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IFOP is a source of pride for Chile and it is necessary that its work in defense of aquaculture resources and environment be known

LUIS PAROT EXPLAINS THAT FISHING DEVELOPMENT INSTITUTE (IFOP) IS THE APPLIED RESEARCH INSTITUTION THAT HAS THE LARGEST TERRITORIAL PRESENCE AND ADVANCED HUMAN CAPITAL TO CARRY OUT ENVIRONMENTAL MONITORING OF AQUACULTURE INDUSTRY AND RESEARCH CLIMATIC CHANGE IMPACTS ON THE WHOLE ECOSYSTEM.

-What IFOP aims for?

-Fishing and aquaculture applied research. It generates public value knowledge, so that sectorial institutions (Subpesca) take administrative and regulatory measures for fishing and aquaculture. In short, our task is to protect resources and marine and freshwater environment, which are impacted by these human activities.

-How has the pandemic affected you?

-We have almost 200 scientific observers from Arica to Puerto Williams, taking hydrobiological and oceanogra-



Luis Parot, executive director of the Institute for Fisheries Development

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phic data in coves, ports and aboard industrial and artisanal fishing vessels. That task has been affected by quarantines, travel controls and the general decline in activity that occurred during the first months. Even so, we will reach 75% of the activity of a normal year by year-end.

-How does this situation affect IFOP advice given to Subpesca?

-In general, the models we use to build up this consultancy use historical data. Thus, they do not react immediately to a lack of



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data or exceptionally good data in a season, since in order to change the trend, several years of trend-setting data are required. The natural dialogue that exists within the Scientific-Technical Committees (CCT), which are the place for scientific discussion and analysis, is a very good tool to ensure that advice is maintained at a level of excellence.

-How does IFOP sees fisheries resources and aquaculture status?

-Current Fisheries Law established what it aptly calls a "precautionary approach" that should inspire decisions on these matters. Recognizing that there is always uncertainty in forecasts, he decides to take the most conservative decision: protect resources. As long as all actors in fisheries understand and abide by the rules and their inspiring principles, we can increase fish yields in the medium term. Today, we have almost all of the resources in full or overexploitation, but considering remained biomass after overfishing to which they were subjected during the 90s. Recovering the fishing biomass to its pre-crisis level would be a very good first step.

-Does illegal fishing affect?

-Of course! Starting from generating a hidden catch figure that is one of the data considered in the models, to irreparable damage to work transparency and formality in the fishing sector, especially the artisanal sector and in the distribution chain. When these mafias are created, all the activity is invaded by corruption in the whole column and variety of actors.

-What about aquaculture and its environmental impacts?

-Aquaculture has made an enormous contribution to the country's development and especially to the South Austral zone, but clearly and it still happens in other economy sectors, we do not have a proactive State that guides and accompanies private sector in its initiatives. We are paying very dearly for this lack of a foresighted and regulatory state, and it explains the resistance of groups and communities that are very opposed to the aquaculture industry, based mainly on its environmental impacts. But that can be remedied with high-level research, with environmental monitoring in the areas involved and with the more proactive and participatory management of an industry in constant expansion and technological evolution.

-How IFOP relates to aquaculture?

-IFOP has 228 environmental monitoring stations in inland waters between south of Los Ríos Region to Beagle Channel, plus 79 stations in the Pacific from Coliumo to the northern sector of Aysén Region, all of them for tidal monitoring red. We do modeling of currents and tides in inland sea of Chiloé and Aysén, the results of which can be seen at <http://chonos.ifop.cl/>, a useful predictor to know how particles move in fjords and channels area. In addition to environmental monitoring, we do biological sampling throughout the area to detect toxins in mollusks also associated with red tide, we do research in animal health

and small-scale aquaculture. IFOP has a strong presence in southern zone with its centers in Puerto Montt, Chiloé (Ancud, Putemún and Hueihue), Aysén and Punta Arenas.

In sum, IFOP is the research institution with the largest territorial presence and advanced human capital to carry out environmental monitoring of the aquaculture industry and study of climate change's impact on the entire ecosystem.

-It seems that climatic change was a postponed concern due to the pandemic...

