

# INTEGRATING PEOPLE AND WILDLIFE FOR A SUSTAINABLE FUTURE

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The Wildlife Society  
Bethesda, Maryland

1995

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Printed in the United States of America for The Wildlife Society by Allen Press, Inc. Lawrence, Kansas 66044

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Suggestion citation formats:

*Entire book*

Bissonette, J. A., and P. R. Krausman, eds. 1995. Integrating people and wildlife for a sustainable future. Proceedings of the first International Wildlife Management Congress. The Wildlife Society, Bethesda, Md. 697pp.

*Individual Paper in the book*

Bissonette, J. A., and C. D. Hargis. 1995. Linking landscape and smaller scale responses: a multi-scale model. Pages 432–435 in J. A. Bissonette and P. R. Krausman, eds. Integrating people and wildlife for a sustainable future. Proceedings of the first International Wildlife Management Congress. The Wildlife Society, Bethesda, Md.

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This book was produced on the Penta DeskTopPro<sub>US</sub><sup>®</sup> and output to an AGFA SelectSet 7000 imagesetter. The text is Adobe Times Roman. The text paper is 50 pound Husky Offset (50/10 recycled). This book was printed on a Hantscho full-sized waterless web press by Allen Press, Inc.

ISBN 0-933564-12-0

Library of Congress Catalog Card Number: 95-60231

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**BIRDS AND COASTAL WETLANDS OF VENEZUELA**

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*Abstract:* There are 53 wetlands along the coast of Venezuela, covering of 38,655 km<sup>2</sup> representing 4.2% of the area of Venezuela. All coastal areas faced similar problems: increases in population in the neighboring urban areas, scarcity of land for agriculture, pollution, pressures from industrial developments, and urbanization. Protected areas shared the same problems; e.g., low budgets, administrative and protection deficiencies, and lack of properly marked boundaries. Implementation of programs of aquaculture and fisheries need strict supervision, and development of coastal tourist facilities must be controlled carefully. As intrinsic parts of wetlands, mangrove swamps should be protected by the government, and local communities.

*Resumen:* Hay 53 humedales en la costa de Venezuela, cubriendo un área total de 38,655 km<sup>2</sup> que representan un 4.2% del territorio total Venezolano. Todas las áreas costeras enfrentan problemas similares: aumentos de población en las áreas urbanas adyacentes, escasez de tierra para cultivos, polución y presiones por el desarrollo industrial y la urbanización, con sus consecuencias asociadas inmediatas. Las áreas protegidas también comparten algunos problemas, tales como bajos presupuestos, deficiencias en administración y protección, y falta de fronteras debidamente delineadas. La implementación de programas de acuicultura y piscicultura debe ser llevada a cabo bajo estricta supervisión, y el desarrollo de facilidades turísticas en áreas costeras debe ser cuidadosamente controlada. Los manglares, como parte intrínseca de las tierras pantanosas, deben ser el centro de protección por parte del gobierno, y tema de interés de la comunidad.

*Key words:* aquatic birds, coastal wetlands, Venezuela.

Due to high productivity, wetlands constitute areas of great importance, especially in developing countries where entire communities may depend almost completely on the resources they generate; e.g., lumber, coal, wildlife, fish, honey, and salt (Dugan 1992). The benefits provided by wetlands can be classified in 3 categories including food sources,

environmental quality, and socio-economic issues. Food source benefits included habitat and breeding areas for fish, crustaceans, and molluscs; aquatic birds, and other wildlife species of interest to hunters. Environmental quality benefits included maintenance of biological diversity and water quality, filtering of contaminants, sediment removal, oxygen production, nutrient recycling, absorption of nutrients and other chemical substances, aquatic productivity, microclimate regulation, macroclimate regulation, and source and replenishment of aquifers. Socio-economic benefits included: flood control, shoreline protection, erosion control, source and replenishment of aquifers, salt production, lumber and other forestry products, fuel production (peat), pasture lands, industrial and small-scale commercial harvesting of fish, crustaceans and molluscs, subsistence and sport hunting, recreational values, esthetic values, and educational and scientific research values (Tiner 1984, Dugan 1992). Even when their economic and environmental importance was well recognized, wetlands were drained and converted to uses different from those suitable to their nature. Wetlands were considered "non-productive", and an obstacle to the development of traditional economic activities, especially agriculture.

