

# Summary of Inquires and Responses Posted on the Shorebird Management ListServe — January 2003 to December 2004

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## INTRODUCTION

The shorebird management listserve, *fws-shorebirdmanagement*, was launched in January 2003 as a cooperative effort of U.S. and Canadian Shorebird Conservation Plan partners and is maintained by the U.S. Fish and Wildlife Service. The purpose of the listserve is provide users with: 1) a forum to discuss approaches to managing shorebird habitats, 2) information on shorebird management resources, 3) answers to specific, regional management questions, 4) a forum to discuss regional-scale projects, and 5) technical advise on monitoring shorebirds. This report represents a summary of the inquires and responses to the shorebird management questions raied over the last year. I have also included notices of new publications pertinent to shorebird management and the discussion of revising the *Shorebird Management Manual*; I did not include announcements of workshops, meetings, etc. Thanks to all who have contributed to the discussions, and I apologize in advance for inadvertently leaving out any parts of the discussion. Please send me any comments you have on the value of this document or on the operation of the listserve. This report will be posted on the U. S. Shorebird Conservation Plan website (<<http://shorebirdplan.fws.gov>>). Below are reminders on operation of the listserve.

**To send a message:** Either reply to a sent message or send a separate e-mail to [fws-shorebirdmanagement@lists.fws.gov](mailto:fws-shorebirdmanagement@lists.fws.gov) and everyone on the listserver will see your message (do not use cc's or bcc's). You may also send a message directly to the intended recipient's individual e-mail address, if it's not relevant to everyone on the list.

**To subscribe:** Send an e-mail indicating a wish to subscribe to [Brad\\_Andres@fws.gov](mailto:Brad_Andres@fws.gov)

**To unsubscribe:** Send a message to [fws-shorebirdmanagement-requests@lists.fws.gov](mailto:fws-shorebirdmanagement-requests@lists.fws.gov) with "unsubscribe" in the subject line.

**For questions or general comments, contact:** Brad Andres, National Coordinator, U.S. Shorebird Conservation Plan, U.S. Fish and Wildlife Service, Division of Migratory Bird Management, phone: 703/358-1828; e-mail: [brad\\_andres@fws.gov](mailto:brad_andres@fws.gov)

**Plan information:** U.S. Shorebird Conservation Plan (<http://shorebirdplan.fws.gov>)  
Canadian Shorebird Plan ([http://www.cws\\_scf.ec.gc.ca/birds/sh\\_or\\_e.cfm](http://www.cws_scf.ec.gc.ca/birds/sh_or_e.cfm))

## INQUIRIES/RESPONSES

### **Shallow Wetland Engineering Specifications**

*Inquiry.* Increasingly, I'm providing training or other technical guidance to land managers and other resource professionals regarding wetland restoration or creation as it relates to shorebirds. This ranges from small wetlands (depressional & non-depressional) for WRP easements to large flood control projects (impoundments) that are being modified to better accommodate migrating

shorebirds and other wildlife. Although I've amassed considerable information well above and beyond Doug Helmer's Shorebird Management Manual, it is clear that this isn't enough. People are seeking engineering specifications -- not my forte. I've promised colleagues that I'd look into this. Recognizing that each situation has its own particulars (i.e. no "cookbook" answer) it still would be very helpful to communicate more effectively in "engineering speak". I'm wondering what others' experiences are in this regard, and if anyone knows of biologist-friendly publications/ documents that would be helpful. In an Internet, I only found:  
<<http://www.wes.army.mil/el/elpubs/pdf/trel99-11.pdf>>. [[Lisa Gelvin-Innvaer, Minnesota Department of Natural Resources, [lisa.gelvin-innvaer@dnr.state.mn.us](mailto:lisa.gelvin-innvaer@dnr.state.mn.us)]]

*Response 1.* The book - *Wetlands* by Mitsch and Gosselink has a section on wetland creation and restoration with eng. specs and references. Island Press publishes *Wetland Creation and Restoration: the status of the Science* by Kusler and Kentula. EPA has a publication for the public - *A Citizen's Guide to Wetland Restoration* with some tech info and also with good references to books in the back of the booklet (EPA910/R-94-006). The Federal Highway Administration Report #FHWA-IP-86-22 - *Highways and Wetlands: Compensating Wetland Losses* has tech info. It is an older pub., but they may have a newer version or guidelines? Washington State Department of Ecology usually has great pubs on watersheds and wetlands. Their phone number for Publications is #360-407-7472. Another good place for info is the USDA-NRCS Wetland Science Institute. [[Nancy Zapotocki, U.S. Fish and Wildlife Service, [nancy\\_zapotocki@fws.gov](mailto:nancy_zapotocki@fws.gov)]]

*Response 2.* The problem with jumping directly into engineering is that other important considerations must be made if a system is to function properly. Wildlife Biologists have the bad habit of jumping directly into the use of a technique without making appropriate considerations that will lead to success. The first step must be one in which one identifies the location within the landscape. Questions relating to the geomorphology, historic and contemporary abiotic conditions, degree of perturbations and type of perturbations, surface and subsurface hydrology, and short and long term climatic variability are critical. For example if you are in the prairie pothole region it is critical to understand if the site is recharge, discharge, or flow-through. If you are in the Mississippi Alluvial Valley one must understand if the site is a point bar, an abandoned channel, a back swamp, or a natural levee. I have seen hundreds of misplaced impoundments that are difficult and costly to manage because the development strategy was simply to pick a technique and place it on an available site without regard to position in the landscape. Likewise there is much erroneous information in the literature because researchers had no idea whatsoever where they were in the landscape.

Many wetland management approaches are related to capture water on the landscape. This is not surprising given the fact that there are so few places remaining in the 48 states or Hawaii where both surface and subsurface hydrology has not been highly modified. Thus our historic tendency has been to use structures that retain surface water in a more pond or lake-like setting. This approach changes the functionality of wetland systems. I suggest that it is important to extend hydroperiods in places where they have been

reduced but extending hydroperiods is not the same as capturing water. Engineers are not yet in tune with this challenge because they do not understand or appreciate the hydrologic dynamics necessary to have a viable system where an appropriate suite of plants and invertebrates will respond in a way that is closer to historic conditions. My experience has been that in our desire to improve conditions we often compromise current conditions in a way in which providing or moving toward historic conditions becomes impossible or very costly in time, personnel, money, and equipment.

To understand this concept one must take the time to observe a variety of sites where water moves in a more unrestricted way during different seasons and years. Understanding the variation over spatial and temporal scales is a critical aspect for success. Important sites are in the highlands of Mexico, California's San Joaquin Valley, South Dakota's James River Lowlands, Cheyenne Bottoms in Kansas (TNC lands), sites within historic Lake Agassiz, Copper River Delta, Yukon River system for example. These sites provide examples in which water moves across the landscape without or with limited man-induced obstructions. The hydroperiod is longer because drainage has not been enhanced or restoration efforts have been made to lengthen the hydroperiod. Nevertheless hydroperiods remain short enough that robust emergent vegetation has limited potential to develop. Thus habitats have limited vertical structure. The problem with impoundments is that few are constructed or managed in a way that restricts the development of vertical cover unless the site is in the West or in coastal systems with high salinities. In fresh systems restricting vertical cover is more problematic and becomes an increasing challenge the longer water is stored. Thus some treatment is necessary to reduce vertical cover--mowing, disking, burning, or grazing for example. All of which require equipment (or fences), fuel, personnel, and time and cooperation from weather.

