concludes that any decision to remove mistletoe must take into account several issues, including the actual damage to the host that parasitism may have caused; the potential of mistletoe reinfestation; and the possibility that extensive pruning could introduce diseases to the tree through bark wounds.

78

Temperate Forests Gain Ground. 1998. Moffat, A.S. **Science Magazine.** 282(5392):1253.

Data from the U.S. Forest Service indicate that the amount of temperate forest growth in the United States has outpaced forest clearing during the past 50 years. Moffat cites some of the factors contributing to this phenomenon, including the reversion of marginal farmlands to forest; improvements in tree-harvesting, paper-milling, and other technologies; increased paper and wood recycling; and the substitution of other materials for lumber by the construction industry.

79

Effects of Wet- and Dry-Season Fires on *Jacquemontia curtisii*, a South Florida Pine Forest Endemic. 1998. Spier, L.P., Dept. of Biological Sciences, Florida International University, Miami, FL 33199; and J.R. Snyder. **Natural Areas Journal** 18(4):350-357.

For this comparative study of the effects of seasonal prescribed burns on a native pineland herb, Spier and Snyder conducted winter and summer fires in the pine stands of Florida's Big Cypress National Preserve. Though the summer wet-season fires produced lower temperatures than the winter dry-season burnings, they resulted in a far greater mortality rate for adult plants of pineland clustervine (*Jacquemontia curtisii*) and one-fifth the number of seedlings. Both flowering and fruit-production by surviving individuals was greater, however, on plots subject to wet-season burns than on unburned plots or plots with dry-season burns. Spier and Snyder conclude that varying the season and the intensity of prescribed fires will help maintain genetically diverse populations of the affected species.

WETLANDS

80

Tree Spade Used to Establish Wetland Grasses, Rushes and Sedges (Kansas)

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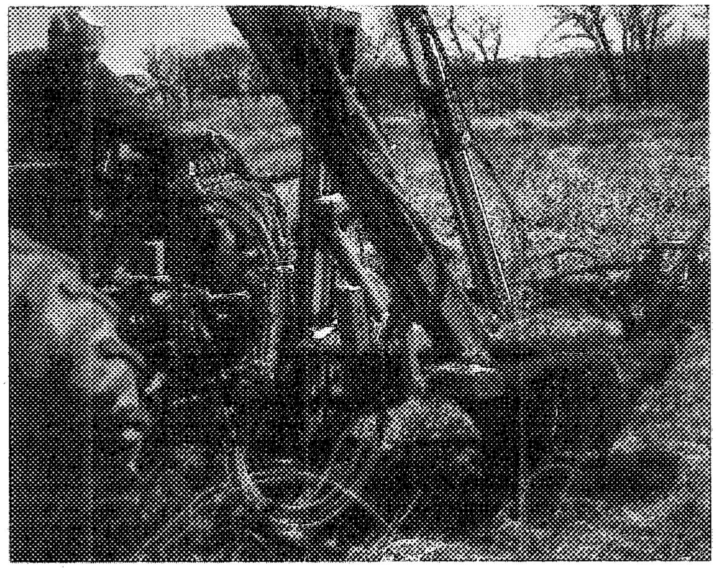
During the course of a three-year study at two mitigation sites in Kansas, we found that we could transplant wetland vegetation with a common implement of the nursery trade–a tree spade. Moreover, our findings suggest that this tool is well suited to working with clonal, herbaceous species, and should be considered for use with wetland and upland species that do not reproduce easily by seed.

Located near Lawrence in northeast Kansas, the Santa Fe site is a 17-acre (6.9-ha) prairie wetland restoration on hydric clay soils. The Public Works Department of Douglas County had the site constructed in 1994 as part of a required wetland mitigation for the proposed South Lawrence Trafficway. The mitigation plan called for both seeding and transplanting native species. As part of this effort, we selected, and marked for salvage, wetland plants growing along the proposed highway route through the Haskell-Baker Wetlands. We selected species that were known to occur in wetlands (Reed, 1988), many of which reproduce clonally. In March 1994, we moved 107 transplant "chunks" into the Santa Fe site with a tree spade. Each "chunk" was approximately 2 feet (61 cm) in diameter and about 2 ft deep in the center. Each October, from 1994 through 1997, we monitored the transplants, and by 1997 we had observed only two dead "chunks," although some individual species within other "chunks" were lost.



