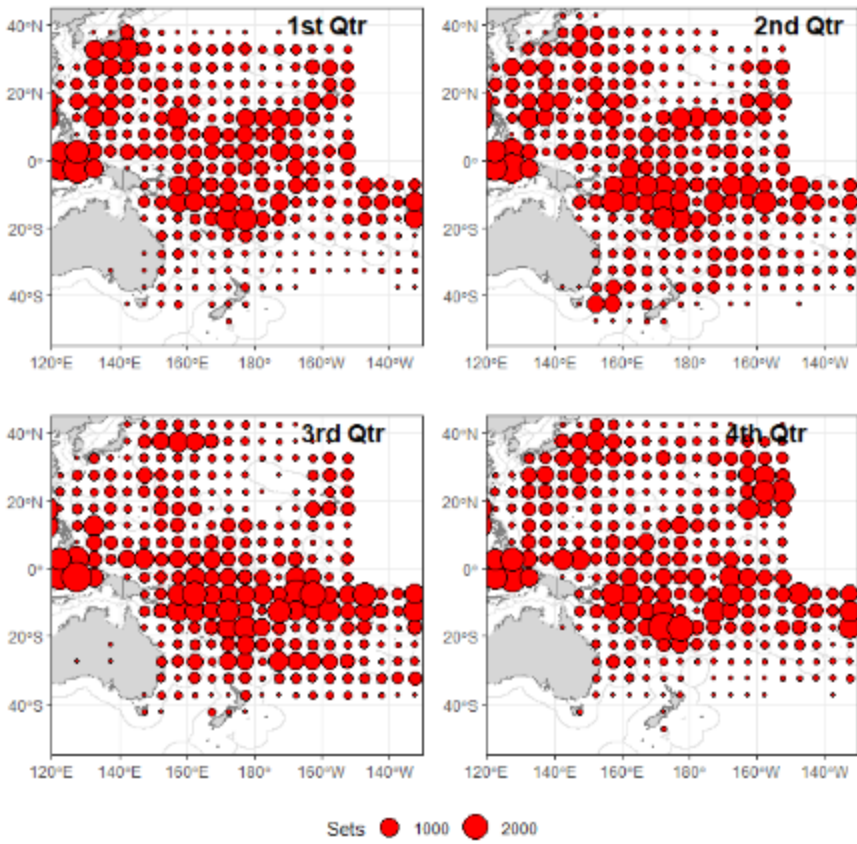


Figure 13. Distribution of longline effort in the WCPF Convention Area, by quarter, 2015-2020.¹⁵¹

¹⁵¹ (Williams, Pilling, and Nicol 2021)

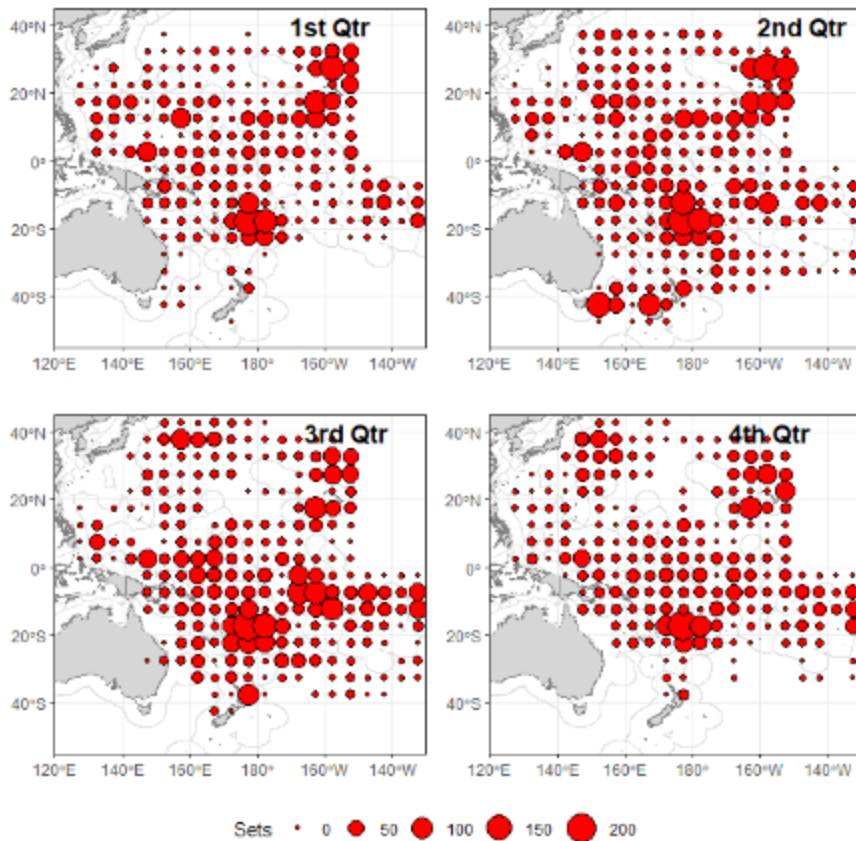


Figure 14. Distribution of Observer longline effort in the WCPFC Convention Area by quarter 2015-2019.¹⁵²

b. WCPFC Purse Seine Fishery

The WCPFC has a number of CMMs related to scientific observer programs and bycatch. CMM 2008-01 set in place a requirement for 100% observer coverage for purse seine operations between 20 degrees South and 20 degrees North from 2010 onwards.^{153,154} CMM 2007-01 requires a minimum of 5% observer coverage for purse seine fishing elsewhere.¹⁵⁵ Observer coverage during 2020 was estimated 45-50%.¹⁵⁶ South Korea did not report finalized percentages for 2020 because the WCPFC Commission agreed to suspend the requirements for observer coverage on purse seine vessels and at-sea transshipment due to the COVID 19 pandemic.¹⁵⁷

The WCPFC recorded the five species of marine mammals most commonly bycaught by the purse seine fishery. In unassociated sets, or those without the use of a Fishery Aggregating Device (FAD), the most bycaught species are: false killer whale; Bryde's whale; sei whale;

¹⁵² (Williams, Pilling, and Nicol 2021)

¹⁵³ (WCPFC 2008)

¹⁵⁴ (Williams, Pilling, and Nicol 2021)

¹⁵⁵ (WCPFC 2007)

¹⁵⁶ (Williams, Pilling, and Nicol 2021)

¹⁵⁷ (Lee et al., 2021)

short-finned pilot whale; Risso’s Dolphin. In associated sets, or those with the use of a FAD, the most commonly bycaught species are: false killer whale; rough-toothed dolphin’ Bryde’s whale; sei whale; bottlenose dolphin.¹⁵⁸ In South Korea’s report to the WCPFC, the nation reported the bycatch of 20 individual marine mammals. The mammals were recorded as being found alive (Table 9).