Some of the greatest talent to develop sites for shorebird or for their management reside in Arkansas. The resculpting of modified landscapes, the timing and manipulation of soil and water, and the recognition of different landscape features are all involved in the process. The latest NRCS workshops are directing thinking along these lines. A major change from the first workshops initiated after the 1985 Farm Bill. Today the talk is about restoring microtopographic--a must for success because impoundment development often specifically overwhelms microtopograph and limits value to the edges of impoundments.

There are other examples of success around the country, some by default and some because of site conditions. My experience has been that reasonable application of techniques is often more by chance than by design. Something we must change if we are to assure the viability of shorebird and other waterbird populations into the future. [[Leigh Fredrickson, University of Missouri, gaylord1@sheltonbbs.com]]

*Response 3.* Leigh, great points. I absolutely agree! Landscape/ecological context is an overriding theme in my work. I am also working to become more knowledgeable about hydrology and other the other considerations that you mentioned. Understanding wildlife species biology/ ecology alone is not sufficient for providing more specific habitat recommendations. My original post had 3 main motives: 1) To jumpstart this listserv by stimulating good discussion (which it has, I'm glad to see. Although much of it was emailed to me personally.) 2) To address something that keeps arising in my work (& of others): How to communicate more effectively to other resource professionals when it comes to the design/engineering aspects of wetland management and restoration. 3) In most cases, this work is going to occur with or without my input. Plus this kind of information is something that I'm increasingly asked for -- most recently by NRCS and NGOs actively involved in wetland projects. Therefore I need to communicate to wetland engineers in their "language". I've also been informally compiling examples from other colleagues re: their experiences in this regard. Departing from standard practice ---- persuading others to incorporate the considerations that you've mentioned can be a challenge. I am also interested in collaborative approaches that more effectively address the issues you've raised. Of course there is no cookbook design suitable to each situation. Nevertheless, I believe that future efforts can benefit from examining case studies and having good checklists of pre-project considerations (accompanied by solid understanding of these). [[Lisa Gelvin-Innvaer, Minnesota Department of Natural Resources, lisa.gelvin-innvaer@dnr.state.mn.us]]

*Response 4.* The process of designing wetland restorations is a combination of the engineering and biological sciences. If the biologist describes the desired product, then the engineer knows what to design. The effort in the Rainwater Basin has been to establish communication links between biologists, engineers, and conservation planners to enable communication. The engineering processes generally have few opportunities for changes and modifications. Bringing engineers and biologists together to design the design process from initial site visit to construction completion helped clarify when opportunities for review were needed. The engineers were a little quick to put lines on paper when the biologists were still formulating the product and thinking out loud. Both wetland engineers and biologists need to clarify the "language" so they are understood when they talk. The key to wetland restoration is in communications between those involved. Wetland restoration is too much of an art to fit into a ordinarily structured engineering design process. While engineers may want base drawings and standardized designs, that isn't the way it works. While biologists may want total flexibility and a dynamic restoration process, that isn't the way it works. To get close to both, people have to talk, a lot, and often. Make some new friends. (Hope I don't sound like I am preaching). [[Steve Moran, Rainwater Basin Joint Venture Coordinator, steve.moran@ne.usda.gov]]

*Response 5.* Leigh, In many impoundments that are currently being constructed by NRCS, from a management standpoint, there is a tendency to over-engineer or create what I think of as a "magnum topography". I think some of their superiors are providing direction that virtually every few acres contain a mound, hole, deepened slough channel, or some degree of irregularity with the idea that this is restoring hydrology and topography as it historically occurred in the

Mississippi Alluvial Valley. This development of magnum topography is all well intended, but if one is to control or restrict vertical cover and maintain early successional plant communities on these sites, these features are a nightmare and overkill. Driving a tractor with disc other implement to create soil disturbance over this terrain is difficult and in some cases virtually impossible. If the mounds are not disturbed, they will grow up in willows which will spread throughout the site in a short period of time. If the area is to be replanted with trees, survival and growth will be adversely affected if planted in subsoil where an artificial slough or depression area may have been constructed. If no active management is to take place, then the creation of magnum topography is maybe not necessarily a bad thing. An example of this "restoration" is located across the highway from my office. This habitat is the perfect example (I think) of what you refer to as "capturing water" and has created the pond or lake setting that you describe. It may be providing some habitat for amphibians and reptiles but I have seen no migratory bird use on this site. It is situated on a high site where natural flooding is most likely non existent. The hole has to rain full and there is no means of water release. I do not blame the local NRCS personnel for constructions of this type. I think they have been instructed to build them wherever the farmer is willing to have them and funding has been provided. I have attended a show and tell where an assortment of these features covered a significant portion of a WRP site and when we arrived at a naturally wet area of around 60 or so acres, the "man from Washington" asked, " Why am I not seeing any mounds and sloughs out there?" There was a ridge/slough topography out there - he just couldn't see it. Looking at most any "natural" bottomland habitat in the MAV, one will find that what we call a "ridge" is a change in elevation of only a foot or two, is very subtle; so gradual of an incline that (without surveying equipment) it is most easily discerned by wading the area in hip boots when flooded. Same with a natural depression or slough only in reverse. If the habitat is forested or grassed over and dry, the ridges and sloughs are generally not noticed by seeing ground elevation changes with the eye, but are more noticeable by change in vegetation species. Aside from sloughs and ridges, there are, throughout natural wetlands and non-improved farmed wetlands, thousands of minute ups and downs that create microtopography. Even after landclearing and farming this microtopography still exists if the site has not been precision levelled or zero graded. If an adequate levee and water control structure is placed in the natural drain of any such place, the hydroperiod can be extended. When these areas are being dewatered, the microtopography is evident and the wet spots left behind are where all the birds congregate until the soil dries and inverts disappear. These spots may only be a few feet in size but are numerous and their importance to shorebirds cannot be overemphasized. I simply don't see a problem with Engineering language vs biological language. My experience with engineers is that we pretty much talk the same. However, I think engineers like to make a big showing for their time spent and for adequate habitat management for migratory birds, especially shorebirds, a big showing isn't needed. What do you think? [[Lake Lewis, Felsenthal NWR, Lake\_Lewis@fws.gov]]

*Response 6.* Lisa, I took a Corps course on wetland restoration a good time ago and they had presented abundant information on the wetland development and restoration end of your question. They also had good information and speakers address the wildlife issues. Here is a citation if you do not already have it: Corps of Engineers. 1995. Wetland development and

restoration. Control # 276. Numerous papers in US Army Engineer Division, Dir. of CE training management, PO Box 1600, Huntsville, AL 35807-4301. In working with wetland restoration in coastal areas, I have found that natural systems may or may not provide good shorebird habitat. This reflects back on what Leigh was getting at and it all depends on the existing factors and elements that serve as the driving force that directs natural systems and habitats (e.g., regarding natural systems and restoration of altered wetlands to natural systems). This is very different from creation of wetland areas and then the question that comes to my mind is: is this created area going to be managed or is it going to be driven by existing conditions? I think all the responses have hit the nail. The engineering specifications will have to be site specific as you and others have mentioned. Hope the citation is helpful. Please keep us informed on you findings and any resulting documents. [[Marc Epstein, Sr., Merritt Island NWR Complex, marc\_epstein@fws.gov]]

