

Abstracts, Reviews, and Meetings

To develop the abstracts, the editorial staff searches more than 100 scientific journals, professional and organizational newsletters, conference proceedings, and other resources for information relevant to ecological restoration practice and research.

Grasslands

Wicking Sumac. 2007. Clubine, S. (Missouri Dept of Conservation, PO Box 368, Clinton, MO 64735, [steve.clubine@mdc.mo.gov](mailto:clubine@mdc.mo.gov)). **Native Warm-Season Grass Newsletter** 26(1):8–9.

Steve Clubine investigated wick-applications of herbicides to control scattered woody vegetation while minimizing impacts on lower-growing herbaceous vegetation. After running experiments in 2006 and 2007 at Hi Lonesome Prairie, Missouri, he recommends wick-application to control scattered woody vegetation 0.75 to 1.8 m tall. Smooth and winged sumac (*Rhus glabra* and *R. copallinum*) along with other tree and shrub species were treated effectively. Both picloram and glyphosate in water with crop oil surfactant killed 95% of sumac, but the glyphosate treatment (\$32/ha) was 60% cheaper. Clubine prefers a tractor with the wicking boom attached to a front-end loader bucket, so that the operator can readily adjust wick height and observe hazards. He recommends keeping ferrules loose to maintain herbicide flow, but warns that dripping herbicide can pool and damage non-target species when equipment is stationary. To reduce this risk he suggests draining the wick at the end of each treatment period and using a boom with end elbows to facilitate drainage.

Woodlands

Interactive Effects of Garlic Mustard Metabolites on Jewelweed Plants and Their Mycorrhizae. 2007. Barto, E.K. (Wright State University) and D. Cipollini. Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

To determine the effects of allelopathic chemicals, Barto and Cipollini exposed pale jewelweed (*Impatiens pallida*) plants to various garlic mustard (*Alliaria petiolata*) extracts. They found that glucosinolate fractions of garlic mustard led to lower rates of mycorrhizal colonization in plant roots and reduced jewelweed germination by 50 percent compared to controls. Whole-plant garlic mustard extracts resulted in greater mycorrhizal hyphae production in soil, but lower rates of root colonization by mycorrhizae. Additionally, jewelweed plants without mycorrhizal associations

experienced higher root growth rates. Amending the soil with activated carbon resulted in larger and more effective root systems in all plants without mycorrhizal associations, even those exposed to chemical extracts, which may indicate a potential means to boost competitiveness of native plants growing amidst garlic mustard.

White Pine in the Northern Forests: An Ecological and Management History of White Pine on the Bad River Reservation of Wisconsin. 2007. Steen-Adams, M.M. (Environmental Studies, University of New England), N. Langston and D.J. Mladenoff. **Environmental History** 12(3):614–648.

Using archival documents and satellite images, the authors trace vegetation changes on the 50,000-ha Bad River Reservation. They found that white pine (*Pinus strobus*) dominated 41% of the area in 1857. In 1930 at the end of the logging era, aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*) covered 83% of the land, with many white pine seedlings in the understory, while mature pine forest, mainly red pine (*Pinus resinosa*) covered 1%. By 1987, the aspen-paper birch forest persisted on 40% of the area, while much of the rest converted to northern mixed conifer-hardwood forest. Early forest management concentrated on converting land to agriculture, but in the 1930s management switched to pulpwood production with the ultimate goal of restoring pine forest through the removal of aspen nurse trees and allowing white pine in the understory to mature into canopy trees. However, introduced blister rust fungus (*Cronartium ribicola*), fire suppression, deer (*Odocoileus virginianus*) browsing, and large-scale aspen harvesting on short rotation cycles (35 to 50 years) effectively eliminated both the existing pine cover and seed production. The scattered landscape distribution of white pine seedlings, increasingly fragmented ownership, and management emphasis on short-term benefits have combined to prevent white pine forest regeneration up to the present day.

The Stoddard-Neel Method: Forestry beyond One Generation. 2006. Way, A.G. (University of Georgia). **Forest History Today** Spring/Fall:16–23.

In an interview, Leon Neel, who began working with pioneering wildlife biologist Herbert Stoddard in 1950, describes their approach to managing bobwhite quail

(*Colinus virginianus*) habitat in the Southeast. Their goal was to preserve quail hunting and enhance timber values on 200,000 ha of longleaf pine (*Pinus palustris*) forest by maintaining an open and aesthetically pleasing forest landscape. Their underlying premise: "Why destroy an ecosystem just because you want more money out of the trees?" Management consisted of selective timber harvesting and prescribed burning tailored to the unique problems of each site. This approach increased timber quality and volume over the long term by creating small canopy gaps and converting forest stands to younger age classes without removing all large-diameter trees. However, since the strategy originated on the property of wealthy landowners who did not require a steady income from the land, some people argue that this management system is not economically viable today.

Wetlands

The Role of Regulatory Change on Wetlands Mitigation. 2007. BenDor, T. (University of North Carolina at Chapel Hill, bendor@email.unc.edu) and N. Brozović. **National Wetlands Newsletter** 29(4):10–13, 21.

Using geospatial data on 1,058 wetland impact permits issued in the Chicago region from 1993 to 2004, BenDor and Brozović discuss how changes in the permitting process have influenced compensatory mitigation trends. The average wetland impact size decreased over time, while the displacement distance between impact and mitigation locations for smaller areas (< 0.1 ha) increased, particularly when mitigation banking was involved. Off-site mitigation increased over time and occurred for 59% of the permits, typically for small impact areas (< 1.2 ha). Developers relied on mitigation banks for 60–70% and in-lieu fee programs for 20–50% of permits issued for small impact areas. The authors suggest that regulators have facilitated the rapid expansion of mitigation banking by requiring compensatory mitigation for increasingly smaller areas that cannot be handled cost effectively by the developer, leading to third-party participation and creating a customer base for banks.

Lakes, Rivers & Streams

Taking Out a Parking Lot to Improve Water Quality in Indiana. 2007. **Coastal Services** 10(5):2–3.

In the 1920s a 397-m stretch of Dunes Creek was diverted into a culvert and a 1-ha parking lot was built at Indiana Dunes State Park. These changes contributed to increased *E. coli*, sediment, and nutrient levels at nearby swimming beaches. In 2005–2006, private contractors removed the parking lot and culvert, graded a floodplain area,

constructed a meandering channel, and established native plants using seed mixes and transplants. The restoration cost \$700,000. Within the first year, sediment deposition has occurred in the floodplain area and fish and bird species have colonized the area; however it may be another two years for improvements in *E. coli* levels and other water quality parameters to develop. The Association of Conservation Engineers recognized this restoration as the 2006 Project of the Year.

Stream Restoration Using Sculpted Concrete Drop Structures and Soil Lifts. 2007. DeLeo, C.L. (Boulder County Parks & Open Space). Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

DeLeo discusses a project in 2005 to improve a creek in Boulder County, Colorado. Development in the watershed had converted an ephemeral stream into a waterway with year-round flows and higher peak flow rates. The county parks department installed six concrete drop structures over 3.2 km to raise the channel bottom. The deeply eroded banks were regraded and stabilized using a variety of bioengineering techniques including soil lifts to create a natural-fiber retaining wall. The parks department also removed soil containing reed canary grass (*Phalaris arundinacea*) or buried it on-site. Contractors propagated native sedges and woody species, including cottonwoods (*Populus* spp.), Emory's sedge (*Carex emoryi*), and willows (*Salix* spp.). Community groups transplanted 10,000 plants over two years. Wetland plants have established and restoration efforts are expanding into upland areas.

Engineering Ecosystem Restoration: Surface Water Availability and Bird Community Structure Following Beaver Re-introduction in an Arid Land River System. 2007. Johnson, G. (University of Arizona) and C. van Riper III. Poster at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

After conducting an eight-year study along 80 km of the upper San Pedro River in Arizona, Johnson and van Riper concluded that beaver (*Castor canadensis*) dams enhance riparian areas in arid ecosystems. They found that beaver dams stabilized available downstream water in June, and increased the total surface area of water despite drought conditions in the watershed. Moreover, the species richness and abundance of obligate riparian birds positively correlated with level of beaver activity. The authors suggest that beaver introductions can provide a cost-effective means to restore aridland riparian areas.

Coastal Communities

Mangrove Restoration in Baja California. 2007. Bashan, Y. (CIBNOR, La Paz, Baja California Sur, Mexico, bashan@cibnor.mx). *The Blazing Star* 8(3):7–8.

In this article Bashan outlines the current status and role of mangrove plant communities, and describes a mangrove restoration in Balandra Lagoon in Baja California Sur, Mexico, after a clear cut in the early 1990s. In 1994 black mangrove (*Avicennia germinans*) seedlings were propagated in a nursery, and then densely planted along a secondary channel in order to foster plant forms that would trap propagules and facilitate continued mangrove recovery along the channel. Twelve years later, in 2006, the clearcut area has returned to mangrove forest and local residents are resisting proposals to convert part of the main lagoon into a golf course and resort. Details are available at www.bashanfoundation.org/balandra/balandra.html.

