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IFOP's Director Gonzalo Pereira meets with Minister of Science's Silvia Díaz

On Monday, October 17th, in Santiago, Gonzalo Pereira, Fisheries Development Institute Director met Minister of Sciences Silvia Díaz on a formal visit. They were also accompanied by the Minister's Chief of Staff, Sebastián Vergara, and Doctors Daniela Díaz, in charge of IFOP cooperation and international affairs and Carlos Montenegro, Fisheries Research Division head. On the occasion the authorities discussed IFOP's research issues, projects and international alliances.

Daniela Díaz explained "in the meeting with the Minister, the Director talked with her about; our role and mission, permanent research programs, and the Institute's role as an institution that does science aimed at informing decision-making in fisheries and aquaculture field of. But she was also told about the other lines of research that IFOP develops in alliance with other institutions, for example, through cooperation agreements, competitive funds and collaborations applications for with other national and international institutions. In this context, he was told that IFOP has highly capable professionals with more than 150 researchers, including many with postgraduate degrees".

It should be noted that IFOP signed a collaboration agreement with the Ministry of Sciences in 2021, in which the main National Fisheries Research Institution (IFOP) will contribute with environmental information as a result of its activity and that they are part of the System of the "Climatic Change Moni-

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Graphic design
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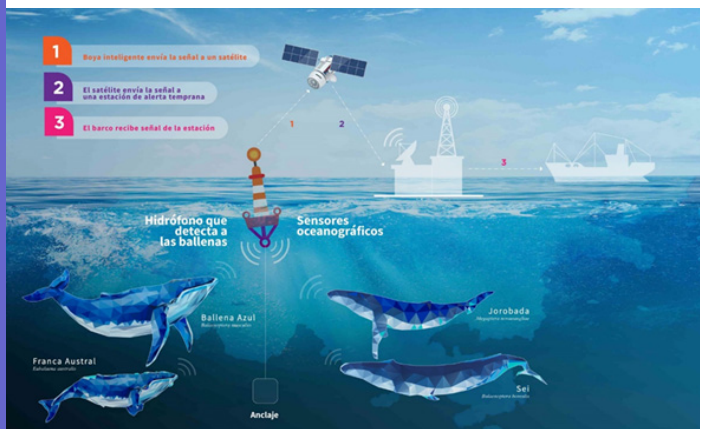
toring for fisheries and Aquaculture follow-up System" (www.ifop.cl) to Ministry of Sciences promoted Climatic Change Observatory (https://www.minciencia.gob.cl/occ/).

IFOP en el proyecto Blue BOAT Initiative, hito mundial en la conservación de los cetáceos

The initiative aims to protect cetaceans, with the first intelligent buoy installation by means of an acoustic signal, will warn vessels of the presence of whales. This buoy and those that will follow it will also contribute to oceanographic and meteorological data collection for Climatic Change impact on chilean coast, reducing public oceanographic data gap that has characterized the eastern South Pacific.

Dr. Carlos Montenegro Fisheries Development Institute (IFOP),Fisheries Research Division's Head and Oceanography and Environment Department head of the of the same Institute, Dr. Jaime Letelier Pino both participated in the first buoy of "The Blue BOAT Initiative"project 's ceremony and installation carried out in Castro city of on October 13th, 2022. IFOP researchers were invited by the president of Meri Foundation, Francisca Cortés Solari, Dr. Sonia Español-



Jiménez," Blue BOAT Initiative" executive director and Patricia Morales Errázuriz, General Manager

Attending this ceremony were Science's Minister Dr. Silvia Díaz Acosta ,Dr. Maisa Rojas Environment Ministery and former Environment Minister Marcelo Mena, as well as Senator Ricardo Lagos Weber and former Senator Guido Girardi, as also Quellón's Mayor, Cristian Ojeda Chiguay, regional presidential delegates, representatives of the Chilean Navy such as Admiral Juan Guajardo among other authorities, national and international press.

In this ceremony, Dr. Letelier was invited to give a talk called "Oceanographic challenges of Chile", where he highlighted human and technological challenge of working at sea and the women's primary role in oceanography, as well as the importance data distribution and collaborative scientific research based on trust. In addition, he highlighted IFOP's work as a conservation of hydrobiological resources and national ecosystems for the sustainable development of fishing and aquaculture activities research center.

