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ECOLOGICAL SENSITIVITY ATLAS OF THE ARGENTINE CONTINENTAL SHELF

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ABSTRACT

The Argentine Petroleum Institute, together with the National Institute for Research and Development of Fisheries and the Navy Hydrographic Service, is producing an Ecological Sensitivity Atlas of the Argentine Continental Shelf.

The aims of this project are to indicate ecologically sensitive areas, in order to provide valid guidelines to effectively control oil pollution incidents in those areas and, in general terms, to contribute to the preservation of the marine environment. Also to determine oil tankers' navigation routes and areas to be avoided when navigating waters and to create a database to aid in risk management, in pilotage associated with control of incidents causing oil pollution.

INTRODUCTION

The Argentine Continental Shelf and shores constitute an extremely rich and diversified habitat in terms of primary production, fish populations, commercially valuable invertebrates (squid, crustaceans, mollusks), cetaceans and other marine mammals, seabirds and algae. According to available information, annual catches of the different fish species reach almost 700,000 tons, and yet, an increase of this figure is considered feasible, given a proper assessment and monitoring of fish stocks. Argentina is one of the world's major producers of agar-agar, a product obtained from marine algae, which grow abundantly in certain gulfs and bays of the Patagonian coast. The Argentine Continental Shelf also encompasses numerous maritime routes for merchant ships, particularly oil tankers. Local oil transport by ships is carried out between Patagonian harbours and Buenos Aires, as well as river

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harbours. This oil transport activity, together with increasing bulk transport of chemicals by water, creates a situation of risk to the marine habitat and a potential hazard of pollution.

Bearing this in mind, the Argentine Petroleum Institute (IAP), more specifically the Committee for the Prevention of Water and Shore Pollution, together with the National Institute for Research and Development of Fisheries (INIDEP) and the Navy Hydrographic Service (SHN), has initiated a project aimed at providing a set of Ecological Sensitivity Charts.

These charts can be consulted for information on resources of the Argentine Sea and also for the identification of specially sensitive areas.

Knowledge of the ecology of the marine ecosystem and the physico-chemical variables affecting its behaviour will allow a proper planning of maritime routes to be used by ships, the creation of a database to aid in risk management associated with control of incidents causing oil pollution and, if necessary, appropriate decisions for controlling oil spills.

The Argentine Petroleum Institute (IAP), which is formed by representatives of almost all companies related to the oil industry in the country, is a non-profit making organization conceived to develop activities on all aspects involved in the oil industry, to promote knowledge of the different related disciplines and to provide training in new technologies, in an effort to achieve a standard comparable to that of developed countries.

The National Institute for Research and Development of Fisheries (INIDEP) is the consulting technical body to the Undersecretary for Fisheries, in charge of policy and decision-making on this matter.

INIDEP is responsible for research, assessment and monitoring of aquatic fauna and flora, including fish, mammals, invertebrates and algae, on a nationwide basis. It produces and carries out research projects on fisheries and related subjects, as well as on technological development in this field (fishing gear, new products, processing, etc.).

The Navy Hydrographic Service, which is part of the Argentine Navy, was created in 1879 and is in charge of collecting information concerning safety of navigation (pilots, nautical charts, notice to mariners, nautical ephemerides, tide and current tables, lights and radio tables), as well as carrying out research work on hydrography, marine meteorology and oceanography, including pollution of the marine environment.

USES OF THE ATLAS

Three different uses of the proposed Atlas have been contemplated, the first of which is to contribute to the enforcement of the International Convention for the Prevention of Marine Pollution from Ships, known as MARPOL 73/78.

This point also implies providing information on types of damage produced by different pollutants introduced in the marine environment. This includes not only pollution by oil, but also by noxious liquid substances, sewage and garbage, which are expressly regulated in the MARPOL 73/78 annexes.

Some characteristics to be taken into account are accumulation along the trophic chain (bioaccumulation, toxicity and persistence), in order to assess potential risks to aquatic organisms, to human health and also the loss of certain resources for recreational use. Special attention should be given to pollutants with carcinogenetic properties.

A second use of the Atlas is related with a better selection of criteria for risk management. This implies implementing rules and regulations concerning human activities in the marine environment which are not considered in MARPOL 73/78, stressing those aimed at preventing pollution, and establishing well defined actions in case of damage or disturbance to the environment as a result of an accident.