Other Communities

Positive Feedbacks Promote Power-Law Clustering of Kalahari Vegetation. 2007. Scanlon, T.M. (Dept of Environmental Sciences, University of Virginia, Charlottesville, VA 22903), K.K. Caylor, S.A. Levin and I. Rodriguez-Iturbe. *Nature* 449(7159):209–212.

And

Spatial Vegetation Patterns and Imminent Desertification in Mediterranean Arid Ecosystems. 2007. Kéfi, S. (Dept of Environmental Sciences, Copernicus Institute, Utrecht University, PO Box 80115, 3508 TC Utrecht, The Netherlands), C.L. Alados, Y. Pueyo, V.P. Papanastasis, A. ElAich and P.C. de Ruiter. *Nature* 449(7159):213–217.

Both research teams used computer simulations in addition to satellite images or vegetation surveys to demonstrate that the distribution pattern of plants in arid ecosystems displays fractal characteristics. The plants cluster together in a power-law distribution; that is, the frequency of vegetation patches in the landscape decreases with increasing patch size. Both groups concluded that local positive feedbacks cause this aggregation: plants are more likely to establish and survive near other plants, probably because of greater water and nutrient availability and a higher proportion of dispersed seeds. Kéfi and colleagues also explored the influence of livestock and found that intense grazing tends to truncate the power-law distribution, such that larger patches are destroyed and local positive interactions cannot compensate. Their computer model also demonstrated that the patch-size distribution does not follow the power law just before the transition point from vegetated arid land to desert. They suggest that monitoring patch-size distributions may provide early warning of imminent desertification.

Ecological Restoration of a Longleaf Pine Savanna in the Southeastern Coastal Plain. 2007. Carr, S.C. (University of Florida), K. Robertson, R. Martin, N. McInnis and L. Smith. Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

In Louisiana, researchers conclude that thinning and burning can facilitate understory vegetation recovery in remnant longleaf pine (*Pinus palustris*) savanna. They found that graminoids increased in the understory of thinned areas within two years of logging, increasing overall species richness. The area was burned twice in eight years, leading to similar species composition and richness in the logged and unlogged areas. The authors recommend logging with off-site disposal of slash, in conjunction with frequent prescribed burning, to return understory vegetation to a presettlement trajectory.

Propagation & Introduction

Partnerships Help Root Four-Petal Pawpaw. 2007. *Plant Conservation* 20(1):3.

Researchers at the Cincinnati Zoo and Botanic Garden have spent nearly ten years developing new procedures to store germplasm of four-petal pawpaw (*Asimina tetramera*), an endangered Florida plant whose seeds remain viable in storage for only two weeks. They used tissue culture techniques to propagate plantlets in the lab that were then established in greenhouse pots. Once the plants are sufficiently large, they will be transplanted to restoration sites. Similar efforts are underway with two other endangered Florida pawpaw species: beautiful (*Deeringothamnus pulchellus*) and Rugel's (*D. rugelii*).

Seagrass Restoration Genetics: Donor Bed Genetic Diversity and Shoot Density of *Zostera marina* in Mesocosms. 2007. Ort, B.S. (Romberg Tiburon Center, San Francisco State University), E.K. Crumb, L.K. Reynolds, K.E. Boyer and S. Cohen. Poster presented at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

To assess the potential importance of source population genetics in restoration plantings, these scientists conducted a propagation experiment using 18 mesocosms to germinate seeds from three populations of seagrass (*Zostera marina*). They compared an annual population that reproduces by seed and two perennial clonal populations that reproduce vegetatively. They analyzed DNA from 128 seedlings and measured shoot densities, finding that although seedlings from the two perennial populations had higher initial shoot densities, the mesocosms seeded from the annual

population had the highest final shoot density, as well as greater genetic diversity. They concluded that long-term persistence of restored seagrass meadows may depend on the genetic diversity of seed sources.

Control of Pest Species

Impacts, Effects, and Food Webs: Integrating Science and Conservation Perspectives into Non-native Species Management on the Channel Islands. 2007. Klinger, R. (U.S. Geological Survey Biological Resources Discipline). Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

Klinger evaluates values-based conservation and restoration approaches to managing non-native species in the California Channel Islands. He argues that such approaches, which perceive non-native species as undesirable, can be ineffective if efforts to control the target species disrupt positive interactions with native species. Moreover, management activities in a complex system may lead to unexpected outcomes that do not match restoration or recovery goals. He recommends incorporating an “objective ecological perspective” by 1) initiating monitoring before implementing management actions; 2) studying the wider ecological roles of target species, not just their negative impacts; 3) using conceptual models to frame management that incorporate multiple scales and processes; and 4) determining target species management options according to the stage of invasion.

Cooperation Key to Success. 2007. Vollmer, J. (BASF, Inc.). *Land and Water* 51(4):22–26.

Vollmer interviewed people involved with Dalmatian toadflax (*Linaria dalmatica*) control in Park County, Wyoming. In 1973 Dalmatian toadflax existed as a 72-ha patch within Shoshone National Forest, but three years after Forest Service control efforts ended, the plant’s range expanded to cover 800 ha of federal and adjacent private lands. After the 1988 Yellowstone Fires, multiple state and federal agencies signed a Memorandum of Understanding to coordinate invasive weed control. It was the first large-scale collaborative effort of this kind and in 1994 the MoU became the groundbreaking South Fork Weed Management Area. Control efforts have evolved from summer herbicide applications of picloram and 2,4-D to an integrated management program combining late fall and winter applications of the selective herbicide imazapic in accessible areas with biocontrol in less accessible areas using European weevils (*Mecinus janthinus*).

Wildlife Habitat

Editorial: Grazing and Nesting Cover. 2007. Clubine, S. *Native Warm-Season Grass Newsletter* 26(1):1–3.

Informed by 1970s research on prairie chickens (*Tympanuchus* sp.) in central Missouri, Clubine discusses how land use change has reduced available nesting habitat for grassland bird species such as grasshopper sparrow (*Ammodramus saviarum*), upland sandpiper (*Bartramia longicauda*), and bobwhite quail (*Colinus virginianus*). Land moderately grazed by steers in spring and summer and prairies harvested in July for hay thirty years ago have been converted to tilled crop fields, “improved pasture” dominated by fescues (*Festuca* spp.), and exotic cool-season hay fields harvested in May and June. He provides specific grazing recommendations to enhance wildlife nesting habitat, in terms of stocking rates, timing, and effects on plant community structure.

So What Does CRP Have to Do with Trout Anyway? 2007. Kaarakka, P. (pkaarakka@tds.net) and A. Gargas. *The Blue Mounds Area Project* 10(1–2):2, 10.

Wisconsin Department of Natural Resources scientists compared 2001–2005 water quality, fish assemblage, and land use observations in the Pecatonica watershed to 1970s records. They found that areas with high Conservation Reserve Program (CRP) enrollment showed the greatest improvements in trout habitat in terms of water temperature, dissolved oxygen, sensitive aquatic insect populations, and proportion of cold-water species in fish assemblages. They suggest that the perennial cover of CRP grasslands reduces erosion, increases water infiltration, and dilutes nutrients carried in the runoff. The authors raise concerns about the future of CRP grasslands, since the contracts of 72 percent of the 14.4 million hectares currently enrolled in the U.S. will expire in 2007 and 2008. Current economic incentives, including those related to ethanol production, favor conversion to crop fields and threaten to reverse the trend towards improved wildlife habitat.

Large-Scale Riparian Restoration and Agriculture: Ecosystem Services and Habitat Buffers? 2007. Langridge, S. (University of California). Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

Langridge conducted bird surveys in 23 orchards along 160 km of the Sacramento River during the winter of 2006. She found 23 riparian insectivorous bird species, 4 of which prey on a common agricultural pest, the codling moth (*Cydia pomonella*). She determined that the abundance and species richness of insectivorous birds was greater in orchards adjacent to restored riparian forests than in those adjacent to other orchards. She concludes that orchards

may act as habitat buffers, especially in winter when birds forage over larger areas. During this season reduced agricultural activities, such as pesticide spraying or mowing, present less risk to wildlife. In return, she emphasizes, these bird species provide a valuable ecosystem service by reducing pest populations.

Tools & Technology

Cool Tools: Automatic Seed Weigher. 2007. Ison, J. (Chicago Botanic Garden). *Plant Conservation* 20(1):7, 10.

