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The presence of sharks means health in our ecosystems

SHARK WORKING GROUP MET IN THE VALPARAÍSO REGION TO DISCUSS VARIOUS TOPICS ON SHARKS AND RAYS CONSERVATION AND MANAGEMENT

In Viña del Mar, a Shark Working Group (GT-Sharks) was formed, consisting of a team of researchers dedicated to these species study in Chile, this entity advises the Undersecretariat of Fisheries and Aquaculture on these species management and conservation issues. The group is also responsible for the National Shark Action Management Plan and participates in regional programs in shark conservation and climate change adaptation in fisheries and aquaculture. Researchers from various public entities and regional universities participated in this meeting.

The president of the Sharks Working Group, MSc. Patricio Barría, is an IFOP researcher, leads this advisory group and directs the Highly Migratory Resource Fisheries Monitoring project, explained "this is a shark working group that advises the Undersecretariat of Fisheries in making decisions regarding measures of



administration and fishery management. The important thing is that it was reactivated after a two-year break, the issues we are dealing with are sharks and rays conservation and administration nationally. Regarding pelagic sharks that are transzonal and highly migratory, they need to coordinate research topics at national and international levels, through which scientific knowledge is generated about these marine species.

Today we are focused on carrying out an evaluation of the National Shark Action Plan in Chile, where conservation issues are analyzed, as well as management in those species that constitute fisheries. The Action Plan has a series of lines of action in which several institutions participate in order to generate knowledge and, on the other hand, support

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management measures taken with respect to sharks and rays. We are currently focused on knowing the diversity of condrict species that are caught in national fisheries by industrial and artisanal fleets as target species and as companion fauna. The above is the first step to move towards the quantification of these complex interactions with fishing fleets, identify mitigation measures and advise the authority on ways to minimize the impacts of fishing on these species and their ecosystems.

We are beginning studies on climatic change and how it could affect the distribution and abundance of shark populations; These cumulative changes may affect the different levels of integration, modifying biological processes at the level of the individual, population, communities and relationships between species in coastal and oceanic trophic networks. We must always remember that the presence of a high diversity of sharks in the catches of our fisheries are indicators of good health and when they decrease in the catch as an accompanying fauna, it is an unequivocal symptom of deterioration of marine ecosystems, they indicate that Trophic relationships between organisms and their environment are altered and the flows of matter and energy have been modified. ”

Germán Pequeño Professor at the Universidad Austral de Chile “I am part of the shark working group and I want to start by emphasizing that for years the image of the sharks was that of the bad boys of the sea, but science advanced and could show people that sharks are top predators within the food chains in the ocean and constitute a fundamental link in the food chains with their presence give a sign of good ocean health ”

Enzo Acuña Universidad Católica del Norte academic “we are focused on working sharks, rays and chimeras conservation and take care of some international commitments, since some sharks have been incorporated in Appendix II of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) and that establishes a series of requirements to the countries to be able to export the product ”

Francisco Ponce independent consultant “the idea of the National Shark Action Plan is to work in the long term the conservation of sharks so this work group has been generated to advise the Undersecretariat of Fisheries in the conservation of these species through scientific recommendations and some procedures necessary for this ”.

Dr. Ray Hilborn visited IFOP from Washington University

HE IS A MARINE BIOLOGIST AND FISHERY SCIENTIST, KNOWN FOR HIS WORK IN CONSERVATION AND NATURAL RESOURCES MANAGEMENT IN THE CONTEXT OF FISHING. HE IS CURRENTLY A PROFESSOR OF AQUATIC AND FISHERIES SCIENCES AT WASHINGTON UNIVERSITY. IT FOCUSES ON CONSERVATION, NATURAL RESOURCE MANAGEMENT, FISHERY STOCK ASSESSMENT AND RISK ANALYSIS, AND ADVISES SEVERAL INTERNATIONAL FISHING COMMISSIONS AND AGENCIES. RAY HILBORN HAS WRITTEN MORE THAN 200 PEER-REVIEWED SCIENTIFIC ARTICLES AND SEVERAL BOOKS

<https://fish.uw.edu/faculty/ray-hilborn/>

On September 11th , in Valparaíso, Dr. Ray Hilborn visited Fisheries Development Institute on the occasion he signed a memorandum of understanding between the initiative he directs at the University (RAM Legacy Stock Assessment Data Base Initiative) and IFOP.