The third use is related with education, through distribution of the Atlas in high schools and technical schools. The aim is to introduce the principles of preservation and the value of natural resources in the community through the educational system.

PROJECT ACTIVITIES

In October 1985, the Committee for the Prevention of Water and Shore Pollution from IAP carried out a study and classification of critical areas in the Argentine Sea.

The designation of critical areas is based on the following criteria:

- high ecological sensitivity;
- high socio-economic value; and
- high potential risk due to heavy transport activities

In this case, ecological sensitivity was assessed on the basis of information provided by the INIDEP, which in turn had been compiled along the years by researchers in the field.

At a later stage, the Committee thought of continuing this study and widening its scope, producing a series of charts which could be useful to biologists, to enforcement and management authorities, to companies involved in oil transport activities, as well as to the fishing industry and NGO's involved with conservation and environmental protection.

In March 1988, an agreement between the IAP and the INIDEP was signed, through which the INIDEP committed itself to providing scientific information of a biological nature in the Argentine Sea on original partial nautical charts, on a seasonal basis.

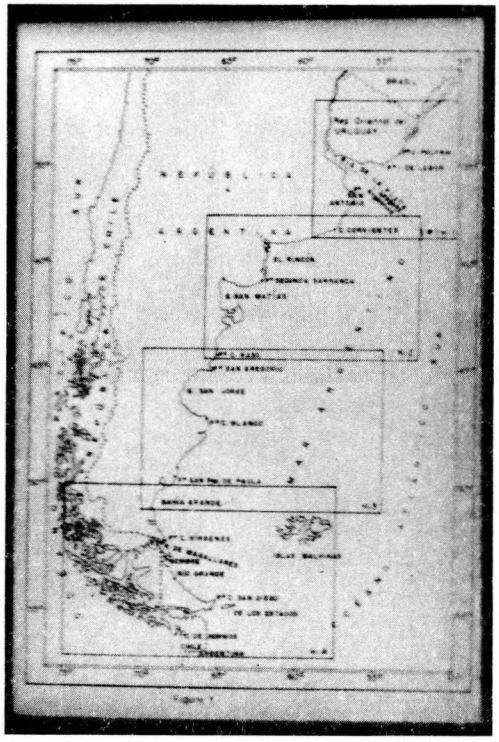

FIG. 1.- Nautical charts H-1, H-2, H-3 and H-4.

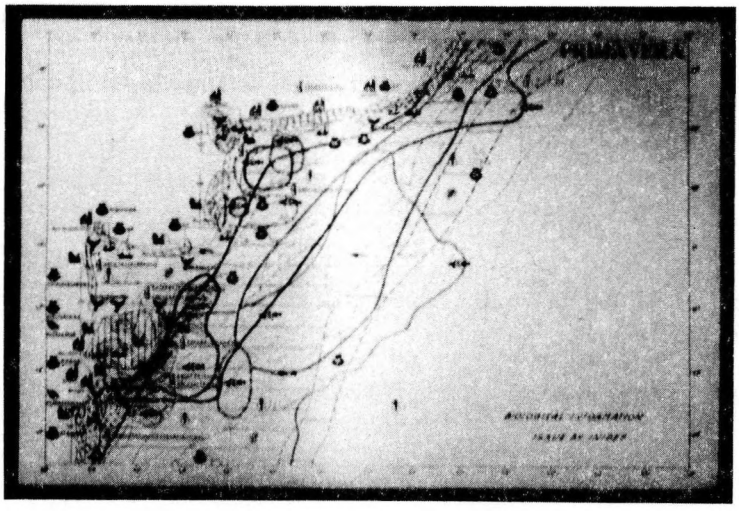

FIG. 2.- Set of 16 charts elaborated by INIDEP.

Identification of relevant species and compilation of information on their distribution

The species to be included in the charts were selected according to their commercial value (fish, crustaceans, mollusks) or their importance from a biological or ecological point of view, i.e. species deserving special protection (marine mammals and seabirds).

At this stage of the project, the biological cycle of each species, population dynamics and seasonal variations were particularly taken into account. In the case of migratory species, concentration areas (feeding and breeding grounds), migration routes, and seasonal variations were considered.

In some cases, areas were identified where a particularly sensitive stage of the life-cycle (e.g. breeding, spawning, etc.) took place, therefore deserving special protection.