The Chicago Botanic Garden seed biology lab uses a pharmaceutical pill counter modified to automatically weigh seeds heavier than 0.3 mg. An agitator receives the seeds and sorts them so that they drop individually through a chute to the balance that weighs them and records the value on a computer. It can be programmed to measure either a specific number of seeds or all seeds loaded into the machine. This device is useful when visual inspection cannot determine seed viability, such as species of Asteraceae that produce achenes, for example dandelions (*Taraxacum* spp.). One study used the machine to determine the presence of embryos in over 30,000 seeds of blacksamson echinacea (*Echinacea angustifolia*).

Management & Monitoring

Special Feature: Monitoring Wetlands at the Watershed Scale. 2007. Batzer, D.P., ed (Dept of Entomology, University of Georgia, Athens, GA 30602, 706/542-2301, dbatzer@uga.edu). *Wetlands* 27(3):411–560.

This special feature consists of a dedication, foreword, and nine papers. These articles were developed from research on the Nanticoke and Upper Juniata watersheds in Pennsylvania, Delaware, and Maryland. The foreword by Mary E. Kentula outlines the “three-tier approach” to wetland assessments: 1) landscape—synthesizing digital remote sensing images; 2) rapid—surveying physical and biological indicators; and 3) intensive—collecting quantitative data in field studies. The nine articles illustrate different aspects of these monitoring protocols, including implementation and improvement. Kentula indicates that these research findings will play an important role in planning the National Wetland Survey to be conducted by the Environmental Protection Agency in 2011.

We Can Survive Anything except Poor Quality. 2007. Holm, L. (651/967-4651, lholm@bonestroo.com). *Land and Water* 51(4):6–11.

Through personal observations and anecdotes, Holm discusses ways that the erosion control industry can improve the quality of their products and services. He recommends

that contracts 1) include workmanship requirements that define thresholds for acceptable work; 2) specify consequences for failure to meet the requirements, such as double deductions for missing items; and 3) avoid loophole language, such as “or approved equal.” He also argues for the need to educate inspectors and managers about quality assurance issues, to enforce contract requirements, and to “practice due diligence.” Finally, he warns that a bid more than 20 percent below estimated cost is a red flag that the contractor may compromise quality or performance.

The Benefits of Prescribed Burning and Native Species. 2007. Kocourek, M. (Applied Ecological Services, 608/897-8641) and M. Chang. *Land and Water* 51(4):30–36.

Kocourek and Chang describe the 60-ha Flambeau Copper Mine Reclamation Project near Ladysmith, Wisconsin. Completed in 1999, it created wildlife habitat and a public recreational area open since 2001, and received the 2007 Green Award from the Ladysmith Chamber of Commerce. In this publication, intended as a vegetation management primer for managers and contractors, the authors explain the importance of prescribed burning to maintain prairie plant communities and provide a brief overview of goals, benefits, tools, planning, prescription parameters, the need for public outreach, and a glossary of terms related to fire, weather, and smoke management.

Reclamation & Rehabilitation

Revegetation Success at the Roadside: What Matters When All Fails? 2007. Mola, I., N. López-Jiménez, M.D. Jiménez (Universidad Politécnica de Madrid ETSI Montes) and L. Balaguer. Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

After conducting a three-year study of hydroseeding (sprayed slurry of seeds and mulch) combinations incorporating native species, the authors concluded that this technique alone is insufficient to revegetate roadside slopes. Roadside conditions, which often include an absence of topsoil and erosion-prone cut embankments, make plant colonization difficult. The researchers found adequate local seed rain for plant recruitment, and a strong influence of initial soil organic matter and nitrogen levels on plant cover in the first two years. They also found that work schedules, and not seasonal conditions, constrain the timing of hydroseeding, which can result in establishment failure of both non-native commercial cultivars and native species. The unusual environmental conditions of roadsides influenced plant recruitment more than hydroseeding factors.

Endangered Species

Restoring and Reintroducing Red-Cockaded Woodpecker Populations: The Ecological Basis for Translocation Success. 2007. Costa, R. (U.S. Fish & Wildlife Service) and R. DeLottele. Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

Costa and DeLottele describe efforts to boost small populations of red-cockaded woodpeckers (*Picoides borealis*) by capturing 1,014 subadult woodpeckers from 6 large donor populations and releasing them at 30 sites in 11 states. The goal was to prevent extirpation of existing local populations of the birds, and even to facilitate range expansion. Before the program began in 1989 the researchers estimated the original population of woodpeckers was 532; 7 years later these populations totaled 1,307. Red-cockaded woodpecker populations are aggregates of adjacent clusters, and both male and female subadults can successfully disperse and breed in their first year. Therefore, scientists translocated unrelated subadult pairs to “artificial recruitment clusters” near existing woodpecker groups. Subadult survival depends on roosting cavity availability, so researchers provided cavities at these recruitment sites. The authors credit the program’s success to understanding and mimicking the species’ ecology.

***Ptilimnium nodosum* and the Road to Recovery.** 2007. Randall, J. (North Carolina Botanical Garden). **Plant Conservation** 20(1):1, 3, 5.

The endangered emergent aquatic plant harperella (*Ptilimnium nodosum*) colonizes gravel bars in eastern U.S. rivers. In 2007 only 13 populations remain, down from 26 in 1988. The only remaining population in North Carolina is in the Deep River. In 1997 seeds were collected from eight plants at this site and stored in the National Collection of Endangered Plants. In 2006, 800 plants propagated from these seeds were reintroduced to the Deep River site in either natural cobble or coconut fiber mats used to stabilize the channel bed. About 50% of the plants survived repeated flooding and grazing by Canada geese (*Branta canadensis*) in the first season, and 19% of the original transplants grew well. Randall reports that as of June 2007, 125 plants were observed, 85% in the streambed stabilization areas, and that plants were reproducing both from seed and vegetatively.

Education & Social Sciences

The Roles of Ownership, Ecology, and Economics in Public Wetland-Conservation Decisions. 2006. Ando, A.W. (Dept of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, 326 Munford Hall, 1301 W Gregory Dr, Urbana, IL 61801, 217/333-5130, amyando@uiuc.edu) and M. Getzner. **Ecological Economics** 58(2):287–303.

Ando and Getzner analyzed data on 2,997 protected wetlands in Austria to determine the relative importance of ownership, land use conflicts, and ecological and geographic characteristics in decisions to enroll these sites in conservation programs. After discussing the Austrian regulatory framework and several potential decisionmaking models, they conclude that the observed patterns reflect a “budget-constrained welfare maximization” strategy that was consistent across Austria, despite the nine provinces operating independently. They found that sites more likely to be protected were large, vulnerable, more pristine, non-eutrophic, in wetland-scarce regions, or not subject to competing land uses. Finally, they did find a bias towards protecting public lands, but attribute this to the lower overall cost when compensation is not involved rather than to political pressure from private landowners. However, they also suggest that insufficient compensation may act as a disincentive for stricter protection status of private lands enrolled in conservation programs.

Preparing Resource and Environmental Managers with International Understanding and Merits (PREMIUM): Introducing a Research Experience for Undergraduates Program. 2006. Yin, R. (Dept of Forestry, Michigan State University, 126 Natural Resources Bldg, East Lansing, MI 48824, jinr@msu.edu). **Journal of Forestry** 104(6):320–323.

In 2004 the National Science Foundation awarded a three-year grant to Michigan State University to provide undergraduates an opportunity to explore development and conservation policies in Beijing and southwestern China. Yin describes the approaches and goals of the eight-week program designed to foster a new generation of resource professionals. In the first two years 24 students from 15 universities gained firsthand experience with rural poverty, local initiatives, and the scientific process from proposal to publication. Referring to participant testimonials, Yin reports on accomplishments and intentions to pursue careers in the natural resources and international development fields. She recommends that academic institutions develop innovative programs to produce high-quality professionals and that funding organizations support these efforts.

Policy & Planning

Environmental First Lady. 2007. *Wildflower* 24(1): 20–27.

In an issue that commemorates the life and accomplishments of Lady Bird Johnson, this article describes her career as a visionary who elevated environmental issues to a national priority. She was among the first to advocate the use of native plants in landscaping, and she linked social and environmental concerns through neighborhood beautification projects in urban areas that addressed pollution, litter, crime, mental health, transportation needs, and more. Lady Bird Johnson was influential at national and local levels, particularly in her home state of Texas, and tirelessly promoted restoration of native plant communities. Many parks, gardens, and trails, as well as a soil series, have been named in her honor over the years.

