The Virginia Wetlands Report

Spring 2002
Vol. 17, No. 1

Update On Virginia's New and Improved Nontidal Wetlands Program

By Ellen Gilinsky, Ph.D. PWS
Virginia Water Protection Permit Program Manager
Virginia Department of Environmental Quality

October 1, 2001 has come and gone, and the Department of Environmental Quality (DEQ) has moved smoothly into full implementation of its new and improved Virginia Water Protection (VWP) Permit Program. As you may recall from former articles in this newsletter, the 2000 Session of Virginia's General Assembly passed legislation that built on the existing VWP Permit Program, which was the state's Section 401 Water Quality Certification of federal Section 404 Permits for dredge and fill projects, and created an independent nontidal wetlands program. Key changes included the provision of additional jurisdiction over: excavation in all wetlands, impacts in isolated wetlands, filling or dumping, activities in a wetland that cause drainage or significantly alter or degrade existing wetland acreage or function, and permanent flooding or impounding.

Exemptions from the regulations are provided for normal agricultural and silvicultural activities, normal residential lawn and yard maintenance and use activities, and for isolated wetlands of minimal ecological value (IWOMEV). An IWOMEV is defined by regulation as an isolated wetland that has all of the following characteristics: less than one-tenth acre in size, not forested, does not have any federal or state listed threatened or endangered species, is not a special community type such as a vernal pool, and is not located in a 100 year floodplain. In the case of isolated wetlands, the Corps will continue to approve delineations and make the isolated wetland determination; however the Corps will now note on the confirmation that the applicant must seek a permit from DEQ for impacts to isolated wetlands. Since excavation in wetlands began being regulated by DEQ starting July 1, 2000, and other impacts in isolated wetlands starting October 1, 2001, we have seen a halt to Tulloch ditching in Virginia, and we have been able to require avoidance, minimization and compensation for impacts to ecologically valuable isolated wetlands.

Nontidal wetlands have many functions that help maintain good water quality.

The new regulations, which may be referenced on DEQ's website at http://www.deq.state.va.us/wetlands, also detail how: the applicant must avoid and minimize impacts to wetlands to the extent practicable prior to considering compensatory mitigation; that permits shall ensure that cumulative impacts to wetlands will not cause significant impairment of state waters or fish and wildlife resources; and that compensation must be sufficient to ensure no net loss of wetland acreage and functions. Acceptable forms of compensatory mitigation for unavoidable wetland impacts include: creation; restoration; purchase of mitigation bank credits; contribution to Approved In-Lieu Fee Fund (note that the Virginia Wetland Restoration Trust Fund, operated by TNC under supervision of the Norfolk District Corps, is currently the only such approved fund in Virginia); or preservation of wetland or upland buffers in combination with creation, restoration or purchase of bank credits. Other important changes to the VWPP regulation were made to clarify information needed for a complete application;

the steps in permit review and issuance; provision of an expedited process for making minor changes and time extensions to permits; and an increased permit term from 5 years to the time needed to cover the permitted activity, not to exceed 15 years.

In addition, DEQ now has four general permits to cover impacts to nontidal waters (stream and wetlands) for certain types of projects, including transportation, development and utility projects. The DEQ website can be referenced for a summary of each of the four general permits as well as the full text. General permits are beneficial because they provide the same level of environmental protection through enforceable permits while providing standard conditions that allow for shorter processing times. For all the General Permits, there is a registration statement available on the DEQ website that contains the informational requirements for coverage under the general permits. The Joint Permit Application form may still be used to apply for coverage under the general permits provided it contains all the required information. An abbreviated registration statement is used for impacts less than 1/10 acre; no application fee is required, but this reporting function is critical to the tracking of no net loss of wetlands. It is important to note that if an activity is covered by a Corps Nationwide or Regional Permit that has received Section 401 Certification from DEQ, then you do not need to apply for a DEQ General Permit for that activity.

While there have been many changes to the program, there is also much that stays the same. The VWP Permit still serves as Section 401 Certification of Section 404 Clean Water Act activities, including those for tidal impacts. The avoid-minimize-mitigate sequence still takes precedence. The Norfolk District Corps will still conduct pre-application site visits and approve delineations. What is new is that DEQ can now take permit action regardless of whether there is a Corps action; therefore the state can regulate all types of excavation in wetlands and activities in isolated wetlands through the VWP Permit process. We now have general permits that will cover the majority of impacts to wetlands, thereby freeing up staff time to better inspect and enforce the permits we issue. Finally, DEQ no longer has the ability to waive the requirement for a permit, except for IWOMEVs and certain tidal impacts when they are covered by a Corps and VMRC permit.