In the afternoon at the Museum of Natural History of Valparaíso Auditorium, he performed the talk “Impacts of fishing with bottom trawls in the marine ecosystem and how to mitigate them“. Professionals from IFOP, Subpesca and Sernpesca attended the conference. “Among the results presented by Dr. Hilborn, it is worth highlighting that the Chilean fishery with a bottom trawl that is carried out in the southern part of the country is one of the ones with the lowest impact on the seabed and covers a small portion of the platform continental. Meanwhile, other fisheries with the same



Australian aquaculture re-population expert visits Chile

BETWEEN SEPTEMBER 1ST AND 8TH, DR. MATTHEW TAYLOR VISITED CHILE INVITED BY FISHERIES DEVELOPMENT INSTITUTE

Dr. Matthew Taylor is a Principal Investigator and Acting Director of the Port Stephens Fisheries Institute under the Department of Primary Industries of New South Wales, Australia. It has more than 100 scientific publications and has developed numerous studies applying innovative approaches to improve both productivity and sustainability of fisheries. Within research lines that it currently develops, there are ecology, fishery and crustaceans ecotoxicology and fish from estuarine environments, stocking and stock improvement based on aquaculture, habitat recovery for fisheries improvement, fisheries recruitment, marking and animals monitoring.

fishing gear have a greater impact on the seabed, as is the case with the Mediterranean Sea," said Galvez.

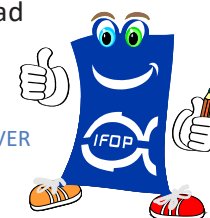
Mauricio Gálvez, head of Technical Specialties Division explained "the agreement will allow us to continue with internships of four of our researchers at the School of Aquatic and Fisheries Sciences of the Washington University all this at the cost of the Ram Legacy project, IFOP professionals can be trained for two months; IFOP, in turn, undertakes to finance the internships of two additional researchers in order to have more professionals improving.

IFOP will contribute to Dr. Hilborn's initiative by supporting the Ram Legacy project with information; which focuses its work on compiling all the information of the world's fisheries, regarding trend in their status. IFOP would be contributing this information to make a global analysis of fisheries and this collaboration also implies participating in scientific analyzes and publications on the state of world fisheries with Dr. Hilborn's team. "

Carlos Montenegro, head of Fisheries Evaluation Department, stressed out that "Ray Hilborn's visit and the signed letter of understanding is another step in the extension of the national and international scientific collaboration networks that the Fisheries Development Institute is developing."



The technical visit took place in Coquimbo and Los Lagos regions, including field visits to study sites, hatcheries and farming centers; meetings with the IFOP teams working on repopulation studies of river shrimp and algae; and the realization of two workshops open to the community, which were organized jointly with the Universidad Católica del Norte (Coquimbo) and Universidad Santo Tomás and Universidad Arturo Prat (Puerto Montt) and where the advances and challen-



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ges of Australia and Chile in repopulation based on aquaculture.

Dr. Francisco Cárcamo, Head of the repopulation and cultivation department of IFOP commented "The visit was beneficial in many aspects, highlighting knowledge of how New South Wales state with the support of scientists and various involved participants, have defined and are implementing a strategy and various recovery plans for estuarine fisheries of importance for recreational fishing, using aquaculture as a means for them. This strategy incorporates the best available science, which includes approaches from ecology, trophic and economic modeling, fisheries, aquaculture genetics, monitoring, effectiveness evaluation. Additionally, future collaborations were projected in the field of aquaculture-based repopulation. "

IFOP Arica holds talk at Miramar School

WITHIN THE FRAMEWORK OF CONICYT EXPLORA REGIONAL ASSOCIATIVE PROGRAM , 1000 SCIENTISTS 1000 CLASSROOMS

The Fisheries Development Institute is part of the institutions that support the Explora program throughout the country, this time Arica was the city that received the visit of the talks that IFOP gives in order to bring science to children and young people .

A team of Scientific Observers made up by; Juan Antonio Ríos, Felipe Orellana and Patricio Muñoz, made a day of scientific dissemination, at Miramar school in Arica, they offered a talk called "Eyes in

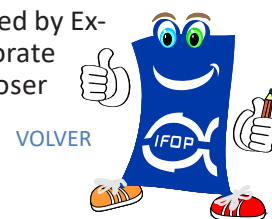


the Sea, Scientific Observers on board !!! .. a look at marine fish's life . "

"Being a Scientific Observer (OC) of Fisheries Development Institute for (IFOP) is a very important task for data collection on fishery resources in Chile. In the Arica and Parinacota Region, anchovy fishing is a resource that supports the fishmeal industry and production of Omega 3. There are also other fishing resources called Highly Migratory such as: Albacora, Maco, Azulejo, Palometa , among others.

Scientific observers get on fishing boats to collect data that allows them to answer questions such as: How old are the fish? How is their reproductive condition? What do they feed on? What are their migration routes? , How is the interaction with the other species that are not the target fishing? During the presentation, images and videos were shown during their embarked work, and at the end of the day a practical laboratory workshop was held that allowed the student community to get closer to the work of the IFOP in the region ".

The IFOP Headquarters Head Hernán Padilla said that "these activities organized by Explora Conicyt, allow us to collaborate bringing the world of science closer



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to the classroom. On this occasion, the important work of the Scientific Observers and some research programs that our Institute develops in the region were announced. The information was very well received by the students of the Environmental Forgers Group of Colegio Miramar and their Professor Kitaro Arroyo ”.