-It is probable, but for that reason it is not less urgent. Climatic change affects ecosystems crucial variables, causing changes in the species behavior or replacing them by others. In fjords and channels case, temperature increase will increase fresh water contribution and will bring changes in currents and tides and will bring effects on biological processes. Investigating these phenomena intensely and in a timely manner, allows us to know them and anticipate their effects.

-Is IFOP prepared for this task?

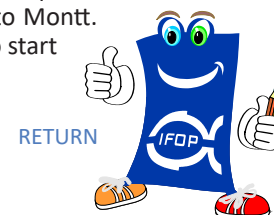
-IFOP was created by Corfo 56 years ago, in which it has built a solid tradition that is reinforced today by its 170 high-level researchers, many of them internationally recognized. We have established relationships with main research centers in the world, clear high-level improvement policies, we are peer-reviewed in our models and processes, part of our data program is already under the ISO 9001 standard and we are determined to win a relevant space in the discussion of subjects in which we have specialized. IFOP, for example, carried out the first Krill fishing campaigns in Antarctica, therefore, any new fisheries research initiative that wants to develop there should consider IFOP in its role, recognized in the law, as an advisor to the State. in fishing and aquaculture.

-But are there other topics that interest you?

-Of course; Until a few months ago and around the CC, initiatives were known that showed a lack of basic information. As IFOP, we approached to speak with the Ministry of Sciences to tell them what we do and what infrastructure and data we have and, from that first opportunity, a very useful working relationship was generated; The same goes for the Environment and Foreign Ministry, which IFOP can support with information, management, professional support and high-level research and favor the work of the country involved in its important decisions.

-What challenges does IFOP face today?

-The first is high-level training for its researchers and all our processes ISO certification. The second is to have a good time, with a very collaborative internal work, this time of restrictions imposed by the pandemic. And of course our flagship project which is to build a new Aquaculture Division headquarters based in Puerto Montt. We are very hopeful to get support to start work soon



-Even with pandemic restrictions?

-Yes. We have the land, we are about to obtain the building permits and it is a project with many positive externalities: science and research; in fishing and aquaculture, two very significant activities for Chile; it strengthens the scientific capacities and the character of leaders of Los Lagos and Aysén regions, has an affordable budget of 5 million dollars equipped and can be executed in 18 months.

My effort aims at ensuring that its construction is included in the economic reactivation program promoted by President Sebastián Piñera's government. We already have the Mayor support, Corfo, Economy Ministry, and Housing Development Ministry and I hope to have Ministry of Public Development support, Alfredo Moreno. If all goes well, we can start construction in the first quarter of 2021.

"I am especially confident in the President's support, because he demonstrated it by supporting the construction of two scientific research vessels," he asserts.

Source: La Segunda newspaper / IFOP press

IFOP's important role in technical scientific committees

A TECHNICAL SCIENTIFIC COMMITTEE (TCC) IS THE UNDERSECRETARIAT OF FISHERIES AND AQUACULTURE ADVISORY BODY CONSULTED ON SCIENTIFIC MATTERS RELEVANT TO FISHERIES AND AQUACULTURE MANAGEMENT.

There are currently eleven TTCs, which were created from No. 20,657 Law (Fisheries and Aquaculture General Law). A first hierarchical level divides them into: Committees oriented to fishing activity, and aquaculture sector for environmental, health and management purposes Advisory committees, where there are 3 Committees.

In the fishing sector case, Fisheries Law established eight Committees creation, which collaborate in making decisions for different groups of economically relevant fisheries. A group of five TCAs focus on pelagic, demersal fisheries and their regional divisions. Two TCCs advise on to benthic fisheries and demersal crustaceans related matters, respectively. While a TCC provides elements for chondrichthyan species management, highly migratory and environment interaction.

Luis Parot Donoso, IFOP Executive Director, referred to the role played by Fisheries Development Institute



in the Committees "provides scientific information, Scientific Committees necessary knowledge to give recommendations to Fisheries Undersecretariat, fishery administration and regulation measures; particularly when these committees refer to a species that is subject to catch quotas establishment, it is that resource state base information provided by IFOP, according to certain previously established parameters, recommends quota ranges in which the authority can move considering eventually other antecedents of social, labor and economic character.