*Response 7.* The Corps has an Engineering Handbook that can be obtained at the following web site. I've heard from others that use this manual there are sections in it that are not quite good. The section written by the Louis Berger group is quite relevant to specifications and comes from practical experience. With that said try Hayes 2000, et al., the Wetlands Engineering Handbook at: <<http://www.wes.army.mil/el/wetlands/pdfs/wrpre21/wrpre21.pdf>>. One thing missing in the discussion is the implementation of the design plans. More wetland creation/restoration project success depends on the equipment operator that is doing the work, the "man with the big cigar" as he's referred to around here. If you don't have a good working relationship with the people that are actually doing the work, there is a good possibility that the work won't be done right. [[Bernie Carr, Terrestrial Environmental Specialists, Inc., berncarr@alltel.net]]

### **Beach Nourishment Activities**

*Inquiry.* The Florida Fish and Wildlife Conservation Commission (FWC) has recently drafted an agency position and recommended permitting requirements regarding impacts of beach nourishment activities on "shorebirds" (including Larids and all beach-nesting birds). The literature on the subject indicates that there are some pro's and cons (creates new nesting opportunities vs. disrupts benthic communities). I was hoping to generate some discussion regarding this subject to share with those individuals involved in developing the FWC's position. Have any other state or federal agencies or NGO's developed a formal position or permitting guidelines with regard to impacts to shorebirds? Is anyone familiar with definitive work regarding direct or indirect impacts of beach nourishment activities on these taxa? [[Nancy J. Douglass, Florida Fish and Wildlife Conservation Commission, Nancy.Douglass@fwc.state.fl.us]]

*Response 1.* Check with the Delaware Department of Natural Resources and Environmental Control. I think the Division of Soil and Water has done this <<http://www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Soil.htm>> [[Lisa Gelvin-Innvaer, Minnesota Department of Natural Resources, lisa.gelvin-innvaer@dnr.state.mn.us]]

*Response 2.* Back when I was at J.N. "Ding" Darling NWR, we had a USFWS Fish & Wildlife Biologist (Andy Eller) from Vero Beach ES come out to review a proposed project that involved opening up Blind Pass on Sanibel Island via dredging. The sand was to be replaced along the Bowman's Beach beachfront at Sanibel Island. The big issue was the temporary disruption of benthic communities, especially with the potential for use by wintering piping plovers. No plovers had actually been wintering along that stretch of beach, but other shorebirds and larids did use it. The ES office developed a position that no dredge material could be placed along the beachfront during the critical wintering period as part of the permitting guidelines. If Wilson's or snowy plovers had been nesting in the area, that might have complicated the position. I would think that targeting the period after Wilson's or snowy plovers have fledged but before wintering piping plover, or other shorebird, arrival might be the best time for beach nourishment in that scenario. However, if no Wilson's or snowy plovers are nesting in a given beach area, then the earlier the nourishment the better in order to allow the benthic inverts to re-colonize the nourished area. That would mean commencing nourishment right after shorebirds departed for breeding areas. Here's a contact you may try for more information on that project: South Florida Ecological Services Office, 1339 20th St., Vero Beach, FL 33960-3559, Andy Eller, Fish & Wildlife, Biologist, andy\_eller@fws.gov, Phone: (772) 562-3909 [x. 285], Fax: (772) 562-4288 & 564-7393. [[Jorge L.Coppen, E.B. Forsythe NWR, jorge\_coppen@fws.gov]]

*Response 3.* I made a number of inquiries among our staff at the Michigan Department of Environmental Quality (MDEQ) and Mich. Department of Natural Resources (MDNR) and pretty much satisfied myself that the situation has not changed much since I last worked on Piping Plovers over ten years ago. Essentially we have no guidelines or data regarding beach nourishment or other shoreline development related activities (either under permit or otherwise) that relates directly to impacts to avian species that occupy these habitats as migrants or as breeding species. Even working with plovers on state-owned lands showed the major consideration to changing of habitat by the removal, or addition of material, related to how it would impact human use of the park on the part of the agency managing the land. The biologists of course were interested in recovery of the species and how the changes to the substrate would benefit the value of the habitat to the birds. The recovery plan for the plovers of course does have a section dealing with critical habitat, but at present I am unaware that quantitative evaluations have been undertaken to determine exactly what this consists of in the Great Lakes. So, in short. We appear to have no guidelines or data that would be of direct benefit at this time. [[Richard Wolinsky, Michigan Department of Natural Resources, wolinskr@michigan.gov]]

*Response to Richard.* I have been working with the USCOE for several years to develop and test a Piping Plover habitat for assessing beach nourishment projects on Long Island, NY. While not for Michigan habitats, this model might give you some ideas that you could use to construct a model for your habitats/issues. [[Adrian H. Farmer, U.S. Geological Survey, adrian\_farmer@usgs.gov]]

*Response 4.* I wanted to respond to your request, forwarded to me from several sources, by encouraging you (if you aren't already doing so) to consider the impacts that beach nourishment causes by forestalling natural barrier island formation processes, especially overwash and inlet formation/migration. In the Atlantic Coast piping plover conservation effort, we focused early on the obvious deleterious effects of shoreline hardening. In recent years, however, we have become increasingly concerned about the more subtle but perhaps more injurious long-term and cumulative effects of systematically preventing natural overwash and barrier island migration via "soft" shoreline protection technologies. I am hoping that Jim Fraser from Virginia Tech (copied on this message) will be able to direct you to a paper he gave a while back at a symposium held at Gulf Shores Seashore, on questions about the effects of beach stabilization (including beach nourishment) on a variety of rare/imperilled species. If it isn't included in the Gulf Shores paper, it would also be good for you to see some of the data that his students have collected on the abundance of many shorebird species in the vicinity of a large breach that occurred about 10 years ago on Long Island. Tracy Rice (also copied on this message) from the FWS Raleigh NC office, helped organize the Gulf Shores symposium and may be able to direct you to other useful sources. I will also mail you a paper that I coauthored several years ago that focused on a different approach to beach nourishment and also explaining some of the concerns we have identified. [[Anne Hecht, U.S. Fish and Wildlife Service, [anne\\_hecht@fws.gov](mailto:anne_hecht@fws.gov)]]