Year	Number of bycatch incidents by species in purse seine fishery			
	False Killer whale	Humpback whale	Pygmy killer whale	Other whales
2016	D:0 A:1	-	-	-
2017	D:0 A:3	D:1 A:2	D:0 A:1	D:0 A:6
2018	-	-	D:0 A:7	D:0 A:12
2019	D:0 A:12	-	D:0 A:7	D:0 A:24
2020	D:0 A:13	-	-	D:0 A:7

Table 9. The annual estimated catch or encounter of marine mammals by Korean fisheries in the WCPFC Convention Area, 2016-2020.¹⁵⁹

¹⁵⁸ (Williams, Pilling, and Nicol 2021)

¹⁵⁹ (S. I. Lee et al. 2021)

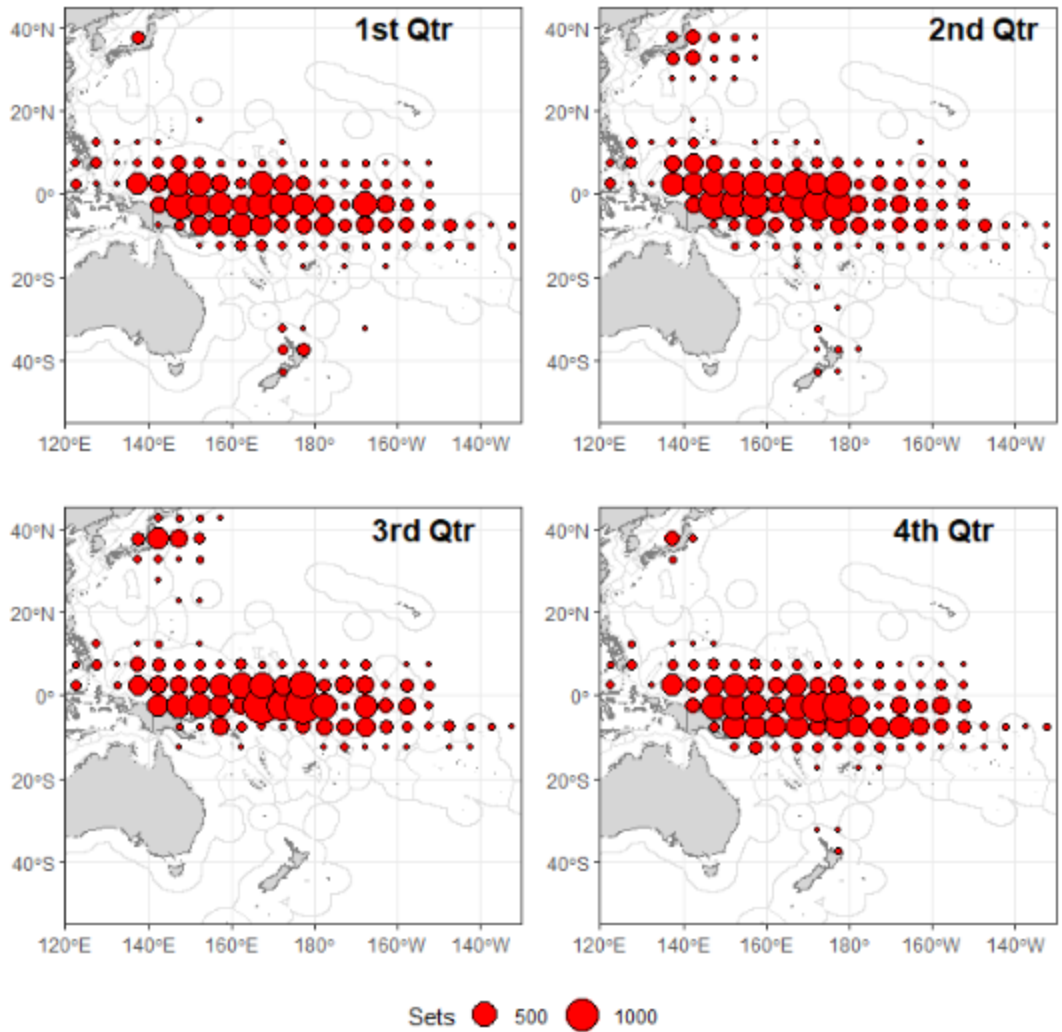


Figure 15. Distribution of purse seine efforts in the WCPFC Convention Area by quarter, 2015-2020.

In 2019 (the last year with available data in a year with 100% observer coverage required), the WCPFC purse seine fishery interacted with 1,640 marine mammals.¹⁶⁰ From 2015-2020, the purse seine fishery interacted with a reported total of 8,442 marine mammals. The observers reported 6,052 marine mammals as alive, 1,673 were classified as dead, and 717 were reported in an unknown condition.

V. South Korea's Policies on Bycatch and Marine Mammal Protection

1. Fisheries Act

Korea's Fisheries Act is implemented by the Ministry of Oceans and Fisheries, as well as local entities. The law requires fishermen operating a vessel over 10 tons to obtain a license to

¹⁶⁰ (Williams, Pilling, and Nicol 2021)

fish from the Ministry; smaller vessel operators must generally seek permission from the relevant provincial government.¹⁶¹ Through a Presidential Decree, the “types of aquatic animals allowed to be caught and harvested” may be established, while the Ministry may determine vessel quotas and gear types for fisheries through Ordinances.¹⁶²

The Fisheries Act addresses but does not define “bycatch,” so it is unclear whether the law’s bycatch provisions apply to marine mammals or just fish bycatch. The law states that a fisher “shall not engage in the bycatch of other types of aquatic animals” that are not included in their fishing permit. However, the law goes on to say “bycatch shall be allowed” in cases that satisfy standards set by Presidential Decree. While not entirely clear, the law appears to ban bycatch unless expressly authorized in a permit. If a fisher’s bycatch exceeds that allowed by their permit, the law requires that fisher must suspend fishing, move to another place, or “take other appropriate measures.”¹⁶³ Fishers must also “attach to fishing gear a device for reducing bycatch” if directed by the Minister of Oceans and Fisheries.¹⁶⁴ If a fisher uses gear without a bycatch reduction device, the penalty is a fine not exceeding 10 million won.¹⁶⁵ The Fisheries Act also states that fishers “shall sell, purchase, or exchange” bycaught animals at designated places.