These changes to the VWP Permit regulation set the stage for DEQ to work with the Corps Norfolk District on another statutory requirement, to seek a State Programmatic General Permit (SPGP) to streamline the state/federal permitting process. The Corps can issue an SPGP for certain activities covered under one or more state GPs, resulting in a reduction of duplication between similar regulatory programs that manage the same or similar resources. It provides a tiered approach to issuing permits:

- Tier I: DEQ issues alone when impacts to wetlands and streams are below a certain threshold (generally less than 1/2 acre)
- Tier II: For slightly larger impacts, DEQ issues their permit, Corps reviews the project and allows federal agency comment, and either allows coverage under the SPGP or requires an individual Corps permit if there is more than minimal impact (generally less than 1 acre)
- Tier III: both DEQ and Corps issue for projects with large impacts (generally greater than 1 acre)

The Norfolk District is currently considering an SPGP for development and transportation projects, In June 2001, the Norfolk District Corps formed a stakeholders group composed of environmental and developmental interests and federal and state groups. These stakeholders met several times to provide input into the scope, thresholds and review procedures of an SPGP. A federal Public Notice was issued on October 31, 2001 advertising the proposed SPGP. The Corps has reviewed the comments received and is still making final decisions on thresholds and activity coverage. The Corps proposes to suspend and revoke the nontidal portions of NWPs 14 and 39 when the SPGP is implemented, to avoid confusion for applicants requesting coverage under the SPGP.

Continued on the next page

***Editor's Note*:** We appreciate very much Dr. Gilinsky's willingness to take time out from her extremely busy schedule to keep our readers informed regarding implementation of the non-tidal wetlands law. If you wish to review her previous update, it appears in Volume 15(2) of this newsletter and can be found on the VIMS, CCRM website under "publications." A related article by Carl Hershner was published in Volume 15(1) and can be accessed at the same location.

The Virginia Wetlands Report is a quarterly publication of the Wetlands Program at the Virginia Institute of Marine Science of the College of William and Mary. Subscriptions are available without charge upon written request to: Wetlands Program, Virginia Institute of Marine Science, P.O. Box 1346, Gloucester Pt, VA 23062 USA. *Address corrections requested.*

Program Director:
Dr. Carl Hershner
Head, Wetlands Advisory Program:
Thomas A. Barnard, Jr.
Produced by:
VIMS Publication Center

In this Issue:

This report was funded, in part, by the Virginia Institute of Marine Science and by the Virginia Coastal Resources Management Program of the Department of Environmental Quality through Grant #NA97OZ0181-01 of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resources Management, under the Coastal Zone Management Act, as amended.

GIS Geographic Information System

Natural Resource Agencies Identify GIS Data Necessary to Address Agency Mandates

Marcia R. Berman

The Natural Resource Agency Workgroup, coordinated by the Virginia Geographic Information Network (VGIN) and chaired by the author, first convened in October, 2000 to begin the process of defining GIS data needs across agencies that deal with natural resource issues within the Commonwealth. Most of these agencies fall under the Secretary of Natural Resources. Some, like the Department of Forestry and the Virginia Institute of Marine Science are also primary stakeholders in Virginia's natural resource management, but have no regulatory authority. The workgroup's membership includes representatives from the Department of Conservation and Recreation, the Department of Game and Inland Fisheries, the Department of Environmental Quality, the Virginia Marine Resources Commission, the Chesapeake Bay Local Assistance Department, the Virginia Department of Forestry, and the Virginia Institute of Marine Science. The first mission of the group was to identify a list of spatial data themes which were necessary to carry-out agency goals or missions.

The workgroup approached the task by looking within each agency to identify leading missions or applications underway. More than 60 different applications were sited and reviewed in detail. They loosely can be grouped into eight general categories: Land Use, Land Cover, Hydrology, Geology/Land Forms, Socioeconomic and Community Based Infrastructure, Natural Resource Conservation Zones, Monitoring and Site Assessments, and Other. It is understood that this list is a living document which will evolve as agencies refocus their priorities periodically. The current applications within these categories range from maintenance of a forest inventory to developing total maximum daily load (TMDL) models. A detailed list of spatial data needs was compiled and reviewed for each application. The cumulative list includes more than 90 spatial data layers.

