

Mapping Barrier Island Vegetation

By Beau McCaffray

Barrier islands are some of the earth's most dynamic landforms: consequently, maps of the coastal barriers can become abruptly antiquated. Barrier island mapping techniques must accommodate the natural forces that constantly shape these coastal barriers. A mapping technique sensitive to the dynamics of coastal barriers has been developed at North Carolina State University's (NCSSU) School of Forest Resources for Ocracoke Island, Cape Hatteras National Seashore (CHNS). Two features of this technique, the use of computer mapping and the available NCDOT aerial photography, combined, provide the capability to update and reproduce barrier island maps frequently and inexpensively.

First, by using a computer, island map data may be easily stored, retrieved and changed. In addition, different scales and a wide variety of data, such as fire history and wildlife nesting locations, can be added easily to the base data and graphically portrayed on a map. Perhaps the greatest benefit of using computer maps is that they are inexpensive to reproduce at multiple scales, shading configurations and overlays.

Second, by using NCDOT aerial photographs, a resource base becomes available on a frequently updated and inexpensive basis. The Department frequently takes aerial photos of its roads and highways. When severe weather events threaten or damage highways on barrier islands, the NCDOT takes aerial photos of the area to assess road status and to develop and analyze alternatives to correct problems. The low attitude/large scale photography preferred by Department professionals is inexpensive and useful

for interpreting vegetation communities, making NCDOT photography ideal for inexpensive diagnosis of changes in vegetation and other features wrought by storms, road rerouting and other events.

For the Ocracoke vegetation map, Physiognomic - floristic vegetation zones were defined with the assistance of Kent Turner (CHNS) and E.D. Seneca (NCSU Botany Dept.), identified (interpreted) on 1:12000 black and white aerial photographs, and then delineated on acetate overlays. Using a Bausch and Lomb stereo zoom transfer scope, the vegetation zones were transferred onto the base maps, USGS 7.5 minute topo sheets covering Ocracoke Island. The 1:24,000 vegetation map of NPS land displays 140 zones of 11 different vegetation communities for a total of 5,118 acres. The minimum mapping area was .19 acre. The State Plan Coordinate System frames the map; fire occurrence can be precisely located. A separate map report also is produced by the computer, which sequentially numbers each zone as it is plotted, giving the acreage and vegetation type of each zone. These sequence numbers also are printed in each zone on the map itself for easy reference to the map report.

A sampling procedure was developed to test photo-interpretation accuracy by stratifying all data into boundary and interior vegetation. These two strata were created based on their assumed differing levels of difficulty of classification. That is, boundary points, by virtue of their close proximity to differently identified zones, were considered harder to identify correctly than interior points. Additionally, the vegetative successional nature of many boundary areas could contribute to interpretation error, especially when the photos are more than a few years old. Interior points were considered to be less difficult to identify since these areas' texture, shading and patterns were often uniform for some distance. Sampling results revealed the overall photointerpretation accuracy to be 76%. As expected, boundary points were more difficult to correctly identify (67% accuracy rate) than were interior points (90% accuracy rate).

This mapping system provides a flexible capability to inventory data needed to manage some of the most dynamic landforms on earth.

McCaffray is a research assistant working under the direction of Prof. Hugh A. Devine, Recreation Resource Administration, North Carolina University School of Forestry.