Final Performance Report
South Carolina State Wildlife Grant T-14
October 1, 2005 – September 30, 2009

Title: "Development of Best Management Practices for Sustaining Wildlife In the Maritime Zone of South Carolina"

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Grant Objective
Best management practices have long been known and discussed for protecting water quality, but we are not aware of any dedicated effort to document best management practices (BMPs) for wildlife. Numerous books and reports have been written about the inter-relationships between wildlife and habitat and the negative impacts of development on wildlife and wildlife habitat, but not BMP guide, *per se*, is available. As a primary objective of this grant, we proposed to create a set of written BMPs that can be utilized during the planning and construction phases of development projects to minimize and mitigate the negative effects of coastal development on CWCS priority species. This project involved researching existing development guidelines and community covenants, and gathering information from experts in the field. The ultimate goal was to consolidate the findings into a single layman's-language publication that could be used by builders, developers, planners and private citizens as a guide to minimizing the impacts of development on coastal wildlife species. Although this report was focused on the "maritime forest" it is certainly relevant to all coastal forests and much of it applies to forests throughout the Southeastern United States. Those of us involved in the conservation of natural resources would prefer that no additional development be done in natural forests and woodlands, but given that such development is likely to continue, this book is intended to minimize impacts to wildlife and natural habitats.

Activity Overview:
Objective 1. Create and distribute a set of Best Managaement Practices that can be utilized during the planning and construction phases of development properties to minimize and mitigate the negative effects of coastal development on CWCS priority species.
Task 1. Research and recommend critical habitat needs, impacts of domestic species, sensitivities to human activity and construction, and identifying the native and migratory species of concern that utilize maritime habitats.
Task 2. Develop a BMP guidelines booklet.

Activity:
Task 1 activities were accomplished over the first two and ½ years of this project. This work included researching the critical habitat needs, impacts of domesticated species, sensitivities to human activity and construction, and identifying the native and migratory species of concern that utilize maritime habitats. To accomplish this, project staff, including a College of Charleston graduate student, conducted a review of available information related to habitat protection from coastal communities and municipalities. This included examination of zoning ordinances, covenants, homeowners' association guidelines and other rules. Relevant published literature was also examined through internet searches, and library research. Several relevant published documents and books were secured and utilized. Personal contact was made with docents, property managers, wildlife managers and naturalists associated with coastal communities and developments. When practical, staff and students conducted on-site visits to communities to examine wildlife and habitat protection guidelines in action. In most cases, these communities were exclusive areas where property and home values are well above the regional average. We did, however, make an effort to review the habitat protections guidelines that exist in the coastal towns, cities and counties. Data were not only collected from communities in South Carolina, but also North Carolina, and Florida. South Carolina communities that provided substantial information included Dewees Island, Palmetto Bluff, Spring Island, Kiawah Island, Sewee Preserve, Chechessee Creek, Bray's Island, and Bailey Island. Out-of-state contacts included Bald Head Island, North Carolina, Lake Tallavanna, Florida and Sanibel, Florida. Staff visited Dewees Island, Palmetto Bluff, Spring Island, Kiawah Island, and Lake Tallavanna, Florida. These communities are focused on minimizing impacts on upon natural resources, particularly wildlife.

Upon gathering substantial quantities of printed literature and internet files, the information was partitioned and examined for its usefulness in creating guidelines that can minimize impacts upon natural coastal fauna and associated coastal habitats. Guidelines were judged for usefulness and applicability in the coastal zone of South Carolina. They were also judged with respect to meaning effects upon wildlife and wildlife habitat. Some regulations were found to be more related to aesthetics than practical importance to wildlife. Tree ordinances varied considerably, most being related to prohibition of cutting those above a minimum trunk regardless of the species. Some communities did not allow the cutting of any trees of certain species. Some regulations were directed more at global issues, such as rainforest destruction through the prohibition of use imported hardwood timbers above a minimum size. We also made efforts to recognize the need for practical considerations such as minimizing fire hazards and providing access of emergency vehicles.

Personnel also accumulated biological information on the common (and rare) coastal fauna that depend upon maritime forests. This information summarizes interrelationships focusing on food habits and critical habitat needs. We developed lists of common fauna including migratory species that utilize coastal zone woodlands and we identified both plant and animal species that are considered to be in decline or rare.

Task 2 was completed during the last 1 ½ years of this project. Upon collected and organizing the data (Task 1), work was undertaken to develop a Best Management Practices (BMP) for Wildlife booklet. To accomplish this, staff first developed a faunal list of the more common and important wildlife species and species of concern. For these species, a literature review was conducted to determine optimal habitats and foods. Linkages between fauna and flora were investigated. This information of mammals, birds, reptiles, and amphibians was assembled for the booklet. Next, all of the assembled BMPs were ranked and sorted as being community level, neighborhood level, or single home level. These were consolidated as needed and grouped by topic. Where pertinent, web site addresses were added to provide more detailed information. Several appendices were developed including a) native plants of importance to wildlife, b) rare and uncommon native plants, c) invasive plants to be avoided or eradicated and d) a list of common and scientific names used throughout the booklet.

