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"Measures adopted by the Peruvian Government to protect the small cetaceans in artisanal fisheries: Bycatch mitigation"

Ministry of Production of Perú, Peruvian Sea Institute and Ministry of Environment.



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"MEASURES ADOPTED BY THE PERUVIAN GOVERNMENT TO PROTECT THE SMALL CETACEANS IN ARTISANAL FISHERIES: BYCATCH MITIGATION"

I. REGULATORY MEASURES AND CONTROL ACTIONS

Articles 66, 67 and 68 of the Political Constitution of Peru establish that the natural resources are the patrimony of the Nation and that the State is obliged to promote their sustainable use and the conservation of biological diversity.

According to article 1 of the General Fisheries Law, Decree Law No. 25977, hereinafter the Law, aims to "regulate fishing activity in order to promote its sustained development as a source of food, employment and income and to ensure a responsible use of hydrobiological resources, optimizing economical benefits, in harmony with the preservation of the environment and the conservation of biodiversity. "

The aforementioned Law in its article 2 establishes that the hydrobiological resources contained in the jurisdictional waters of Peru are patrimony of the Nation; and that, consequently, it corresponds to the State to regulate the integral management and rational exploitation of said resources, considering that the fishing activity is of national concern.

From the aforementioned norms it follows that the Peruvian State seeks that the development of fishing activities is sustainable and that such use is consistent with the conservation of biodiversity, among others, with the conservation of small cetaceans.

In this sense, Peru has various regulations aimed at guaranteeing the conservation of the small cetaceans.

One of these norms is Law No 26585, which dates from 1996, which in its article 1 declares the species of marine mammals known as dusky dolphin (*Lagenorhynchus obscurus*), Burmeister's porpoise (*Phocoena spinipinnis*), bottlenose dolphin (*Tursiops truncatus*), and the common dolphin (*Delphinus delphis* and *Delphinus capensis*) and the fresh water cetaceans Amazon river dolphin (*Inia geoffrensis*) and grey river dolphin (*Sotalia fluviatilis*), as legally protected species.

Article 2 of this Law prohibits the extraction, processing and commercialization of referred species.

Through Supreme Decree No. 002-96-PE, the Regulations of the aforementioned Law were approved, which in its articles 2 and 3, it prohibits the consumption of meat from small cetaceans, whether fresh or in any of its conservation and also provides that live specimens found trapped in the nets used in artisanal fishing must be released.

Likewise, article 6 prohibits harassing, hurting, injuring, permanently or intentionally mutilate any specimen of small cetacean.

The most recent regulation at the national level regarding the conservation of cetaceans has been through Ministerial Resolution No. 451-2019-PRODUCE, which, among others, establishes the following:

- I. The minimum approach distances to cetaceans, among others, when said species are found in feeding and socialization activities.
- II. The specification of the signals that allow the identification of feeding activities and socialization.
- III. The prohibition to approach or approach groups of cetaceans with young or a mother with calves.
- IV. The specification that in the event of an accidental collision with a cetacean or it is one injured or entangled in a net or fishing gear, such situation must be reported to IMARPE for the adoption of the corresponding measures.

Considering the regulatory framework aimed at the protection of cetaceans, the Ministry of Production (PRODUCE), through the General Directorate of Supervision, Inspection and Sanction, carries out the inspection work with the purpose of verifying compliance with said framework. The control work conducted by PRODUCE is complemented by the work of Regional Governments, supported by institutions such as the Public Ministry, Ports and Coast Guard General Directorate (DICAPI) of the Ministry of Defense (MINDEF), Peruvian National Police (PNP), among others.

It should be noted that article 134 of the Regulations of the Law No. 25977, approved by Supreme Decree No. 012-2001-PE, establishes administrative infractions, including some related to protected species:

- To extract hydrobiological resources during closed seasons or in unauthorized periods.
- To extract species protected by special legal provisions.
- To exceed the established percentages of bycatch.
- To receive or process protected or prohibited species by regulations.
- To transport, commercialize or store protected species.

Finally, it is important to indicate, that the cited regulation is intended to mitigate the incidental capture of small cetaceans in the artisanal fishery, which in turn will contribute to the conservation of resources.