Dr. Montenegro pointed out: "This is an example of a cutting-edge research initiative with a long-term vision and an ecosystemic approach, in which government's institutions collaborative work,

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philanthropy, science and NGOs allows the development of applied research programs synergies aimed at meeting sustainability and sustainability of socio-ecological systems challenges ".

This smart buoy marks a global milestone in cetaceans conservation as it will warn nearby vessels of the presence of whales, significantly reducing these cetaceans interactions with fishing operations and maritime transport. In addition, this buoy and those that will follow it will contribute to oceanographic and meteorological data collection for impact of Climatic Change on Chilean coast research, reducing the gap in public oceanographic data that has characterized the eastern South Pacific.

Oceanographic and meteorological data will be available through the IFOP Climatic Change Observation system for national fisheries and marine ecosystems, as well as through the Multinational System for the Observation and Prediction of Climatic Change for resilient fisheries of the large ecosystem of the Humboldt Current (S.A.P.O). These systems are part of a multinational collaboration between Peru Sea Institute (IMARPE), Ecuador Aquaculture and Fisheries Public Research Institute as well as IFOP from Chile, coordinated by the Environmental Defense Fund (EDF) and its representative in Chile. MSc Sergio Palma.

In this regard, Mr. Palma stated "that these collaborative actions based on trust and information exchange lay the solid foundations for ocean observation systems at the national and international levels, to strengthen decision-making at different levels and the growth of scientific research globally.

Links:

Iniciativa Blue Boat: https://theblueboatinitiative.org/

IFOP Climatic Change Observation system for national fisheries and marine ecosystems : https://www.ifop.cl/red-de-monitoreo-cambio-climatico/

S.A.P.O.

https://www.sapohumboldt.org/

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IFOP researcher, assumes as Understanding Memorandum Work Plan Coordinator between South Pacific Permanent Commission and Inter-American Tropical Tuna Commission

PATRICIO BARRÍA MARTÍNEZ IS A MARINE BIOLOGIST WITH A MASTER'S DEGREE IN BIOLOGICAL SCIENCES, MENTION IN ECOLOGY, FROM UNIVERSIDAD DE CHILE. HIS MAIN INTEREST AREAS HAVE BEEN FISHERIES ECOLOGY, POPULATION DYNAMICS, HIGHLY MIGRATORY FISH STOCK ASSESSMENT, AND SCIENTIFIC ADVICE FOR FISHERIES AT THE NATIONAL AND INTERNATIONAL LEVELS CONSERVATION AND MANAGEMENT.

At the XVI Annual Meeting of the Regional Action Plan for Sharks, Rays and Chimaeras Conservation and Management in the Southeast Pacific Scientific Technical Committee. Delegates representing the Member States (Chile, Colombia, Ecuador and Peru) appointed Mr. Patricio Barría as Coordinator of the Work Plan between Inter-American Tropical Tuna Commission (CIAT) and South Pacific Permanent Commission (CPPS).

Patricio, referred to the responsibilities of the position "being coordinator of the memorandum of understanding is to carry out scientific management and actions with four countries with the purpose of establishing a community of 16 researchers, considering a joint work process that enhances the formation of its members and the additional support of professionals and technicians, in which we advance in the macroscale stock assessment of highly migratory fish.

The action plan of this memorandum has a schedule that was evaluated and approved by CPPS Scientific Technical Committee, and establishes the participation in various workshops and work that have been organized by IATTC, in addition to quarterly meetings and seminars with the countries of the region".

Barría added "From a personal point of view, it is a new professional challenge and also an additional responsibility, in which there is an opportunity to work together with the countries of the region on common problems and it is a challenge in which we must achieve success, so that these scientific initiatives are more frequent every day in the globalized world in which we live.

For IFOP, the position implies recognition from the scienti-

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fic community for being an institution that has a history in monitoring and evaluating fisheries and in the work carried out at the international level in regional fishing organizations. On the other hand, these initiatives generate opportunities from the scientific point of view, there is a relationship, communication in direct interaction with the people of these organizations, labor links are established and new knowledge and technologies are accessed, which open up new opportunities. for IFOP researchers and technicians".

