

CONTRIBUTION OF INDUSTRIA SALINERA DE YUCATAN (ISYSA) TO THE PROTECTION OF THE ENVIRONMENT IN THE RESERVE OF THE BIOSPHERE RIO LAGARTOS, YUCATAN, MEXICO.

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EXTENDED ABSTRACT

With more than 60 years of production of sea salt, the Industria Salinera de Yucatán S.A. de C.V. (ISYSA) is one of the most important Mexican companies in this heading. During these years, the production area has comprised of one of the coastal ecosystems of significant environmental characteristics. At the moment the production system is within the Ría Lagartos Reserve of the Biosphere, an area of federal protection, which counts on classification RAMSAR being a coastal wetland of international importance because it supports to a great amount of species of plants and vulnerable animals and in danger of extinction.

In this zone a great amount of migratory and resident birds comes together emphasizing by their ecological importance in the region the Pink Flamingo of the Caribbean (*Phoenicopterus ruber ruber*), that it has a located site of preponderant nesting area in the neighborhoods of the Las Coloradas Saltworks facilities. On the other hand, the coast that delimits the ocean with the production ponds, they are of vital importance for the nesting area of two of the most important species of marine turtles: hawksbill turtle (*Eretmochelys imbricata*) and black turtle (*Chelonia mydas*).

ISYSA comprises one of the components of users of the Reserve of the Biosphere, and like so, it must accept the fulfillment of the effective environmental laws being one of the few companies that by their dimension are located within a protected natural area.

Therefore, ISYSA during many years has been it compromise with the care of the environment, recognizing that exists one narrow relation between the salt production system and its natural surroundings.

Key words: Ecosystems, environment, pink flamingo, sea turtle, Ría Lagartos Reserve of the Biosphere.

1. INTRODUCTION

The facilities of Industria Salinera de Yucatan are located within the Reserve of the Biosphere Rio Lagartos (Figure 1), one of the most important at national and international level. At the moment it counts with classification RAMSAR like wetland of international importance because it presents a great amount of fauna and rare flora, vulnerable or in extinction danger, as well as the greater number of pairs of bird's of a single species (pink flamingo of the Caribbean) and its high biological productivity by the diverse conditions of salinity throughout coastal lagoon (SEMARNAP, 1999).

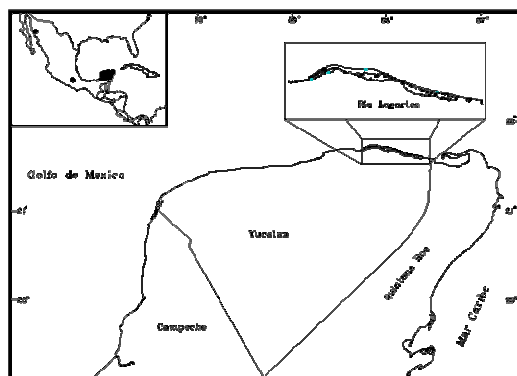


Figure 1: Geographic location of Rio Lagartos Natural Reserve.

The Direction of the Reserve has carried out diverse tasks for the protection of the most important species of flora and fauna, as well as the spreading of the “Plan of Handling” in the communities that are located to the interior of the Reserve: San Felipe, Rio Lagartos, Las Coloradas, Dzonot Carretero and El Cuyo. In each one of these programs the main actors take part that have some type of interaction with environment of the Reserve.

From the beginning of the decree of the Reserve, ISYSA has participated in the decisions taken for the adequate handling of the natural resources in the area, being one of the “users” whom it has working in this zone for more than 60 years. ISYSA approximately occupies 20% of the natural protected area creating one of the most interesting ecosystems of the Reserve, increasing the salinity of waters (brines) where certain group of organisms can be developed of unique way. The conservation of the natural resources has been during the ISYSA history a philosophy that allows the balance between the nature and the production of sea salt.

2. ENVIRONMENTAL SUPPORT PROGRAMS

One of the most important environmental programs for the Rio Lagartos Reserve is the conservation of pink flamingo of the Caribbean (*Phoenicopterus ruber ruber*) in this program some nongovernmental organizations are dedicated to the preservation and study of this wonderful bird. The main functions of the program of pink flamingo: 1) To protect the nesting areas, 2) to assure that sites of feeding exist in good environmental conditions, 3) to guarantee the fresh water flow in critical areas and 4) to carry out a study of the population of this species by means of a method that allows to know history life of flamingo, using a plastic ring in its left leg with 4 letters that allow to be located by means of a telescope in different places from the reserve or other points of the Yucatan coast (Von Bertrab and Tabasco, 2006).

