

**VEGETATION CHANGES THROUGH TIME OF UPLAND HABITATS
ON SELECTED DREDGED MATERIAL ISLANDS IN UPPER
LAGUNA MADRE, TEXAS**

Several hundred islands were created in the late 1940's in the Laguna Madre of Texas. They were formed by dumping material dredged during the construction of the Gulf Intracoastal Waterway. Plants quickly began to colonize the islands. After over fifty years most of the islands in the upper Laguna Madre now support a diversity of plants. These include grasses, herbs (non woody flowering plants), forbs (non grass-like herbs), and shrub sized vegetation. Many of the islands have supported nesting water-bird colonies for decades. The birds nest in both the vegetation and on the bare soil each year. Twenty-three different species of birds have been documented on a Laguna Madre rookery island on at least one occasion. It is estimated that a total of 503,761 nest pairs used the islands from 1973 to 1996.

The islands within the Padre Island National Seashore are under the protection of the National Park Service. The National Seashore is located on the north end of Padre Island, Texas and is separated from the mainland by the Laguna Madre. Five Islands in the upper Laguna Madre and within the park boundary are important nest sites ("rookeries") for larger wading birds. In addition, one island supports the largest rookery for American White Pelicans (*Pelecanus erythrorhynchos*) found along the coasts of North America.

In an effort to further understand the habitats of selected islands, the National Park Service funded a study to map habitats and evaluate changes over a thirty-year period. However, this approach did not include any potential short-term variations that might occur in the vegetation types. Therefore, a smaller study was implemented to assess vegetation changes through an annual cycle. Of particular concern were changes that could potentially impact the annual nesting success of the colonial water birds. If detected then management strategies could be designed and implemented by the National Park Service to remedy the problem.

Eight islands were selected (five active rookeries, three islands with no nesting activity) for the study. The plan was to evaluate changes in grasses and forb vegetation in the upland habitat zone covered in the recent study. Ten sampling areas were randomly selected on each island intended to generally represent this zone. Care was taken to establish a survey route on the active rookery islands that would minimize disturbance to nesting birds during spring and summer sampling.

All of the vegetation was identified in a one square meter sample area. In the fall of 2001 and 2002, data were collected directly in the field. However, in the spring and summer of 2002, the same sample areas were photographed and the vegetation later identified from the digital pictures. The latter method was used to minimize disturbance to nesting species on the active islands. The presence of rare plant species or those individuals growing under other vegetation that might not show clearly in a photo were recorded in field notes.

Plant species were categorized as annual or perennial (lasting more than two years), or as grasses (family Poaceae), sedges (family Cyperus), herbs, forbs, shrubs, or trees. Qualitative comparisons were conducted using the species richness, distribution, and ecological data to determine if vegetation community changes were occurring. The study also assessed what potential implications this would have for colonial water-bird nesting success. A total of 54 plant species, in 20 families were documented during this study. The grass family exhibited the highest representation of species (14), followed by the sunflower family (Asteraceae) with 12 species; ten additional families were represented by only one species.

Fewer grass species were encountered in the recent study, potentially indicating changes from a grass to forb community. Since the inactive islands were not surveyed in the earlier study, no trends through time could be evaluated. However, the amount of bare soils that still exist at higher elevations indicated a stressful environment that would limit high species richness and diversity.

The overall vegetative structure of the active and inactive islands did not change throughout the annual survey. Productivity appeared higher in the second fall season following substantial rainfall. The only island that exhibited dramatic changes in vegetative cover and perennial grass and annual herb recovery was Pelican Island. This is the island where dense concentrations of American White Pelicans nest annually. On the other active islands, the bird nesting activity did not appear to affect the upland forb/shrub communities.

Active management strategies to increase colonial water bird nesting success should be carefully developed with specific objectives in mind. Removal of existing vegetation and shade cover may initiate annual herb and forb establishment.

In the interest of investigating the potential effect of active vegetation management in a scientifically defensible approach, study areas should be implemented and treated and evaluated in relation to reference sites. These treatments could include mechanical, chemical, and fire plots where vegetative community recovery could be measured and analyzed over time.