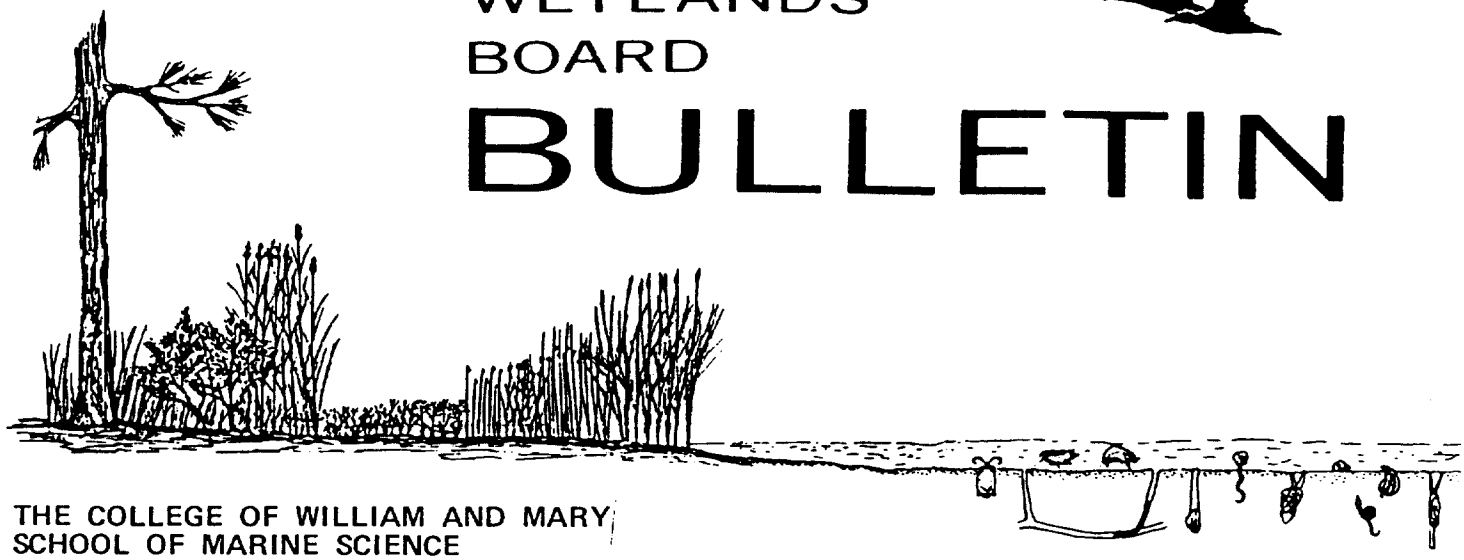
WETLANDS BOARD BULLETIN



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SCHOOL OF MARINE SCIENCE
VIRGINIA INSTITUTE OF MARINE SCIENCE

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PLANTING WETLANDS AND DUNES IN VIRGINIA, PART 1: HOW TO CRITICALLY REVIEW PROJECT DESIGNS

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INTRODUCTION: Since the late 1960's and early 70's a new found enlightenment of the value and function of our coastal dunes and wetlands has led to a search for alternative methods of coastal development which would help conserve the integrity of these sensitive habitats. However, despite our best effort, we often find that disturbance of these habitats is necessary to insure a balance between public and private benefits and the environment. When in the judgement of coastal resource managers it becomes necessary to impact a coastal dune or wetland system, several tools exist to help lessen the damage to the environmental system. This article will deal with one of those tools: the art of compensation and restoration. I wish to state here that I do not intend to try and answer the question of whether compensation and/or restoration repesent good or evil implements in our managerial toolbox. Rather, I will restrict my comments to the practical aspect of instituting a dune and wetland establishment project. The first article in this series will present information on critically reviewing compensation and restoration projects. Succeeding articles will cover constuction techniques, problems, planting times and procedures.