2. Notice on Conservation and Management of Whale Resources

The Ministry of Oceans and Fisheries issued the Notice on Conservation and Management of Whale Resources under the Fisheries Act to preserve and manage cetacean resources in Korean waters. Article 4 of Notice states that “No one shall catch cetaceans,” unless for scientific or rescue purposes, which presumably bans whaling or directed catch in Korea.¹⁶⁶ Under Article 9 of the Notice, the Minister of Oceans and Fisheries “shall take necessary measures to mitigate bycatch;” however, we were unable to identify any such measures. Article 10 of the Notice states that upon finding a whale that has been caught, stranded, or adrift persons “must immediately report it” to the head of the maritime police station and “must take possible measures for rescue or rehabilitation of live whales.”¹⁶⁷

Once brought to shore, cetaceans are discarded differently depending on whether they were incidentally bycaught or illegally caught. The Notice says that “stranded or drifted cetaceans are discarded” except for when the animal is requested for research or education by the National Institute of Fisheries Science. It also states that police officers “shall dispose” of cetaceans that are identified as having been caught illegally during investigation by selling the cetacean and receiving a dismantling place and disposal plan from the purchaser. For bycaught

¹⁶¹ Fisheries Act, Art. 40.

¹⁶² Fisheries Act, Art. 40(4).

¹⁶³ Fisheries Act, Art. 42(3).

¹⁶⁴ Fisheries Act, Art. 42(4).

¹⁶⁵ (Republic of Korea 2009)

¹⁶⁶ Notice on Conservation and Management of Whale Resources. Available at:

<https://www.law.go.kr/LSW/admRulInfoP.do?admRulSeq=2100000223112&chrClsCd=010201#AJAX>

¹⁶⁷ (Ministry of Fisheries and Oceans, 2023)

cetaceans, the reporting person can sell the whale as bycatch “only at the Fisheries Cooperative Commission designated by the head of the Korea Coast Guard.”¹⁶⁸

3. Fishing Vessels Act

Under the Fishing Vessels Act, the owner of each fishing vessel or the owner of each ship prescribed by Ordinance of the Ministry of Oceans and Fisheries “shall file registration of such vessel or ship in the fishing vessel register” with the head of the port or dock where the fishing vessel or ship mainly arrives or departs from. No fishing vessel may be used for fishing without registration. Each registered vessel receives a certificate as proof of registration.¹⁶⁹ However, the law does not require or specify any additional information that must be disclosed upon registry, including gear, fishing season, etc.

4. Conservation and Management of Marine Ecosystems Act

Korea’s Conservation and Management of Marine Ecosystems Act seeks to “conserve or manage marine ecosystems in a comprehensive and systematic manner.”¹⁷⁰ South Korea defines “marine organisms under protection” or “protected marine creatures/organisms” as any marine species determined by Ordinance of the Ministry of Oceans and Fisheries as: a) unique species living in the Republic of Korea; b) species with a remarkably decreasing population c) species with high academic or economic values; or d) species internationally highly worthy of protection.¹⁷¹ Currently, 88 species are managed under the act as “marine protected organisms.” The list includes 19 mammals, 36 invertebrates, 7 seaweeds, 8 reptiles, 5 fish, and 13 birds.¹⁷² The listed species include some but not all marine mammals inhabiting Korean waters, including: sei whale, Bryde’s whale, blue whale, fin whale, northern fur seal, North Pacific right whale, Stellar sea lion, western gray whale, ribbon seal, humpback whale, finless porpoise, killer whale, spotted seal, sperm whale, ring seal, false killer whale, Indo-Pacific bottlenose dolphin, bottlenose dolphin, and Japanese sea lion (Table 2).

Several provisions of the Conservation and Management of Marine Ecosystems Act address take of listed (but not all marine mammals), however, there appear to be exceptions for bycatch. Article 20 of the Conservation and Management of Marine Ecosystems Act prohibits the catching, collecting, transplanting, processing, distributing, storing, or damaging marine protected organisms or installing “nets or fishing gear” so as to catch or damage protected species.¹⁷³ While this might be read to ban bycatch, there are several key exemptions for fisheries. First, the Minister of Oceans and Fisheries may issue a permit for such activities “[w]here it is necessary for preventing damage to cultured fish species or fishery products.”¹⁷⁴ This appears to allow for intentional take of marine mammals during fishing, if permitted by the government. We were unable to determine if such permission has been given. Second, the

¹⁶⁸ (Ministry of Fisheries and Oceans, 2023)

¹⁶⁹ (Republic of Korea 1993)

¹⁷⁰ Conservation and Management of Marine Ecosystems Act, Art. 1.

¹⁷¹ (Republic of Korea, n.d.)

¹⁷² (Marine Environment Information Portal n.d.)

¹⁷³ (Republic of Korea, n.d.), Art. 20.

¹⁷⁴ Conservation and Management of Marine Ecosystems Act, Art. 20(1)-3.

prohibition of capture of protected marine mammals does not apply “[w]here anyone inevitably catches marine organizations under protection with other marine organisms during fishing activity and such catch is report to the Minister of Oceans and Fisheries within 48 hours.”¹⁷⁵ This appears to exempt bycatch of protected marine mammals, as long as the bycatch is reported.

Further, Article 18-2(1) directs that “[a]nyone shall endeavor to prevent marine mammals and marine organisms under protection from being incidentally caught during fishing operation, and proactively cooperate with the measures of the State and local governments to prevent incidental catch.”¹⁷⁶ While unclear, this provision may apply to both protected and non-protected marine mammals. However, the law does not define what “endeavor” means and does not directly require any bycatch reduction measures. Article 16 states that the Minister of Oceans and Fisheries and other entities “may prohibit or restrict capture . . . of migratory marine animals and marine mammals.”¹⁷⁷ The law further grants the Minister of Oceans and Fisheries the authority to “prepare measures to conserve marine organisms under protection” and “implement such measures.”¹⁷⁸ We urge NMFS to confirm whether these provisions have been applied to protect any marine mammals from bycatch.

The Conservation and Management of Marine Ecosystems Act does not require bycatch mitigation for marine mammals. Moreover, the list of protected marine organisms only includes 19 marine species. The law also does not comprehensively protect marine mammals, including the minke whale, which is sold with a high value on the South Korean whale meat market.¹⁷⁹

5. Notice No. 85-17

According to Kang and Phipps (2000), in 1985, Notice No. 85-17 banned killing of all cetaceans in Korean waters effective January 1986. The Notice was based on Article 27 of the *Marine Resources Protection Ordinance* and banned whaling in the Korean East Sea, West Sea, and beyond latitude 25 degrees North and longitude 140 degrees East. The Notice specifically allows for scientific whaling with a governmental research permit.¹⁸⁰ Notice No. 85-15 also apparently describes how the South Korean government defines illegal whaling and related activities. These include intentional killing by violent means with guns or harpoons; the deliberate killing of a live, trapped whale; and trade, possession, storage, transportation or export of illegally caught whale meat with the intention of trade.¹⁸¹ However, we were unable to obtain this Notice, and it is unclear if it is still in effect.