Healthy Waters, Strong Economy: The Benefits of Restoring the Great Lakes Ecosystem. 2007. Austin, J.C., S. Anderson, P.N. Courant and R.E. Litan. The Brookings Institution Great Lakes Economic Initiative. http://www.brookings.edu/metro/pubs/20070904_gleiecosystem.pdf

This paper outlines a Great Lakes Regional Collaboration Strategy report (http://www.healthylakes.org/site_upload/upload/America_s_North_Coast_Report_07.pdf). It presents costs, predicted benefits, and necessary policy steps for a regional restoration effort that calls for 1) reducing current sources of persistent toxic substances and preventing new contaminations; 2) cleaning up contaminated sediments in 43 Areas of Concern; 3) developing agricultural nutrient and manure management systems; 4) reducing soil erosion; eliminating wastewater discharges; containing current aquatic invasive species and preventing new introductions; 5) restoring plant and animal communities in lakes, shorelines, wetlands, streams, rivers, and tributaries within the Great Lakes Basin; 6) facilitating sustainable planning, development, and resource management; and 7) investing in long-term monitoring and research. The total cost is estimated at \$26 billion, while the projected economic benefits are \$30–50 billion short-term and more than \$50 billion long-term.

Happy Anniversary, *Rapanos* . . . Now What? 2007. Myers, B. (Environmental Law Institute) and R. Thomas. *National Wetlands Newsletter* 29(4):14–16.

In June 2007, the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency issued a joint guidance document to elucidate the “significant nexus” test proposed in Justice Kennedy’s concurring opinion in *Rapanos v. United States* for asserting federal jurisdiction over wetlands adjacent to non-navigable tributaries. Myers and Thomas briefly discuss Kennedy’s opinion, the legal framework for federal jurisdiction of wetlands and streams, and potential

legislative solutions to this increasingly complicated issue. They provide separate legal test checklists for wetlands and streams to determine federal jurisdiction over a given site. Finally, they recommend that citizens and regulators use the newly published *Clean Water Act Jurisdictional Handbook* (available at http://www.elistore.org/reports_detail.asp?ID=11225) to assist in interpreting the many legal requirements.

Wetlands and Livelihoods: Both Sides of the Coin. 2007. Van de Bund, H. (Wetlands International, The Netherlands) and T. Wickham. *National Wetlands Newsletter* 29(4):17–20.

The authors argue that wetland quality and economic health are inextricably linked, particularly in developing countries. Poor communities depend directly on wetland resources, including lakes, marshes, and floodplains, for subsistence. The authors highlight three Wetlands International programs: 1) Wetlands and Poverty Reduction, which concentrates on sustainable wetland management in Africa to support local livelihoods; 2) Green Coast, which seeks to restore mangroves in the 2004 Asian tsunami zone; and 3) the Central Kalimantan Peatlands Project, which aims to restore peat forests logged and burned in Indonesia and to create economic opportunities that do not depend on draining these peatlands. They also advocate a “bio-rights approach,” which creates incentives for local communities to take ownership and sustainably manage wetland resources. Women’s groups in Mali, for example, receive funds to establish vegetable gardens in exchange for sustainably managing trees in the Niger Delta.

Collaborations

Seeds of Success: A Collaborative Approach to Restoration. Byrne, M. (Seeds of Success Program, U.S. Bureau of Land Management, mary_byrne@blm.gov) and P. Olwell. *Public Garden* 22(2):23.

Byrne and Olwell describe the Seeds of Success program, created in 1999 and spearheaded by the U.S. Bureau of Land Management. The goal is to collect seeds of over 5,000 species native to the United States for storage in the Millennium Seed Bank at the Kew Royal Botanic Gardens and the Seed Extractory of the U.S. Forest Service. The seeds are processed by Kew Gardens, and then sent to national plant germplasm stations in Colorado and Washington. The seeds will be used in restoration efforts on federal lands. More than 3,000 species have been collected during the seven years of the program, 670 in 2006 alone. This collaboration involves federal government agencies joined in the Plant Conservation Alliance, and botanic gardens and arboreta affiliated with the Center for Plant Conservation.

Climate Change

Elevated Atmospheric CO₂: A Nurse Plant Substitute for Oak Seedlings. 2007. Davis, M.A. (Macalester College) and P.B. Reich. Presentation at the Ecological Society of America/Society for Ecological Restoration joint meeting held in San Jose, CA, August 5–10. <http://eco.confex.com/eco/2007/techprogram/>

Davis and Reich conducted an eight-year experiment to measure the impacts of elevated CO₂ on the survival and growth of pin oak (*Quercus ellipsoidalis*) seedlings. The authors conclude that for seedlings growing in bare open areas increased carbon dioxide levels can create more favorable conditions, similar to the effect of nurse plants. They observed pin oaks planted as acorns in an old field in Minnesota and found that elevated CO₂ (550 ppm) in hot and dry conditions enhanced soil moisture and seedling survival and growth. Managers of prairies, savannas, and other open plant communities may expect an uphill struggle to maintain these areas, however, in the face of a steadily expanding “establishment window” for woody species.

Book Reviews

The Invasive Species Cookbook: Conservation through Gastronomy

J.M. Franke. 2007. *Wauwatosa, WI: Bradford Street Press. Paper, \$24.95. 111 pages.*

The idea of managing (or at least making use of) invasive introduced species by eating them is not completely novel. Marsh (1987), for instance, produced an entire book of recipes for kudzu, while Rapoport et al. (1997, 2001) published a cookbook for plants introduced to the Patagonian Andes. The Louisiana Department of Wildlife and Fisheries provides several nutria recipes on its website.

J. M. Franke, however, appears to have written the first cookbook that covers the full range of invasive species: plants, invertebrates, and all five vertebrate classes, and he is probably the first to suggest that such an effort will actually aid conservation. Approximately 160 recipes treat about 25 species, the great majority animals. Some recipes would be applicable to other introduced species (in fact, also native species) as well. For instance, *ragoudain à l'orange*, one of several recipes for nutria provided by Chef Philippe Parola, would probably be tasty with any meat substituted for the nutria, or even old shoes. Similarly, steamed snakehead Chaozhou style is remarkably like a steamed fish recipe I have used on several less dramatic fish species.

For almost every species, Franke briefly describes its biology, along with the history, geography, impact of the introduction, and, occasionally, anecdotes about the invasion. There are also tips about collecting various species:

gigging bullfrogs, netting crayfish, hooking carp, shooting boar and nutria, snaring iguanas, etc. The recipes are extremely eclectic. Franke gives sources for some of them, and it would be interesting to know where he found many of the others. Many recipes appear to be from cooks and cookbooks from the native range of the invader, while others are from areas in which a species has become an invasive pest. Several interesting carp recipes are from the Nebraska Game and Parks Commission, for example, while others for garlic mustard are from the “Garlic Mustard Cook’s Challenge 2001.”

Degree of difficulty both assembling ingredients and following instructions varies widely among the recipes. A novice could prepare tempura kudzu leaves, venison hamburger rice pie, and broiled starling or starling paté, assuming he or she could find the kudzu, venison, or starlings. By contrast, Bonaire iguana soup, Khmer caramelized black pepper snakehead, and apple knotweed pie would be accessible only to experienced cooks, at least on the first try. Some of the nutria recipes from Chef Parola will challenge even experienced chefs. Aside from the featured invasive species, ingredients in most recipes are readily available in standard groceries or supermarkets, though a few will require visits to Asian or Latin American stores.

The recipes almost always appear accurate, and are usually sufficiently explicit. I did find fairly frequent instructional gaps, however; for instance, for iguana stew, surely one slices the onion and garlic before rubbing it into the skinned, cleaned meat. Generally, such lacunae can be fairly easily remedied by the average cook. Although the collection offers several recipes that can be prepared quickly, most dishes are not the kind a person would want to dive into after a full day’s work. Several require hours of preparation or at least processing. Monitor lizards, for instance, are gamy and require at least six hours of marinating.

Probably almost any kind of meat or vegetable can be made palatable with enough effort, so it is perhaps unsurprising that many of Franke’s recipes require many other ingredients or a long preparation time. Most of the recipes are good, however, the variety is excellent, and with suitable accompaniment (often a starch for the meats), many of Franke’s dishes would be fine centerpieces for a good meal. Certain guests may be squeamish about such delights as fried pigeon, lamprey bordelaise, or cold snail salad.

In the preface, Franke rather lightly dismisses a complaint voiced by “a few biologists” that popularizing some of the invasive species as foods may create a market, which in turn might impede efforts to reduce or eradicate species. His defense—that he advocates using these species until they are “commercially extinct”—is questionable on at least two counts. First, if a species is sufficiently valuable economically, it will likely spread via covert or overt cultivation. Among popularly consumed introduced plants in the United States, for instance, marijuana comes immediately to mind. Franke defeats his own stated purpose at times,

telling readers, for example to “get out there and catch yourself a mess of nutria, the scourge of our southern wetlands,” (page 4), and yet providing contact information for a commercial provider of nutria in Louisiana—“if you don’t want to go out and get your own nutria” (page 65).