Compensation and restoration are both a form of mitigation (i.e. an attempt to lessen impacts on the respective habitat). Compensation involves the construction of a new marsh in terrestrial or subaqueous habitats (please note that subaqueous systems are themselves sensitive habitats and their use for compensation sites should be discouraged!). On the other hand, restoration is restoring a habitat to a natural state. For example, if a dune must be crossed or breached during a construction project, it is possible to "restore" the dune by sand replenishment, the placement of sandfencing and the planting of dune grasses. In short, compensation is the changing of one habitat site to another and restoration is reverting a habitat to a preconstruction condition.

COMPENSATION AND RESTORATION DESIGNS: There are two parts to all compensation and restoration projects: 1) design and 2) construction. During design it is important to remember that it is easier to plot a proposed elevation on a piece of paper than it is to actually grade a site to that elevation. Therefore, any good design must include a thorough outline of construction procedures. Unfortunately, each project site will usually present the manager with a unique set of circumstances and a different set of procedures will probably be necessary for each site. Below is a check list of some questions to ask about a design that, although they cannot insure a successful compensation and/or restoration project, will increase the managers chances of finding and correcting shortcomings that may lead to failures. Remember, as resource managers we must view the design from both an engineering and environmental point of view.

WETLAND DESIGNS

COMPENSATION:

1. Are the appropriate plant species being used ? Can the plants tolerate the salinity of the system? Are the proposed elevations appropriate? An elevation that is too high usually leads to invasion by non-wetland or noxious plant species (such as Phragmites australis). Elevations that are too low will cause dieback of the plantings (information on planting will be given in a future article).
2. Does the proposed compensation appear to adequately replace the lost wetlands? Unfortunately, there is no definitive way to answer this question, but as managers we must try. Is the lost wetland being replaced by a similar type or one of a greater or lesser ecological value? Will the placement of the new wetland be as accessable to wildlife and estuarine\marine animals as the one that is lost?
3. If heavy equipment is to be used, is there adequate access to the site? Overhead powerlines, underground cables and pipes, existing building structures, natural wetlands, other sensitive habitats such as dunes and subaqueous bottoms must be considered.
4. Will the tidal flushing of the area be complete? Tidal pools are rare in our geographic area and should not be built into a design (they create mosquito breeding habitat). NOTE: This does not include salt ponds. Salt ponds are large bodies of water with a depth equal to the adjacent estuary while tidal pools are small depressions only a few meters wide and a couple centimeters deep.
5. What type of grading of the area does the design call for? Only fine grading should be allowed. Rough grading creates tidal pools (see 4. above) and dieback of plantings via prolonged inundation periods.
6. What type of soil will be removed? Are there any contaminants present? Where will it be placed?
7. What type of substrate will be exposed for planting? Certain clays and old peat soils (i.e. previously filled marshes) are generally not a good planting medium.
8. What is the fetch of the compensation area? Through experience I have found that establishing a marsh on sites with a fetch greater than 1/4 mile is difficult. Large fetches will require some form of wave abatement structure (breakwaters, offshore riprap, etc.).
9. Will boat wakes be a problem? If the area is heavily used by recreational or commercial boating traffic wakes can be more devastating than the fetch. It may be possible to control for boat wakes by planting in late winter or early spring. Wave stilting (abatement) devices can also be used but are much more expensive.
10. Has any type of guarantee been offered? Research has shown that there are usually small areas of dieback in large plantings. However, they should not make up more than 35% of the planted area by the end of the first growing season and 20% by the end of the second. Most reputable contractors will replant any dieback areas the following spring.

RESTORATION:
All of the above questions can be applied to marsh estuarine projects. Special precautions must be used when allowing heavy equipment on old marsh soil. Many good operators have been (unpleasantly) surprised at how fast and hard they have become stuck in "solid" marsh soil.