VI. South Korea’s Compliance with the MMPA Imports Rule

¹⁷⁵ Conservation and Management of Marine Ecosystems Act, Art. 20(3).

¹⁷⁶ Conservation and Management of Marine Ecosystems Act, Art. 18.

¹⁷⁷ Conservation and Management of Marine Ecosystems Act, Art. 16.

¹⁷⁸ Conservation and Management of Marine Ecosystems Act, Art. 19(1).

¹⁷⁹ One minke whale auctioned for 71.3 million won in 2020. *See* https://www.koreatimes.co.kr/www/nation/2023/06/113_281514.html.

¹⁸⁰ (Kang and Phipps 2000)

¹⁸¹ (Kang and Phipps 2000)

A. MMPA Imports Rule Requirements

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.” 16 U.S.C. § 1371(a)(2). In applying this requirement, the United States “shall insist on reasonable proof” from the exporting nation of the effects of its exporting fisheries on marine mammals – i.e., its marine mammal bycatch. *Id.*

To implement this provision, the National Marine Fisheries Service (NMFS) issued its MMPA Imports Rule. 81 Fed. Reg. 54,415 (Aug. 16, 2016). Under the Rule, in order for South Korea to continue exporting fish to the United States after December 31, 2023, Korea must apply for and receive a “comparability finding” from the U.S., essentially a determination that its bycatch and bycatch program for each exporting fishery meets U.S. standards. 50 C.F.R. § 216.24(h)(6).

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

- (1) Korea “[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, Korea “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, Korea 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.”

Id. § 216.24(h)(6)(iii)(C).

Under both the MMPA and the MMPA Imports Rule, South Korea bears the burden of demonstrating each export fishery meets these requirements. 16 U.S.C. 1371(a)(2); 50 C.F.R. § 216.24(h)(5) (“harvesting nation shall submit . . . an application . . . , along with documentary evidence demonstrating” the conditions have been met “for each” fishery).

Accordingly, in order to achieve a comparability finding, South Korea must demonstrate and document that it meets each of the conditions above or maintains a regulatory program that “effectively achieves comparable results,” for each “export” fishery listed on the LOFF. This is a strict standard.

B. South Korea’s Export Fisheries Assessed Do Not Meet U.S. Standards and Are Not in Compliance with the MMPA Imports Rule

Based on the information available to our organizations, South Korea lacks effective bycatch measures, monitoring, and data necessary to demonstrate comparability for its export fisheries outside of Regional Fishery Management Organizations (RFMOs). The lack of data on marine mammal stocks, as well as the lack of data provided to the 2020 LOFF, make it difficult to accurately assess South Korea’s export fisheries’ bycatch or ultimately comparability to U.S. standards. Therefore, unless significant improvements are made in South Korea’s data collection and reporting, observer programs, and legal requirements, NMFS should ban at least some of South Korea’s export fisheries.

1. South Korea Does Not Ban the Intentional Killing of All Marine Mammals

The MMPA Imports Rule requires that, to export seafood to the United States, South Korea must demonstrate that it “[p]rohibits the intentional mortality or serious injury of marine mammals in the course of commercial fishing in the fishery.”

South Korea does not prohibit the intentional killing of all marine mammals in the course of commercial fishing. South Korea prohibits the commercial, directed fishing of whales under the Ministry of Oceans and Fisheries’ Notice on Conservation and Management of Whale Resources.¹⁸² However, we were unable to identify a provision expressly prohibiting the intentional killing or injury of marine mammals during commercial fishing. As noted above, the Conservation and Management of Marine Ecosystems Act prohibits the catching or damaging of listed marine protected organisms,¹⁸³ however, the law allows the Minister of Oceans and

¹⁸² Article 4 of Notice states that “No one shall catch cetaceans,” unless for scientific or rescue purposes, which presumably bans whaling or directed catch in Korea.

¹⁸³ (Republic of Korea, n.d.), Art. 20.

Fisheries to issue a permit for such activities “[w]here it is necessary for preventing damage to cultured fish species or fishery products.”¹⁸⁴ This appears to allow for intentional take of marine mammals during fishing, if permitted by the government. Further, not all marine mammals are listed as protected under the Conservation and Management of Marine Ecosystems Act.

South Korea has created an economic incentive to kill marine mammals if labeled as bycatch and sold for profit. Many of South Korea’s commercial fishing vessels lack onboard observers, enabling illegal intentional killing to occur. Bycaught cetaceans are not visually inspected until they are landed where, if the cause of death is drowning, the bycatch is considered incidental. Without an independent observer program for its domestic fisheries, South Korea cannot properly enforce a commercial whaling prohibition or demonstrate that such a prohibition is followed, especially as it simultaneously allows a market for bycaught cetaceans.

2. South Korea Likely does not Maintain a Regulatory Program “Comparable in Effectiveness” to the U.S. Program for Fisheries

As detailed above, under the MMPA Imports Rule, South Korea 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 and discussed below or that it effectively achieves comparable results as maintaining such a program.

a. South Korea Does Not Conduct Regular Marine Mammal Stock Assessments for All Bycaught Stocks

The MMPA Imports Rule requires that South Korea demonstrate that 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.¹⁸⁵ It is critical that stock assessments for bycaught stocks be conducted; without this information, it is impossible to know whether bycatch is below PBR.

South Korea carried out a vessel-based survey in the East Sea in 2020.¹⁸⁶ However, South Korea does not have a regulatory program requiring or providing for regular stock assessments. Some information on marine mammals in Korean waters has been collected primarily through sighting surveys, bycatch studies, and from strandings, but this research is not systematically organized, and most species remain understudied.¹⁸⁷ In 2016, scientists concluded that “[t]he study of cetaceans in Korean waters is not sufficient compared with that of other countries at present.¹⁸⁸ They also stated that “[I]ittle is known about the distribution, movement, and abundance of cetaceans in Korean waters.”¹⁸⁹

¹⁸⁴ Conservation and Management of Marine Ecosystems Act, Art. 20(1)-3.

¹⁸⁵ 50 C.F.R. § 216.24(h)(6)(iii)(C).

¹⁸⁶ (Hyun, 2021)

¹⁸⁷ (Song 2016a)

¹⁸⁸ (Song 2016a)

¹⁸⁹ (Song 2016a)

While individual studies have calculated PBR estimates for minke whales, South Korea does not have the population data necessary to calculate PBR for all marine mammal species subject to bycatch in its waters.^{190,191,192,193}

b. South Korea May Maintain an Adequate Fishery Register

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 as maintaining such a registry.