A person might want to know what level of mortality imposed on an invasive pest by harvesting would be additive (new mortality experienced by a population in addition to whatever deaths would otherwise have occurred from other causes) rather than compensatory (removal from the population of individuals that would have died from other causes anyway, or failed to reproduce). This important distinction has been the focus of much research on wildlife harvest schemes since Allen (1954) introduced it, so it is striking that Franke does not discuss it.

A second problem with Franke’s framing of the invasive species issue concerns the possibility that a species becomes so desirable a game target that control, to say nothing of eradication, becomes a social impossibility. A prime example is the heated battle in the Hawaiian Islands between conservationists and hunters over proposals to reduce or locally eliminate boar populations that threaten native plant species and destroy forest habitats (Burdick 2005). Fishers may have deliberately sabotaged an attempt to eradicate introduced northern pike from Lake Davis in California (Elmendorf et al. 2005). It seems unlikely that garlic mustard, bullfrogs, or common pigeons would ever become so desirable that food advocates would raise a hue and cry over plans to eliminate them, but for some of the fishes and mammals that Franke discusses, such a scenario is not beyond the realm of possibility.

Bottom line: consider buying this book if you want to spice up your table and impress your friends with some exotic treats. The book would be particularly useful for the wild-game picnics and dinners popular in some university wildlife departments. Do not believe, however, that you are aiding the struggle against harmful invasive species.

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Reviewed by Daniel Simberloff, Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN 37996, 865/974-0849, dsimberloff@utk.edu. Dr. Simberloff is an ecologist who has published many papers on conservation biology and has specialized in research on the impacts and management of invasive introduced species. He is the Nancy Gore Hunger Professor of Environmental Studies.

Wetland Drainage, Restoration, and Repair

Thomas R. Biebighauser. 2007. *Lexington: University of Kentucky. Cloth, \$50.00. ISBN: 978-0-8131-2447-6. 241 pages.*

The ecological and economic consequences of wetland loss and degradation include significant declines in biological diversity, water quality, wildlife habitat, natural flood protection, and human quality of life (National Research Council 1995). Although governmental agencies at all levels have attempted to reverse this trend by protecting wetlands, it is now clear that wetland ecosystems and functions must be restored if we hope to meaningfully reverse these trends (Zedler 2001). However, despite a great deal of time and energy invested every year, many wetland restorations do not develop or function as planned and ultimately fail. In *Wetland Drainage, Restoration, and Repair*, Thomas Biebighauser examines why we fail and how we can succeed in developing what is arguably the most critical element in a restored or constructed wetland: the appropriate hydrology.

Written to “help people build wetlands,” the book is targeted at restoration practitioners, providing a wealth of detailed background information, practical advice, and real-world examples of how problems have been overcome. Biebighauser relies heavily on his experiences creating and restoring wetlands for over 25 years as a wildlife biologist with the U.S. Forest Service. His primary thesis is that we must first understand drainage before we can restore water to landscapes.

Wetland Drainage, Restoration, and Repair has two main areas of focus: it first examines the historical record of how and why wetlands were drained; next it focuses on techniques to reverse these processes through restoration. Biebighauser provides valuable insights into why hydrologic restorations fail, coupled with practical solutions on how to avoid failures. Anecdotes of wetland projects illustrate cases where these solutions have been applied. Also included are chapters on creating small demonstration wetlands, vegetating wetlands, fixing failed wetlands, and funding strategies to finance wetland projects.

In the initial chapters, Biebighauser discusses how strong economic incentives to drain land in our agrarian society changed entire landscapes. Owing to the industry and ingenuity of farmers, recognizing that many drained lands were once wet is now difficult. One of the more important contributions of this volume is the discussion on how

to identify evidence of prior drainage when looking for potentially restorable wetlands. Biebighauser goes on to trace the evolution of various drainage practices, from digging simple open ditches to filling wet ground to the installation of “buried ditches” or below-grade drainage structures. The success of these techniques throughout the United States is reflected in the staggering proportion of wetlands that have been lost (Dahl 1990).

In his chapters on building and restoring wetlands, Biebighauser discusses the different challenges restorationists face when working on what he categorizes as the two different types of wetland construction: dry land and wet ground. He also provides a very good overview of the permit process, including how to ensure compliance with the Clean Water and Endangered Species Acts, and issues surrounding 404, 401, and Nationwide 27 permits. He covers how to proceed if cultural resources are found onsite, a circumstance that can significantly delay or add prohibitive costs to a project.

Unfortunately, Biebighauser appears to support a somewhat narrow view of what constitutes an appropriate restoration target. Although most of the wetlands drained for agriculture were wet meadows, wet forests, shallow marshes, spring seeps, or ephemeral wetlands, most of the book is devoted to restoring open water ponds by either damming surface drainage or excavating below the water table. Restoring such ponds on shallow slopes can result in the development of adjacent marsh and wet meadow habitat, but this is neither a stated goal nor a focus of these efforts. More distressingly, one of the main thrusts of this book is to develop open water ponds on existing wetland habitat (Chapter 13). Biebighauser suggests that vegetated wetlands such as bogs or wet meadows are good candidates for conversion into open water habitat. Without question, permanent or ephemeral ponds provide important benefits for waterfowl and other wildlife, but these communities are generally much more common and robust than the wetlands they are replacing.

The author’s approach to restoration also suffers from his choice of criteria for restoration success. He states early on (page 2) that “restoration explains actions designed to return to a condition that existed about the time of European settlement.” Although this is a commonly stated goal of restoration projects, the focus here is almost exclusively on restoring wetland hydrology, which is but one of several wetland functions that can and should be considered. This is further reflected in his treatment of wetland restoration “failure,” which is defined solely as failure to hold water (Chapter 17). Although the primary focus of this volume is clearly hydrologic restoration, it should not be presented as the sole criterion of a functioning natural wetland. Biebighauser’s statement, “I have yet to meet anyone with a Ph.D. who actually drained a wetland, so why do so many believe that you need an advanced degree to build one?” (Chapter 11), suggests that communication needs to be

greatly improved between the scientific community and at least some restoration practitioners at work in the field.

For those looking for guidance when establishing wetland plant communities, Biebighauser devotes a chapter to restoring wetland vegetation (Chapter 16). However, he does not discuss the importance of establishing a biologically diverse plant community to develop wetland functions (Hooper et al. 2005, Sullivan et al. 2007), nor the use of local or regional reference systems in providing a blueprint for plant introductions. He states that his “observations show that establishing aquatic plants in a wetland project largely depends on first creating a desired hydrologic regime.” Hydrology is by necessity the first step, but there is no guarantee that an appropriate wetland plant community will follow. Biebighauser correctly suggests that many species will establish readily without intervention, but plants must often be introduced where seedbanks or donor populations do not occur in close proximity. Unfortunately, the group of species most likely to establish early also includes many of the invasives that can quickly dominate a site and exclude the more conservative species most critical to other functions. Without adaptively managing the more aggressive invasives such as reed canary grass (*Phalaris arundinacea*), reed grass (*Phragmites australis*), or purple loosestrife (*Lythrum salicaria*), a restored or created wetland may quickly cease providing most of the functions originally desired.

Wetland Drainage, Restoration, and Repair is a great resource for restorationists looking for an in-depth and well-referenced volume on drainage history, the evolution of drainage practices, and a wide range of practical advice on how to recognize and disable drainage devices. Despite his bias towards restoring or converting wetlands to open water systems, Biebighauser provides a wide range of valuable information on the many issues to be considered and overcome in developing wetlands on previously drained lands. The many anecdotes represent the collective wisdom of many years of experience and provide important insights into the kinds of problems that actually develop, and how they might possibly be avoided.

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Reviewed by Gary Sullivan, Senior Restoration Ecologist at The Wetlands Initiative, 53 W Jackson Blvd, Chicago, IL 60604, www.wetlands-initiative.org, gsullivan@wetlands-initiative.org. Dr. Sullivan has conducted research on the importance of biological diversity to the restoration of wetland ecosystems, with an emphasis on salt marsh and riparian restorations over the past 12 years. Most recently, he has been developing techniques for restoring a mosaic of wetland and prairie habitats on a large-scale in the U.S. Midwest.

Environmental Values

John O'Neill, Alan Holland and Andrew Light. 2007. *New York: Routledge. Paper, \$37.95. ISBN: 978-0-415-14509-1. 233 pages.*

Environmental Values is an excellent book, easy to read and relatively short. Although its title is *Environmental Values* rather than *Environmental Ethics*, I plan to use it as one of my required texts the next time I teach our Philosophy Department course called Ethics and Ecology. The authors avoided the word “ethics” in their title, I assume, because they spend a good part of the book finding objections to standard ethical theories.

The aim of the book is to criticize the criteria that environmental policy-making institutions use as well as the “undemocratic” power that they wield. A more “deliberative”-based set of institutions would not only allow more input from more sources, the authors argue, but would allow more reasoned deliberation and a fairer distribution of decision-making power. The problem is how to bring this sort of democracy about. The book is detailed and closely argued, and I will not be able to explain all of the argument. I will instead try to highlight what might be of greatest interest to readers of *Ecological Restoration*.