IFOP role is very relevant when making decisions that protect sea resources, marine environment and ensure their preservation in the future"

Dr. Juan Carlos Quiroz, IFOP's Resource Evaluation Department head, explained "the creation of Committees was formalized in February 2013 within the framework of the regulations of Law No. 20,657. Its objective was to provide transparency and scientific support to processes and decisions related to fisheries management and ordinance measures (for example, fishing quotas and extractive closures), setting aside management decisions from the Zonal Fishing Councils. Currently its operation is based on sessions (at least 6) that are temporarily distributed throughout the year, making it compatible with relevant milestones for management (for example, new data for the decision-making process, or updates of the methods to estimate limit catches).

The Committees are made up of three types of members. The first type corresponds to members nominated by public competition, who make up the quorum for the decision-making process. This group of participants has extensive experience in the fishing sector, and their impartiality, objectivity and absence of conflict of interest must be demonstrable. The



second type are institutional members, who have expert knowledge of the fisheries, and are involved in the management procedure. For example, scientists in charge of the fisheries data collection and population assessment programs. Finally, the third group are members from the productive sector, such as scientific advisers to the industry and teachers representing the extractive sectors, whose participation in the Committees is merely consultative since they do not have the right to vote during the decision-making process.

The Fisheries Development Institute participates in all (11) of the fishing and aquaculture sector Scientific Committees. In the case of the Fisheries Committees (8), IFOP contributes through two members in each Committee. These representatives are selected by the governing body of the Institute in consistency with their experience and scientific-technical knowledge of the fisheries addressed by the Committee”.

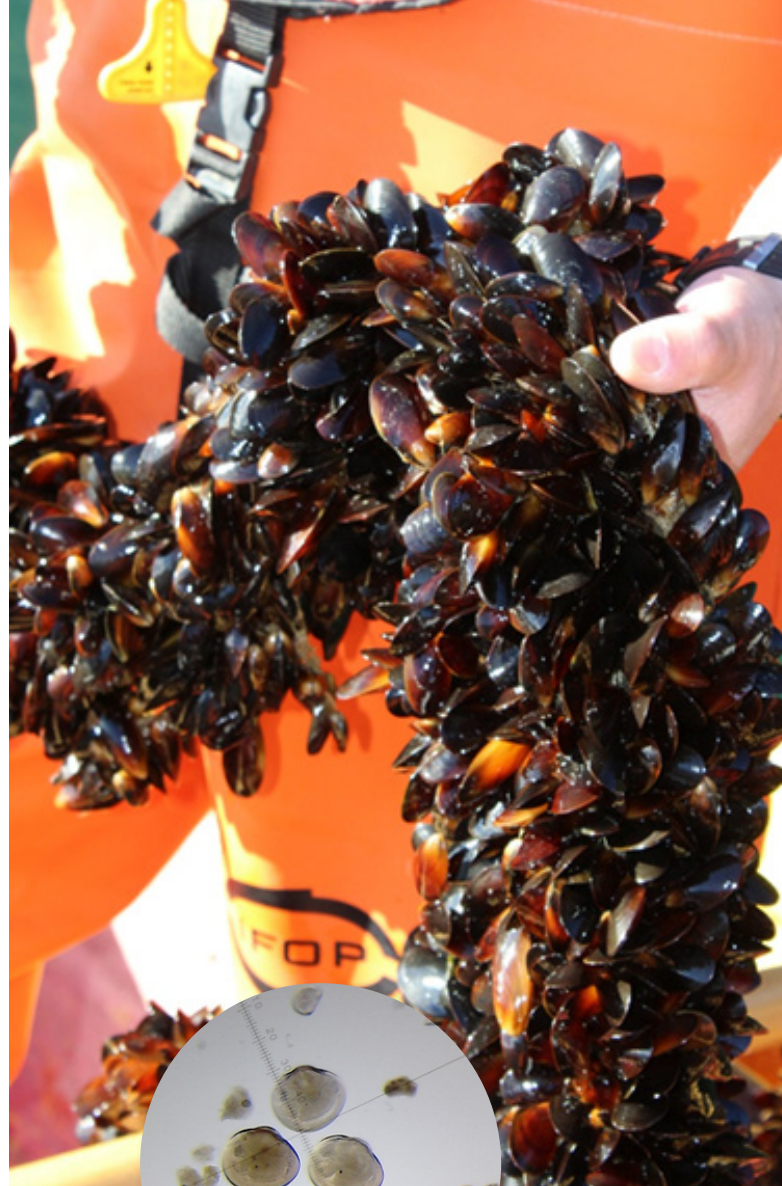
IFOP will hold a larvae and capturing mytilid seeds monitoring workshop