South Korea may maintain a fishery register that includes the requirements necessary to comply with the MMPA Imports Rule. As detailed above, the Fishing Vessels Act requires that the owner of each fishing vessel or ship must register their vessel in the Fishing Vessel Register with the head of its home port or dock. However, the law does not require owners to disclose the time, season, gear type, and target species. Additionally, the Fisheries Act requires any person operating a vessel over 10 tons to obtain a license to fish from the Ministry; smaller vessel operators must generally seek permission from the relevant provincial government.¹⁹⁴ The “types of aquatic animals allowed to be caught and harvested” may be established through a Presidential Decree, while the Ministry may determine vessel quotas and gear types for fisheries through Ordinances that are presumably effectuated through license requirements.¹⁹⁵ While the Fisheries Law does not state that a fishery register be maintained, we note that, for most of the fisheries listed in the 2020 LOFF, South Korea had reported the number of vessels, the target species, and the gear types used. Accordingly, Korea may maintain a registry of the required information based on licensed issued. We urge NMFS to clarify whether Korea maintains an adequate fishery register.

c. South Korea Does Not Maintain Adequate Regulatory Requirements for Bycatch

i. South Korea Likely Requires Reporting of Marine Mammal Deaths and Injuries

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.

South Korean law appears to require reporting of “whales caught” in fishing gear. Article 10 of the Notice on Conservation and Management of Whale Resources states “[a] person who discovers a whale that has been caught, stranded or adrift must report immediately” to the head

¹⁹⁰ (Song 2016b)

¹⁹¹ (Song 2011, 11)

¹⁹² (Lukoschek et al. 2009)

¹⁹³ (Smith et al. 2014)

¹⁹⁴ Fisheries Act, Art. 40.

¹⁹⁵ Fisheries Act, Art. 40(4).

of the maritime police station.¹⁹⁶ While our translation of the law only requires reporting of bycaught “whales,” it appears from published literature that other marine mammal bycatch is also reported.

According to published scientific research papers, once reported, the Coast Guard examines the body and determines whether the cause of death occurred as a result of bycatch or, in the case of strandings, “naturally.” The Coast Guard and the Cetacean Research Institute (CRI) of the National Fisheries Research and Development Institute (NFRDI) of the Korean Government report the details of the inspection and the bycatch. These reports include: 1) the date and location (latitude, longitude, distance from land, water depth); 2) the species, length and sex of the bycaught cetacean; 3) detailed information on the type of fishing gear used. Finally, the CRI verifies this information and makes a determination of cause of death.^{197,198,199, 200} This information is collected and maintained by the Korean National Fisheries Cooperative and the Korea Coast Guard.²⁰¹

ii. South Korea Likely Does Not Require Fishers to Implement Measures to Reduce Mortality and Serious Injury in All Export Fisheries

Next, under the MMPA Imports Rule, South Korea must maintain regulatory requirements that require fishers to implement measures to reduce mortality/serious injury or “effective achieves comparable results” as requiring such measures.

Several South Korean laws may address marine mammal bycatch generally, and the government is authorized to mitigate bycatch, but we were unable to identify any specific bycatch mitigation measures or fishery-specific requirements. As described above, the Fisheries Law addresses bycatch, but it is unclear whether the law’s bycatch provisions apply to marine mammals or just fish bycatch. The law appears to ban bycatch unless expressly authorized in a permit, stating that a fisher “shall not engage in the bycatch of other types of aquatic animals” that are not included in their fishing permit but also that “bycatch shall be allowed” if standards set by Presidential Decree are satisfied.²⁰² Fishers must also “attach to fishing gear a device for reducing bycatch” if directed by the Minister of Oceans and Fisheries.²⁰³

Moreover, under the Notice on Conservation and Management of Whale Resources, Article 9 requires that the Minister of Oceans and Fisheries “shall take necessary measures to mitigate bycatch.”²⁰⁴ However, we were unable to identify any such measures, regulations, or further details under this directive.

¹⁹⁶ (Ministry of Fisheries and Oceans, 2023), Notice on Conservation and Management of Whale Resources, Art. 10.

¹⁹⁷ (S. Lee et al. 2018)

¹⁹⁸ (MacMillan and Jeonghee 2011)

¹⁹⁹ (Kang and Phipps 2000)

²⁰⁰ (Song 2016b)

²⁰¹ (S. Lee et al. 2018)

²⁰² Fisheries Act, Art. 42.

²⁰³ Fisheries Act, Art. 42(4).

²⁰⁴ Notice on Conservation and Management of Whale Resources, Art. 9.

Additionally, several provisions of the Conservation and Management of Marine Ecosystems Act appear to address take of listed (but not all) marine mammals, however, there appear to be exceptions for bycatch. As noted above, Article 20 of the law prohibits the “catching . . . or damaging” of marine protected organisms or installing “nets or fishing gear” so as to catch or damage protected species.²⁰⁵ However, this prohibition on capture of protected marine mammals does not apply “[w]here anyone inevitably catches marine organisms under protection with other marine organisms during fishing activity and such catch is reported to the Minister of Oceans and Fisheries within 48 hours.”²⁰⁶ This appears to exempt bycatch of protected marine mammals, as long as the bycatch is reported.

Further, Article 18-2(1) directs that “[a]nyone shall endeavor to prevent marine mammals and marine organisms under protection from being incidentally caught during fishing operation, and proactively cooperate with the measures of the State and local governments to prevent incidental catch.”²⁰⁷ While unclear, this provision may apply to both protected and non-protected marine mammals. However, the law does not define what “endeavor” means and does not directly require any bycatch reduction measures. Article 16 states that the Minister of Oceans and Fisheries and other entities “may prohibit or restrict capture . . . of migratory marine animals and marine mammals.”²⁰⁸ The law further grants the Minister of Oceans and Fisheries the authority to “prepare measures to conserve marine organisms under protection” and “implement such measures.”²⁰⁹ However, we were unable to identify any specific measures or requirements for specific marine mammals.

As mentioned above, South Korea’s National Institute of Fisheries Science (NIFS) has undertaken research to reduce the bycatch of marine mammals in Korean fisheries, including stow net, trap, set net and trawl fisheries. NIFS is also conducting research on a zipper-type mechanism allowing trapped animals to escape and is testing ‘on demand’ buoy line release systems. NIFS is conducting tests to gauge the finless porpoise response to acoustic deterrent devices due to concerns over habituation and effects of these devices on other marine organisms.²¹⁰ In May of 2023, the Ministry of Oceans and Fisheries issued an “urgent” tender notification, calling for a “business operator to undertake research services to reduce the bycatch of marine mammals in mussel farms.”²¹¹ Despite these various research projects taking place, they do not appear to require bycatch mitigation measures in South Korea’s export fisheries.