In this program of pink flamingo, ISYSA has collaborated widely in these functions of protection and study, because one of the main areas of feeding is located within salt ponds in the points where the populations of brine shrimp are abundant (Figure 2). In the annual program of marking flamingoes ISYSA is part of the main sponsors of this event that year per year has taken greater importance at national and international level.



Figure 2: Pink flamingoes in salt ponds.

On the other hand, one of the programs with greater time of development in the reserve, is the protection of the sea turtles, that in the beginning the company has donated an area for the establishment for the turtle camping area and supported with the materials and equipment necessary for the monitoring and care of the turtles and its nests throughout 42 km of beaches in the zones of ISYSA influence (Figure 3).



Figure 3: Juveniles of hawksbill turtle (*Eretmochelys imbricata*).

One of the most important programs in the reserve of Rio Lagartos, is the diffusion of the conservation of the natural resources, by means of a system of continuous education focused mainly the children who live in the towns located within the reserve (Figure 4). ISYSA supports these work groups by means of donations of materials and money like fundamental tool to increase the knowledge, the participation and the citizen responsibility in the relation with its environment. This type of education allows the people to recognize values and concepts to create necessary abilities and attitudes that they will make him understand and appreciate the natural and social relation between the man and his surrounding environment, to the time that gives him possibilities of creating norms and codes of behavior to obtain the improvement of the environmental quality (Von Bertrab and Quijano, 2006).



Figure 4: Environmental education program in Las Coloradas.

3. RESULTS

3.1. Pink flamingo program

In the last 5 years the annual program of marking the juveniles of pink flamingo of the Caribbean has been carried out with the exception of year 2002 when the hurricane Isidore did not allow the birds to form nests in the main established zone for this activity. This program normally requires the participation of the government, as well as of nongovernmental and private institutions (as the case of ISYSA) to carry out with total punctuality and professionalism the works of marking the juveniles of pink flamingoes.

This activity has become a great important event for the research of the flamingo behavior and during these 5 years, the number of participants has been increased continually but controlled by the care that must be had during the activity of the positioning the ring (Figures 5 and 6).



Figures 5 and 6: Part of the activities to put the rings in juveniles of pink flamingoes.

In average 500 juveniles of pink flamingo has been marked with rings every year. The results are reflected in the increase of the populations of this bird in the last 6 years, in 1999 was reported a census of 26.000 adult birds in the coastal lagoon of Rio Lagartos and for the census of the 2005 the approximated population was 54.000 individuals, that represents an increase of the 107,7%. In this program is impossible to place ring to the 100% of the juveniles, in 1999 was reported 5.500 juveniles and for 2005 near 10.000 birds.

3.2. Sea turtles program

In all nesting season (April - September) the two main species of marine turtles: hawksbill turtle (*Eretmochelys imbricata*) and black turtle (*Chelonia mydas*), is necessary the use of special equipment to make the routes throughout beaches of Las Coloradas and the field measurements for the study of the behavior of both species. Part of this equipment is the four wheels motorcycles that are indispensable for the nocturnal routes, as well as a series of inputs. For the care and maintenance of this equipment ISYSA every year collaborates, even with the fuel for these motorcycles that works all the nights in the coast. In specific studies on the behavior and habits of feeding, ISYSA has sponsored with special equipment (GPS) for the tracking of the female marine turtles, as well as equipment of marine photography to know the feeding zones of these species (Figure 7).

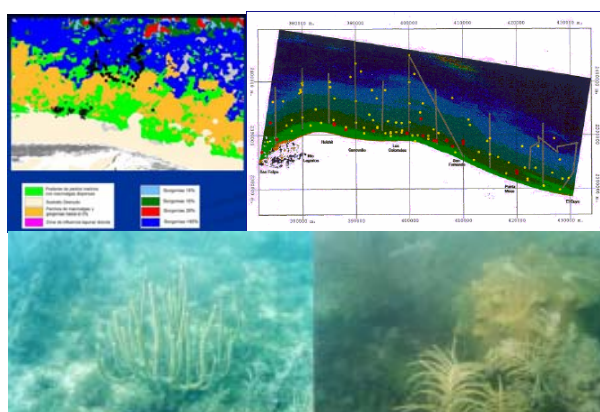


Figure 7: Results obtained by studies with equipment sponsored by ISYSA.