Transfer of compiled information to charts

The information compiled by specialists was included in nautical charts H-1, H-2, H-3 and H-4 provided by the Navy Hydrographic Service for the Argentine Sea (Fig. 1), and for each one of the four seasons (Winter, Spring, Summer and Fall). All data were condensed and standardized prior to inclusion in the above mentioned charts.

On the other hand, a specific set of symbols was adopted after consulting international literature and United Nations agencies on the subject. The nautical symbols are based on those adopted by the International Hydrographic Organization, while the biological symbols were designed by the INIDEP specialists, since there were no standard international criteria on this matter.

Current status of the Project

At the current stage, the INIDEP has finalized the task of compiling information and has included all available data in the charts, as described above.

The INIDEP elaborated a total of 16 charts (Fig. 2), condensing biological information and results of field work. The Atlas will be completed with the addition of one more chart with references to symbols and abbreviations, making a total of 17.

The SHN has developed one part of the Summer H-3 chart (Fig. 3), which contains the largest amount of information and will therefore represent a complex task to cartographers. The Cartography Division is in charge of preparing the original charts, in 15 different colours, adding the hydrographical, oceanographical and meteorological information, such as currents, deeps, winds, types of coasts, types of sea-beds, etc.

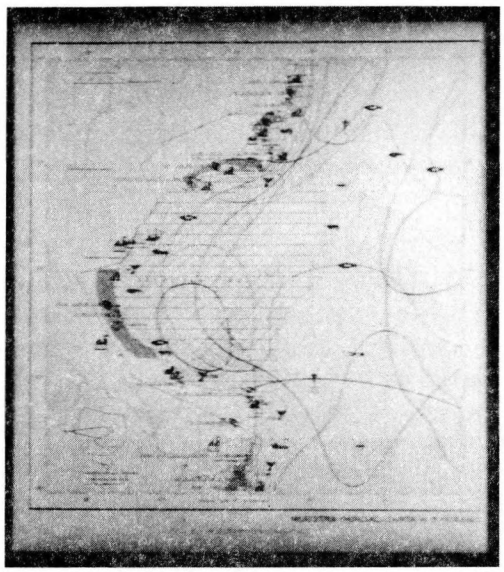

FIG. 3.- Summer H-3 chart.

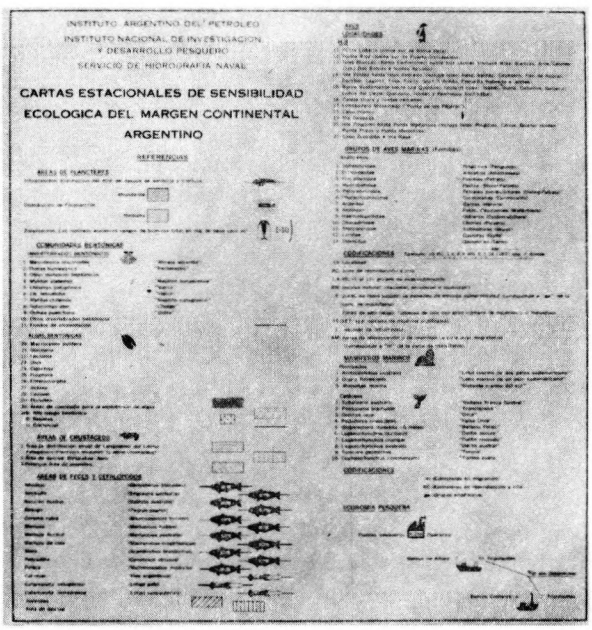

FIG. 4.- Symbols and abbreviations used for the INIDEP charts.

As mentioned above, symbols and abbreviations used in these charts (Fig. 4) were produced in view of the need to identify commercially and ecologically valuable species of the Argentine Sea, indicating population densities and migration routes for each season of the year.

The 17 charts will be compiled in an Atlas to facilitate their transport, care, use and future amendments; this Atlas will be completed by the descriptive and user's handbooks in order to produce a useful and reliable set of charts.

At present, the Argentine Petroleum Institute, together with national organizations, are procuring the financial resources and it is expected that the Ecological Sensitivity Atlas of the Argentine Continental Shelf will be available by the end of 1993.

Acknowledgements

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