Overall, while several South Korean laws may address marine mammal bycatch generally, and the government is authorized to mitigate bycatch and has undertaken some research on methods for reducing bycatch, we were unable to identify any specific bycatch mitigation measures. We note this is possibly due to translation challenges, as it was challenging to find

²⁰⁵ (Republic of Korea, n.d.), Art. 20.

²⁰⁶ Conservation and Management of Marine Ecosystems Act, Art. 20(3).

²⁰⁷ Conservation and Management of Marine Ecosystems Act, Art. 18.

²⁰⁸ Conservation and Management of Marine Ecosystems Act, Art. 16.

²⁰⁹ Conservation and Management of Marine Ecosystems Act, Art. 19(1).

²¹⁰ (IWC, 2023)

²¹¹ See <https://www.mof.go.kr/doc/ko/selectDoc.do?menuSeq=379&bbsSeq=13&docSeq=51063>

license requirements or details and urge NMFS to insist that South Korea demonstrate that specific bycatch mitigation measures apply.

d. South Korea Lacks Monitoring Procedures to Estimate Marine Mammal Mortality and Serious Injury from Fisheries

The MMPA Imports Rule also requires South Korea 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.

As discussed above, South Korea requires the reporting of bycatch at Korean ports under the Notice on Conservation and Management of Whale Resources.²¹² However, research indicates that bycatch of cetaceans is drastically underreported.^{213,214} Researchers estimate that the bycatch incidents reported and landed in Korean ports likely represent half of the true level of commercial bycatch of cetaceans.^{215,216,217,218} Interviews with local stakeholders in South Korea suggested that illegal and unreported catch of minke whales may be even larger than the legal bycatch.^{219,220} In addition to failing to capture all bycatch of cetaceans, South Korea's bycatch reporting system may not require reporting bycatch of pinnipeds, as our translation of the law requires reporting of "whales," not cetaceans.

In addition to reporting bycatch at ports, onboard observer coverage is critical for monitoring bycatch in commercial fisheries. South Korea does not appear to have an observer program in place for its domestic fisheries.²²¹ Korea started its scientific observer program for 'distant water fisheries' in 2002 but it does not seem to provide sufficient coverage and has been deemed largely ineffective.²²²

e. South Korea Has Not Published a Bycatch Limit for Its Export Fisheries

The MMPA Imports Rule requires South Korea to calculate a bycatch limit for marine mammals taken in each fishery.²²³ The "bycatch limit" is PBR or a "comparable scientific metric." Because South Korea does not conduct regular surveys of all marine mammal stocks that interact with its export fisheries and does not appear to have an effective system of

²¹² Notice on Conservation and Management of Whale Resources, Art. 10.

²¹³ (Lukoschek et al. 2009)

²¹⁴ (M. Kim et al. 2020)

²¹⁵ (M. Kim et al. 2020)

²¹⁶ (Baker et al. 2006)

²¹⁷ (Lukoschek et al. 2009)

²¹⁸ (Smith et al. 2014)

²¹⁹ (MacMillan and Jeonghee 2011)

²²⁰ (Smith et al. 2014)

²²¹ (Varkey et al., 2006)

²²² (Shon et al., 2014)

²²³ 50 C.F.R. § 216.24(h)(6)(iii)(C).

monitoring bycatch in most fisheries, it is unlikely South Korea has calculated a bycatch limit for most export fisheries. As noted below, PBR has been calculated for minke whales.

f. South Korea Cannot Demonstrate that Serious Injury/Mortality from Export Fisheries Is Below the Bycatch Limit

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

Based on our assessment, South Korea will likely not be able to demonstrate that mortality and serious injury from its export fisheries do not exceed the bycatch limit. Even if South Korea had the data to calculate PBR for its marine mammal stocks, it will not be able to demonstrate that bycatch does not exceed PBR for each export fishery because it lacks an effective bycatch monitoring system.

South Korea’s bycatch of minke whales may exceed PBR. As discussed above, Song (2011) estimated that PBR for minke whales is 52.5 individuals using the minimum population estimate of 5247 individuals. An estimated 827 minke whales were bycaught from 1999 to 2003 for an annual death average of 165.4.²²⁴ Another study reports that 1,131 minke whales were reported as bycatch from 1996-2008, with an annual average mortality of 87 individuals.²²⁵ In 2020, South Korea also exceeded estimated PBR with 59 bycaught minke whales.²²⁶ South Korea also has very high bycatch of finless porpoise, an endangered species.

VII. Conclusion and Recommendations

It is unlikely that South Korea will be able to demonstrate that it meets the requirements of the U.S. MMPA Imports Rule for all export fisheries. South Korea does not prohibit the intentional killing of all marine mammals and does not conduct marine mammal surveys for all stocks affected by export fisheries. South Korea also lacks a comprehensive bycatch monitoring system, likely lacks detailed bycatch mitigation measures, and has not published a bycatch limit for its export fisheries. South Korea requires reporting of cetacean bycatch and prohibits commercial whaling. However, neither of these policies are adequately enforced and there is an economic incentive for commercial fishers to catch whales due to the nation allowing the sale of bycaught whales. Without an effective bycatch reporting and monitoring system and marine mammal stock surveys, South Korea is unable to calculate PBR. Finally, peer-reviewed literature indicates that South Korea may be exceeding PBR for minke whales.

South Korean waters are highly biodiverse, and fishing gear entanglement threatens numerous species. Bycatch occurs in South Korean fisheries, and the allowed sale of bycaught marine mammal meat has created an economic incentive for fishers to intentionally catch, or neglect to release marine mammals bycaught in their nets. Under South Korea’s current policies,

²²⁴ (Baker et al., 2007)

²²⁵ (Lukoschek et al. 2009)

²²⁶ (IWC and South Korea 2020)

the information available to our organization indicates that an export ban is appropriate for some of South Korea's export fisheries.