Abate Molina Scientific Ship sets out to evaluate bio-oceanographic conditions and anchovy spawning stock evaluation

BETWEEN ARICA AND PARINACOTA, AND ANTOFAGASTA REGIONS

Tomorrow, Saturday, September 14th , from Valparaíso's Port , Abate Molina IFOP's scientific vessel sets sail with a staff of 30 people, the captain of the ship is Takashi Abe Pellisa; The research journey will last 33 days.

The cruise aim is to evaluate anchovy spawning stock and oceanographic conditions during maximum reproductive activity period in the area between Arica and Parinacota, and Antofagasta Regions.

The cruise and fishing research expected results are:

- Spatial distribution of environmental conditions and temperature salinity, oxygen, chlorophyll and nutrients analysis. To determinate water masses and percentages in which they are present in the area, geostrophic currents and wind during the study period
- Analysis of phytoplankton mesozooplankton and ichthyoplankton.spatial distribution, abundance and composition.
- To characterize food supply for anchovy in the study area
- Determination and geographical characterization of anchovy.spawning area.
- Daily egg production per sampling unit at sea estimation.



- Proportion of microscopic stages of maturity and daily fraction of spawning females according to the postovulatory follicles used in the estimation (age).
- Estimation of partial fertility based on body weight and height, the model corresponding to this relationship, with its respective degree of adjustment.
- Estimation of average population fertility and its associated variances
- Sexual proportion in weight, average weight of mature females anchovy
- Size distribution determination of sampled specimens.
- Anchovy spawning stock biomass estimation with its respective variance and confidence intervals.
- Eggs spatial distribution associated with oceanographic variables.
- General tendency of eggs / larvae spatial distribution with respect to oceanographic variables, which can serve as a reference for future distribution conditions.
- To support anchovy reproductive closure with information from biological samples during the cruise execution.



Regional Shark plan implementation Progress

In Santiago, the shark, ray and chimera technical scientific committee , regional plan of Permanent South Pacific Commission (CPPS) meeting was held, with the purpose of guaranteeing sharks conservation and management and their long-term sustainable use.

It was organized by the South Pacific Permanent Commission ; scientists from Colombia, Ecuador, Peru and Chile participated

Miguel Romero, a researcher at the Institute of the Sea of Peru, commented “at the meeting we are developing a series of actions in order to better address the conservation and sustainable use of sharks in the South Pacific, respecting the global agreements that involve these species. In these assemblies, we show the progress by country in these aspects and enrich ourselves from the experiences of associated countries ”

Patricio Barria researcher of Fisheries Development Institute , explained “we are in the technical scientific committee of the regional shark plan that is carried out within the framework of the South Pacific Permanent Commission. Each country shows its progress, both in terms of research, control and fisheries management in these resources; In Chile we have a national shark action plan and we are adhering to the regional shark plan that has been in effect since 2010. This plan gives us the basic conservation guidelines for these species, regarding research, control, management, aspects socio-economic, training and dissemination. Substantial progress has been made in Chile, there is legislation in this regard, such as the Law of finning that prohibits mutilation, taking sharks fins and returning them to the sea is now a crime; we have protected the great pelagic sharks, such as the white shark, the whale shark, the basking shark are species protected by Chilean Law and there are a series of fishing gear and gear regulations, since



Chile as a fishing country exploits these species of sharks, rays and chimeras that are caught as companion fauna in the various national fisheries ”.

Camila Bustos from the Fisheries and Aquaculture Subsecretariat of Chile added “this meeting is held every year since, in it, the topics of conduct at the regional level with the CPPS countries are discussed, we are looking at the CITES issue that is very relevant, where the shark (*Isurus oxyrinchus*) was added to Appendix II of the Convention on International Trade in Wild Fauna and Flora (CITES), which means that for our countries there are a number of requirements that we have to meet, so it is important to work together. Among these requirements we have to make a non-detriment assessment for sharks, which means having a stock assessment of this highly migratory shark, which we currently do not have in Chile. The remarkable thing is that in the region we are agreeing to make scientific recommendations ”

Heins Bent official of the Ministry of environment and sustainable development of Colombia said “the meeting is an important space in which we work on issues related to the conservation and management of sharks and the scientific advice that can be given to the different countries of the region South Pacific”

Carla Bravo of the Vice Ministry of Aquaculture and Fisheries of Ecuador said “we think this type of meetings at the regional level is very interesting since new species have recently been incorporated in Appendix II of CITES and therefore we need measures for their conservation and management, CITES regulates international trade, exports of this type of shark ”

Marcelo Nilo, CPPS scientific affairs Director said “the meeting we are holding is within the framework of one of the working groups that depend on the scientific direction; our role is to generate the enabling conditions so that the States have a forum for scientific discussion that supports the regulatory measures in which each State is involved ”.