The operator of a tree spade removes a "chunk" of wetland vegetation destined to be lost to highway expansion for transplanting to a restoration site. *Photo by Kelly Kindscher*

We transplanted two species—eastern cordgrass (*Spartina pectinata*) and spikerush (*Eleocharis macrostachya*)—in large enough numbers to study their response to the transplanting in some detail. We found that transplants of eastern cordgrass increased three-fold in average basal area, while transplants of spikerush increased 12-fold in average basal area–each being affected by the microtopography of the Santa Fe site. Eastern cordgrass spread most in the highest and driest areas. Spikerush, meanwhile, flourished in areas of moderate elevation and in low areas that had greater depth and duration of flooding. Other species that we transplanted have also survived and spread, including thin-scale sedge (*Carex hyalinolepis*), narrow-leaved cattail (*Typha angustifolia*), and softstem bulrush (*Scirpus atrovirens*). We are encouraged by the survival and growth of these transplants at the Sante Fe site, although they were not planted densely enough to dominate the overall vegetation by 1998.

The Medicine Lodge site is a 0.4-acre (0.15-ha) created wetland in south-central Kansas. The Department of Transportation had it constructed in 1995 as part of a wetland mitigation for a bridge replacement project. At the time of construction, we moved 25 "chunks" of bulrush (*Scirpus pungens*) to Medicine Lodge from a wetland area that was harmed by road construction. We monitored the transplanted vegetation at the Medicine Lodge site in June and September of 1996 and during those same months in 1997 to determine the species composition. By the end of 1997, we had observed no mortality in the transplanted material. We found that the percent cover of bulrush increased rapidly, comprising 15.9 percent of the total site vegetation in June 1996, and 85.3 percent by September 1997. We suspect that the bulrush thrived because it is well suited to the 6-10 inches (15-25 cm) of standing water that is present throughout the growing season at Medicine Lodge. We found no other perennial wetland plant species on the site—the majority of the other plant species were weedy annuals. Wetland vegetation dominated the Medicine Lodge site two years after site construction—a scenario that we believe would not have occurred without transplanting the bulrush.

The success of tree spade transplants depends on two factors: 1) Taking a sod plug large enough to insure the survival of the designated species; and 2) Selecting species suited to hydrology of a site. Large sod plugs reduce transplant shock and increase transplant survival, keep beneficial soil microbes and seedbanks intact, and reduce disturbance by animals such as muskrat, beaver, and large grazers.

Reference

Reed, P.B. 1988. *National List of Plant Species that Occur in Wetlands*. Washington, DC: United States Government Printing Office.

81

Faunal Diversity and Richness of Natural, Restored, Dam-created and Borrow-pit Wetlands in the Prairie Pothole Region of Eastern South Dakota. 1998. Berry, C.R. The South Dakota Cooperative Fish and Wildlife Research Unit, Brookings, SD, 605/688-4785; fax, 605/688-4515; berryc@mg.sdstate.edu.

The South Dakota Department of Transportation surveyed the animal communities of 27 natural and created wetlands to establish design criteria for wetland construction. The resulting recommendations include: creating several 10-acre (4-ha) wetlands rather than one large wetland; backfilling soil at three to five sites around the wetland perimeter to maximize shoreline development; constructing a gentle slope; and creating a shallow, undulating bottom.

82

Lower Codornices Creek Adopted. 1998. Bradt, J. **Creek Currents**). Pp. 1, 3.

The Urban Creeks Council (1250 Addison St., #107C, Berkeley, CA 94702) together with the Waterways Restoration Institute and several businesses and citizen groups in Berkeley, California, is restoring natural meanders and riparian vegetation to an urban stretch of the lower Codornices Creek that had been straightened several years ago. Plans also call for replacing culverts with bridges, and constructing a pedestrian/bike trail. The city of Berkeley is donating land to the project and will maintain the area after the restoration is completed.

83

The Do's and Don'ts of Wetland Planning. 1998. Garbisch, E.H. **Wetland Journal** 10(4):21- 24.

Garbisch suggests several specifications for seeding, using mycorrhizal fungi, and watering at wetland restoration sites. For seeding, he recommends sowing pure, live seed early in the growing season and on dry soil rather than under water; taking into account the light requirements of species; and using plant material that can be planted at any time of the year. Garbisch cautions against inoculating wetland plants with mycorrhizal fungi unless research indicates that mycorrhizae improves the growth and survival of a particular plant species. He also reminds planners to budget for each anticipated watering event.