II. ON BOARD OBSERVATIONS BY IMARPE

Notwithstanding the regulation adopted by the Peruvian Government, seeks to reinforce the measures adopted, since it is recognized that bycatch is one of the greatest threats to the survival of small cetaceans (Mitchell 1975, Perrin et al., 1994, Brownell, 2019), particularly in gillnets (Read et al., 2006; Lewison and Crowder, 2004, 2007; Wallace et al., 2010; Alfaro- Shigueto et al., 2011). In spite of the prohibition of hunting, possession and commercialization of small cetaceans, there is evidence that these captures, mainly those of incidental nature, still occur in various ports along the Peruvian coast.

Mangel et al. (2010), reported that the incidental capture of minor cetaceans in Peru, probably exceeded 10,000-20,000 animals per year. Their study reported a total of 253 dolphins caught during 66 fishing trips in both longline and gillnet, for the port of Salaverry from 2005 to 2007. Two of the most commonly captured species were the dusky dolphin (*Lagenorhynchus obscurus*) and the Burmeister's porpoise (*Phocoena spinipinnis*), which have conservation priorities considered by the Cetacean Specialists Group of the International Union for Conservation of Nature (IUCN).

Alfaro-Shigueto et al. (2018), report bycatches widely distributed in the artisanal gillnet fishery in Peru. Van Waerebeek et al. (2017), using stranding data (2000-2017) as a proxy for removal, found that the most affected cetaceans were *Phocoena spinipinnis* (66.3%), *Lagenorhynchus obscurus* (14.9%), *Delphinus spp.* (10.1%), *Tursiops truncatus* (8.5%).

Regarding the aforementioned problem, IMARPE carries out on board Observations on large scale vessels through the Programa Bitácoras de Pesca. Despite not being a smaller-scale fleet, it can be observed that the trips carried out between 2000 and 2019, reported interaction of the same species: *T. truncatus* and *L. obscurus* (Fig. 1). The development of this activity allows to clarify the panorama of the interactions and their real scope, as well as identifying the hotspots where these conflicts occur.

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INTERACCIONES ENTRE CETÁCEOS Y PESQUERÍAS



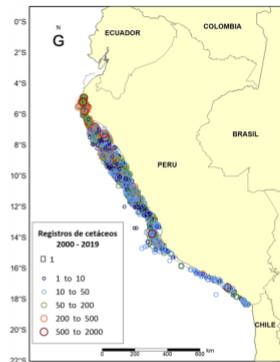
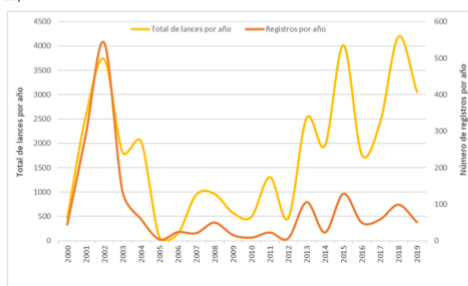
DISTRIBUCIÓN DE LA INTERACCIÓN ENTRE CETÁCEOS Y LA FLOTA INDUSTRIAL

Avistamientos de cetáceos mayores

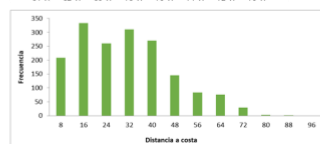
Los avistamientos de misticetos se registraron entre los 5°S y 15°S. Las ballenas jorobadas fueron avistadas en su mayoría, entre los 6° y 9°. Los avistamientos de cachalote *Physeter macrocephalus* fueron reportados a la altura de Supe, en los 11° S y frente a Pisco en los 13°S. Los años de mayor número de avistamiento de cetáceos mayores fueron 2002, 2019, 2017 y 2016. Sin embargo, esto no refleja necesariamente la abundancia de cetáceos mayores, ya que a partir del año 2014 se incrementó el esfuerzo y por lo tanto, el tamaño de muestra.

Avistamiento de cetáceos menores

Del total de lances evaluados a lo largo de toda la costa peruana entre los años 2000 y 2019, solo se observó cetáceos menores en el 4.84% (n = 1 720 lances). La especie con mayor cantidad de registros fue *Tursiops truncatus*, representando el 37.27% del total de avistamientos (n = 641), seguida por *Lagenorhynchus obscurus*, que alcanzó el 35.58% (n = 612).