*Response 5.* The Delaware Bay hosts an extraordinary number of migrating shorebirds each spring, coinciding with peak horseshoe crab spawning. Delaware has recognized that beach nourishment activities play an important role in preserving and protecting beach front (and adjacent wetland and impoundment) habitat for many species. The best locations in Delaware for foraging shorebirds and horseshoe crabs are places where large public works projects have occurred. We have begun to look at ways to improve our nourishment projects and include specific design parameters for these species so that nourishment projects become more like habitat restoration projects. Delaware has beach fill placement windows specifically to address the needs of shorebirds and horseshoe crabs. No placement of material is permitted on our bayfront beaches between April 15 and Aug. 31. The length of this window is largely due to concerns about allowing adequate time for hatchling horseshoe crabs to exit the sand, but certainly encompasses peak shorebird times. This restrictive window is causing some operational problems however, because it forces dredging operations into the worst time of year - fall, winter and early spring, when weather can be a major issue. There are projects that may not be able to proceed without relief from this window. Further, in some portions of the bay, dredging windows for fish coupled with windows for placement of beach fill for horseshoe crabs and shorebirds mean that there is two months or less of available work time. Large nourishment projects cannot be accomplished in this period of time and to continue them throughout numerous years is cost prohibitive. [[Susan E. Love, Delaware Coastal Programs, [susan.love@state.de.us](mailto:susan.love@state.de.us)]]

## Creating High Tide Roosts

*Inquiry.* We are seeking assistance or information from anyone who has experience or knowledge of creating high tide roosting habitat for shorebirds. We are the Miranda Naturalists' Trust, a voluntary organisation who own and operate the Miranda Shorebird Centre on the Firth of Thames, New Zealand. [www.miranda-shorebird.org.nz](http://www.miranda-shorebird.org.nz). The Firth of Thames, on the north island of New Zealand (80km south east of Auckland), is a significant site for migratory shorebirds. In particular it is an important site for bar-tailed godwit (*Limosa lapponica baueri*) which breed in northwest Alaska, and red or lesser knot (*Calidris canutus rogersi*) which breed in Chukotka, Siberia. The firth is also a very important site for the endemic wrybill (*Anarhynchus frontalis*) 30-35% of which winter here, as well as other species of shorebirds such as pied stilt (*Himantopus himantopus*), and South Island pied oystercatcher (*Haematopus ostralegus*). The Firth of Thames is a Ramsar site and is also incorporated in the East Asia-Australasia Shorebird Site network. On the southwest corner of the bay is a good example of a shellbank chenier plain. These shellbanks and associated embayments of intertidal mudflat and adjoining saltmarsh, have, in recent years been the most important high tide roosts for shorebirds. However over the same timescale, there has been a dramatic expansion in mangroves (*Avicennia marina resinifera*) around the southern margins of the bay. From a few isolated stands of mangrove in 1961, there is now a strip of 300-400 metres along most of the coast. Land use practices in the surrounding catchment - forest clearance, drainage, stopbanks and run off from intensive dairy farming - are all implicated in this expansion. Of most concern to Miranda Naturalists' Trust is the loss of wader roosts to mangrove expansion. Recently a block of 11 hectares was purchased by the trust, in association with a number of funding agencies. The block is less than a kilometre from the current shoreline and existing roost sites. Our intention is to redevelop the land ( along with any subsequent acquisitions of adjoining properties should they become available) as wader roosting habitat. Currently the land is dairy pasture on old shellbank cheniers. Our question is whether anyone has experience of or information about creating such roosts. [[Keith Woodley, Miranda Shorebird Centre, [shorebird@xtra.co.nz](mailto:shorebird@xtra.co.nz)]]

*Response 1.* Although I have extensive experience with shorebirds, and teach a shorebird management training workshop, I do not have any experience with creating and managing roosting habitat for shorebirds. But as I expect you know, the key ingredients of good roost locations for coastal waders are sites close to foraging areas, sites that have minimal amounts of vegetation, and (for most species) locations that are safe from (minimally vulnerable to) stealth approach by raptors or other predators. I once heard of an effort to create a roost location in an effort to attract shorebirds to a site where rocket-netting could be accomplished. I think that Clive Minton was involved in this, but I do not know what success was achieved. I also have heard of some situations (in French Guiana and Suriname) where waders have taken up roosting in mangrove, but I think most of these were species such as the small calidrid sandpipers, not larger ones like godwits and knots. I frankly would be surprised if you were able to create a site that would be attractive to waders like knots (virtually obligate coastal sites, so far as I know) unless they had virtually no other immediate coastal options available to them. But, having said that, I do know of some situations where knots have taken up roosting on open pannes in salt

marshes (and even floating mats of thatch) at Delaware Bay locations during the spring migration, but they used these places only under extreme conditions such as spring tides. Another possible lead for information might be The Nature Conservancy in their Delaware Office. A year or two ago they were exploring the possibility of creating an artificial roosting site on the Delaware Bay shore. This was not built, but so far as I know, is still under consideration. The person I had been having discussions with is no longer with the organization, so I do not have a contact name for you. [[Brian Harrington, Manomet Center for Conservation Sciences bharr@manomet.org]]

*Response 2.* Brian Harrington sent me a copy of his letter to you responding to your enquiry about the possibility of creating an artificial wader roost at Miranda. I have been involved in, or am aware of the details of, a number of artificial wader roosts both in Australia and back in the UK. I have some comments therefore which may help you in your deliberations. Firstly can I say that waders take to properly constructed artificial roosts very readily. Brian has outlined the key necessary features. In fact, creating a roost is not a difficult job provided an appropriately accessible and visible (to the birds) location is available. What is often however under appreciated is that very significant ongoing annual maintenance is usually necessary to keep the roost in an attractive condition for roosting waders. All too often vegetation grows up both on dry land areas of the roost and in the shallow waters adjacent to it and this can quickly destroy its attractiveness. Please therefore build this into your planning and ongoing operating costs estimates.

I note that you have recently purchased a block of 11 ha, and this, per se, ought to be of sufficient size to create a good, attractive roost. The fact that however the location is not on the shoreline, but up to a km inland, is a significant negative and means that it has to be of extra special attractiveness to cause birds such as Godwit, Knot, Oystercatcher and Wrybill to travel inland that far from their existing roosts on the shellbanks and immediately adjacent to these. I would suggest that you make the majority of the 11 ha into a shallow lagoon with three or four islands, each at least the size of a tennis court. The water depth only needs to be a metre or so, and the islands should not be more than half a metre above water level. Ideally, the islands should be heavily topped (20cm plus) with shell grit or gravel to minimise vegetation growth and the associated need for weed control. At least part of the perimeter of the lagoon, which should have gently sloping sides rather than steep banks, should also be heavily covered with shell grit/gravel for the same reasons. There should be no trees anywhere in the vicinity and bushes should be minimised, except perhaps to provide a screened approach to an observation hide.