DUNE DESIGNS

COMPENSATION:
1. Where will the sand come from, on site or off? If from off site is the grain size comparable to that found on site? A smaller grain size will have a tendency to blow or erode away.
2. How high will the new dune be? Research has shown that the best results are obtained when a new dune is no greater than 4 feet high. By erecting sandfences (approximately 10 to 20 foot intervals) and planting the appropriate plant species the new dune will mature through natural accretion processes in a few years. Attempts at constructing higher dunes often lead to an unstable structure prone to rapid wind erosion. Some of the longest standing dunes, visible along the Back Bay and False Cape region of Virginia Beach, were constructed with only plantings and sandfencing, no sand was moved by machinery or by hand.
3. Is the proposed dune aligned with the existing dunes? If the proposed dune is seaward of the existing dunes it will be prone to the onslaught of storm waves of a greater force than the adjacent dunes. If it is landward it will receive the refracted wave energy from the adjacent dunes. The former is a greater danger since it leads to a faster erosion rate.
4. Does the proposed dune run parallel to the shoreline? We protect our dunes not only for their habitat value, but also for their ability to buffer storm waves. They serve as natural wave energy dissipators during hurricanes, nor'easters, and other nameless storms. It is obvious that a dune built perpendicular to a beach would provide little protection.
5. When will the planting be done? Planting should be done only in the late fall and winter.
6. Are the appropriate plant species being used? Can the plants tolerate the salinity of the system? You can tell which species will do best by identifying the species growing on an adjacent dune.
7. Has any type of guarantee been offered? Again, research has shown that there are usually small areas of dieback in large plantings. However, the survival rate for dune plantings are usually quite high (>95%) and replanting is generally not necessary. But as before, it is best to make contingency plans. Most reputable contractors will replant any dieback areas the following fall.

RESTORATION:
Many of the above dune compensation questions hold true for restoration with the exception of alignment (2 and 3 above). The appropriate questions
are presented below with minor changes.

1. If sand is to be added, where will it come from, on site or off? How much height will the sand add to the existing dune? Remember, sand of a smaller grain size will probably erode faster and large man-made dunes tend to be very unstable.
2. When will the planting be done? Plantings should be done only in the late fall and winter (informati on planting will be given in a future article).
3. Are the appropriate plant species being used ? Can the plants tolerate the salinity of the system? You can tell which species will do best by identifying the species growing on the dune prior to construction or on an adjacent dune.
4. Has any type of guarantee been offered? Again,research has shown that there are usually small areas of dieback in large plantings. Remember to set up contingency plans.

The preceding list of questions is not complete. Research on long term trends in man-made wetlands is sparse. Often a planting on one site will fail, while that on a similar site will be very successful. Why the first site failed generally becomes a chore of speculation and environmental rationale. If we're lucky we may find the answer through further research. However, funding for compensation and/or restoration research is scarce, therefore many of the questions we now ask must, at least in the near future, remain unanswered. In fact, many of the questions we <u>should</u> be asking are probably still unknown. Therefore, I must end the first article of this series with a warning: compensation and/or restoration are young sciences having not yet passed from the experimental stage to one of scientific certainty. The best approach is one of caution. Don't be afraid to ask questions, stick with established compensation and/or restoration procedures and be leery of outlandish and overly complex projects (the more complex they are, the less chance they have of long term survival).

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Editor's Note

Special recognition to Bruce Anderson and the Lancaster County Wetlands Board, who with the help of the Chesapeake Corporation and the Lancaster Board of Supervisors have arranged for a marsh-walk nature trail in Lancaster County.

This type of project is especially important in educating the public about the many benefits of a healthy marsh ecosystem and can provide hands on experience to different groups in identifying the various and numerous values that the marsh supplies.

Hopefully, the school systems will take advantage of such a trail and use it as an educational tool for today's youth and tomorrow's leaders.

Other counties that do not have such trails might consider the advantage of such an educational area and propose the idea to their supervisors or administrators. The Virginia Institute of Marine Science Wetlands Program can supply scientific and technical assistance to counties that establish marsh walks.

The Lancaster County Wetlands Board in an effort to become more prepared for larger marina projects that might be coming into their county in the future has arranged to meet with the chairman of the Mathews County Wetlands Board to discuss how Mathews is dealing with these types of applications.

This type of interaction between Wetlands Boards should be encouraged and other boards that border the same waterways might consider meeting to discuss how the growing concerns of development and the marine environment should be met.