VIII. Literature Cited

- AIDCP. 2021. "Report on International Dolphin Conservation Program." AIDCP-43-02 Rev. Agreement on the International Dolphin Conservation Program. https://www.iattc.org/Meetings/Meetings2021/IATTC-98b/Docs/AIDCP/_English/AIDCP-43-02-REV-13-Oct-2021_Report%20on%20International%20Dolphin%20Conservation%20Program.pdf.
- 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 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>.
- Anderson, R. Charles. 2014. "Cetaceans and Tuna Fisheries in the Western and Central Indian Ocean." 2. International Pole & Line Foundation.
- Baker, C., Vimoksalehi Lukoschek, S. Lavery, M. Dalebout, M. Yong-un, T. Endo, and N. Funahashi. 2006. "Incomplete Reporting of Whale, Dolphin and Porpoise 'bycatch' Revealed by Molecular Monitoring of Korean Markets." *Animal Conservation* 9 (August): 474–82. <https://doi.org/10.1111/j.1469-1795.2006.00062.x>.
- Baker, C.S., Cooke, J.G., Lavery, S., Dalebout, M.L., MA, Y.U., Funahashi, N., Carraher, C. and Brownell Jr, R.L., 2007. "Estimating the number of whales entering trade using DNA profiling and capture-recapture analysis of market products. *Molecular Ecology*." 16(13), 2617-2626.
- Bath, G.E., Price, C.A., Riley, K.L. and Morris Jr, J.A., 2023. A global review of protected species interactions with marine aquaculture. *Reviews in Aquaculture*.
- 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>.
- CCAMLR. 2019. "Report of the Thirty-Eighth Meeting of the Commission." ISSN 1031-3184. Convention on the Conservation of Antarctic Marine Living Resources. https://meetings.ccamlr.org/en/system/files?file=e-cc-38_0.pdf.
- . 2021a. "Report of the Working Group on Fish Stock Assessment." Convention on the Conservation of Antarctic Marine Living Resources. <https://meetings.ccamlr.org/en/system/files?file=e-sc-40-a7.pdf>.
- . 2021b. "Schedule of Conservation Measures in Force 2021/22." Convention on the Conservation of Antarctic Marine Living Resources. <https://www.ccamlr.org/en/system/files/e-schedule2021-22.pdf>.
- "Draft. The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean." 2021. Summary Report Eighteenth Regular Session of the Commission. https://meetings.wcpfc.int/system/files/2022-02/Draft%20WCPFC18%20Summary%20Report%20with%20Attachments_as%20at%2007%20February%202022_for%20participants%20comments.pdf.

- Endo, Tetsuya, Ma Yong-Un, C. Scott Baker, Naoko Funahashi, Shane Lavery, Merel L. Dalebout, Vimoksalehi Lukoschek, and Koichi Haraguchi. 2007. “Contamination Level of Mercury in Red Meat Products from Cetaceans Available from South Korea Markets.” *Marine Pollution Bulletin* 54 (6): 669–77.
<https://doi.org/10.1016/j.marpolbul.2007.01.028>.
- Environmental Justice Foundation (EJF). 2020. “Illegal Fishing and Human Rights Abuses in the Korean Fishing Fleet.” UK: Environmental Justice Foundation.
<https://ejfoundation.org/resources/downloads/IllegalfishinghumanrightsKorea.pdf>.
- Felix 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.
- Hyun, Woo Kim. 2018. “Republic of Korea Progress Report Summary.” Progress Report Summary. IWC.
- Hyun, Woo Kim. 2021. “Republic of Korea Progress Report Summary.” IWC.
- IATTC. 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.iattc.org/Meetings/Meetings2021/IATTC-98a/Docs/_English/IATTC-98a-01_The%20fishery%20and%20status%20of%20the%20stocks%202020.pdf.
- IATTC Scientific Advisory Committee. 2022. “2021 Annual Scientific Observer Report for Korea Tuna Longline Fishery in the Antigua Convention Area.” SAC-13 INF-A(g). 13th Meeting. Inter-American Tropical Tuna Commission.
https://www.iattc.org/PDFFiles/CatchReports/Observers-on-LL/_English/KOR-C-19-08_Scientific%20observers%20on%20board%20longliners.pdf.
- IUCN. 2023. The IUCN Red List of Threatened Species. <https://www.iucnredlist.org>. Accessed on 1 June 2023].
- IWC. 2019. “Report of the IWC Workshop on Bycatch Mitigation Opportunities in the Western Indian Ocean and Arabian Sea.” Nairobi, Kenya: International Whaling Commission.
https://www.bmis-bycatch.org/system/files/zotero_attachments/library_1/WIEQBEX3%20-%20RS9612_IWC_Indian_Ocean_Arabian_Sea_bycatch_report_2019.pdf.
- IWC and South Korea. 2020. “2019 Large and Small Cetacean Bycatch.” International Whaling Commission: Portal: Progressreportspublic. 2020.
<https://portal.iwc.int/progressreportspublic/report>.
- IWC. 2023. Report of the Scientific Committee 69a. Bled, Slovenia 24 April- May 6, 2023 and IWC. 2023. Annex J: Report of the Sub-Committee on Non-Deliberate Human-Induced Mortality of Cetaceans (HIM).
- Kang, Sue, and Marcus Phipps. 2000. “A SURVEY OF WHALE MEAT MARKETS ALONG SOUTH KOREA’S COAST.” *TRAFFIC East Asia*, 18.
- Kim, Miyeon, Hoa Quynh Nguyen, Yoonjung Yi, Jaeha Ahn, Ye Eun Kim, Soojin Jang, Sanha Kim, Sungsik Kong, and Amaël Borzée. 2020. “Policy Recommendation on Whaling, Trade and Watching of Cetaceans (Mammalia Cetacea) in the Republic of Korea.” *Biodiversity Journal* 11 (1): 255–58.
<https://doi.org/10.31396/Biodiv.Jour.2020.11.1.255.258>.
- Kim, Young-dong. 2018. “One Gang Caught in Japan for Smuggling and Distributing Whale