The level of wetland degradation depends to a great extent on the socio-economic characteristics of neighboring human settlements. In industrialized countries, wetland degradation or destruction is caused by an increasing demand for urban, agricultural, and pasture land. In developing countries, the causes were related to poor watershed management and unsustainable uses of the resource, including tourism developments that exceeded the carrying capacity of the area, and conversion to shrimp farming and salt production.

The problems associated with wetland conservation often involve conflicting interests almost impossible to reconcile. Little consideration is given to the effect that human actions can have on natural processes; these consequences may be irreversible (Phleger 1969). These facts underline the importance of establishing sound strategies for conservation and rational use of the resources that the wetlands generate (Dugan 1992).

We thank Wild Wing Underhill Foundation, Wildlife Conservation Society-NYZZS and National Audubon Society who provided financial support.

**STUDY AREA**

We worked on the coastal shoreline of Venezuela, from Punta Castilletes in the state of Zulia to the delta of the Orinoco River in the state of Delta Amacuro. Along the shoreline, there were 47 wetland areas with a surface areas between 100 and 30,000 (ha) and 6 wetland areas with surface areas under 100 ha. Wetlands covered 16.4 % of Venezuela, compared to 25% for the Llanos (central plains), and 45% for the Guayana Shield. The surface area of Mediterranean wetlands in the country

far surpassed that of coastal wetlands, which were generally small in size compared to the inland areas. The largest expanse of wetlands is in the flood plains of the Llanos (10,100,000 ha), followed by the delta of the Orinoco (3,000,000 ha), and the alluvial plains to the south of Lake Maracaibo (1,280,000 ha). Marine wetlands comprised 500,000 ha; almost half of that area consisted of islands. The tiny mountain lakes scattered about the Páramos of the Andes region represent the smallest area of wetlands (10,000 ha). On the south of the Paria Peninsula, the wetland areas (100,200 ha) were closely related to the delta of the San Juan River and were considered part of the same geological, hydrographic, and biogeographic watershed.

The largest portion of the coastal wetland was found in the states of Delta Amacuro (78.1%), Zulia (14.8%), Sucre (3.8%), and Falcón (2.5%). The remaining 6 states contain less than 1% (30,000 ha) of the total wetland area.

#### PROBLEMS AND PRESENT SITUATION OF THE COASTAL WETLANDS OF VENEZUELA

Planning and land use regulations for coastal wetlands in Venezuela were incorporated into the framework of the National System of Protected Areas (Sistema Nacional de Areas Naturales Protegidas), and in the National Land Use Plan (Plan Nacional de Ordenación del Territorio). Land use planning, or "territorial organization" as it is called in Venezuela, is considered one of the fundamental mechanisms to achieve the goals of the national policy for natural resource conservation. The policy is developed and carried out by the Ministry of the Environment as part of a process of integral development for the country (Ministerio del Ambiente y de los Recursos Naturales Renovables 1987). However, Venezuela does not have a system of protected coastal areas per se. The criteria for grouping protected areas in Venezuela has never been based on general types of biological resources, or geographical or ecological zones, but rather types of management and use; e.g., national parks, forest reserves, and wildlife refuges, (Ministerio del Ambiente y de los Recursos Naturales Renovables 1992). The main criteria used have been special ecological features; (e.g., rare, endemic, and important animal or plant species), special economic importance, outstanding scenic characteristics, and the existence of threats or situations that degrade the ecosystem.

Because coastal wetlands only amounted to 4.19% of the area of Venezuela, there was a tendency to think they were insignificant. People did not understand that wetlands performed vital ecological, economic, and recreational functions. Strong urban and recreational pressures threatened the wetlands, creating an urgent need for developing rational and efficient management systems, a task requiring a high level of information. The urgent need for adequate management is illustrated

by the fact that the four coastal wetlands in National Parks (Mochima, Morrocoy, Laguna de Tacarigua and Laguna de La Restinga), were among the 10 areas receiving the greatest impact (Rivero and Gabaldón 1992).