Since the use of cost-benefit analysis (CBA) is the main tool that environmental policy making institutions currently use, the authors devote the first part of the book to an examination of the ethical foundations of CBA. They find this dominant *calculative* (as opposed to *deliberative*) tool wanting. For anyone desiring a clear and easy to read introduction to current ethical theorizing, the first three chapters are excellent. Chapter One is dedicated to explaining and critiquing utilitarianism and other consequentialist theories (those that evaluate an action or policy solely on the bases of consequences). Chapters Two and Three cover critiques provided by deontological theories and virtue theory.

The authors dedicate Chapter Five to a critique of *value monism* and *value commensurability* and a preliminary argument for *value pluralism* and *value incommensurability*.

Value monism is the “assumption that only one kind of thing is of value,” and value commensurability is the “assumption that there is a single measure of value through which we can arrive at policy choices” (page 7). The authors present their thesis that we value aspects of our “environment” differently and these environmental values are often in conflict. There is no way of calculating the right choice; all we can do is deliberate about our best choices under the circumstance. This deliberation is not a form of calculation but a fair weighing of claims and the reasons that support them.

Philosophers commonly make the distinction between *subjective* and *objective* theories or conceptions of welfare (by which I mean well-being, quality of life, or happiness). Subjective theories argue that the criterion for determining the good life depends on what the subject values. According to subjective theories of well-being, our social and ethical policies should not try to tell people what they should value. We can judge between competing valued items not in terms of the actual worth of the item, the argument goes, but based on the fact that it is valued. CBA does this in terms of weighing how much something is valued against how much we disvalue what we have to pay for getting it. CBA aims to give as many people as possible what they value, whatever that is. It is a value monism because there is only one characteristic of a valuable item that accounts for it having value. That is the fact that it is valued.

In contrast, so called *objective* theories of welfare claim that things are valuable because of certain objective properties and that a person is well off to the extent that they have these things (whether or not they do value them). A value pluralist would hold that there are a number of things that humans ought to value because they do in fact make a person better off. Environmental values are things about our environment (built and “natural”) that we ought to value, not because they have *intrinsic value* but because of the contribution they make to human well-being. The authors emphasize the distinction between *the source* of value and *the object* of value. In the second part of the book, Chapters Six through Eight, the authors critique efforts to develop an alternative non-anthropocentric environmental ethics, arguing that this sort of new foundation is not needed if we keep in mind the distinction between source and object of value. “Nature” can be an object of value, but the source of value is human beings.

Living “natural things” can be said to be in a state of well-being or flourishing. We might value this flourishing because it is constitutive of our own flourishing. Humans have the capacity to care about the well-being of natural things; exercising this capacity in caring is part of our own flourishing. The authors write, “It can be argued that for at least a large number of individual living things and biological collectives, we should recognize and promote their flourishing as an end in itself. Such care for the natural world is constitutive of a flourishing human life. The best

life is one that includes an awareness of and practical concern with the goods of entities in the non-human world” (pages 120–121). They continue:

We live from them—they are the means of our existence. We live in them—they are our homes and familiar places in which everyday life takes place and draws its meaning, and in which personal and social histories are embodied, We live with them—our lives take place against a natural world that existed before us and will continue to exist beyond the life of the last human, a world that we enter and to which awe and wonder are appropriate responses. It is from our place within these various relations to the world that reflection needs to begin. (pages 123–124)

In the final chapter of Part II (Chapter Eight), the authors look at the efforts some have made to find a sense of “nature” and “the natural” that does justice to our concerns for the natural. Readers of *Ecological Restoration* will probably find this section especially interesting because it discusses both the paradoxes of restoration and its various types and goals. Restoration in the sense of returning a place to its original condition to make up for its destruction (restitutive restoration) has its value in some cases but “ecological restoration projects need not be justified in terms of returning a place to some arbitrary natural starting point. They can play a variety of roles in the ongoing relationships that humans bear to the environments in which humans find themselves” (page 148).

In this last part of the book the authors develop some of the implications of their view that “many environmental goods we value are valued as spatio-temporal particulars. What matters are particular beings and places constituted by their particular histories” (page 153). This, by the way, is also true of the cultural, and the natural and cultural often come into conflict in making ethical and policy decisions. Hence, the inevitability of value conflicts.

The title of Chapter Ten is “Biodiversity: biology as biography.” The broad range of concerns about biodiversity loss suggest that different conceptions of biodiversity are being appealed to in public debates, so the authors attempt to bring some clarification to the concept. To do this, the authors distinguish between two approaches: what they call the itemization approach and the narrative approach. The itemizing approach is an example of a form of consequentialism discussed earlier in the book and used to assess which action or policy is best in a given context solely by its consequences. After clarifying the different senses that biodiversity can have, the authors argue that the itemizing approach appeals to consequentialism, which leads to the commodification of environmental goods and risks tradeoffs that fail to capture the significance of environmental loss. Can a destroyed woodland be replaced by another one just like it? Even if it could, the authors point out, its replacement ignores the fact that “instances of biodiversity, such as particular habitats, are valued precisely because

they embody a certain history and certain processes” (page 175). It is what they embody that is of value to those who have special relationships to these places. The value of “a specific location is often a consequence of the way that the life of a community is embodied within it” (page 176). The authors conclude this chapter by expressing concern over the approach used by Katz and Oechsli (1993), who argue that the dangers of the loss of rain forests can only be captured by appeal to non-anthropomorphic values. But such an approach, which the authors criticize earlier in Chapter Six, fails to capture the importance of human scales of value in motivating the most effective resistance to development of the Amazon. It was efforts to protect their resource base essential to their survival, the authors insist, that has motivated the most effective resisters.

In the final chapter the authors note some of the problems with the way in which a non-anthropocentric nature ethic has been formulated. Especially with its equation of nature and wilderness, the authors complain, such an approach divorces reflection about why environments matter to people:

[I]t loses touch both with why it is reasonable to care about the environment and what is at stake in many environmental disputes. Where it does have an influence, it is not always a benign one, issuing, for example, in an overemphasis on the value of wilderness conceived in a particular way. This has been employed in the unjustified exclusion of marginal communities from the places they have inhabited.¹ It has also tended to employ an abstract and thin meta-ethical vocabulary which is blind to the role of place and history in the evaluation of both cultural and natural worlds. (page 8)

They argue in contrast “for the need to begin ethical reflection from the human scale of values evident in our everyday encounters with human and nonhuman beings and environments with and in which we live.” Environments matter to us for social, aesthetic, and cultural reasons. “Particular places matter to both individuals and communities in virtue of their embodying their history and cultural identities” (page 3).² This theme is repeated in Chapter Eleven, titled “Sustainability and human well-being,” which is an analysis of the various senses that “sustainability” has come to have in public discussions of its meaning and value. The basic question is, “sustainability for what and for whom?” The authors raise the issue of substitutability in the context of discussions about the relationship between human and natural capital, and substituting one form of natural capital for another. Their main point is that in discussions of natural capital what is ignored is the role of narrative in accounting for the meaning of an environment to its occupants. In making this important point, the authors once again take up the distinction between subjective and objective accounts of human well-being. A preference theory of wellbeing fails to distinguish between instrumental and non-instrumental

needs. They write, “Non-instrumental needs are those conditions that are necessary for a flourishing life, the absence of which would be said to harm a person” (page 193). “It is not simply that ‘natural’ and ‘human’ capital are not substitutable for each other or are in some sense complementary goods,” they continue. “It is rather that environmental goods are not substitutable for other goods because they answer to quite distinct dimensions of human wellbeing” (page 195). Finally, “part of what makes for a flourishing human life is the narrative structure that gives it coherence” (page 197). This structure includes a sense of the cultural and natural history of the places in which this life takes place. “Something that has a life has a history and potentiality to develop. To sustain the life of a community or land is not to preserve it, or to freeze it but to allow it to change and develop from a particular past into a future. Sustainability in this sense would be . . . about ‘preserving the future as a realization of the potential of the past . . . about negotiating the transition from a past to a future in such a way as to secure the transfer of . . . significance” (page 201).

In conclusion, I found myself agreeing with most of the authors’ arguments. If their position has a weak point, it is their subscription to an objective³ theory of human wellbeing and the role of cultural and natural place in enabling humans to flourish. This flourishing-capabilities approach has been developed by Sen (1993) and by Nussbaum (1988, 1995, 2004), and it is not without its critics (see, for example, Sumner 1996, Chapter 3). The authors argue for the objectivity of their account in Chapter Two and again in Chapter Eleven. It is not at all clear to me how their inclusion of human autonomy (see page 25) makes their objective theory any different from Sumner’s account (see his Chapter 6) and Sumner describes his theory as a subjective one.