One of the most successful artificial wader roosts is on the RSPB reserve at Snettisham Gravel Pits, Norfolk, England (on the east side of The Wash). Until the RSPB bought this habitat in the late 1960s and manipulated the islands and the shores to make them attractive to waders in the way I have described above, virtually no waders roosted there. For the last 30 years, it has been the prime wader roost on the east side of The Wash with 1000s, sometimes 10000s of Knot, Oystercatcher, Bar-tailed Godwits, Dunlin, etc roosting there on every significant daytime high tide. The Snettisham Gravel Pit roosts

are immediately adjacent to the shoreline, but I'm sure would have worked equally well, but with perhaps a slightly longer induction period, had they been a few 100 metres inland. (They were more in the position where you have freshwater lagoons inland of the shellbanks at Miranda and used occasionally by Godwits, etc). I hope these comments are helpful and encourage you to proceed with engineering a new wader roost on your newly acquired land. Please let me know if you require any more information. [[Clive Minton, Australasian Wader Studies Group, mintonsoz@ozemail.com.au]]

*Response 3.* At the Mai Po Nature Reserve in Hong Kong, a shorebird roost was built in the mid-1980s by knocking together two adjacent rectangular shrimp ponds, each of about 10ha in size. The bund separating them was dismantled and the earth used to build up three large islands (each about 0.5 ha in size and 1.5 metre in height) going down the middle of the length of the new pond. The two original ponds had small areas of reeds and mangroves and these were cleared to create open patches of water. The pond is on the edge of the spring high tide mark next to the mangroves and mudflats of the adjacent Deep Bay. Overall, water level management consisted of keeping water levels low (around 3cm) during spring and autumn migration, and keeping it high during summer (to stop the spread of reeds from the edges into the centre of the pond) and winter (so that the pond can be used as a roost for wintering ducks and other waterbirds). These traditional shrimp ponds have sluice gates to allow exchange of water with that in Deep Bay, and this is done up to ten times per month, coinciding with periods of spring high tides.

For the first 5 - 8 years after creation, the roost worked well and it was used by up to 10,000 shorebirds in spring. Over time however, we noticed that shorebird numbers declined to almost zero and this was suspected to be due to tall trees growing up along the edges of the pond and disturbance from peregrine falcons hunting over the roost in early spring when the shorebirds had just started returning. There was nothing we could do about the raptors but we did try and cut down the tall trees along the side of the pond. This seemed to work and some 4,000 shorebirds started using the roost again after the cutting. The three large islands were originally intended to attract nesting terns and they had a layer of small stones layed over them. This did not work unfortunately and grass did grow up in-between the stones. These island then had to be cut at least twice per year (before the spring and autumn migrations periods), so that shorebirds could use the edges and larger waterbirds, e.g. herons and spoonbills (in winter), use the higher parts of the islands. Over the past 10 years, we have had a number of RSPB nature wardens pass through Mai Po and they all suggested that we removed the large islands and use the spoil instead, to create smaller and lower islands, some tens of meter square in area and 20cm in height. If needs be, these could be flooded in summer when there are few shorebirds around, so as to prevent the growth of grasses on them. We are beginning to do this now, and have a number of such small islands scattered around the scrape, but mainly in front of the hides, and the result has so far been good. We have also found that even by turning over the mud floor of the roost has helped in making the place more attractive for our shorebirds. Some RSPB wardens have also found this in their reserve but I am not sure if

anyone knows the reason for this. The first manager of Mai Po and the person who built our scrape, is David Melville and he is now based in New Zealand <david.melville@xtra.co.nz>. I am sure that if you were to contact him, he would give you some very useful advice. [[Lew Young, WWF Hong Kong, LYOUNG@wwf.org.hk]]

## **Mudflat Shoes**

*Inquiry.* The challenge is walking on newly formed mudflats, consisting of Kaufman series soils, which are deep, clayey, sticky, alluvium. Does anyone have recommendations for techniques or types of shoes made for trudging on mudflats without getting knee deep in gumbo mud? A brand offered by Forestry Suppliers has been proposed. Historically, some creeks in the vicinity were named after pedestrians that were stranded in the mud, so think sticky. [[Aron A Flanders, Texas Parks & Wildlife Department, Cooper@neto.com]]

*Response 1.* You can use snowshoes with manmade lacings, not leather. A bit awkward, but better than sinking in, losing a rubber boot, or getting stuck till someone comes and finds you. [[Pat Baird, California State University Long Beach, patbaird@csulb.edu]]

*Response 2.* Been there, done that! I'm thinking snowshoes with a solid, teflon-coated, metal bottom with NO webbing or laces, etc on the bottom that would catch ooze. Once you put them on, just keep truckin! You may also need cross-country ski poles! I remember seeing styrofoam shoes for walking across water, but nothing for muck. When you patent your new snowshoes, send me part of the royalties! [[Mark Schuller, Natural Resources Conservation Service, markschuller@wa.usda.gov]]

*Response 3.* I agree with Mark. We use childrens size plastic snowshoes. They work very well. However, in really good muck, we have broken the bindings from them. A couple of hose clamps came in handy to reattach the bindings to the snowshoes. After that, we never had problems with them again. [[Hal Laskowski, U.S. Fish and Wildlife Service, harold\_laskowski@fws.gov]]

*Response 4.* We have had good luck with the basic adult snowshoes by Little Bear for work in tidal wetlands (shrubland and forested) on Maryland's eastern shore. Not always as much pure muck as what is mentioned below, but they have really helped us out. They have also held up well for several field seasons, and adjust well for different foot sizes. I found the best price and good customer service, too, at Michigan Snowshoe Center ([www.snowshoecenter.com](http://www.snowshoecenter.com)). The snowshoes are much cheaper than the mudders (\$59). [[Gwen Brewer, Maryland Natural Heritage Program, gbrewer@dnr.state.md.us]]

*Response 5.* I've also been stuck in bottomless gumbo ooze (I could picture the vultures patiently waiting nearby as I died of thirst out there) during mist netting work at Minnewaukan Flats, ND (before they were inundated by 12 feet--give or take--of water!!). And I wonder whether MSR brand snowshoes would do the trick... they are (or were) solid plastic snowshoes with rubberized

vinyl straps. I wonder because a few years ago I rented snowshoes for some winter bird survey work in the mountains during a VERY warm winter that made the snow impossibly wet and heavy (like mud!). The Atlas snowshoes I used became agonizingly heavy as they 'collected' glaciers on just about every surface, including the nylon-web straps and the aluminum crampons!), and in every fold of the decking where it wrapped around the frame. Meanwhile, my survey partner had no such problem with her MSR snowshoes (a solid-decked model from several years back; the only objection was that her plastic shoes made a lot of noise as they dragged across the corn-like snow). Maybe MSRs (or something made of similar materials) would help on deep, sticky mud too. Maybe the crampon could (should?) be removed and the toe hole covered with one of MRS's 'tail' accessories that are designed to attach to the rear portion of the shoe to extend its length. I doubt the MSR noise issue would come up on the ooze mud.