At the moment in spite of the concerted efforts to protect to these species, a report of the Pronatura Peninsula de Yucatan A.C. organization in 2005 reported a decrement in the amount of sea turtle nests in Las Coloradas zone (Figure 8), due mainly to the meteorological phenomena that appear in the zone, as well as to the low preparation of the personnel that every year enters for the first time to carry out these workings.

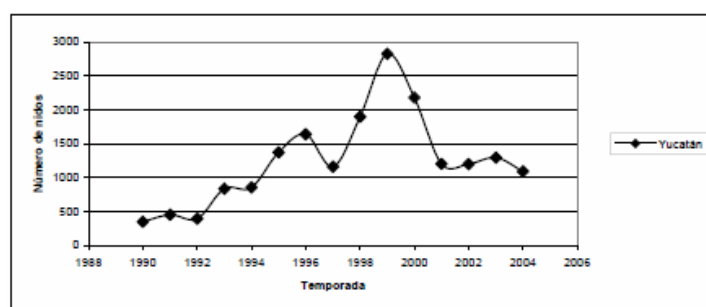


Figure 8: Results of last years of nesting season of hawksbill turtle (*Eretmochelys imbricata*), Source: SEMARNAT, Dirección de Vida Silvestre, 2004.

In the 2005 the hurricane Wilma ended a great amount of nests of hawksbill turtle, despite in the report of that year 298 nests were reported (Figure 9), where 80% of them were rescued and placed in the corral located in the margins of the ISYSA facilities, with support of the company.

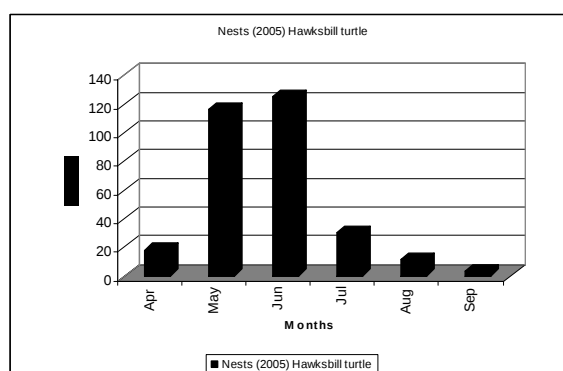


Figure 9: Temporal nests distribution of hawksbill turtle (*Eretmochelys imbricata*) in the beach of Las Coloradas

3.3. Environmental education program

One of the main works in the social sector of the Rio Lagartos Reserve is the creation of the conscience on the environmental problematic, as well as of its possible solutions, providing foundations in order to develop individuals better informed and participate in the protection of environment and in the sustainable use of the natural resources.

From the declaration as Reserve of the Biosphere Rio Lagartos in the year of 1999, the “Program of Handling” counts with a social objective of environmental education and the participation that must have the social sector. At this moment the Reserve counts with the voluntary participation of ISYSA in this program of education, because 80% of the population of Las Coloradas works in the facilities of the company and it was considered important that all the levels of the population will count with the knowledge of environment that surrounds them.

At the moment the participation of ISYSA is by means of the sponsorship of the necessary materials of education for the fulfillment of these objectives, as well as with the economic resources for the payment of qualified personnel. These efforts have been reflected in the gradual growth of the number of children who are educated in this area (Figure 10). This activity is making all the localities that are within the Rio Lagartos Reserve: San Felipe, Rio Lagartos, Las Coloradas, Dzonot Carretero and El Cuyo.

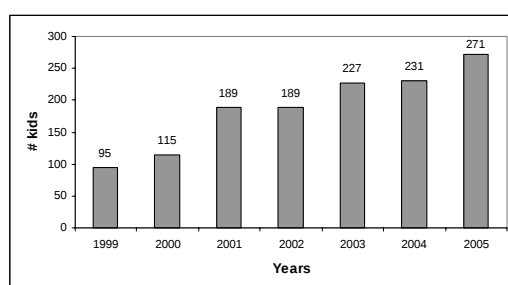


Figure 10: Participation in the environmental education program.

5. CONCLUSION

ISYSA collaborates in the main projects of conservation of the Reserve of the Biosphere Rio Lagartos and of general form it contributes in the extension and diffusion of the knowledge of the conservation of the natural resources, taking into account that one of these resources is of great importance for the economy of the region as it is the same for the extraction of the mineral in the Saltworks.

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