84

Enhanced Wetlands in Urban Landscapes: A Demonstration with the Corpus Christi Bay National Estuary Program. 1998. Smith, E.H., Center for Coastal Studies, Texas A&M University, Corpus Christi, Texas; and S. Alvarado. **National Wetlands Newsletter** 20(6):9-11.

The Corpus Christi Bay National Estuary Program (CCBNEP), together with several public agencies and the town of Refugio in southern Texas, initiated a wetland enhancement project to reduce nonpoint urban source pollution on the watershed of the Little Creek tributary of the Mission River. The CCBNEP increased the wetland shoreline, created terraces, planted 1,500 native plants to filter pollutants, and constructed a waterfall that provides an auxiliary water source during drought. Local teachers earned certification as volunteer water-quality monitors, and members of the public participated in interactive field days and education workshops. This project was part of an ongoing study by the CCBNEP of three of the seven major estuary systems along the Texas Gulf coast.

85

Some Scientists Attack Plan to Restore the Everglades. 1999. Stevens, W.K. **New York Times** February 22, 1999. **Putting Things Right in the Everglades.** 1999. Stevens, W.K. **New York Times** April 13, 1999. **Feuds Delay Everglades Restoration.** 1999. UPI wire story, April 5.

These articles describe the continuing efforts by the staff of Florida's Everglades National Park, ecologists, and the Army Corps of Engineers to hammer out the details of a proposed 20-year, multi-billion-dollar plan to restore the natural hydrologic flow of the Everglades to 90 percent of its historical volume. The plan, which the Clinton Administration submitted to Congress in July, spells out a program intended to reverse the damage caused by a century of flow diversion for agricultural and urban use that has fragmented the Everglades, altered its natural flow, and reduced populations of wading birds by 90 percent. The most recent version calls redirecting through the Everglades billions of gallons of water that currently flow to the Atlantic and Gulf of Mexico, the removal of 240 miles of levees and canals, reconstruction of the Tamiami Trail highway to permit an unimpeded flow of water between the Everglade's two largest compartments, and cutting weirs into a major levee. The Army Corps of Engineers and South Florida Water Management District predict that this endeavor will help increase the abundance of all animals, from minnows to alligators. A recent investigation by the General Accounting Office cites interagency squabbling for having delayed the project for two years and causing cost overruns of $80 million.

86

Improving Mitigation Performance: Results from a Maryland Study. 1998. Street, B. **National Wetlands Newsletter** 20(5):11-13.

When Street compared 13 constructed wetlands throughout Maryland with performance standards developed by the state's Interagency

Mitigation Task Force, he found that most did not meet the minimum standards established for mitigation projects. He identified two factors that would prevent several of the sites from developing the wetland functions that had been lost: 1) Inadequate supplies of organic soil, which could be remedied with additions of organic soil amendments and a covering of course woody debris; and 2) Hydrodynamic and geomorphic differences between the constructed sites and the sites they had replaced. Street proposes that the mitigation process includes a hydrogeomorphic classification to ensure functional, in-kind replacement of wetland areas.

87

Restoring an Atlantic White Cedar Bog. 1998. Wicker, M. and E. Hinesley. **Endangered Species Bulletin** 23(5):18-19.

North Carolina's Pocosin Lakes National Wildlife Refuge, along with the United States Fish and Wildlife Service and North Carolina State University, is restoring native Atlantic white cedar (*Chamaecyparis thyoides*) and bald cypress (*Taxodium distichum*) to a 18,000-acre (7,280-ha) bog where decomposition from ditched peat has released excess loads of nutrients and mercury into coastal rivers and estuaries. To date, the project team has planted 2,000 acres (810 ha) of white cedar and bald cypress and is currently working to restore wetland hydrology by installing water control structures on drainage canals. The combination of revegetation and improvements in hydrology already has reduced mercury runoff to below state water-quality standards. The restoration site also has improved habitat conditions for small mammals and amphibians, and, within a few years, should provide nesting sites for many neotropical songbirds.

LAKES, RIVERS AND STREAMS

88

Opportunities for Ecological Improvement Along the Lower Colorado River and Delta. 1998. Briggs, M.K and S. Cornelius, Sonoran Institute, 7650 E. Broadway Blvd., Suite 203, Tucson, AZ 85710. **Wetlands** 18(4): 513-529.