ALSO, I described the problem I had encountered on the Atlas shoes to every snowshoe salesperson I encountered... and more than one suggested using spray-on cooking oil to create a non-stick surface. Perhaps that would work to resist sticky mud too...?? For what it's worth... If you try any of this and it works, I'd like to know for future reference! I just checked the web and found a snowshoe called "Little Bear" that looks like what I had in mind in terms of retrofitting an MSR-type shoe. Check them out: <http://www.snowshoecenter.com/shop/product.cfm?p=153>>. The only problem I see is that the decking---although hard plastic---has a grid of tiny openings in it.... not sure how the openings would affect the shoes' usefulness on mud (probably an issue if you stand in one spot for any amount of time). Perhaps you could glue some kind of solid, thin plastic sheeting to their bottoms---perhaps one of those plastic (teflon-like) sheets sold for rolling out pastry dough (supposedly they are non-stick to keep dough from sticking). The straps look like they might be made of nylon webbing, but they could be dipped in hot wax or sprayed with cooking oil to make them more repellent. [[Cynthia Melcher, U.S. Geological Survey, [cynthia\\_melcher@usgs.gov](mailto:cynthia_melcher@usgs.gov)]]

### **Moist Soil Management for Invertebrates**

*Inquiry.* Thanks to STWG and WCRP funding we have 2 new moist soils units that are to be managed specifically for migrant shorebird habitat in Kentucky. However, because water has to drain over private land, we can't do a late summer draw down in preparation for early fall migrants (or else we flood the farmer's crops). Therefore, rather than hold water during the summer and draw it off late summer, we have to start pumping water into these units late summer to get shallow water habitat. Will the summer dryness negatively affect invertebrate productivity? What can we do increase invertebrate productivity in a case like this? [[Beth Ciuzio, Kentucky Department of Fish and Wildlife Resources, [Elizabeth.Ciuzio@mail.state.ky.us](mailto:Elizabeth.Ciuzio@mail.state.ky.us)]]

*Response 1.* We do the same thing here in West Tennessee. We have found that we begin to see invertebrates within two weeks of flooding. We lightly disk our moist soils and roll the unit prior to flooding. The disk vegetation helps invertebrate production and rolling creates a smooth surface at drawdown. Our biggest problem is vegetation regrowth after flooding. The shallow flooding really seems to stimulate emergent vegetation. Let me know how things go. [[Carl Wirwa Tennessee Wildlife Resources Agency, Carl.Wirwa@state.tn.us]]

*Response 2.* In coastal Texas holding water in moist soil units through summer frequently serves two purposes. One it provides for brood habitat for local nesting ducks, and two as the impoundment draws down through evaporation it provides an edge of mudflats which are used by shorebirds when they start returning in early July. Most shallow impoundments either completely dry on their own or become very reduced in size by the end of summer. If the mudflats are extensive enough, adult shorebirds during arriving in July and August will actually go through a complete wing molt before continuing migration. My recommendation to landowners that have multiple impoundments is to retain water in some for natural drying and draw down the others in late spring to allow for vegetation management during the dry season with reflooding as early as possible. My experience with re-flooding dried out impoundments is that the invertebrates will retreat to the moist area of the soils. If they are dry for the top foot, then it will take a while for the invertebrates to recolonize, but if the soil is moist, but just not flooded, the invertebrates are still near the surface and the shorebirds will use them as soon as they are made wetter.

Along the Texas Coast where summers are normally dry. Not draining impoundments at the end of spring frequently results in quality brood habitat for summering waterfowl, and nesting habitat for breeding Black-necked Stilts. The natural lowering of these waterlevels during hot and dry summers usually creates very shallow wetlands that are teeming with invertebrates which shorebirds use as soon as they start returning in July. If you need to add a little water, you can always pump more in during the early fall as you indicated in your plans. Depending on what vegetation you were trying to promote in the impoundments, you may want to rotate the impoundments which you allowed to remain flooded each summer. Keeping impoundments dry during summer will probably delay the re-establishment of invertebrates. I have no experience in KY and do not know if this same process would work for you. [[Brent Ortego, Texas Parks and Wildlife Department, Brent.Ortego@tpwd.state.tx.us]]

*Response 3.* The invertebrate response is dependent upon the hydrological, substrate, and vegetation conditions in the unit at the time of flooding. The invertebrate response to flooding is very different from the invertebrate availability related to a drawdown. The key factors in fall flooding relate to the type and density of vegetation, whether or not there has been soil or vegetation manipulation, the type and intensity of that manipulation, the ambient temperature, and the condition of the vegetation. The invert response then determines the type and degree of response by shorebirds.

Vegetation type: Invertebrate type and abundance is dependent, in part, upon the substrate structure (plant and soils). The more complex the vegetation structure, the more likely to have a greater diversity of invertebrates. Nevertheless, when one floods a site in fall insects would be expected to be one of the first groups to respond. A major response can be anticipated by mobile adults that fly to the site and deposit eggs. Both dipterians and hemipterians will do so immediately. Thus, in as few as 3 days there may be evidence that there is a good response to the flooding. Among these early arrivals are mosquitoes and back swimmers. These organisms likely will grow in size and abundance as the flooding continues provided certain conditions are present (see below). However, the initial invertebrate foods are best suited for gleaners and sweepers but are not as valuable for probers. Thus, the management is for a selected species of shorebirds for the duration of shallow flooding when the habitat remains open (lack of dense vertical structure).

Because of the type of growing season in KY, there is a tendency for dense robust growth to develop rapidly. Not always but generally this is true depending on a whole suite of conditions related to the timing and type of drawdown before or during the growing season. This is further complicated by the site conditions. I am unsure of where you are located but if you are in the Mississippi Alluvial Plain then I would suggest that you take a look at Saucier 1994. Roger described the geomorphic conditions in great detail with his work and if these sites are in the MAV it would be relatively easy to make this linkage. It would be important to understand if the sites that you manage are backswamps, point bars, abandoned channels or natural levees or a mix of these. These geomorphic features will determine much about your potential or challenges in managing these specific sites as well as the type of vegetation (desirable and undesirable) that is most likely to be present on the site. Another challenge is that the arrival of shorebirds is well before the growing season shuts down in KY and thus there is a narrow window in which one can maintain conditions conducive to shorebird use. What this means is that some sort of manipulation is typically required to attract shorebirds to the site. That manipulation whether mowing, soil disturbance, or fire results in different substrate conditions that has a profound influence on the type of invertebrate response. With certain plant species shallow/light disking speeds the decomposition process and creates an open area more conducive to shorebird response in fall but the degree of disturbance also influences the time in which new growth responds which then influences the duration of the conditions suitable for shorebird response. When there is a good response in fall the benefits in the spring may be reduced. Not a big deal with spring conditions in most places because spring habitats are usually more widespread and abundant than fall habitats.

The ambient temperature influences the invertebrate response. This occurs in two ways. First if there is much green material, then the BOD can be so high that there is no oxygen available. The oxygen supply influences the composition of the invertebrate response. Certain invertebrates are tolerant of low oxygen levels--things like rat-tailed maggots and those organisms with hemoglobin--aquatic oligochaetes and chironomids do well when

little oxygen is available. The oligochaete response may be great but the duration of time for a harvestable individual may be beyond the time in which conditions are suitable for the fall shorebird response before the site develops an unacceptable vegetation structure. Thus, a slow flood that recognizes the amount of organic material and its conditions will assure that invertebrates that require much oxygen will be present in abundance.

In general there are fewer management challenges during the first years after development. A common problem is that a site may be wonderful for some suite of birds initially. This gets the manager excited about repeating these conditions by setting up a management regime that follows the actions resulting in the original wonderful response. In the vast majority of sites, but not all, continuation of the original timing and pattern of manipulations will lead to failure. Thus, my suggestion is that one must be fast on their feet. To be successful in most situations, one must change the timing and type of manipulations among years to assure continuing success. Thus by changing the type of disturbance, when it is implemented, as well when and how long the site is flooded have important implications for long-term success. Even then the wonderful part of biology is that nothing is ever the same among years but viability can be used to your advantage to assure success. I bring this to your attention because there was an indication that these units were specifically designed for shorebirds. In arid systems that is much easier to do (focus only on shorebirds) but here in the Midwest/South where rainfall is equal to or greater than precipitation this can become a manager's nightmare.