IFOP researchers participate in XVI National Limnology Congress

LIMNOLOGY IS THE STUDY OF AQUATIC ECOSYSTEMS, MAINLY LAKES, RESERVOIRS, RIVERS AND WETLANDS.

In October, XVI National Limnology Congress was held in Coyhaique city at Aysén Region. Doctors Rodrigo Vera, Osvaldo Artal and Claudia Pérez participated in IFOP's representation.

About their presentations

Title: Invasive cyanobacteria Dolichospermum lemmermannii Blooms in Chiloé Island freshwater systems, Chile

This work's presentation at XVI Limnology Congress is related to cyanobacterial blooms that occurred in water bodies of Chiloé's analysis, precisely in Tarahuín and Huillinco lakes, and Mechai estuary. Through genetic analysis we identified flowering species as Dolichospermum lemmermannii. Toxin assays recorded five microcystin analogs presence . These blooms analyzes are under development, since work is being done on other cyanotoxins identification and quantification. Viviana Almanza from Uiversidad de Concepción EULA center also participated in this work development; Luis Norambuena, Gonzalo Fuenzalida and Jorge Mardones from Fisheries Development Institute's CREAN center and Angélica Lisperguer from INITI.

Claudia Pérez Sáez, is a Marine Biologist and Doctor in Environmental Sciences from Universidad de Concepción; Her interest area relies on biogeochemical processes in freshwater and marine systems research influenced by different anthropogenic factors. She is linked to Puerto Montt IFOP's environmental group, she performs tasks in environmental state of lakes assesment.

Title: FLOW: A freshwater explorer and visualizer in Chilean Patagonia within CHONOS.

This presentation deals with a new web tool available in oceanographic observation system CHONOS (chonos.ifop.cl). This web tool is called FLOW and presents daily freshwater flows between 1980 and 2018 at discharge points of rivers and glaciers in the coastal area between the Los Lagos and Magallanes regions. FLOW allows you to explore and visualize these results in an easy and friendly way. FLOW is available to the entire community. More details can be found on our YouTube channel

https://youtu.be/7UmJLP-lhek

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Osvaldo Artal is a geophysicist and Ph.D. in physical sciences from Universidad de Concepción, an expert in numerical modeling and data analysis with an emphasis on physical oceanographic processes in fjords and channels in Chilean Patagonia. Main lines of research: Dynamics of fjords, Mixing processes, turbulence, tides and marine energies.

Title: Ecosystem services of 4 basins of Chiloé, Chile

The Huillinco-Cucao Basin System is made up of the union, through tributaries and effluents, of 4 lakes on the Big Island of Chiloé: Tarahuín, Tepuhueico, Huillinco, all flowing into Lake Cucao, including 9.9% of the surface of the Big Island.

For this basin system ecosystem conceptual map construction information services were used from data obtained from sources such as IDLE, CORFO, SERNATUR, Ministry of Environment and Google with which thematic maps were prepared showing the area's characteristics, water rights, tourist points of interest, pompom extraction, national parks, wetlands, fish farms, water quality stations, RILes and others.

Within the ecosystemic services basin system's 4 main classification categories, provision, regulation, cultural and biodiversity appear. Provisioning services are related to food, wood and water that the watershed provides, either naturally (eg water supply) or through its production (agriculture). Regulation-type services are related to climate, air quality, erosion, natural hazards, water, pollination, water quality and treatment, soil formation, and regeneration. Services of a cultural nature give rise to ES for recreation and aesthetic values, which are related to

the landscape and the possibility of accessing them to develop recreational activities. Lastly, biodiversity and habitat ecosystemic services provide genetic and ecological support. Maps and a conceptual model of the basin system are presented.

Rodrigo Vera is a Marine Biologist and Doctor of Science: Systematics and Ecology. Main areas of interest have been biological oceanography, carbon fluxes in the water column (biological sequestration of CO2, and its effect on global warming), marine ecology and the environment, heavy metals in water, biota and sediments.