GRUPO	ESPECIE	NOMBRE COMÚN
CETÁCEOS MAYORES	Balaenopteridae	Cetáceo mayor No Identificado
	<i>Megaptera novaeangliae</i>	Ballena jorobada
	<i>Physeter macrocephalus</i>	Cachalote
CETÁCEOS MENORES	Delphinidae	Cetáceo menor no Identificado
	<i>Tursiops truncatus</i>	Delfín nariz de botella
	<i>Lagenorhynchus obscurus</i>	Delfín oscuro
	<i>Delphinus capensis</i>	Delfín común de hocico largo
	<i>Delphinus delphis</i>	Delfín común de hocico corto
	<i>Globicephala sp.</i>	Ballena piloto



Frecuencia de avistamientos a diferentes distancias de costa

Fuente de información: IMARPE
S. RIVADENEYRA/17.08.2020

Fig. 1. Interaction between cetaceans and industrial fisheries in the Peruvian coast (2000-2019)

III. MONITORING BY THE PERUVIAN SEA INSTITUTE THROUGH ITS COASTAL LABORATORIES

Another measure adopted by the Peruvian State, through IMARPE, is the constant monitoring carried out by its coastal Laboratories, which allows

obtaining, in some cases, systematized information on small cetacean's bycatch, including the records of interactions and evaluation of the stranding events.

The information collected about the incidental capture of small cetaceans is detailed below:

Characterization of gillnets in Lambayeque:

In the Lambayeque region there are 4 landing points: Puerto Eten, Caleta Santa Rosa, Puerto Pimentel and Caleta San José. Artisanal fishing in the region uses various types of boats:

- Medium-sized boats: use gillnet, have a haul capacity between 4 and 25 tons. There are two types of these boats: boats with a central engine and the use of *winche*. The largest ones are focused on Giant Squid (*Dosidicus gigas*), they use polyfilament yarn nets, 30 to 50 bzs long and 9 to 12 bzs high, with a mesh size from 7 "to 12". These vessels are also used for the fishing of sharks, mobules and manta rays (*Mobula spp.* and *Manta birostris*), through the use of driftnets.
- Smaller boats: they use polyfilament nets that are 30 bzs long and 2 to 5 bzs high. Their target species is the eagle ray (*Myliobatis spp.*) and other smaller elasmobranchs. To this same group of nets, some fishermen adapt them for surface fishing, through adhesion of empty drums at the beginning and end of each group of 10 nets.
- Smaller vessels working in coastal areas use bottom nets about 30 bzs long, 2 bzs high, and a mesh size of 4.5". They target smooth-hound shark (*Mustelus spp* and *Triakis maculata*), these nets are used with a good amount of lead to get to the bottom of the column of water.
- Large fleet with smaller vessels called *chalanas*, which have approximately 4 tons of haul capacity, outboard engine and bottom trammel and surface nets. For surface fishing they use a 4" mesh for the capture of: bonito (*Sarda sarda chilensis*), pampano (*Peprilus spp*) and lisa (*Mugil cephalus*); and for bottom fishing they use 2.5 " and 3 " nets of size, which target species are: cachema (*Cynoscion analis*) and 4" for tollos.

Small cetaceans involved in interactions

a) Burmeister's porpoise *Phocoena spinipinnis*

Burmeister's porpoise, which is categorized as "Almost Threatened" by the IUCN Red List, interacts mainly with coastal trammel and bottom nets, which target the common tollo, and remain about 12 hours in the water. Generally, when the nets are lifted after a long time of fishing, the porpoises emerge entangled and dead.

In another bottom gear that targets cachema (*Cynoscion analis*), operating time is only two hours, so there have been reported higher possibility of survival. Most

records of interaction occurs in Los Chanchos (06 ° 28'S; 80 ° 24'W) and La Casa (06 ° 37'S; 80 ° 09'W) mainly between 3 and 10 nautical miles from the coast (Fig. 2). Other areas with the lowest incidence of this species are between San Jose (06 ° 46'S; 79 ° 58'W) and Puerto Eten, always in coastal areas within the continental shelf of Lambayeque.