This Friday, August 28th, Fisheries Development Institute (IFOP) will hold a workshop to show of the “Monitoring and on the larval availability of mitilidae for the sustainability of aquaculture activity surveillance program in the southern zone of Chile, VII stage 2019-20 ”, it shows results over a study that has been carried out since 2013 and is part of the permanent monitoring programs executed by IFOP and defined by the Undersecretariat of Fisheries and Aquaculture.

In the workshop, IFOP professionals associated with the monitoring program will make presentations focused on describing the history and current status of mitilid seed collection activity, in addition to presenting monitoring the abundance of larvae and environmental variables main results in sites. selected from the regions of Los Lagos, Aysén, and Magallanes.

Mythiliculture and seed collection

Mushroom farming is the second most important aquaculture activity at the national level, and Chile is the main exporter of moth at the world level today. This industry is developed mainly in Los Lagos region, and depends entirely on the collection



of larvae of the Chilean mussel (*Mytilus chilensis*) through the activity known as seed capture.

After experiencing sustained growth for more than a decade, between 2012 and 2014 the volumes harvested by the national mussel farming suffered a fall that was largely associated with problems in capturing mitilidae seeds in the main seed sectors of the region. In turn, these catchment problems were associated with low abundances of mytilid larvae in the water, which is why the Undersecretariat of Fisheries and Aquaculture requested IFOP to carry out a permanent monitoring program that would improve understanding of the factors that affect larvae natural supply that supplies this important economic activity in the Los Lagos region and the country.



IFOP and MarViva got awarded a project to reduce incidental catch of leatherback turtles in the Eastern Pacific in spinel fisheries in northern Chile

THROUGH FUNDS FROM THE NATIONAL FISH AND WILDLIFE FOUNDATION, IT WILL HAVE A TWO YEARS EXECUTION PERIOD, IT WILL DEVELOP BINATIONAL CAPACITY AGAINST THREATS THAT AFFECT THE LEATHERBACK TURTLE

On August 15th, an agreement was signed between Fundación MarViva (Costa Rica) and Fishing Development Institute (Chile) to execute the bi-national project called "(Reduce incidental catch of eastern Pacific leatherback turtles in the spinel fisheries of northern Chile). This agreement will be executed by the Highly Migratory Resources Monitoring Project, Ecosystemic Approach of IFOP Oceanography and Environment Department under Dr. Patricia Zárate leadership, member Specialists of Sea Turtles of the International Union for Nature Conservation Group (<https://www.iucn-mtsg.org/>) and president of the Marine Turtles Working Group of Chile.

The project will be funded by the National Fish and Wildlife Foundation (NFWF), from United States. This foundation has a Sea Turtle Program focused, among other things, on supporting long-term conservation projects that will considerably improve the current leatherback, loggerhead and hawksbill species of turtles recovery, threatened with extinction in the Eastern Pacific.

The bilateral Marviva-IFOP project will focus on eastern Pacific leatherback turtle (*Dermochelys coriacea*), whose populations have decreased by approximately 90% in the last 30 years due to intense poaching and bycatch. Therefore, eastern Pacific subpopulation is threatened with extinction and has been classified as Critically Endangered by the International Union for Conservation of Nature (IUCN). Studies carried out in the region have determined the presence of a migration corridor that links Central America and the South Pacific, through Ecuador. Leatherback turtles that hatch and nest on the nesting beaches of Costa Rica, considered the most important for this species in the eastern Pacific, move



through this migrator to reach Chile, where they feed in the productive waters of Humboldt tide. Despite protective activities on nesting beaches, mortality rates remain, largely due to interactions with artisanal and commercial fisheries. The largest catches of this species occur in highly migratory fisheries that use industrial and artisanal longlines and gillnets off Peru and Chile.