- Meat Disguised as Shark Meat.” *The Hanky-Oreh, Seoul, Republic of Korea*.
https://www.hani.co.kr/arti/area/area_general/855753.html.
- Korea Legislation Research Institute. 2011. *Wildlife Protection and Management Act*.
- Calderan, S. and Leaper, R. 2017. “Investigations of countries exporting seafood to the US which may be subject to regulation under the MMPA bycatch rule with respect to cetaceans.”
- Lee, Byung-wook. 2019. “53 whales illegally caught in the last 5 years – 31 illegal whaling vessels nationwide.” *News Penguin*, 2019.
<https://www.newspenguin.com/news/articleView.html?idxno=419>.
- Lee, Gun-Ho, Dae-Ho Song, Hyun-Young Kim, and Fisheries Resource and Environment Division, West Sea Fisheries Research Institute, National Institute of Fisheries Science. 2022. “Characteristics of Catch Losses in Stow Nets with Finless Porpoise Excluder Devices and a Strategy to Reduce Them.” *Regional Studies in Marine Science* 50 (February): 102147. <https://doi.org/10.1016/j.rsma.2021.102147>.
- Lee, Seulhee, Seulgi Choi, Ji Hye Kim, Hyun Woo Kim, and Hawsun Sohn. 2018. “Characteristics of the Cetacean Bycatch in Korean Coastal Waters from 2011 to 2017.” *Korean Journal of Fisheries and Aquatic Sciences* 51 (6): 704–13.
<https://doi.org/10.5657/KFAS.2018.0704>.
- Lee, S-M., Y-Y. Choi, M-S. Min, H. Lee, and M-Y. Lee. 2019. “Molecular Species Identification of Whale Meat in South Korean Markets.” *Genetics and Molecular Research* 18 (2). <https://doi.org/10.4238/gmr18171>.
- Lee, Sung Il, Mi Kyung Lee, Junghyun Lim, Youjung Kwon, and Republic of Korea. 2021. “Annual Report to the Commission Part 1: Information on Fisheries, Research and Statistics.” WCPFC-SC17-AR/CCM-12 (Rev.01). Western and Central Pacific Fisheries Commission. <https://meetings.wcpfc.int/node/12158>.
- Lee, Sung Il, Jung-hyun Lim, Mi Kyung Lee, and Youjung Kwon. 2020. “Korea National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2020.” IOTC-2020-SC23-NR10. Indian Ocean Tuna Commission.
- Lukoschek, V., N. Funahashi, S. Lavery, M. L. Dalebout, F. Cipriano, and C. S. Baker. 2009. “The Rise of Commercial ‘by-Catch Whaling’ in Japan and Korea.” *Animal Conservation* 12 (5): 398–99. <https://doi.org/10.1111/j.1469-1795.2009.00313.x>.
- MacMillan, Douglas Craig, and Han Jeonghee. 2011. “Cetacean By-Catch in the Korean Peninsula—by Chance or by Design?” *Human Ecology* 39 (6): 757–68.
- Marine Environment Information Portal. n.d. “Legal Management Marine Life | Marine Environment Information Portal.” Accessed June 13, 2022.
<https://www.meis.go.kr/mes/marineLife/protection/view1.do>.
- “Marine Regions · South Korean Exclusive Economic Zone (EEZ).” n.d. Accessed June 15, 2022. <https://www.marineregions.org/gazetteer.php?id=8327&p=details>.
- Ministry of Fisheries and Oceans. 2023. “Notice on Conservation and Management of Whale Resources.”
- NOAA Fisheries. 2020. “2020 Final List of Foreign Fisheries (LOFF),” 217.
- . n.d. “US Trade in Fishery Products.” NOAA. <https://www.fisheries.noaa.gov/foss>.
- Peatman T, Nicol S (2020) Updated longline bycatch estimates in the WCPO. In: WCPFC Scientific Committee 16th Regular Session. WCPFC-SC16-2020/ST-IP-11, Electronic Meeting.
- Republic of Korea. 1993. *Fishing Vessels Act*.

- . 2009. *Fisheries Act*. Vol. Act No. 17331, May 26, 2020.
https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=54590&type=part&key=27.
- . n.d. *Conservation and Management of Marine Ecosystems Act*.
- Shon, S., Harper, S. and Zeller, D., 2014. Reconstruction of marine fisheries catches for the Republic of Korea (South Korea) from 1950-2010.
- Smith, Zak, Margaretmary Gilroy, Matthew Eisenson, Erin Schnettler, and Stephanie Stefanski. 2014. “The Killing of Marine Mammals in Foreign Fisheries,” 48.
- Song, Kyung-Jun. 2011. “Status of J Stock Minke Whales (Balaenoptera Acutorostrata).” *Animal Cells and Systems* 15 (1): 79–84. <https://doi.org/10.1080/19768354.2011.555148>.
- . 2016a. “Cetacean Strandings in Korean Waters.” *Pacific Science* 70 (1): 35–44. <https://doi.org/10.2984/70.1.3>.
- . 2016b. “Current Stock Situation and Measures for the Management and Conservation of Minke Whales (Balaenoptera Acutorostrata) in Korean Waters.” *Ocean & Coastal Management* 119: 164–68. <https://doi.org/10.1016/j.ocecoaman.2015.10.011>.
- . 2018. “Bycatch of Cetaceans in Korea Fisheries in the East Sea.” *Fisheries Research* 197 (January): 7–9. <https://doi.org/10.1016/j.fishres.2017.10.002>.
- 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/>.
- Statistics Korea. 2021. “Preliminary Results of the Fishery Production Survey in 2020.” <http://kostat.go.kr/portal/eng/pressReleases/2/10/index.board>.
- United States Department of Agriculture Foreign Agriculture Service and Global Agriculture Information Network. 2021. “Korea Seafood Market Update 2021.” Fishery Products KS2021-0014. https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Korea%20Seafood%20Market%20Update%202021_Seoul%20ATO_Korea%20-%20Republic%20of_06-01-2021.
- USITC. 2021. Seafood Obtained via IUU Fishing: U.S. Imports. Publication Number 5168, Investigation Number: 332-575. <https://www.usitc.gov/publications/332/pub5168.pdf>
- Wade, Paul R., Kristy J. Long, Tessa B. Francis, André E. Punt, Philip S. Hammond, Dennis Heinemann, Jeffrey E. Moore, et al. 2021. “Best Practices for Assessing and Managing Bycatch of Marine Mammals.” *Frontiers in Marine Science* 8. <https://www.frontiersin.org/article/10.3389/fmars.2021.757330>.
- Wang, J.Y. , Reeves, R. 2017. *Neophocaena asiaeorientalis*. The IUCN Red List of Threatened Species 2017: e.T41754A50381766. <http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T41754A50381766.en>
- Western and Central Pacific Fisheries Commission. 2018. “Handbook of Conservation Management Measures & Resolutions for WCPFC Regional Observer Programmes.” Western and Central Pacific Fisheries Commission. <https://www.wcpfc.int/system/files/2018%20CMM%20Handbook%20of%20%20CMMs%20for%20WCPFC%20ROP%20Observer%20Programmes.pdf>.
- Williams, P, G Pilling, and S Nicol. 2021. “An Update on Available Data on Cetacean Interactions in the WCPFC Longline and Purse Seine Fisheries.” WCPFC-SC17-2021/ST IP-10. Scientific Committee of the Western and Central Pacific Fisheries Commission.

- Varkey, D., Ganapathiraju, P. and Pitcher, T.J., An Estimation of Compliance of the Fisheries of South Korea with Article 7 (Fisheries Management) of the UN Code of Conduct for Responsible Fishing.
- Yoo, S. 2022 “Korea Seafood Market Update 2022.” United States Department of Agriculture Foreign Agricultural Service.
- Young, M.O., 2015. Marine animal entanglements in mussel aquaculture gear: documented cases from mussel farming regions of the world including first-hand accounts from Iceland (Doctoral dissertation).