Workshop for for horse mackerel age determination new criteria's approval

At Valparaíso's Fisheries Development Institute , from October 18th to 21rst, "Workshop for new criteria homologation for jack mackerel age determination" was held with the participation of Msc Lilián Cisterna and Evelin Sanhueza

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from Fishing Research Institute, (INPESCA) and researchers from age and growth section of Fisheries Development Institute (IFOP), Camilo Rodríguez, Lizandro Muñoz and Francisco Cerna, supported by the expert Dr. Miguel Araya from the Arturo Prat University.

Francisco Cerna, head of the age and growth section explained "This workshop is one of the last activities of the FIPA 2021-21 Project "Update of information associated with age and growth of horse mackerel, in the context of the RFMO-PS", whose objective is to generate a protocol for reading jack mackerel (*Trachurus murphy*) otoliths from reference collections and graphic catalogues, which contribute to the standardization of the age determination process. A high precision and accuracy in the estimation of the age of exploited fish, such as horse mackerel, are decisive for an adequate evaluation of the stock and its fishing management, which ensures its sustainability over time.

We can satisfactoorily say that after a year of work in meetings and workshops, we have reached an important level of precision in determining this resource's age, between INPESCA and IFOP, which ensures the quality of the data that Chile generates and contributes to South Pacific Regional Organization (SPRFMO) international body in charge of assessing jack mackerel stock of the South East Pacific. The final result of this work will be embodied

in a protocol for determining the age of jack mackerel, which will provide the necessary background information to subsequently scale this work with the other member countries of SPRFMO".

IFOP exposes on mussel larval monitoring program, in VIII seminar of research applied to mussel farming

During the day of October 20th and with an audience of more than 150 people, represented by mussel farmers, authorities and the academy, the "VIII SEMINAR ON RESEARCH APPLIED TO MUTTILULTURE – SIAM 2022" was held, organized by Mussel Farming Technology Institute (Intemit), Chilean Mussel Farmers Association (AmiChile) and Regional Strategic Program (PER) for Los Lagos Corfo Mussel Farming Industry.

Occasion in which one of the nine exhibitors from different prestigious national

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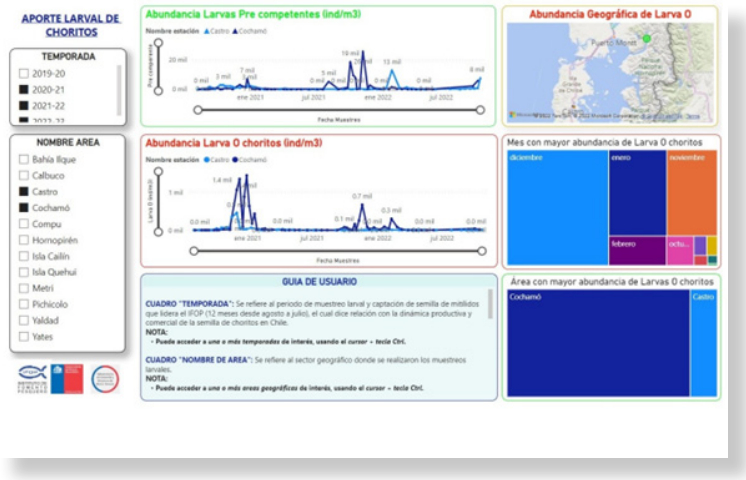
institutions in terms of the development of science applied to aquaculture and in particular to mussel farming, was Dr. Cristián Segura Rivera from IFOP Fisheries Development Institute, he spoke about “Larval interactive report and mussel seed collection for mussel farmers”. Opportunity in which the researcher disseminated the interactive platform available on our institutional website, where the main results of the Mytilid Larval Monitoring Program are reported, in POWER BI format. The seminar was held entirely remotely, by videoconference on the Zoom platform.

According to Dr. Segura from IFOP “In this seminar we showa new digital interactive platform attributes which are based on Mytilid Seed Program Larval Monitoring and Collection led by IFOP. In this platform users will be able to interact directly and from any device (computer or cell phone), with an executive report that shows the results of analysis associated with larval development and abundance of the last 4 years, in different geographical areas (12 areas) located in the inland sea of the Los Lagos region, as well as on accumulated collection of seeds in Yates and Castro areas. Our challenge is that this instrument can support the authorities in making regulatory decisions, but we also hope to contribute with information for an efficient and sustainable collection of mussels seeds”.