Half of the population of Venezuela is concentrated along the coastal region. The 1990 census showed that 70% of the 20 million inhabitants of Venezuela lived on the coastal-Andean axis of the country, subjecting the region to strong urban, industrial, recreational, agricultural and fishing pressures. Each wetland area and coastal lagoon has a large or small community nearby. In recent years, because of their small size, some of the wetlands from Castilletes to Chacopata have disappeared or are on the verge of disappearing, and the majority are in quite critical situations.

The environmental problems of the coastal areas were caused by economic improvement and development. Problems characteristic of the coastal region include: unwise use of resources, unbalanced urban settlement and settlements on flood plains and other highly fragile natural areas, overcrowding, water and air pollution, and poor or non-existent solid waste disposal (Canestri et al. 1973, Cervigón and Gómez 1986, Novo 1988, García 1993).

Venezuelan legislation requires that Environmental Impact Assessments (EIA) be carried out before the development of construction or infrastructure projects (Casler et al. 1987, 1992). Very few are carried out during or after construction (Franco 1987, Lopez and Machado 1987, Instituto de Recursos Naturales 1988, Viale 1992). There is little experience in analyzing, evaluating, and quantifying the effectiveness or adequacy of the recommended management and protection measures. An example of this problem involved the installation of a shrimp farm in the Lagoon of Píritu (Fig. 1). Construction work and subsequent drainage of the pools increased the turbidity of the Lagoon's waters by 50% (Viale 1992), a condition observed from satellite images. This situation was not addressed in the EIA of the project.

#### THE IMPORTANCE OF COASTAL WETLANDS AND AQUATIC BIRDS IN VENEZUELA

Among the most outstanding features of wetlands are aquatic birds. A number of them are very conspicuous in appearance and often found in great numbers. For these reasons, they are frequently used as indicators of environmental quality (Scott and Carbonell 1986). Some 120 species of birds, including shorebirds, waders, herons, ducks, and other marine birds, depend on coastal ecosystems for feeding, reproduction, and staging areas during long migrations. Some of species are considered in danger of extinction; e.g., the peregrine falcon (*Falco peregrinus*), greater flamingo (*Phoenicopterus ruber*) and the scarlet ibis (*Eudocimus ruber*). In other cases, populations are shrinking because of the disappearance of feeding areas. In the last 30 years, most waders and migratory shorebirds have