Notes

1. For an excellent account of this in relation to U.S. Forest Service policy and native New Mexicans, see Kosek (2006).
2. This point is also made by Norton in his 2005 book *Sustainability*, which the authors cite several times. For several reviews of this book and a response by the author, see the *Journal of Agricultural and Environmental Ethics*, 2007, 20:335–405. Holly, in her review raises the question about identities and their relation to place of the new suburbanites who seem highly mobile (pages 342–343).
3. As Sumner (1996) points out, the notion of valuing plays an ambiguous role in determining whether a theory is subjective or objective. The authors of our book do start off saying that there are no such things as values (page 1). There is only the fact that various things *matter to us*. But if they matter to us because they enable us to flourish, and we value flourishing, then is flourishing the ultimate value that gives things their value? If so, is this not a form of value monism? To avoid this reduction, the authors seem to rely on some teleological account of the nature of valuers that is objective. See Sumner (1996, 69–80) for an account and criticism of such an account.

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Reviewed by Richard Haynes, Associate Professor of Philosophy at the University of Florida and Editor-in-chief of the Journal of Agricultural and Environmental Ethics.

Roadside Weed Management

Bonnie L. Harper-Lore, Maggie Johnson and Mark W. Skinner, editors. 2007. *U.S. Department of Transportation, Federal Highway Administration. Publication Number FHWA-HEP-07-017. 369 pages.*

Roadside Weed Management, like its companion handbook, *Roadside Use of Native Plants* (FHWA-EP-99-014), is a compilation of information from a variety of sources regarding control of invasive weed species. Author Harper-Lore explains in the introduction “We drew from many national experts to go beyond the law and policy of weeds to the applied science of weed control and management.” The intent of the book is to provide impetus for cooperation and integrated management across agency and governmental boundaries.

Invasive weeds are of international concern and certainly a current topic of intense interest to many agencies and organizations. Roadsides can be corridors for the movement of invasive weeds. The necessity to control invasive species is well recognized, but the means of achieving that control is less clear. Clearly, roadside vegetation management practices and programs must be an integral part of any landscape-scale control programs. Cooperation between states and countries is critical; invasive weeds don’t recognize state or national boundaries.

Funding limitations, difficulty of establishing priorities, and a need for a high level of coordination and cooperation to implement strategies present considerable challenges in developing a plan of action for control, eradication, and monitoring of invasive plants. This handbook will be useful to those initiating and maintaining such cooperative activities and programs. It provides important information for writing and implementing policies for invasive weed control as well as the information needed to establish a national interagency network, our best hope.

Part I consists of a series of essays on topics related to weed prevention, control methods, roadside restoration, and examples of invasive weed education. The 38 essays by individuals and organizations are a potpourri of techniques, activities, and projects to develop a greater understanding of the issues involved and to spark ideas for addressing the problem. A listing of their affiliation below the names of the authors of the essays would have been helpful since the authors represent a wide range of universities, government agencies, and organizations. Universities include Brigham Young, Cornell, Montana State, Northern Iowa, Washington, and Wisconsin-Madison. State Departments of Transportation include Florida, Idaho, Oregon, Minnesota, Iowa, Washington, and Wisconsin. Federal agencies represented by contributors include the Forest Service, Engineer Research and Development Center, Federal Highway Administration, Environmental Protection Agency, Natural Resources Conservation Service, and National Noxious Weed Program. Private organizations represented include the Nature Conservancy, Arizona-Sonora Desert Museum, Duckworth-Cole Environmental Consulting, the Brooklyn Botanic Garden, and others.

The Prevention section offers methods to prevent the spread of invasive species and the use of early detection to prevent their establishment. The Control Methods section, as expected, describes methods, techniques, and projects for controlling established weeds. The Roadside Restoration Section deals with the establishment of suites of native species that will exclude or outcompete invasive weeds. Part I concludes with a section titled, "Education Examples," a collection of programs, conferences, and organizations aimed at increasing awareness of invasive species and the need to control them.

A compilation of policies and laws relevant to invasive weed control in Part II comprises the bulk of the book (256 pages). This part leads off with a summary of federal procedures, laws, and lists related to noxious weeds. The remaining portion is a state-by-state summary of weed laws, noxious weed lists, and informational resources.

Part III is a compendium of national weed policies from 1999 to 2006. It begins with a chronology of weed awareness, followed by memoranda and documents providing guidance for implementing Clinton's Executive Order 13112 concerning Invasive Species. Products resulting from this executive order include the National Invasive

Species Council; legislative action regarding invasive weeds in the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU); and Public Law 109-59, Environmental Restoration and Pollution Abatement: Control of Noxious Weeds and Aquatic Noxious Weeds and Establishment of Native Species. Also included is an example of a Voluntary Code of Conduct for government agencies. This code of conduct for dealing with invasive plants is similar to those used by nursery professionals, landscape architects, botanic gardens, and arboreta. The code was drafted at an international meeting of experts at the St. Louis Botanical Garden in December 2001.

Part IV contains many valuable references grouped by headings such as Contributors to the Handbook, Native Plant Information, Aquatic Weed State Contacts, U.S. Fish and Wildlife Contacts, and Examples of Public Awareness. These resources will be useful for those working to initiate policies and programs. Unfortunately, organizational affiliations and biographical sketches are missing for some individuals.

Anyone developing policy and procedures for interagency, interstate, or international programs to contain and control invasive weeds species should have this handbook on his or her shelf. The book will help us meet the challenge of providing national leadership, or leadership on a national scale, for the development of an intercontinental or worldwide, scientifically based, unified program for the control of invasive weed species.

Reviewed by Daryl D. Smith, Director of the Tallgrass Prairie Center and Professor of Biology, University of Northern Iowa, Cedar Falls, IA 50614-0294, daryl.smith@uni.edu

Recently Received Titles

Chumash Ethnobotany: Plant Knowledge among the Chumash People of Southern California

Jan Timbrook. 2007. Berkeley, CA: Heyday Books. Paper, \$27.95. ISBN: 978-1-59714-048-5. 272 pages.

Farming with Nature: The Science and Practice of Ecoagriculture

Sara J. Scherr and Jeffrey A. McNeely, editors. 2007. Washington, DC: Island Press. Cloth, \$70.00. ISBN: 978-1-59726-127-2. Paper, \$35.00. ISBN: 978-1-59726-128-9. 445 pages.

Old Fields: Dynamics and Restoration of Abandoned Farmland

Viki A. Cramer and Richard J. Hobbs, editors. 2007. Washington, DC: Island Press. Cloth, \$80.00. ISBN: 978-1-59726-074-9. Paper, \$40.00. ISBN: 978-1-59726-075-6. 386 pages.

Mountain Goats: Ecology, Behavior, and Conservation of an Alpine Ungulate

Marco Festa-Bianchet and Steeve D. Côté. 2007. Washington, DC: Island Press. Cloth, \$90.00. ISBN: 978-1-59726-170-X. Paper, \$45.00. ISBN: 978-1-59726-171-5. 265 pages.

Web Reviews

Organization Sites

Center for Invasive Plant Management (CIPM)

<http://www.weedcenter.org/index.html>

This organization is housed at Montana State University (MSU)-Bozeman and partners with public agencies and institutions as well as private groups to promote science-based invasive species management. Their goal is to provide resources for Cooperative Weed Management Areas, educators, and land managers, and also to act as a clearinghouse for invasive species information. The products section of the web site is worth browsing because many of the items can be downloaded for free—MSU Extension publications, literature reviews, the Online Invasive Plant Management Textbook, and more. An extensive annotated list of funding sources will interest every group involved in invasive species control. A detailed step-by-step management procedure, with recommended reading and links, is also useful to a wide audience.

Earth Portal

<http://www.earthportal.org/>

The Environmental Information Coalition, consisting of scientists and educators and their affiliated agencies and institutions, is the governing body for Earth Portal. The enormous web site is organized in three parts: 1) Earth News, which gathers environmental news items from multiple sources; 2) Encyclopedia of Earth, intended to be the largest reliable information resource on the environment by means of thousands of scientific papers involving 700 scholars in 46 countries; and 3) Earth Forum, presenting scholarly commentary and open dialogues on issues. The web site contains a tremendous amount of information that can keep the visitor occupied for hours, organized by general topic areas such as biodiversity and climate change. Features include weekly highlights of key content items such as news story and expert commentary, constantly changing trivia tidbits, RSS feeds, archives, external links to environmental blogs and other sites, and databases searchable by author, location, source, title, and topic.