Finally, one can not go far wrong with invertebrates because there are so many forms that have adaptations to every conceivable wetland condition. Some basic understanding of invertebrate life history strategies gives good insights into optimizing the potential response as well as how to grow big bugs which foraging gleaners tend to select. I could be much more specific if I took a look at the site and asked a whole series of questions that would probably drive you crazy. If I get across the river it would be interesting to identify the conditions on these sites. Maybe we could set something up when and if I am in the area.

Saucier, R. T. 1994. Geomorphology and quaternary geological history of the Lower Mississippi Valley. Volumes I and II. U.S. Department of the Army, Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, USA. [[Leigh Fredrickson, University of Missouri, gaylord1@sheltonbbs.com]]

*Response 4.* I would think that by keeping this moist soil unit dry during the summer months you would encourage the growth of vegetation which may make the site unsuitable for shorebird use. However, the dead vegetation may provide the detritus in shallow water as a food source for the invertebrates. If you can dry this site out enough, you may want to consider disking this site to disrupt any vegetation that may become established and also aerate or break up the soil for the invertebrates. [[Bill Volkert, Wisconsin Department of Natural Resources, William.Volkert@dnr.state.wi.us]]

## **Nesting Tern and Plover Fencing**

*Inquiry.* We had great success last year keeping the nesting areas protected. I am working with a SC State Park to fence in a large area of beach to protect least tern nests from dogs. We want to purchase fencing now. We have priced a black plastic fencing that has 1.5 in. openings that is very weather resistant. Do you know if the birds will nest in an area that is completely enclosed by such a visible fence or should we purchase a more see through wire fence (that is not as UV tolerant)? Also do you know if least tern chicks need to get out of the fence before they fledge? Any ideas or contacts would be of great help. [[Felicia Sanders, South Carolina Department of Natural Resources, fsanders@sccoast.net]]

*Response 1.* I don't know about Least Terns, but production of Black Skimmers have increased in fenced areas when fresh water was provided. I recommend having your fenced area large enough to have some vegetation to allow shading of chicks, and access to some water would be desirable. [[Brent Ortego, Texas Parks and Wildlife Department, Brent.Ortego@tpwd.state.tx.us]]

*Response 2.* For many years/decades many Least Tern colonies in California have been enclosed by either chain link or various types of snow/sand fencing. The only potential problem is if the enclosed area is so small that the fencing changes the "feel" of the area to the birds - it still needs to be perceived as a large, open site, not a big sand box. Also, depending on the nature of the fencing, you want to make sure that if the chicks are able to wander from the enclosed area that they don't become trapped outside. In other words, a small mesh (chick-proof) fence that enclosed the nesting area on 3 sides would not be a good idea. Re whether the chicks need to be able to move in and out of the fenced area. I've certainly seen many extremely successful colonies where chicks were restrained within a nesting area until they fledged (at which point they readily fly in and out on their own). Its in this behavior that the management needs of terns and plovers most diverge (obviously, if you have plovers nesting in the same area their chicks have to be able to move in and out through the fence). But - it becomes imperative that you control any predators that might key in on the colony, and that you make sure that dogs/cats/people don't go over the fence. [[Jonathan L. Atwood, Antioch New England Graduate School, jatwood@antiochne.edu]]

*Response 3.* Jonathan Atwood provided a very good summary of the use of employing more protective duty fence to protect least tern colonies. In New Jersey we have successfully used a heavy duty wire pasture fence to protect some colonies on beaches with heavy human disturbance and/or dog problems. Galvanized fence holds up well over time -- we've had ours for about 10 years (although some of it is just now coming to the end of its useful life). This type of fence has small enough openings to keeps dogs (although not cats or other mammalian predators) from getting in but still allows flightless chicks to move in and out. Our experience is that you would want to allow for this type of movement so that chicks can evade predators when necessary. I would not recommend confining the chicks inside an area, unless the geography/layout of the site already confines them just to the area you are fencing. I agree with Jonathan that the area fenced

has to be quite large so it doesn't inhibit nesting in any way. A few downsides about wire pasture fence 1) It is cumbersome and time consuming to install. 2) It is not easy to adjust once set up -- with string and post "symbolic" fencing we typically adjust fencing when/if the colony expands outside. This is difficult to do with wire fence. 3) Serious coastal flooding/high tides can make a mess of the fence (destroy it in some cases).4) It is initially more expensive -- although as I said it is fairly cost effective in the long run. Finally, this may be obvious -- despite the work involved, this type of fence should be removed at the end of each nesting season. This extends the life of the fence, but also "permanently" leaving the fence in place accelerates the development of dunes/vegetation, which could alter the habitat in a way that it is no longer suitable for least terns to nest. [[Todd Pover, New Jersey Division of Fish and Wildlife, BNB@gtc3.com]]

*Response 4.* At Quivira NWR, in Kansas, we use an electric fence to protect a least tern nesting area, mainly from coyotes. We started with the poly-wire type fencing and later changed to a heavier 6-wire fence that we have designed to raise and lower, since the same area is used by the endangered whooping cranes on migration. We have improved the effectiveness of the electric fence by coating the bottom two or three hot wires with a mixture of very smelly cat and dog food, thinned and blended with vegetable oil. We use a paint roller to speed up the process of coating the bottom wires. We had previously had a coyote run into the charged fence, get shocked but bounce inside instead of outward. Now the coyotes approach the fence slowly to smell the cat and dog food mixture, stick their wet nose on the charged wire and receive a jolt that is very effective in educating them to avoid the nesting area. I don't know if this would work in your situation but it's an idea. [[Dave Hilley, Quivira National Wildlife Refuge, david\_hilley@fws.gov]]

*Response 5.* We usually use chain link fencing with a cantelever at the top. This works wonders and has been responsible, in large part, for the threefold increase in least terns along the California coast. [cantelever often keeps out cats, though not always. Likewise, bury the fence at least a foot, and don't have any perching areas nearby for raptors]. You can use nixalite on the uprights if you use wood. The only problem with chain link is that the proximity to the ocean corrodes it over time. However, fencing that has been up here for over ten years is still standing, so it does last quite a while. The chicks can stay inside until they fledge, unlike plovers [which you will have to deal with I would think, since they use the same habitat as least terns]. We also use what we call 'chick fencing' which is a foot or so high plastic lattice flexible material that keeps chicks from running the length of the colony when you are on the colony monitoring. [[Pat Baird, California State University, patbaird@csulb.edu]]

