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Introduction

The present Instituto de Ciencias Marinas y Pesquerías (ICIMAP; Institute of Marine Sciences and Fisheries; http://www.uv.mx/icmp) acquired its official status and name on 10 July 2009. This was done in the best interests of the Universidad Veracruzana (UV) to make explicit the importance of various marine science disciplines in the management of coastal and marine ecosystems; and after its faculty acquired an excellent academic performance in their various research and teaching activities (Fig. 1).

ICIMAP was originally created in May 2000 as the Centro de Ecología y Pesquerías (CEP; Center of Ecology and Fisheries) as the result of a convergence of academic interests and the recognition of the developing role of science and technology. At that time, the University of Veracruz began a fruitful process of renovation as a result of its recently granted independence. This aimed both to promote scientific research and an associated binomial of excellence in teaching, as well as the need to make the management and implementation of scientific knowledge a commitment with society. The UV is the state university in Veracruz. Veracruz has more than 750 km of coastline, whose inhabitants depend on fishing, and where dozens of rivers flow to the sea. These rivers supply more than 30% of the total hydrologic volume of water in Mexico. They provide freshwater inflow to relevant ecosystems, such as coastal lagoons, coastal swamps, and river deltas, and are also associated with large and complex mangrove and coral reef systems. Veracruz is also home to the Mexican maritime industry and lifestyle, with several of the main ports in the country, hydropower and a nuclear power plant, as well as major oil and gas industrial facilities. These complex issues make it essential to have a specialized research and teaching group for the Veracruz coastal areas (Fig. 2).

At another location, the Instituto de Ciencias del Mar y Limnología (Institute of Marine Sciences and Limnology) of the Universidad Nacional Autónoma de México (National Autonomous University of Mexico) has developed research with a focus on ecology of fisheries. So, in 1999 Dr. Victor Arredondo Alvarez, president of the Universidad Veracruzana, proposed the creation of a similar research group in the Gulf of Mexico, but intended to study marine and coastal ecosystems, such as coastal lagoons, coral reef systems, and incorporating fisheries as part of the ecological studies. This proposal met with much enthusiasm in the University Council, and it received the name of Research and Teaching Unit in Fisheries Ecology. After that, the president of the UV asked Dr. Virgilio Arenas to adapt the original proposal to the characteristics of the coastal zone in Veracruz. He formulated a plan to incorporate a dozen researchers in various disciplines, the creation of academic programs at masters and doctorate levels, and the development of advisory and management mechanisms to link with different sectors (fishermen, authorities, civil organizations, etc.) for dissemination of the importance of the scientific knowledge and maritime history of the sea in Mexican society from Veracruz, the cradle of its maritime culture.

Since its establishment, the unit has been located in the suburbs of Veracruz–Boca del Rio cities, and the focal point of its investigations was the Veracruz Reef System and its areas of influence. It occupies a house converted to offices and labs on the banks of Rio Jamapa. It is part of the Veracruz Campus of the Universidad Veracruzana where it is under the Directorate General for Research. Over the past 10 yr there have been several attempts to find new and adequate locations to endow the group with the infrastructure needed for optimal performance with the support of the fishermen of Laguna de Mandinga and with the collaboration of the Municipality of Boca del Rio (Fig. 3).

Academic Background

The incorporation of academic faculty was not an easy process. The availability of faculty positions to offer and the availability of candidates were not always in parallel. Researchers were integrated according to three criteria: (1) commitment of the researcher to address projects within the identified research lines, (2) diversity in academic field (specialization) as a value to the group, and (3) opportunity and willingness to take the responsibility of initial research groups, lack of equipment, support,

Fig. 1. Research activities and localities in Veracruz.

and infrastructure, but capable of promoting its own development.

The current academic staff of ICIMAP consists of 16 researchers that specialize in various fields of scientific knowledge and have an adequate collective experience. Eleven scientists have been recognized by the National System of Researchers, and the remaining staff with doctoral degrees are well capable of obtaining this recognition in the future. The average scientist is 40, which provides time for significant academic growth (Fig. 4).

The composition of the faculty group is notable for its diversity of experiences and backgrounds. Of these 16 specialists, eight have obtained a doctoral degree and/or a postdoctoral fellowship in foreign institutions and universities highly recognized in their specialties. This represents an important opportunity to combine experiences and insights from outside the country to address research objectives. Four others have obtained their doctoral degree in three national institutions with the best reputation in the field, alongside experts in their fields. One of them has already taken international specialization courses in Japan and Thailand, while the other three are preparing similar sabbatical programs.

Fig. 2. Institute of Marine Sciences and Fisheries facilities.