Florida Natural Areas Inventory (FNAI)

<http://www.fnai.org/index.cfm>

Florida State University administers this nonprofit organization formed in 1981 to collect data and map rare plants, animals, and high-quality ecological communities. Their comprehensive database includes information on more than 1,600 public and private properties. The most interesting

feature is the easy-to-use Biodiversity Matrix Map Server. This screening tool combines aerial photos, USGS quad maps, traditional maps, and GIS data, and allows users to zoom in on counties or cities. Selecting target units on the map will generate a report on potential, likely, currently, and historically documented rare species and communities in the area. The site also provides reporting forms, annual conservation summary, sample ecological survey report, and instructions for requesting data. Searchable databases and interactive maps include the tracking list, the Florida Forever project, public and private conservation lands, and invasive plants. This site also hosts Apalachicola Region Resources On the Web (ARROW), the collaborative effort between NOAA and FNAI.

Health Lakes, Healthy Lives

<http://www.healthylakes.org/>

Launched in 2005, the Healing our Waters-Great Lakes Coalition consists of nearly 100 member organizations and seeks to fund and implement a comprehensive regional restoration of the Great Lakes. Healthy Lakes, Healthy Lives is the coalition's awareness-raising arm. Educational materials include news stories; a congressional watch section with updates on policies and candidates; information, organized by topic, on major environmental threats including invasive species and pollution; and advice and letter templates for writing to newspaper editors and congressional legislators in support of Great Lakes restoration. Users can enter story and photograph contests; people from across the country have submitted stories about their memories, experiences and photos ranging from Lake Michigan waves crashing on a windy day to a young eagle in Braddock Bay, New York.

USA National Phenology Network (USA-NPN)

<http://www.usanpn.org/>

With the initial phase unveiled in spring 2007, this collaborative monitoring network intends to create a continental-scale database of seasonal plant and animal observations joined with computer models of climate forecasts. Professional and citizen scientists alike are invited to share phenological data as registered observers. The indicator program accepts data on sterile lilac (*Syringa chinensis* 'Red Rothomagensis') clones that can be shipped to observers upon request, already established plants of the widespread common lilac (*S. vulgaris*), or cloned honeysuckle (*Lonicera tatarica*, 'Arnold Red') plants distributed prior to 1987 as part of an early research project. The native species observation program accepts data on 36 species from 11 ecoregions. The web site has instructions and forms for registering as an observer and submitting data, links to other monitoring networks and some publications, and 1961–1996 phenological data available as spreadsheets or maps. Registered participants include National Weather Service Cooperative Observers; Community Collaborative Rain, Hail & Snow Network participants; and private individuals.

Government Sites

Minnesota Sustainable Building Guidelines

<http://www.msbg.umn.edu/>

In July the State of Minnesota released version 2.0 of the recommended and required performance standards for publicly funded construction projects. The guidelines, worksheets, and other tools can assist any practitioners involved in mitigating the effects of development, in the form of stormwater management, erosion control, and landscape plantings.

The Vieques Project

<http://mapping.orr.noaa.gov/website/portal/vieques/>

The NOAA Office of Response and Restoration has created a web guide to illustrate watershed mapping and database approaches. The site includes a list of projects, including a coral reef restoration, related to the environmental cleanup of Vieques Island, Puerto Rico, which was used by the U.S. Navy from the 1940s until 2003. An interactive map uses Internet Mapping System software that accesses GIS data on land ownership, topography, hydrology, terrestrial and marine habitats, endangered species, and contaminants in soils, marine sediments, ground water, and surface waters. The site provides background information on Vieques Island and includes a glossary and long lists of resources, references, and links.

Education Sites

STREAMS (Ohio)

<http://streams.osu.edu/index.php>

Ohio State University hosts the Stream Restoration, Ecology and Aquatic Management Solutions web site, intended as a general resource on news, research, and technology related to waterways. Unfortunately, despite an ambitious start, this web site has not been updated since 2004 and tends to have an Ohio focus. The site does contain many links (most still functional) to online resources in the categories of tools and models, educational materials, digital databases, and manuals and journals. It also features examples of stream and ditch restoration projects, and information on two-stage natural channel design.

Water Resources Center Archives (WRCA)

<http://www.lib.berkeley.edu/WRCA/index.html>

The University of California, Berkeley library houses this archive, which was created in 1958 with the goal of gathering current and historic materials related to water resources. Their extensive collection includes CD-ROMs, books, oral histories, 125 manuscript collections, over 1,500 newsletters, over 5,000 maps and videos, more than 25,000 slides and photos, more than 45,000 coastal aerial photos, and over 140,000 technical reports. The web site contains online exhibits, searchable indices of articles, dissertations, electronic journals, and other materials. It also provides access to relevant electronic databases, such as the Water Resources Abstracts, as well as instructions for accessing streamflow records and using the hydrodata software.

Commercial Sites

Robinsong Ecological Resources, Inc.

<http://www.robinsong.com/index.html>

This consulting company located in Alabama specializes in wetland and stream mitigation projects, as well as rare species surveys. The company's web site provides examples of different projects, with descriptions and photos, as well as an overview of five mitigation banks they have developed in Alabama and Mississippi. Robinsong also provides basic information about watersheds, on-site and off-site mitigation approaches, and mitigation banking.

Meetings 2008

May 2–6. **River Rally 2008** will meet in Huron, Ohio. Click on <http://www.rivernet.org/rally/index.php> for updates.

May 6–9. **11th Annual National Mitigation and Ecosystem Banking Conference** will occur in Jacksonville, Florida. Visit <http://www.mitigationbankingconference.com/> for more information.

May 13–16. **World Environmental and Water Resources Congress** will gather in Honolulu, Hawai'i. For more information, go to <http://content.asce.org/conferences/ewri2008/>.

May 15–18. **Florida Native Plant Society Annual Conference** will take place in Palmetto, Florida. More information is at www.fnps.org/.

May 18–23. **32nd Association of State Floodplain Managers Annual Conference** will meet in Reno, Nevada. Check <http://www.floods.org/Conferences,%20Calendar/confer.asp> for updates.

May 18–23. **15th International Soil and Conservation Organization Congress** will gather in Budapest Hungary. Visit <http://www.isco2008.com/> for details.

May 19–21. **7th International Conference on Environmental Problems in Coastal Regions** will convene in The New Forest, United Kingdom. Click on www.wessex.ac.uk/conferences/2008/coast08/ for details.

May 26–30. **29th Society of Wetland Scientists Annual Conference** will occur in Washington, DC. Go to http://www.sws.org/2008_meeting/ for details.

May 27–30. **4th Weeds across Borders Conference** will gather in Banff, Alberta, Canada. More information at <http://www.invasiveplants.ab.ca/WAB2008.htm>.

May 28–30. **2nd International Conference on Environmental Economics and Investment Assessment** will take place in Cadiz, Spain. Visit www.wessex.ac.uk/conferences/2008/economics08/index.html for more information.

June 21–25. **50th North American Soils Conference** will gather in Blacksburg, Virginia. More information is at <http://www.cpe.vt.edu/nafsc/>.

June 23–27. **20th Salt Water Intrusion Meeting** will meet in Naples, Florida. Go to <http://conference.ifas.ufl.edu/SWIM/> for updates.

June 23–27. **5th International Weed Science Congress** will occur in Vancouver, Canada. For more information go to <http://iws.ucdavis.edu/5intlweedcong.htm>.

June 30–July 2. **2008 AWRA Summer Specialty Conference on Riparian Ecosystems and Buffers** will gather in Virginia Beach, Virginia. Click on http://www.awra.org/meetings/Virginia_Beach2008/index.html for details.

July 13–16. **48th Aquatic Plant Management Society Annual Meeting** will convene in Charleston, South Carolina. Go to <http://www.apms.org/2008/2008.htm> for updates.

July 26–30. **Soil and Water Conservation Society Annual Conference** will occur in Tucson, Arizona. Click on http://swcs.org/en/conferences/2008_annual_conference/ for updates.

August 3–8. **93rd Ecological Society of America Annual Meeting** will meet in Milwaukee, Wisconsin. For details go to <http://www.esa.org/milwaukee/>.

August 4–8. **21st North American Prairie Conference** will convene in Winona, Minnesota. Visit <http://bio.winona.edu/napc/> for more information.

September 5–7. **Human Flourishing & Restoration in the Age of Global Warming** will meet at Clemson University, South Carolina. For more information, go to <http://people.clemson.edu/~athomp6/conference/home.html>.

September 14. **Native by Design: A How-To Conference for Gardeners** will convene in Madison, Wisconsin. Check <http://uwarboretum.org/> for updates.

September 16–18. **Wetlands 2008**, the annual conference of the Association of State Wetlands Managers, will meet in Portland, Oregon. For updates, visit <http://aswm.org/calendar/index.htm>.

October 11–15. **4th National Conference on Coastal and Estuarine Habitat Restoration** will gather in Providence, Rhode Island. Click on <http://www.estuaries.org/?id=4> for more information.