Priority	Spatial Data Layer	No. of Applications
1	Hydrology [1]	78
2	Watershed boundaries [2]	47
3	Land Use	40
4	Land Cover	40
5	Wetlands	35
6	Topography/Contours	30
7	Riparian Forest Buffers	27
8	Jurisdictional Boundaries	26
9	Parcel Boundaries	25
10	Soils	24
11	Land Ownership	24
12	Census Data	23
13	Resource Management/ Protections Areas	21
14	Flood Plain Boundaries	20
15	State Forests/DOF Lands	20

[1] Includes coarse and detailed hydrology
[2] Includes 8-digit, 11-digit, 14-digit boundaries
[3] In accordance with the Chesapeake Bay Preservation Act

Table 1. Top Fifteen Data Layers Identified by Workgroup

A matrix was developed to relate spatial layers to the various applications. From the matrix, a prioritized list of spatial layers was constructed based on the number of applications supported by a coverage. The top 15 layers are listed in Table 1. Hydrology, hydrologic units, land use, land cover, and wetlands were at the top of the list. What is the significance of this and the overall exercise? First it helps the Commonwealth's VGIN program prioritize efforts for statewide data acquisition. Second, it provides the opportunity for agencies to maximize the benefits of limited resources through cost sharing when data acquisition is considered. Finally, the process begins an overall assessment of GIS needs in Virginia. Similar workgroups have subsequently been formed to coordinate agencies under other secretariats in the Commonwealth.

Update On Virginia's New and Improved Nontidal Wetlands Program continued from page 2

The Corps and DEQ are also working on a Memorandum of Agreement outlining program responsibilities under the SPGP, to include: Preapplication Consultations; Jurisdictional Determinations; Procedures for review of Endangered Species and Historic Resource concerns; Permit Compliance & Enforcement; In lieu fee mitigation; Mitigation Performance Standards; Monitoring & Reporting Requirements; and Training. Stay tuned to the DEQ wetlands website and this newsletter to find out more about the SPGP and its projected schedule of implementation.

Studies Document Weaknesses In 404 Compensatory Mitigation

Tom Barnard

Two recent studies, [one by the National Academy of Sciences' National Research Council (NRC)* and the other by the Government Accounting Office (GAO)**, the research arm of Congress] have concluded that there are significant problems with wetlands replacement at the federal permitting level and each makes a number of recommendations the researchers feel are necessary for wetland compensation to fulfill its intended role in the implementation of Section 404 of the Clean Water Act.

The subject of the GAO study was the use of the in-lieu-fee mitigation option by the Corps of Engineers. An in-lieu-fee system involves payment of fees by developers to a public entity or a non-profit private natural resource organization such as the Nature Conservancy (the case in Virginia) that under contract with the Corps, carries out various mitigation-type activities with the money. The in-lieu-fee mitigation option has become a very important tool over the last 10 to 15 years with over $64 million having been paid by developers to offset impacts to 1,440 acres of wetlands, according to Corps of Engineer records.

The GAO found that the effectiveness of the in-lieu-fee program was uncertain. While Corps officials in 11 of the 17 districts that have such arrangements stated that more wetland acres had been restored, preserved, enhanced or created under the program than had been adversely affected, the monitoring data submitted by many of these same districts did not back up these claims. In addition, although many of the Corps district officials stated that the wetland functions and values lost through development activities were replaced at the same or higher levels through the in-lieu-fee program, many districts reported that there was no monitoring of the mitigation wetlands and no criteria established by which to measure ecological success for example.

The GAO recommended that EPA take the lead in developing ecological success criteria for mitigation wetlands and that procedures for assessing success be implemented by the Corps and the federal resource agencies. They recommended that these criteria be applied to all compensatory mitigation programs including ad hoc arrangements where an independent third party performs the mitigation. The study found that mitigation conducted under ad hoc auspices suffered from the Corps' low priority on follow-up enforcement and a lack of guidance as to who is ultimately responsible when the mitigation is not satisfactorily accomplished.