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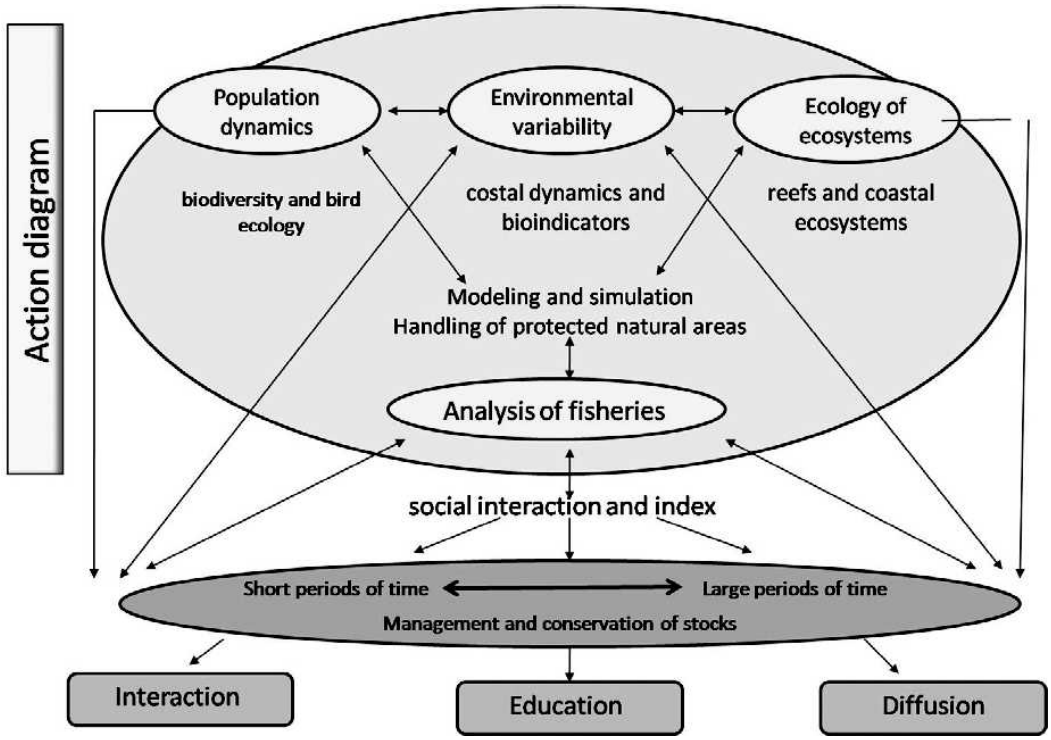

Fig. 3. Activities of the Institute of Marine Sciences and Fisheries.

This provides the ICIMAP with a diversity of experiences and scientific knowledge that allows it to enhance and expand its capacity for linking academic efforts and creating local and global synergies. Each year the institute conducts an internal forum named the Internal Academic Annual Meeting. In the December 2009 forum researchers presented on their research lines, summarized their progress, and reviewed plans for the future (Table 1).

Fig. 4. Virtual design of the future Institute of Marine Sciences and Fisheries.

TABLE 1. Faculty, research lines, and specialization of ICIMAP scientists.

Name	Research Lines	Specialty
Dr. Arenas Fuentes, Virgilio (Director)	Fisheries and aquaculture	Fisheries analysis
Dra. Arceo Briceño, Patricia	Conservation and management	Socioeconomics of marine resources
Dr. Bello Pineda, Javier	Conservation and management	Coastal zone management
Dr. Granados Barba, Alejandro	Coastal and marine ecology	Coastal and marine ecology
Dra. Jiménez Badillo, Lourdes	Fisheries and aquaculture	Fish and wildlife
Dr. Pérez España, Horacio	Coastal and marine ecology	Marine ecology
Dr. Ortiz Lozano, Leonardo Dagoberto	Conservation and management	Coastal zone management
M. en C. Morteo Ortiz, Eduardo	Coastal and marine ecology	Marine mammals
Dr. Okolodkov, Yuri Borisovich	Coastal and marine ecology	Taxonomy and ecology of marine phytoplankton
Dr. Salas Monreal, David	Coastal and marine ecology	Physical oceanography
Dr. Salas Pérez, José de Jésus	Coastal and marine ecology	Physical oceanography
Dra. Velarde González, María Enriqueta	Coastal and marine ecology	Ornithology
Dr. Meiners Mandujano, Cesar Gabriel	Fisheries and environmental variability	Fisheries oceanography
Dra. Sanay González, Rosario	Coastal physical oceanography	Coastal hydrodynamic processes
Dr. Perales Valdivia, Héctor	Estuaries and lagoons	Numerical models

MISSION

The mission of ICIMAP is to develop scientific research on important social and academic topics related to the responsible use of marine and coastal ecosystems; to prepare students through the graduate program; to help train students and professionals with a multidisciplinary approach that can meet the demands of society concerning conservation and sustainable use; and to disseminate scientific knowledge and manage the relationship with various sectors of society so that the human development denominator is academic activity (Fig. 5).