According to Intemit and AmiChile general manager Yohana González, “the activity’s objective was to efficiently transfer new knowledge generated in research fields, development and innovation applied to national mussel farming industry. Privileging open, inclusive and attractive transfer spaces for the community. Allowing research



and technology to be concepts known by most people, especially by those who make up our field and who can apply it in the development of their tasks”.

Larval log link

https://app.powerbi.com/view?r=eyJrIjoiYmUyOTk3OWUtZmYzOS00ZjM2LWJkNzctYTE2NzdkYzRjZThiIiwidCI6ImNmZTQ2ZTA4LTE5NDEtNGNiMS05NWViLTA0NDcyZDI3OTI2NyJ9&pageName=ReportSection

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IFOP researcher specializes in Monaco and France

Dr. Jurleys Vellojin Furnieles, participated in two specialization courses; one in Monaco on “Multiple stressors and ocean acidification”, she referred to the activity “ contents and capacities that were disseminated, are considered relevant and strategic for the lines of work and research that are currently being developed and implemented in our institution related to climatic change and adaptation and mitigation measures. Main benefits of getting involved in this course were acquiring new knowledge on key concepts related to ocean acidification and multiple stressors, acquiring updated knowledge on monitoring protocols and measurement of physical-chemical variables of seawater and relevant laboratory experiments. and field by experts with a long history in this area”.

The other course was held in Barcelonette, France, entitled “Hydrodynamic numerical modeling Training with CROCO ocean code” Jurleys commented “It consisted of a theoretical activity and practical work which gave me the knowledge to start building your own configuration of Croco model (Coastal and Regional Ocean COmmunity model) in your area of interest. The course’s content was relevant because it allowed me to acquire new updated knowledge related to the tools that are contained in CROCO model, which will be of great help for the activities related to one my work objectives, which is analysis and results interpretation of CROCO-PISCES (Pelagic Interactive Scheme for Carbon and Ecosystem Studies) biogeochemical model that is being developed for North

Patagonia by IFOP Castro modeling team. The importance of carrying out this type of course should be highlighted to continue advancing in numerical modeling oceans knowledge , considering that they are potential tools for scientific knowledge necessary advancement for decision-making facing environmental contingencies (i.e., anoxic zones or harmful algal blooms).

Jurleys Vellojin Furnieles, is a Professional in Aquaculture from Universidad de Córdoba, Colombia and PhD in Aquaculture Sciences from Universidad Austral de Chile; Her fields of interest are marine coastal systems biogeochemical dynamics and marine organisms response to climatic change associated stressors . She is linked to Castro IFOP observational oceanography and modeling group.

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Artisanal and industrial fishermen from Chilean fishing fleets learned about techniques for handling, resuscitating and releasing sea turtles

Aiming to minimize sea turtles's incidentally caught by Chilean fishing fleets mortality, Fisheries Development Institute (IFOP) jointly with MarViva Foundation carried out a series of training workshops under "Reduce Eastern Pacific leatherback sea turtle's bycatch in Chilean fisheries" binational project framework. This project is financed by United States's National Fish and Wildlife Foundation (NFWF).

"For IFOP it is very important to socialize handling and release techniques with fishermen and to receive their feedback, so that inputs can be brought to the " Sea Turtles Return National Protocol" that will be implemented as a national effort. Fishermen's response was very positive, and they are willing to implement all recommendations in order to reduce these species mortality", highlighted Dr. Patricia Zárate, Head of IFOP Highly Migratory Resources Monitoring Project – Ecosystemic Approach (SRAM ECO).

A total of 10 workshops were held between October 20th and 28th in the cities of Lebu, Iquique and Arica and aimed at fishermen belonging to the net, longline and purse-seine fleets, as well as officials from private public sector. In addition to release and handling techniques, sea turtle biology aspects, species identification, connectivity, and population status of species present in Chilean waters were included.