The Committee on Mitigating Wetland Losses was charged by the National Research Council to "..evaluate how well and under what conditions, compensatory mitigation required under Section 404 [of the Clean Water Act] is contributing towards satisfying the overall objective of restoring and maintaining the quality of the nation's waters." The committee was composed primarily of wetland scientists from major universities across the country along with individuals having economic, legal and/or practical experience in wetland mitigation. During its deliberations the committee conducted on-site reviews of wetland restoration and creation projects, elicited input from private and government experts, and conducted an extensive literature review of academic research, government and private organization reports.

The principal findings and recommendations of the committee were:

1) The Section 404 program is not meeting the overall goal of no net loss of wetland function despite progress in the last 20 years.

- An improved national database should be developed to track the permitted loss and replacement of wetland area and function over time.
- The Corps and the states should encourage the establishment of watershed organizations to oversee wetlands under easement or public ownership.

2) Permit decision making would be improved through the incorporation of a watershed approach.

- Wetlands that cannot be restored under our present knowledge base should not be filled or adversely affected under permit.
- Site selection for wetland conservation and mitigation should be on a watershed basis.
- Riparian wetlands should receive particular attention and protection due to their water quality role and unique landscape position.

3) Performance requirements have often been unclear and compliance has often not been required or attained.

- Individual compensation sites should be designed to achieve ecological success.
- Compensatory mitigation should be in place concurrent with the permitted activity at a minimum.
- Effective scientific, legal and financial assurances should be in place to ensure long term site sustainability and monitoring.

4) Support for regulatory decision making falls short of that necessary for sound implementation.

- Additional research, reference materials, personnel training and interagency cooperation should be funded and implemented to support the decision makers and improve mitigation decisions and monitoring.

Continued on page 8

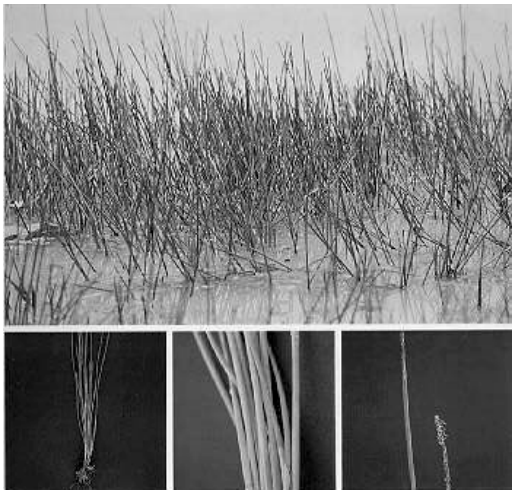
Wetlands Yield Oriental Treats

Pamela Mason

Found in wetland communities throughout the world, many species of spikerushes (genus *Eleocharis*) are known for their value as food for wildlife and domestic livestock. In North America, spikerushes are important forage for cattle in southern Alberta Canada prairie wetlands (Sankowski, et al. 1998), and many species of waterfowl are known to consume underground portions, stems and seeds of several species of spikerush (Ramey, 1999). Locally, several species are grazed by wildlife including the dwarf spikerush (*E. parvula*), the square stem spikerush (*E. quadrangulata*), and the blunt spike rush (*E. obtusa*). One particular species, native to southeast Asia, is consumed not only by native wildlife, but is a favorite ingredient in Chinese food as well - water chestnuts.

Water chestnuts are the corms of the sedge *Eleocharis dulcis*. The corm is the fleshy underground bulb-like portion of the plant stem base. Reddish brown in color, the name water chestnut comes from the similarity in appearance to chestnuts. *E. dulcis* is an annual sedge with erect, tubular leaves typically about one and a half feet tall. The native habitat of the water chestnut is the edges of freshwater ponds, lakes and slow-moving rivers. The plant requires about 230 frost-free days and is thereby limited to tropical climates. Currently, water chestnut production is centered in southeastern Asia with growing interest in Australia. The majority of the United States imports come from China. There has been some production historically in Florida, Georgia and California, with continued interest among the Florida agricultural community given the estimated value of over $25,000,000 canned and frozen water chestnuts imported into the U.S. in 1988 (Diver, 2000). To a lesser extent, water chestnuts are also imported as fresh produce.

Water chestnuts are typically grown in paddies or lagoons. Not unlike paddy rice, water levels are low to allow planting in the spring, and upon germination, the area is flooded through the summer and into autumn when the levels are lowered again for harvesting. Harvesting occurs as the leaves yellow and die back and is typically done by hand. While mechanical harvesters are under development, the labor-intensive harvesting has limited the expansion of commercial production.