For historical reasons, the University of Veracruz and the state of Veracruz had not integrated either the ocean or marine ecosystems in their objects of study as a basis for development. However, ICIMAP has now become a hub of interaction within the UV to spark the capacity of the institution in its various specialties, levels, actions, and areas with regard to marine and coastal ecosystems (Fig. 6).

Fig. 5. Coastal and marine ecosystems in Veracruz.

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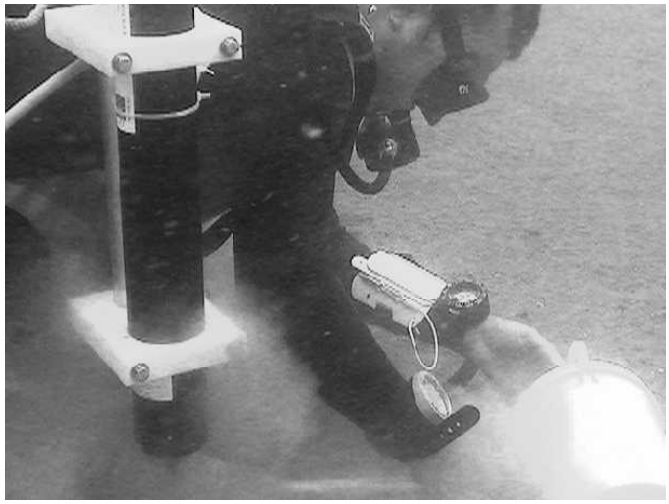

Fig. 6. Research diver placing a current meter at 27 m depth.

Vision

The vision of ICIMAP is to be the leading academic body that generates and promotes the application of knowledge of marine and coastal ecosystems and human resources training to achieve responsible management of the ecosystems for the benefit of society.

Objectives

The primary objectives of ICIMAP are predominantly to develop state-of-the-art scientific research as a fundamental tool of society to manage their sustainability while efficiently using its coastal and marine wealth.

Main areas of action:

1. Marine and coastal ecosystems
2. Use of aquatic resources
3. Management and conservation

Research Program

The main research area of ICIMAP is related to the large and small oceanographic processes that influence the marine ecosystems in the coastal zone of Veracruz City and Port. These ecosystems are highly vulnerable to anthropogenic perturbations. This is the reason why they became the natural protected areas of the Veracruz Reef System and Mandinga Lagoon.

The Veracruz Reef System is formed of 23 coral reefs, with a maximum depth of 40 m and a maximum separation of 120 km in length. The Veracruz Reef System is divided into two main groups: (1) reefs north of the Rio Jamapa and (2) reefs south of the Rio Jamapa. The northern reefs are located off the City and Port of Veracruz. One of the most representative reefs is Sacrificios Island, located 1.5 km off the coast, and it can be considered a natural marine biology laboratory (Fig. 7).

The City and Port of Veracruz is the main Mexican port in the Gulf of Mexico, and it will require a sustainable expansion in the future. The Veracruz Reef System also hosts artisanal fisheries that are extremely difficult to regulate but affect directly the biota of the reefs. The tourism industry and the growing cities also affect the reef areas with pollutants and coastal infrastructure. The Rio Jamapa originates at the Pico de Orizaba volcano and runs for more than 130 km, collecting a variety of municipal and industrial pollutants along the way. Therefore, it represents the major continental impact to the Veracruz Reef System and also to the mangrove, oyster beds, and estuaries, among other habitats. The ICIMAP research program is oriented to promote sustainable human activities in the natural protected areas.

Dissemination Activities

The diffusion of culture is considered a particularly important element of ICIMAP to accomplish the following goals:

1. build links with the society through the development of technologies and specialized advisory services
2. disseminate and promote the application of scientific research generated

Fig. 7. Graduate students attending a coral disease course.

3. promote the culture of scientific knowledge and conservation of marine and coastal ecosystems

Human Resources Training

The core activity of human resource training is the Master of Science Program in Ecology and Fisheries and the Ph.D. in Ecology and Fisheries, which began in 2005. These programs have been recognized as a ''graduate program of excellence'' by the National Council for Science and Technology (CONACyT).

The central training activity of both programs is the development of scientific research by providing students with basic content and a wide range of optional courses offered by ICIMAP researchers and in collaboration with colleagues from other institutions.

ICIMAP currently has 24 masters and 6 Ph.D. students. It also performs an extensive training of undergraduate students who write their theses, participate in academic internships, etc., in the facility. They are more than 50 students present, so that, along with our administrative staff, we have a community of more than 80 people.

Social Linking Academic Activities

ICIMAP participates in actively developing documents and promoting the creation of Technical Councils, Advisory Councils, Consultation Councils, etc., at local, national, and international levels in the management of scientific and technical elements to achieve the sustainable management of ecosystems. This participation focuses on specific ecosystems needing conservation as part of sustainable use.

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