WETLANDS TYPES SERIES

Spartina alterniflora (Saltmarsh, Smooth, or Saltwater Cordgrass)

Saltmarsh cordgrass (*Spartina alterniflora*) is a stout, erect grass (0.1 to 2.5 meters high) with long, smooth leaves that ranges from mean sea level to approximately mean high water. The leaves are flat when fresh and curl as they dry and are present to the top of the stem. Saltmarsh cordgrass density is usually about 215 plants per square meter.

Because of the more extensive rate of flushing in the zone below mean high water where *Spartina alterniflora* communities exist, they provide high nutritive input into the detrital food web. The average yield is about 4 tons per acre per year and can be as high as 10 tons per acre per year.

Saltmarsh cordgrass marshes are important spawning and nursery grounds for fish and the vegetation serves as habitat and cover for numerous invertebrates and vertebrates. The roots and rhizomes are eaten by waterfowl. The stems are used in muskrat lodge construction. The seeds are eaten by marshbirds and 2 species of songbirds (seaside and sharp-tailed sparrows) and by black ducks. *Spartina alterniflora* is also utilized as nesting material for Forsters tern, clapper rail and willet.

In addition to wildlife values, saltmarsh cordgrass is a key factor in controlling coastal erosion and water quality. The underlying peat with its vast network of rhizomes and roots is highly resistant to wave energy and acts as a buffer between the water/upland interface, filtering upland runoff by trapping sediments before they enter the water column.

Considering the many attributes of this type of marsh community, its conservation should be of highest priority.

In the News

THE LEDGER-STAR FRIDAY, SEPTEMBER 26, 1986 D5F

State in U.S. shoreline program

Staff report

VIRGINIA BEACH — Virginia was accepted this week to the federal shoreline management program, eight years after it first began developing coastal protection laws.

Inclusion into the program will bring $1 million to the state this year for planning and enforcing coastal regulations in Tidewater. The grant will be awarded Oct. 1.

Virginia is the 29th of 35 eligible states to join the Coastal Zone Management Program, which is intended to improve consistency in shoreline management. Georgia is the only state on the Atlantic Coast that is not included in the program.

Keith Buttleman, the director of the Virginia Council on the Environment, said the grant will be split between state and local programs.

The state plans to distribute the funds as follows: $345,000 to nine planning district commissions; $389,000 to the State Water Control Board to monitor discharges into waterways; $155,000 for individual city and county projects; and $75,000 to the Health Department to monitor the application of sewage sludge to farmland.

The remaining funds are to be used by the Council on the Environment.

Virginia's efforts to develop laws to make it eligible for the federal program failed in the late 1970s because of opposition to proposed land-use regulations in non-vegetated wetlands and coastal primary sand dunes.

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Readers are asked to submit responsible questions concerning wetland ecology to Editor, Wetlands Board Bulletin, Virginia Institute of Marine Science, Department of Wetlands Ecology, Gloucester Point, VA 23062. The editors reserve the right to edit letters for clarity and space.

THIS ISSUE'S QUOTE

"WETLANDS ARE NOT CONVENTIONAL WILD AREAS. THEY DO NOT CATER TO ESTABLISHED, CLASSICAL CONCEPTS OF VISTA, HORIZON, AND LANDSCAPE... THEY FORCE YOU INWARD, BOTH UPON YOURSELF AND UPON THE NONHUMAN WORLD. THEY DO NOT GIVE YOU GRAND VIEWS; THEY HUMBLE YOU RATHER THAN REINFORCE YOUR DELUSIONS OF GRANDEUR... IN A WETLAND YOU DO NOT 'STAND TALL.' IF YOU ARE TO STAND AT ALL, YOU NEED TO SEARCH FOR SEMI-FIRM GROUND, AND YOU DO NOT EXPECT TO FIND FIRM GROUND AS A MATTER OF COURSE. WHEN YOU MOVE, YOU MOVE SLOWLY, TENTATIVELY, EACH STEP AN EXPLORATION IN ITS OWN RIGHT. YOU WAIT FOR THINGS TO COME TO YOU, RATHER THAN SETTING OFF TO 'FIND OUT WHAT'S OVER THE NEXT RIDGE'." (P.A. Fritzell)