*Response 6.* I am the monitor/manager of largest least tern colony (1257 nests this year) in California at MCB, Camp Pendleton. Our sites on the beach are completely fenced with 4 foot x 100 foot black "tensar grid" material. It is very resistant to degradation in the salty environment. We use the fabric with 1/4 inch pores due to the presence of western snowy plovers that nest within the sites. Older fabric, 1/2 inch pores, allowed plover chicks to get stuck as they tried to pass through. I solved the problem with a specially constructed "plover gate" and the smaller

pore fencing. The gates cost about \$300 and are constructed to block out most predators. The fabric is attached to 4x4 posts that we leave in yer round. The fabric is attached at two points, at the top and middle. This allows surf overwash to come through the fence rather than tearing it down. The bottom foot of the fence is buried to prevent predators from digging under and to prevent chicks from entanglement. The seams between have to be sewn with wire very tightly to prevent chicks from squeezing between the panels and becoming entrapped. The height of the fence is 3 feet above the sand surface. A cable runs along the top to support the middle of the span between posts which are set about 15-20 feet apart. The fencing tends to sag otherwise. You will find that many predators will tend to follow the line of the fence around the site, rather than crossing over. Some will still cross over. We set traps at the corners outside the sites. When you monitor inside the site, the larger chicks will tend to congregate in the corners which makes banding and recaptures easier. The fabric is easy enough to realign if nests are found outside and you want to bring them inside. We currently place Carsonite markers outside the fence in a buffer zone with signs to keep vehicles and personnel out. If you have a lot of joggers, I suggest running twine from the fence to the buffer signs/markers. This discourages walkers and joggers from moving right along the fenceline. Feel free to respond if you have any questions. My group has been monitoring terns out here since the late 70's, I started in 1982. We monitor all the tern colonies in San Diego County, about 60% of the total western population. [[Brian Foster, Camp Pendleton, bfostern@hotmail.com]]

## NEW PUBLICATIONS

### **Playas of the Great Plains**

In Dr. Loren Smith's latest book on playa lakes, he provides a survey of all that is currently known about Great Plains playa ecology and conservation. Smith synthesizes his own extensive research with other published studies to define playas and characterize their origin, development, flora, fauna, structure, function, and diversity. The book also explores the human relationship with playas from prehistoric times, when the wetlands served as campsites for the Clovis peoples, to today's threats to playa ecosystems (see <http://www.utexas.edu/utpress/books/smipla.html>).

### **2003 American Wetlands Conference Proceedings**

Please visit the Izaak Walton League's Web site at [http://www.iwla.org/SOS/awm/conference/2003\\_proceedings.html](http://www.iwla.org/SOS/awm/conference/2003_proceedings.html) to view proceedings of the 2003 American Wetlands Conference. The most comprehensive national training conference on wetland issues, the American Wetlands Conference provided a forum for volunteers, biologists, government agency representatives, policy makers, nonprofit organizations, businesses, and educators to discuss the latest trends in wetland conservation. Some of the many topics covered at the conference included: the status and ecological importance of geographically isolated and ephemeral wetlands, a discussion of whether or not isolated wetlands need federal protection, wetland construction, monitoring and

assessment, hands-on education, conservation development and land-use planning as wetland conservation tools, and public perceptions of wetlands.

### **The Do's and Don'ts of Wetland Construction**

Environmental Concern Inc. is pleased to offer the natural resources community a new resource, the Do's and Don'ts of Wetland Construction. Based on over thirty years experience in wetland restoration, enhancement and creation, Dr. Edgar Garbisch has written a plain-spoken guide that provides invaluable insight for the wetland practitioner. The information contained within will assist the reader in making sound decisions regarding: site selection, plans and specifications, pre-bid and pre-construction meetings, contract bidding, constructing the wetland, post-construction maintenance and success determination, and post-construction monitoring. Order online at <<http://www.wetland.org/>> or by calling 410/745-9620.

### SHOREBIRD MANAGEMENT MANUAL REVISION

*Inquiry.* I am looking for advice from managers regarding the Shorebird Management Manual and shorebird management. Doug Helmers and I are beginning to plan for revision of the manual, but are hoping for feedback from managers before we 'dive in'. If you can help us we'd be grateful — 1) Do you have suggestions for improvement of the Shorebird Management Manual?; 2) If you have actively managed for shorebirds at a site where you are (or formerly were) involved as a manager, we would like to talk with you by phone during the coming winter to learn more about your effort. We are looking for success stories as well as for precautionary advice you may have developed; 3) Or if you have something else you feel should be addressed in a revised manual, please contact either me or Doug. I'd welcome your response through this listserve, or by direct contact. [[Brian Harrington, Manomet Center for Conservation Sciences, bharr@manomet.org, 508/224-6521 (phone)]]

*Response 1.* I am very interested in how we can participate in your evolving programs. Three things come to mind immediately — 1) We have been assisting the USFWS on an impoundment management regime at Wertheim NWR in Shirley, LI. Mark Maghini, Refuge Biologist is really the lead on this one so I will not steal any of his thunder; 2) Our projects promoting ditch plugging(pseudo OMWM) on saltmarshes on LI have at several locations been responsible for substantial increases in shorebird foraging. We are attempting to look at the invertebrate community on these restored marshes and would be very interested in a more scientific approach. Moriches Audubon, who does regular shorebird counts at one location reports,(with glee) substantial increases of activity; 3) The South Shore Estuary Reserve Office, newly created and now staffed on LI, is looking to increase and coordinate all research efforts on all subjects within the Estuary. I'm told that a Symposium of sorts is also in the works. The SSER stretches from the NYC line to Shinnecock Bay and so you can see any evolving info on the subject of shorebirds would fit right in. Looking forward to learning more. [[Craig Kessler, Ducks Unlimited, Inc., ckessler@ducks.org]]

*Response 2.* The revised manual should be a tool for implementing the Shorebird Conservation Plan(s). See what items you can pluck from the plan(s) to have the manual provide some "how to" directions. Our best shorebird sites attract a significant amount of recreation (waterfowl & dove hunting, retriever dog training, passing off-highway vehicular traffic). We'd like some guidance to our recreation management. [[Ron Lambeth, Bureau of Land Management, ron\_lamberth@co.blm.gov]]

*Response 3.* We (my company) in concert with Rob Cavallaro of the Teton Regional Landtrust have managed for intermountain shorebirds by attempting to design in specific habitats on some of our enhancement and restoration projects on private lands in the Tetons (WY and ID). Our efforts are most geared to long-billed curlew, willet, wilsons phalarope, sand hill cranes, etc. we will assist in any way we can if needed. [[Jeffrey Klausmann, Intermountain Aquatics, Inc., jeff@intermountainaquatics.com]]

*Response 4.* I finished my masters from the Univ of Memphis in August. My thesis was titled "The impacts of shorebird foraging on macroinvertebrates in the Lower Mississippi Alluvial Valley." Dr. Keith McKnight (Regional Biologist for DU in Texas and New Mexico) was on my graduate committee which was headed by Dr. Jack Grubaugh. I used Doug Helmers' Shorebird Management Manual extensively and have, what I believe to be, interesting findings that could be useful to shorebird managers. I have attached a soft copy of my thesis to this email. Feel free to use my thesis and ask any questions you may have related to it. A revised copy of the thesis is in review for publication with the Journal of Wildlife Management. I would enjoy assisting in any way possible. [[Darren W. Mitchell, Ducks Unlimited, Inc., dmitchell@ducks.org]]