In September 2009, the final edits on a document entitled, "Best Management Practices for Wildlife in Maritime Forest Developments," were completed. This 76-page booklet with full color photos and illustrations has now been printed and is available to the interested public. Included in this report are the following topics: Purpose of the Report, discussion of plant diversity, description of a maritime forest, animals of the forest (Birds, Amphibians, reptiles, and mammals), Best management practices for wildlife (BMPS for the Community, Neighborhood, and single home), Glossary, references, and appendices (native plants important for wildlife, rare and uncommon native plants, invasive plants to be avoided, and a list of scientific and common names). The booklet includes 58 color photos of various animals and habitats. Three drawings illustrate various principles related situating a home site. A number of sidebars are included which provide more detailed information on: Threat to Red Bay Trees, Invasive Chinese Tallow Trees, Domestic Cat Predations, How to Attract Wildlife, Cluster Development, Why Buffers Matter, and Fire Prevention.

The following animals and their food and habitat needs are included: Birds- Resident Landbirds (Carolina chickadee, Carolina wren, Northern Cardinal, Eastern towhee, and red-bellied woodpecker), Nearctic-neotropical Migratory Landbirds (blue-gray gnatcatcher, Northern parula, chuck-will's-widow, prairie warbler, black-throated blue warbler, yellow warbler, yellow-billed cuckoo, and tree swallow), resident landbirds (yellow-rumped warbler, yellow-bellied sapsucker, palm warbler, and Eastern phoebe), Birds of Prey (bald eagle, osprey, red-tailed hawk, Cooper's hawk, sharp-shinned hawk, turkey vulture, black vulture, great horned owl, and Eastern screech-owl), colonial nesting wading birds, and waterfowl. Amphibians (green treefrog, squirrel tree frog, Southern leopard frog, Southern toad, Eastern narrowmouth toad, and slimy salamander), reptiles (broadhead skink, ground skink, southeastern five-lined skink, green anole, Eastern glass lizard, Eastern kingsnake, corn snake, yellow rat snake, Eastern cottonmouth, banded water snake, and American alligator). Mammals (white-tailed deer, bobcat, American black bear, raccons, Virginia opossum, Eastern gray squirrel, Southern flying squirrel, marsh rabbit, Eastern cottontail, Northern river otter, bats, fox, and various rats and mice), and species of concern (painted bunting, common ground dove, brown-headed nuthatch, and Eastern fox squirrel).

The booklet included 25 BMPs for communities, 20 for neighborhoods, and 28 for the single home. Although these BMPs were intended for use in a maritime forest or coastal forest setting, most of the guidelines are applicable

throughout South Carolina and the Southeast. Homeowners in established, traditional developments should also be able to glean useful information that should benefit wildlife.

While conducting this research, it became apparent to us that the most of the existing communities that have embraced ecologically-sound principles and wildlife management plans are largely "high-end," wealthy communities. It is unfortunate that most traditional developments were made by clear-cutting the landscape and occasionally leaving only the larger native trees in place. We believe that the creation of traditional developments can be done in a much more eco-friendly manner with relatively little impact upon the builders. We also believe that such developments can be more economically rewarding to the developers, because citizens prefer to live in areas that are in harmony with nature.

This publication was reviewed by mammal, herpetological and avian, experts. It was also reviewed by an expert with the SC Forestry Commission. During the development of this a graduate student at the College of Charleston (Elizabeth Mullins) used this project as an internship to satisfy the requirements of her degree. Additionally, another graduate student was employed to assist in this project as she finished her degree.
Thus far about 100 copies have been distributed to various educators, colleagues, planners, NGOs and the general public. In the coming weeks, copies will be actively distributed to libraries, developers, and others who may benefit use of this booklet. In early 2010, a statewide radio show is planned to be devoted to promoting this booklet. Additionally, copies will be provided to the South Carolina Sea Grant Consortium and the Office of Ocean and Coastal Resource Management.

Printed copies of this report are available from:

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Or by emailing to whitakerd@dnr.sc.gov
Copies can also be downloaded at http://www.dnr.sc.gov/marine/pub/BMPSforCoastWeb.pdf

Significant deviation: None

Estimated Federal Cost: $98,508

Recommendations: This grant has been completed and goals achieved. We recommend that efforts continue to distribute the product of this research to coastal developers, builders, educators, and planners. It may be appropriate to update BMPs in a five years.