Water chestnuts are grown in paddies, similar in many ways to rice production.

Some interest has developed in the possibility of capitalizing on multiple benefits of water chestnut production. Phytoremediation, the use of aquatic plants to cleanup hazardous substances provides a promising solution for complicated environmental problems. The use of water chestnuts in constructed wetlands to remove nutrients from wastewater associated with livestock facilities also yields a secondary food product that can be fed to the livestock.

For those interested in the human consumption of water chestnuts, consider the following popular, and very easy, recipe:

1 pound Bacon
16 oz whole chestnuts

Cut bacon in pieces long enough to wrap around the water chestnuts and secure with a toothpick. Bake at 450° until bacon is crisp. An optional glaze may be added consisting of ½ cup brown sugar, ½ c chili sauce and ½ c mayonnaise and bake an additional 15 minutes at 375°.

Given their diminutive size and simple flowering habit, spikerushes are often over-looked and are generally little known and underappreciated by most people. So the next time you are near a marsh (or that low wet area in your backyard), keep your eye toward the ground for the little slender plants with the bullet-shaped seed head right at the top. You may be able to observe whether the plants are being grazed by insects or wildlife. In the mean time, enjoy some water chestnuts - one of the many benefits of wetlands.

References:

Agriculture Notes Chinese water chestnut. February 1998. Notes Series No. AG0643. Farm Diversification Information Service, Bendigo, Australia. http://www.nre.vic.gov.au/web/root/domino/nfseries/infsheet.nsf/HTMLPages/NRE+Note+Series+Homepage?Open.

Diver, Steve. December 2000. Chinese water chestnut. Current topic, Appropriate Technology Transfer for Rural Areas. http://www.attra.org.

Ramey, Victor. 1999. Wildlife, wetlands and those “other plants.” Aquaphyte Online Vol. 19 (1). http://aquat1.ifas.ufl.edu/aq-w99-5.html.

Sankowski, Tomasz, Margaret Haworth-Brockman and Kim Schmitt. 1998. Responses of spikerush (*Eleocharis palustris*) to different water management regimes. http://www.npwrc.usgs.gov/resource/1998/wetsympo/respspik.htm.

-BOOK REVIEW-

Coastal Plants from Cape Cod to Cape Canaveral

By Irene H. Stuckey and Lisa Lofland Gould
Published by University of North Carolina Press. Chapel Hill, NC. 2000. 305pp.
ISBN: 0-8078-4894-8 (pbk.)

Review by David O'Brien

Irene H. Stuckey, professor emerita of plant physiology at the University of Rhode Island's Agricultural Experiment Station and Lisa Gould, research assistant at the University of Rhode Island, executive director of the Rhode Island Natural History Survey and a founder of the Rhode Island Wild Plant Society, have worked together to produce a compilation of 175 plants frequently encountered on the Atlantic coastal plain. The authors discuss various vegetative communities and the commonly found plant species that comprise them along the coastal plain from northern Massachusetts to northern Florida. Their book is the result of expanding upon a popular series of articles (62 total) entitled "Plants beside the Sea", written by Stuckey for the URI graduate school publication, *Maritimes*. Although the authors acknowledge the book is not meant to be comprehensive in its coverage of the diverse assemblage of species that exist across this extensive geographic distance, it does provide the reader with some of the more commonly encountered coastal plants while discussing their typical habitats and range. Other valuable information such as closely related species, pollination method, fruiting season, frequently associated species, wildlife utilization, and medicinal uses are also discussed.

Following the acknowledgments and a brief discussion of how the book is structured, the Introduction discusses the various coastal habitats typically found along the Atlantic coastal plain. These habitats include beaches and mudflats; rocky shores; aquatic beds; coastal cliffs; dunes; tidal salt marshes; tidal brackish marshes; freshwater swamps, marshes, ponds and streams; bogs, fens, and pocosins; coastal scrub and thickets; and old fields, meadows and savannas. The authors provide a description of species commonly associated with each of these habitats along with information regarding the ecological significance of each habitat. Suggested reference sites are provided for each of the coastal habitats discussed. An informative and helpful section on Field Trips to Coastal Areas provides the reader with suggestions on planning and visiting these areas that will help to ensure a safe and enjoyable experience afield. Following the large section dedicated to the Plant Descriptions, the section on Selected Coastal Natural Areas lists recommended sites by state along with the county in which each is located. Unfortunately, the natural areas provided for Virginia list some of the locality information incorrectly, but this is a relatively minor oversight. All of the natural areas listed for the Old Dominion are well known and easily identified on any good map of the Commonwealth. Following this section, a limited glossary of plant and ecological terms is provided.

