THE GEORGE WRIGHT FORUMA volume 23 number 4 · 2006



Environmental Justice





Origins

Founded in 1980, the George Wright Society is organized for the purposes of promoting the application of knowledge, fostering communication, improving resource management, and providing information to improve public understanding and appreciation of the basic purposes of natural and cultural parks and equivalent reserves. The Society is dedicated to the protection, preservation, and management of cultural and natural parks and reserves through research and education.

Mission

The George Wright Society advances the scientific and heritage values of parks and protected areas. The Society promotes professional research and resource stewardship across natural and cultural disciplines, provides avenues of communication, and encourages public policies that embrace these values.

Our Goal

The Society strives to be the premier organization connecting people, places, knowledge, and ideas to foster excellence in natural and cultural resource management, research, protection, and interpretation in parks and equivalent reserves.

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Executive Office

DAVID HARMON, Executive Director EMILY DEKKER-FIALA, Conference Coordinator P. O. Box 65 • Hancock, Michigan 49930-0065 USA 1-906-487-9722 • fax 1-906-487-9405 info@georgewright.org • www.georgewright.org

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On the cover:

The cover photo, as well as the others that accompany the environmental justice articles in this issue, depict activities at the Old Stories, New Voices camp for inner-city youth. All photos courtesy of Gillian Bowser.

SOCIETY NEWS, NOTES & MAIL

Barr, Graber win seats on Board

Brad Barr and David Graber were the winners in the 2006 GWS Board election. It was a three-way race for two open seats being vacated by retiring Board members David Parsons and Dwight Pitcaithley. Barr is a senior policy advisor in the National Oceanic and Atmospheric Administration's National Marine Sanctuary Program; he is the first NOAA employee to serve on the Board. Graber is a senior science advisor for the National Park Service, based at Sequoia–Kings Canyon National Parks. They defeated Frank McManamon, the NPS chief archeologist, in the balloting. The two new Board members will serve three-year terms beginning in January 2007.

2007 GWS award winners named

At its annual meeting in November, the GWS Board evaluated nominations for the 2007 round of Imagine Excellence, the GWS awards program. The awards are bestowed every two years at the GWS conference. The 2007 awards will be given at a banquet to be held April 19 during the conference in St. Paul (for more, see next item). The 2007 winners are:

- The *George Melendez Wright Award for Excellence*, the Society's highest honor, goes to **George B. Hartzog, Jr.** Hartzog is being cited for his leadership as the seventh director of the National Park Service. During his tenure, Hartzog gave new emphasis to scientific research in support of natural resource management and reached out to under-represented and under-served groups, among many other accomplishments.
- The *GWS Communication Award* is being given to NPS historian **Harry Butowsky.** He has been webmaster for the agency's history website since 1999, and through his personal efforts the site has become a major repository for information about NPS. Butowsky has made the full text of more than 2,000 documents, including numerous rare publications, available to the public on the site.
- The *GWS Cultural Resource Management Award* will be received by **Nelly Margarita Robles Garcia**, widely regarded as the "mother" of cultural resources management in Mexico. An archeologist with the Instituto Nacional de Antropología e Historia (National Institute of Anthropology and History), Robles has been a tireless and effective advocate for a resource management approach to the cultural heritage of Mexico and Latin America.
- The GWS Natural Resource Management Award goes to Charles van Riper III of the U.S. Geological Survey's Sonoran Desert Station. Throughout his career, van Riper has conducted research that provides information needed by protected area managers to make informed decisions. A successful field scientist, author, editor, conference convenor, and ombudsman, van Riper's work has had a marked impact on the quality of resource protection in the National Park Service and beyond.
- The Board also decided to present a *GWS Special Achievement Award* to **Gary Machlis**, a professor at the University of Idaho and visiting senior scientist to the National Park

Service. A sociologist, Machlis is being cited for his scholarly achievements in studying the social context of protected areas, for his instrumental efforts in establishing the Cooperative Ecosystem Studies Units (CESU) Network, and for helping to design and establish the highly successful Canon Parks Science Scholars Program.

GWS2007 begins to take shape

Preparations are in high gear for the 2007 GWS conference, "Rethinking Protected Areas in a Changing World," which will be held April 16–20 at the Crowne Plaza Riverfront Hotel in St. Paul, Minnesota. In June 2006 an electronic Call for Proposals was issued and disseminated widely. In response, over 410 abstracts were received by the October 6 deadline. The abstracts were evaluated at a two-day meeting held in early November, and a draft conference program has been developed. Over 130 concurrent sessions are planned, along with a multiday poster session. There will also be six plenary sessions, as follows (titles of some talks are tentative):