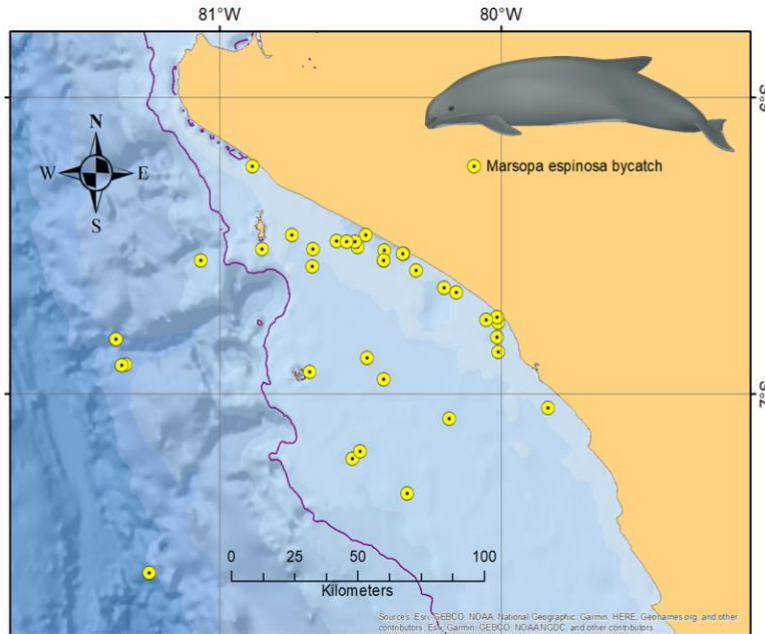


Fig. 2. Interaction areas of Bumeirster'a porpoise (*Phocoena spinipinnis*) in the coast of Lambayeque.

b) Common dolphins (*Delphinus spp.*) and bottlenose dolphins (*Tursiops truncatus*)

These species of dolphins show a oceanic distribution, near the break zone of the continental shelf and interact with the gillnet fleet of surface drift of multifilament. They are generally found in waters between 30 and 50 nm from the coast, and they have been observed interacting in the spring months in the area covered by the continental shelf between the Lobos de Tierra and Lobos de Afuera islands.

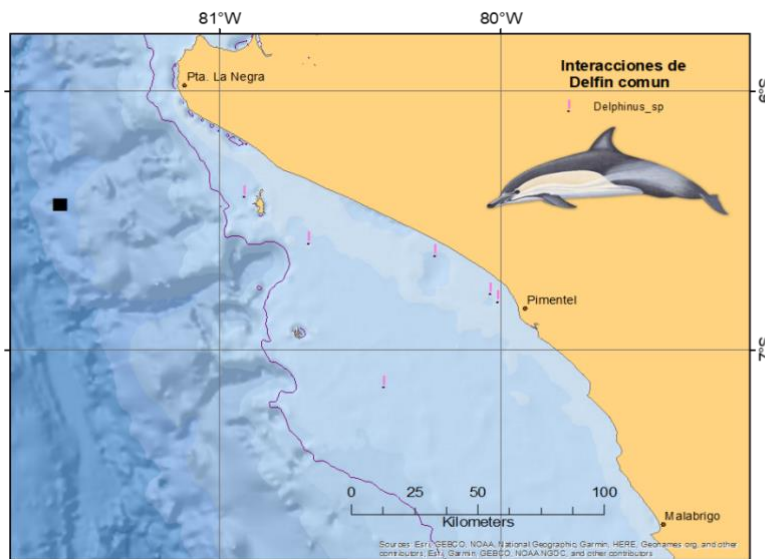


Fig. 3. Interaction areas of common dolphins (*Delphinus spp.*) in the coast of Lambayeque.

IV. MONITORING OF STRANDED FAUNA

Since 2014, IMARPE monitors the stranding of small cetaceans in the area comprised by the regions: La Libertad, Lambayeque, Piura and Tumbes. These assessments have provided important information on the interaction between marine mammals and fisheries. The results of this study showed that the Burmeister's porpoise *Phocoena spinipinnis* and long-beaked common dolphin *Delphinus capensis* were the most affected by capture for human consumption and entanglement with fishing nets. A total of 7,905 dead marine mammals were recorded, out of which 24% were cetaceans (13 species) (Fig. 4).