The link between key nesting sites in Central America and foraging grounds in South America implies shared challenges for effective conservation throughout their range. This common goal of sustainability requires experiences and knowledge exchange between both nations (Chile and Costa Rica). The



bilateral project will also promote knowledge dissemination and international collaboration, taking advantage of the marine turtle specialists of the Lau-DOPO network (<https://savepacificleatherbacks.org/es/>), of the IUCN-SSC-MTSG and of the experience of researchers in measures bycatch mitigation, from the United States National Marine Fisheries Service (NOAA -NMFS). This will be achieved through three main activities:

- 1) To develop local capacity to reduce incidental capture and mortality of sea turtles in Chile through training workshops on good practices, handling and release of sea turtles, focused on artisanal fishermen and institutional technical personnel, such as scientific observers, personnel of the institutions national fisheries (Subpesca, Sernapesca) and DIRECTEMAR.
- 2) Carry out an experiment to test circle hooks effectiveness in reducing incidental capture and mortality of sea turtles in the artisanal spinel fleet in northern Chile.
- 3) Local and regional level project results dissemination to improve eatherback turtle conservation and management in the Eastern Pacificl.

IFOP project registers nearly 800 cetaceans sightings

SIGHTING CONSISTS OF SPECIES IDENTIFICATION, COUNTING OF NUMBER OF ANIMALS SIGHTED, THEIR ACTIVITY AND ALSO ENVIRONMENTAL DATA COLLECTION. IN TOTAL, 12 SPECIES OF CETACEANS HAVE BEEN REGISTERED, THE MOST SIGHTED ARE FIN WHALE, DARK DOLPHIN, CACHALOT, COMMON DOLPHINS AND BLUE WHALE

Highly Migratory Resources Monitoring project, Ecosystemic Approach, of IFOP Oceanography and Environment Department, has been carrying out Cetacean Sighting for four years. This activity is carried out on Abate Molina scientific vessel board during hydroacoustic and bio-oceanographic cruises development.

Dra. Patricia Zárate, head of the project, explained "The sighting is made by Scientific Observers; They are technicians and professionals trained on marine



species data collection, fishing activities and biological samples on board vessels or at landing ports. Based on this information, IFOP scientists can generate knowledge and provide scientific advice required by the country's fisheries and aquaculture institutions; in particular the one required by the Fisheries and Aquaculture Undersecretariat, for our fisheries sustainable management.

Observers are located on Abate Molina ship bridge deck and by means of binoculars and taking all safety measures on board register small and large cetaceans. The sighting process consists of species identification, number of animals sighted counting, their activity and also environmental data collection".

Zárate added "These species identification often takes place from a distance, therefore, it is not easy, it requires a lot of experience, since sometimes you can only see the blow of a whale or its fins.

Since the beginning of this activity and up to date, a total of 20 cruises have been made, and more than 800 sightings have been recorded. The area covered by these cruises ranges from Arica to Corral. In total, 12 species of cetaceans have been registered, the most sighted are the fin whale, the dark dolphin, cachalot whales, common dolphins and blue whales.

With this activity we have improved our knowledge about these species distribution and their abundance in the Chilean Exclusive Economic Zone".

Zárate finally added "This information is of great relevance since it helps us to know different species populations size, key information to understand fishing activity impact when removing these species that are caught incidentally by several fleets in our country. If the populations of these species are made up of few individuals, the incidental capture and mortality of a few specimens in fishing gear and gear could have serious consequences in the medium term since some of these species are currently threatened with extinction".



Covid-19 solidarity campaign in images

IFOP carried out a solidarity campaign at the national level and with the assistance of all its officials, to support organizations dedicated to providing social assistance to those who have been most affected by the pandemic. "We are an institution with a national presence, which has a very relevant public role and which permanently interacts with vulnerable groups in coves and coastal cities. We could not be absent from their urgent needs. We are all very proud of the result"