Briggs and Cornelius present a list of recommendations and strategies for future restoration projects along the Colorado River that is based on the successes and failures of nine wetland restoration sites stretching from Parker Dam in Arizona to the river's delta in Mexico. They suggest that river managers develop well-defined objectives and thoroughly evaluate site conditions, plant vegetation in areas where there is significant agricultural runoff, focus on restoring old river meanders and other low-elevation sites where there is relatively high water availability, and develop long-term planning initiatives. In addition, the authors call for a binational effort to restore the delta region, more community-based conservation efforts, and a greater number of federally protected native wetland and riparian areas.

89

Improving the Nature of Walden Pond. 1998. Editors. **Erosion Control** November/December, Pp. 20-22.

The Massachusetts Department of Environmental Management has planted vegetation and reconstructed Walden Pond's bank to stem erosion of this national landmark that inspired Henry David Thoreau to write *Walden* (see R&MN 7(2):65-69). The department planted about 70,000 trees and shrubs native to the pond and staked blueberry sod into the slopes above the path leading to the site of Thoreau's cabin. It also stabilized the bank with soil lifts and brush layers and created low points and tree-log diversions along the shoreline footpath to control runoff.

90

Survival of Plains Cottonwood (*Populus deltoides subsp. monilifera*) and Saltcedar (*Tamarix ramosissima*) Seedlings in Response to Flooding. 1998. Gladwin, D.N. and J.E. Roelle, United States Geological Survey, Midcontinent Ecological Science Center, 4512 McMurry Ave., Fort Collins, Colo. 80525. **Wetlands** 18(4): 669-674.

These researchers flooded plots of first-year salt cedar and cottonwood seedlings during the spring and fall at a sand and gravel mine pit near Fort Collins, Colorado, to determine whether this would be a viable method for controlling saltcedar. They found only 0.8 percent of the saltcedar survived the flooding, compared with nearly 21 percent of the somewhat larger cottonwood seedlings. Both species showed much higher flood tolerance in tests the following spring, when they had developed a more mature root structure. Gladwen and Roelle conclude that while heavy fall flooding may allow more mature salt cedars to survive, it also successfully controls plants that have germinated earlier in the year.

91

Initial Cottonwood Seedling Recruitment Following the Flood of the Century of the Oldman River, Alberta, Canada. Rood, S.B., Dept. of Biological Sciences, University of Lethbridge, Lethbridge, Alberta, Canada T1K 3M4, rood@uleth.ca; A.R. Kalischuk and J.M.Mahoney. **Wetlands** 18(4):557-570.

Following a heavy rainfall and record flooding in June 1995, Rood and Mahoney established nine research sites along the Oldman River to study the establishment, survival, and growth of seedlings of cottonwood (*Populus* spp.) species during a two-year period. Seedling counts and height measurements revealed that seedling recruitment and establishment was higher during the season following the flood than during subsequent, drier years. The authors also observed that local dams provided gradual flow recessions after the flooding, which probably accounted for the high rate of seedling recruitment. They suggest that other dam operators consider adopting a policy of slow stream stage recession to enhance recruitment of riparian vegetation and to ameliorate the negative effects of flow regulation due to flood control or the diversion of water for irrigation and other uses.

COASTAL COMMUNITIES

92

Effects of Nitrogen Additions on the Vertical Structure of a Constructed Cordgrass Marsh. 1998. Boyer, K.E., Pacific Estuarine Research Laboratory, San Diego State University, San Diego, CA 92182-4625; and J.B. Zedler. **Ecological Applications** 8(3):692-705.

Boyer and Zedler evaluated the effects of fertilizing a constructed cordgrass (*Spartina foliosa*) marsh in San Diego Bay where soil was nitrogen poor and the plants shorter than vegetation at a natural marsh. In 1993, they added 1 oz of N/ft^2 (30 g of N/m^2) to the soil, varying the quantity and seasonal timing of the treatments. All treatments produced plants taller than the 35 inches (90 cm) considered suitable for nesting by the endangered light-footed clapper rail (*Rallus longirostris levipes*). The authors had to add more fertilizer in 1994 to sustain the taller canopy, probably because of insufficient nitrogen storage in belowground tissues. They recommend that planners of future marsh restoration pro-