The workshop's speakers and instructors were researchers Patricia Zárate, Ilia Cari and Ljubitza Clavijo from SRAM ECO project, biologist Rotney Piedra from Costa Rica Conservation Areas National System (SINAC) and Elizabeth Gutiérrez from Peru Coastal Areas and Marine Resources Organization(ACOREMA). Also representing MarViva Foundation were present the biologist Cristina Sánchez and community psychologist Pablo González and social anthropologist Elías Esper from Agroecológic Perspective NGO.

"Satellite markers use has made it possible to identify that individuals that nest on Costa Rica's beaches move south to reach Chilean waters

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where they spend between 4 and 7 years feeding, before returning to Costa Rican beaches. For the Conservation Areas National System, it has been very important to share with the Chilean fishing sector sea turtle's conservation efforts that Costa Rica has been carrying out and to learn from its experience in this South American country," said Rotney Piedra, from SINAC.

As part of this workshop, fishermen were provided with basic equipment so that they can carry out recommended maneuvers such as identification cards, measuring tapes, an unhooker and a line cutter. In total, 151 people were trained, of which 114 were fishermen from various unions and guilds, and 37 officials from different public and private entities, such as Fisheries and Aquaculture Undersecretariat (SUBPESCA), National Fisheries Service (SERNAPESCA), Maritime Territory General Directorate and Merchant Marine (DIRECTEMAR), Environment Ministry (MMA), Sea Applied Research Center (CIAM), Lebu Fishing Port, Arica Municipality, TortuArica NGO, Corporación Norte Pesquero and IFOP.

Worldwide there are 7 species, of which 5 are found in Chilean waters: the leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*) and hawksbill (*Eretmochelys imbricata*) turtles are Critically Endangered, the green turtle (*Chelonia mydas*) is Endangered and the Olive Ridley Turtle (*Lepidochelys olivacea*) in the Vulnerable category. A clear example of sea turtles delicate population status in eastern Pacific leatherback sea turtle can be seen, which has reported a more than 90%population reduction since the mid-1980s. Due to this, in the countries where these species nest, great efforts are being made to prevent their eggs exploitation as is the case in Costa Rica, and in the countries where they feed, for example, Chile and Peru, the greatest effort is performs in reducing mortality due to interaction with fishing. For this reason, Dr. Zárate mentions "it is necessary to make efforts to improve the probability that these animals that are feeding in our waters will return to their nesting beaches to lay eggs. Proper handling and release of incidentally caught sea turtles is key to increasing the survival of this species."

Dr. Zárate added "I want to express my gratitude to National Fisheries and Aquaculture Service for facilitating dissected shells and turtles use for these workshops development , which allowed practical activities realization facilitating knowledge transfer to the workshop's participants ".

Finally, researcher M. Sc Ilia Cari indicated that "the workshops held for fishermen and officials were a complete success, not only due to the attendees active participation but also due to the approach given to the fishing sector and its commitment and willingness as participants to apply acquired knowledge in a new encounter with sea turtles and

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thus provide them with a greater probability of survival facing incidental interactions with fishing gear and equipment".

These workshops held in Chile are part of the country's commitments to the Sea Turtles Protection and Conservation Inter-American Convention (IAC).

IFOP Arica Participates in Research and Innovation Regional School Congress

Researchers and scientific observers from Arica's Fishing Development Institute Headquarters, along with officials from other public and private institutions from Arica and Parinacota region, participated with interactive stands at Research and Innovation Regional School Congress. The activity took place on November 8th and was organized by Arica Regional Associative Explora Project, at Universidad de Tarapaca Saucache Campus.

Hernán Padilla, IFOP Arica headquarters head explained "this event objective was to select among 8 research and nnovation school i projects, the best works developed by 5th grade to 4th grade students from educational establishments. They will be in charge of representing the region in the National School Research and Innovation Congress.

Throughout the activity, both the stands with compiting projects, as well as those belonging to invited institutions, received visits and attention from educational establishments and university academic community delegations, creating room for science appropriation and innovation exchange, as well as socialization ".

Finally, it should be noted that IFOP Arica during 2022 has strongly resumed its environment connection activities participating in a series of scientific dissemination activities, with which it seeks to bring Arica's community closer to the importance of fishing research and aquaculture, applied to sustainable use of hydrobiological resources and their environment.

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