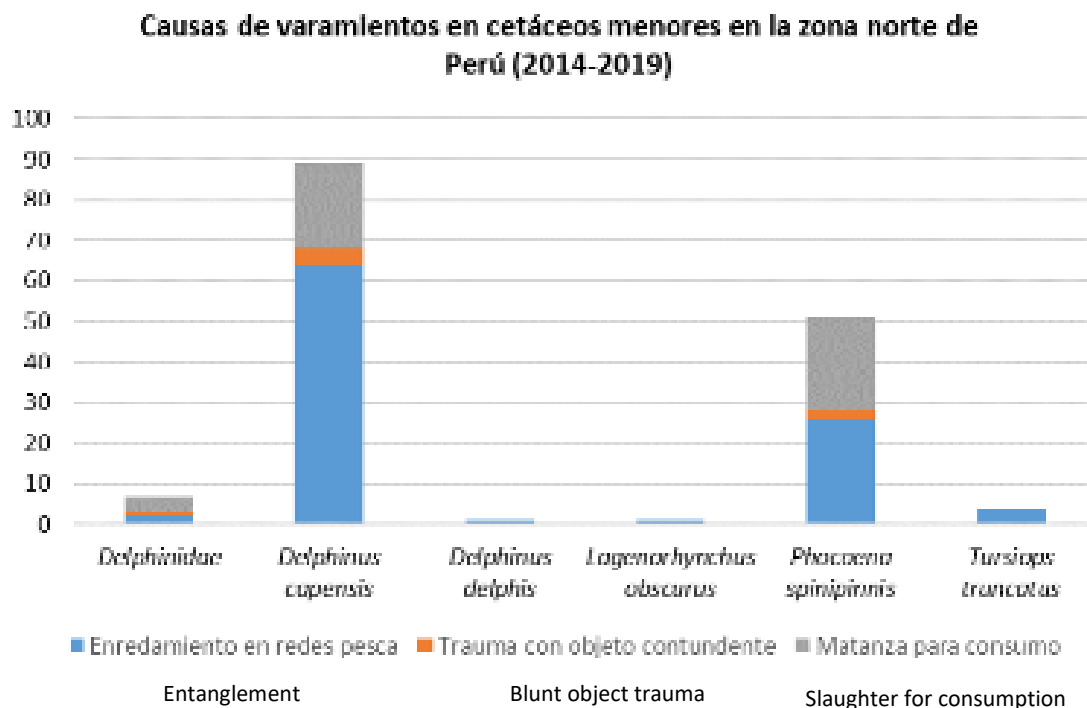


Fig. 4. Small cetacean species reported in the stranding monitoring on the north coast between 2014 and 2019.

V. MITIGATION EFFORTS

Mangel et al (2013), experimented with the use of acoustic devices (pingers) in gillnets targeting elasmobranchs, between 2009 and 2011 in the port of Salaverry. The results reported a reduction in small cetacean's bycatch by 37%, mainly on common dolphins *Delphinus spp.*

In 2019, WWF Peru in a joint work with IMARPE evaluated the use of devices to reduce the incidental capture of marine mammals in gillnets in Tumbes, Salaverry, Pucusana (Lima) and Tambo de Mora (Pisco). Preliminary results of the study showed that the use of LED lights resulted in a 67% reduction in small cetacean's bycatch (*Phocoena spinipinnis* and *Lagenorhynchus obscurus*, mostly) in the port of Tambo de Mora. On the other hand, the use of 50 - 70 kHz pingers reduced the dolphin catch by 60% in the ports of Salaverry and Pucusana during the study period.

IMARPE has been collaborating in technical support and raising awareness for the crew members of the “Salvamares Program” of the National Society of Fisheries (SNP), which include:

- Information for the correct identification of top predators and improvement in registry of species caught incidentally.
- Guidelines for the release of top predators during anchovy fishing operations.

In the study carried out by Bielli et al. (2020), LED lights were used in gillnets of artisanal fishing boats from the ports of San José, Salaverry and Ancón, between 2015 and 2018. They found that the probability of bycatch in the implemented nets with LED lights was reduced by 74.4% for sea turtles and 70.8% for small cetaceans.

VI. IN CONCLUSION

For the Peruvian Government, it is important that fishing activities are sustainably developed and consistently with the conservation of biodiversity and specifically of cetaceans, in compliance with the General Law of Fishing and other measures detailed in this document.

In this sense, there are various regulations aimed to guarantee this conservation goal, as well as control actions developed to verify the compliance of the adopted regulation. Likewise, there are actions aimed at gathering information on the interaction of fishing activities with cetaceans and the incidental capture, as well as measures for raising awareness, conducted by IMARPE. Nevertheless, cetaceans bycatch is still a topic of concern for the Peruvian Government.

In this framework, the Peruvian State has been managing a pilot project with the International Whaling Commission (IWC) to reinforce the work that is being carried out with the main purposes of bycatch reduction and conservation of small cetacean's species.