The plant description portion of the book features vascular plants systematically arranged by family. Beginning with a very brief presentation of ferns and fern allies (3 species), the book moves forward through a limited number of the gymnosperms (cone-bearers) before concentrating on the angiosperms (flowering plants) which comprise the majority of the 175 plant descriptions. Although this systematic organization is used in Radford, Ahles and Belle's *Manual of the Vascular Flora of the Carolinas* (1964, Chapel Hill Press), I found the layout here cumbersome to work with without as much as a simple listing of the included plant families. Additionally, there is no type of dichotomous key provided for the reader to identify unfamiliar species in the field. Consequently, I surmised that the book is not intended for use as a field guide, but rather maybe as a companion guide to more diagnostic texts. Therefore, unless the reader can identify a given plant observed afield, it is difficult to quickly reference likely candidate species in this book.

Obviously it is difficult to present an even somewhat comprehensive vegetative characterization of various coastal plain habitats using only 175 species. Consequently, too many of what I consider to be commonly encountered coastal plants are not photographically represented in this book, (i.e. pond pine, loblolly pine, jewelweed, cardinal flower, sawgrass, etc.). Unfortunately, this sometimes leaves large pieces of the vegetation puzzle for each habitat to be acquired and pieced together by the reader using additional references. One of the most outstanding aspects of the book are the pictures. Most of the species presented are extremely well photographed, using a variety of perspectives for different plants. However, as with any text that uses only a single picture, it is often difficult to accurately represent all the various characteristics of a given plant such as habit, flower, fruit, leaf shape, etc. Examples of this limitation in the book include the photograph of smooth cordgrass (*Spartina alterniflora*), which focuses on a single flowering seedhead while the photograph of big cordgrass (*Spartina cynosuroides*) taken from a distance more closely resembles the short form of smooth cordgrass. As an alternative, the authors might have considered highlighting the distinguishing inflorescence or prominent leaf midrib of big cordgrass while focusing on the general growth habit of smooth cordgrass in their photographs.

Included with the plant descriptions of photographed species the authors identify some commonly associated plant species and often provide detailed descriptions of these. However, I feel many of these "associate" species are encountered in the coastal plain frequently enough and have significant ecological value to warrant their own photograph and plant description. For example, the authors include individual photographs and descriptions of annual salt marsh aster (*Aster*

Continued on the next page

Wetland Denizens

Spotted Sandpiper

Actitis macularia

by Walter I. Priest, III

You are walking along the river and you see a small bird on the beach ahead of you that is constantly bobbing its tail up and down. As you approach, it flies off with rapid wing flutters alternating with short glides. You have just met the spotted sandpiper, *Actitis macularia*, a member of Family Scopalidae, which includes the sandpipers, plovers, and other shorebirds.

While it is most often seen during spring and fall migrations, it is one of the few shorebirds that nest in Virginia, the southern limit of its breeding range that extends to northern Canada and Alaska. It winters south to northern Chile and Argentina. The limited breeding in Virginia is usually observed along the rivers west of the Chesapeake Bay, particularly gravel and pebble beaches. It can also be observed on inland lakes and streams.

A medium sized shorebird, it is normally 8" from the tip of its bill to its tail. In the summer it is dark grayish brown above with characteristic large dark spots on its white chest and belly. Its bill is pinkish orange with a darker tip. In the winter it is grayish above with no spots below but a dark shoulder patch.

It feeds on flying insects and probes along the waters edge for worms and small crustaceans as well as beetles and fish.

The nest is a scrape in the ground lined with grass or moss. It can be located in grass, among rocks, or herbaceous vegetation near water. There are typically four buff colored brown marked eggs per nest. Incubation lasts three weeks with fledging three weeks later. The young are precoccial, eyes open, independent, downy young. One female can produce up to five broods per year.