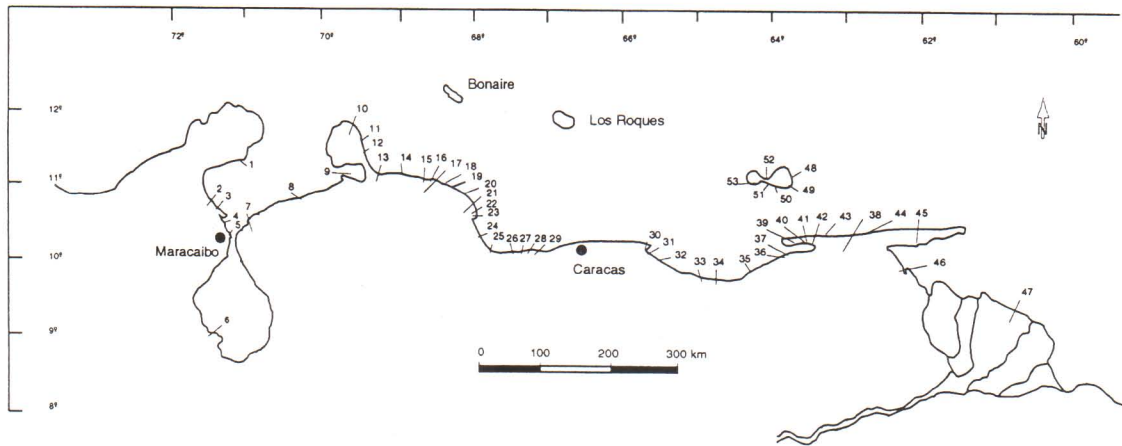


Fig. 1. Location of Coastal Wetlands of Venezuela. 1. Laguna de Cocinetas. 2. Gran Eneal. Caimare Chico. 4. Cienaga Tigra. 5. Laguna Las Peonias. 6. Juan Manuel de Aguas Blancas. 7. Cienaga de Los Olivitos. 8. Boca del Rio Zazarida. 9. Golfete de Coro. 10. Bajarigua. 11. Boca de Cano. 12. Sur de Adicora-Tura. 13. El Isiro. 14. Rio Ricoa. 15. Boca de Hueque. 16. Salinas de Sauca. 17. Cienaga de Tacarigua. 18. Cienaga Tacal. 19. Curamichate. 20. San Juan de los Cayos. 21. Embalses Jatira-Tacarigua. 22. Cuare. 23. Morrocoy. 24. Delta del Rio Yaracuy. 25. Moron. 26. Patanemo. 27. Yapascua. 28. Laguna de Turiamo. 29. La Cienaga. 30. Laguna de la Riena. 31. Laguna Grande. 32. Laguna de Tacarigua. 33. Laguna de Unare. 34. Laguna de Piritu. 35. Los Mesones. 36. Los Patos. 37. El Penon. 38. Laguna de Campoma. 39. Lag. Grande del Obispo. 40. Salinas Golfo de Cariaco. 41. Chachipo. 42. Complejo de Chiguana. 43. Chacopata. 44. Playa Grande. 45. Irapa. 46. Delta Rio San Juan-Guariquen. 47. Delta del Rio Orinoco. 48. Morro de Porlamar. 49. Las Marites. 50. Punta de Piedras. 51. Raya. 52. La Restinga. 53. Boca Chica.

faced problems (McNeil et al. 1985, Guzman and Schreiber 1987, Lentino 1989, Morrison and Ross 1989, Frederick et al. 1990, Lentino and Goodwin 1991).

In recent years, the interest and concern for coastal aquatic environments and for the birds associated with them has increased. During the 1960s, 21 papers on aquatic birds were published in Venezuela, while during the 1980s, 32 papers were published, an increase of 50%. However, to make more accurate and effective evaluations of the status of bird populations and wetlands, additional inventories and censuses are needed, including data from monitoring programs in particularly critical environments; e.g., national parks.

There is growing need for studies that analyze conflicts over use. These studies have become increasingly necessary for an adequate management of natural systems (Instituto de Recursos Naturales 1988).

#### MANAGEMENT IMPLICATIONS

Along the coastal shoreline of Venezuela, 53 wetlands cover a surface area totaling 38,655 km<sup>2</sup>, representing 4.19% of the area of the country. Most coastal wetlands were found in the western coastal states, although there is much more information regarding wildlife, flora, and physical and chemical characteristics of wetlands in the eastern states. Wetland dynamics are determined by biological and physical characteristics. Detailed scientific studies are required to understand the dynamics of wetlands although large-scale ecological processes, and the importance of the area can be inferred because

general characteristics are known. Because they are conspicuous and often found in great numbers, aquatic birds are good indicators of environmental quality and can serve as a basis for long-term monitoring programs.

All coastal areas are facing problems caused by an expanding human population, large-scale industrial developments, and the scarcity of recreational areas that affect wetlands and their associated biota. Pollution is a problem as is encroachment caused by urban development and expansion.

Wetlands are a unique natural resource, but they must be used in a rational manner that does not upset their ecological balance. Thus, aquaculture and fisheries projects must be carried out under strict supervision. The promotion and development of tourism also must be regulated because this activity can have negative environmental consequences. When present, mangroves are internal parts of wetlands and constitute ecosystems of great biological richness and importance. Because they are often exploited in ways that cause their degradation, they should be the focus of government protection programs and the object of community concern. Particular attention must be given to critical areas. Activities that constitute a threat to the ecosystem should be conducted within the limits of established standards and regulations.

For infrastructure projects that must be located in wetlands, measures to mitigate their environmental impacts must be designed based on professional evaluations that consider the effects of all stages of the project, and the effects after the structure is in.

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