The Spotted Sandpiper

This brings us to one of the more interesting aspects of the spotted sandpiper's natural history, its reproductive biology. Spotted sandpipers are polyandrous which means each female mates with a number of males. This allows the species to capitalize on the relatively long temperate breeding season as compared to the arctic and near arctic breeding seasons of other shorebirds. Females arrive on the breeding grounds first and compete for males as they arrive. After mating and laying a clutch of eggs, the female leaves the male to incubate and raise the brood. A female can produce up to five clutches of eggs per breeding season provided there is a sufficient number of males available. If she were to incubate and raise each brood herself, she would barely be able to produce two broods per year. Following a polyandrous lifestyle, leaving a male to raise each brood, she can produce as many as five broods per year, which is clearly advantageous in comparison to a monogamous relationship.

Polyandry, females having multiple male partners, is a reproductive strategy that has evolved in some birds to take advantage of the female's full reproductive capacity. This, coupled with an extended temperate breeding season, helps give spotted sandpiper population dynamics a somewhat unique twist.

---

subulatus) and perennial salt marsh aster (*Aster tenuifolious*). The presence or absence of a rhizome can usually easily distinguish between these two plants. Consolidating these two species with one picture and describing other more subtle differences (i.e. size of and number ray flowers) in the text would have provided an opportunity to highlight another common or interesting "associate" species.

Unfortunately, I feel this book has limited use to the uninitiated reader new to coastal plant communities. Newcomers interested in learning more about these habitats and identifying their representative plants would greatly benefit from the inclusion of a simple dichotomous key and a listing of the plant families presented. Although I would not recommend this book to someone as their first reference on Atlantic coastal plain vegetation, the authors do provide more knowledgeable readers accurate physical descriptions, habitat requirements, and some anecdotal information on many species commonly found encountered in the coastal plain. This book would be an enjoyable addition to the reference libraries of individuals already familiar with various coastal plain plant communities who are looking to expand their knowledge of the species that comprise some of the most ecologically significant habitats found along our east coast.

Calendar of Upcoming Events

March 18-22, 2002	Sixth Marine Estuarine Shallow Water Science and Management Conference. Atlantic City, NJ. Contact Ralph Spagnolo, (215)814-2718, email: spagnolo.ralph@epa.gov
March 20-22, 2002	The First Hydrophytic Vegetation Workshop. Same as above.
May 12-16, 2002	Improving the State of the Coastal Areas. Bangkok, Thailand. Contact Dr. Ratana Chuenpagdee, (804)684-7335 or email ratana@vims.edu
VIMS Short Courses:	
June 26-28, 2002	Riparian Buffers, 3 days, $300.00 Contact Bill Roberts, wlr@vims.edu or (804) 684-7395.
July 17, 2002	Annual Tidal Wetlands Workshop. 1 Day, $20.00. Contact Bill Roberts at above or call Dawn at (804)684-7380 to register.

Studies Document Weaknesses In 404 Compensatory Mitigation
continued from page 4

5) Third-party compensatory mitigation options have some advantages over permittee-responsible mitigation.

- Third-party mitigation options should be available and provide timely and assured compensation for all losses, watershed integration, and assurances of long term sustainability and stewardship for the mitigation wetlands.

In a related article*** three of the NRC study committee members report the results of a detailed analysis of the available literature on compensation wetlands. Through their study they found that only 58 to 78 percent of the mandated compensatory mitigation met permit requirements and that only 20 percent of wetland functions were compensated. Their major conclusion was that the present compensatory mitigation program falls far short of the "no net loss" goal in terms of both wetland area and function.

Their recommendations for improving the system included permits incorporating specific mitigation conditions and deadlines, required longer term monitoring of mitigation sites, giving enforcement higher priority, increased use of ecological criteria, and locating mitigation sites based on a watershed plan or perspective.

All three of the above studies report that compensatory wetland mitigation can work better and each offers recommendations for system improvement. It remains to be seen whether the federal agencies and the states will choose to implement these suggestions and even then only time (and future monitoring) will tell if the mitigation program does improve significantly and contributes to a further reduction of wetlands loss across the country.

References

*Government Accounting Office. 2001. *Assessments Needed to Determine Effectiveness of In-lieu-fee Mitigation.* GAO-01-325. Washington, D.C., 70 pp.

**National Research Council. 2001. *Compensating for Wetland Losses Under the Clean Water Act. National* Academy Press, Washington, D.C., 322 pp.

***Turner, R. Eugene, Ann M. Redmond and Joy B. Zedler. 2001. Count it by acre or function— mitigation adds up to net loss of wetlands. *National Wetlands Newsletter*, Vol. 23 (6), 5-16.