- Monday, April 16 (morning), "Climate Change: Impacts on Parks and Protected Areas." Speaker: Lisa Graumlich, executive director, Big Sky Institute; professor, University of Montana.
- Monday, April 16 (afternoon), "Ecosystem-Level Conservation: From Islands to Networks." Speaker: Harvey Locke, Canadian Parks and Wilderness Society.
- Tuesday, April 17, "Native Peoples and Protected Lands." Moderator: Charles Hudson, public information officer, Columbia River Intertribal Fish Commission. Speakers: Roberta (Bobbie) Conner, director, Tamástslikt Cultural Institute; Tom Lee, former chief executive officer, Parks Canada.
- Wednesday, April 18, "A Report from the Scholars' Forum on the National Park Service and Civic Reflection." Speaker: Daniel Ritchie, chancellor emeritus, University of Denver, and chair, Education Committee, National Park System Advisory Board.
- Thursday, April 19, "Media Realities: The Complex Environment of News Reporting." Speaker: Elizabeth Arnold, former chief environmental correspondent, National Public Radio.
- Friday, April 20, "Lessons from 1491." Speaker: Charles C. Mann, author of 1491: New Revelations of the Americas Before Columbus.

Two meetings will run concurrently with GWS2007: the NPS national Inventory & Monitoring Network meeting, and the NPS Midwest Region Superintendents' Conference. Also, the National Public Radio show *Science Friday* will devote the second hour of its show on Friday, April 20, 2007, to topics taken from the GWS2007 program. For full details on the conference, go to **www.georgewright.org/2007.html.**

New web pages highlight biosphere reserves, World Heritage

The GWS recently launched a pair of matching web resource pages on UNESCO's Man and the Biosphere (MAB) Program (with the main focus on biosphere reserves) and on the World Heritage Convention. The emphasis is on the U.S. position vis-à-vis these two programs, and we've tried to give lots of solid factual information to counteract the misconceptions about these programs that exist among certain parts of the American public. You can view these pages through our the links on our home page (www.georgewright.org)—you'll find them toward the bottom of the page.

Changes coming to Forum in 2007

Next year will bring a new look to *The George Wright Forum*. For most of its history, the *Forum* has been published quarterly, and has always been bound using a technique known as "saddle stitching," which means that the journal is stapled on the spine and lies flat on a table when opened. Starting next year, we will publish the *Forum* three times a year instead of four, and "perfect bind" it, which means it will look like a paperback book. Please note that the amount of content delivered to readers will actually increase. That's because we will be expanding each issue to run 120–144 pages; currently, each issue runs 60–96 pages. The new, longer format will enable us to continue to offer themed issues, but with more room to offer additional articles unaffiliated with the theme. Our aim is to make sure each issue contains material that will appeal to a range of interests. Watch for the first of the "new" *Forums* to arrive in your mailbox in late March or early April. As always, we'll welcome proposals for articles or themes; see the guidelines at **www.georgewright.org/forum.html**.

C. Gordon Fredine, 1910-2006

C. Gordon Fredine, a charter and life member of the George Wright Society, died in August of this year at the age of 96. Born in St. Paul, Minnesota, Fredine was a 1932 biology graduate of Hamline University and did graduate work in zoology at the University of Minnesota. From 1935 to 1941, he was a biologist with the Minnesota Conservation Department, before becoming assistant professor of wildlife at Purdue University. After serving in World War II, Fredine worked for the U.S. Fish and Wildlife Service for several years. He became chief naturalist with the National Park Service in 1955. His interest in the application of ecological principles influenced the agency's research and wildlife management programs. In 1964, he became acting chief of the NPS international affairs division, and helped develop the agency's policy that led to increased international activities. After serving as staff director for the Second World Conference on National Parks, Fredine retired from the Park Service in 1973. With Samuel P. Shaw, he co-wrote Wetlands of the United States (1956), which has become known as the original wetlands inventory of the United States. He received Distinguished Service Awards from the American Fisheries Society and the Department of the Interior. He is survived by his wife of 72 years, Edith H. Fredine of Bethesda, Maryland, and several children and grandchildren.

William R. Supernaugh, 1945-2006

GWS life member Bill Supernaugh, a career employee of the National Park Service, died in November of this year. Supernaugh held a variety of positions within NPS, including posts at the Albright Training Center, Natchez Trace and Blue Ridge parkways, Glen Canyon National Recreation Area, regional offices, Indiana Dunes National Lakeshore, and, most recently, Badlands National Park, from which he retired as superintendent. He was known for his trademark handlebar mustache, easygoing manner, affability, and wry humor. Supernaugh was active in the International Ranger Federation, Coalition of National Park Retirees, and in the Association of National Park Rangers, where he managed the organization's mentoring program. His family has worked with ANPR to set up a donation account in his memory. Donations to the account will be used in upcoming years to help ANPR members attend their first Ranger Rendezvous. Donations may be sent to The William R. Supernaugh, Jr., Memorial Fund, c/o Wells Fargo Bank, 1301 Jackson Street, Golden, Colorado 80401. Donors should list account number 7165422739 on the memo line of the check.

History Repeats? Hydro Dams and the Riverine Ecosystems of Mesoamerica: The Case of La Amistad Biosphere Reserve, Panama, and its Implications

William O. McLarney

IMAGINE THAT A THIRD OF ALL THE FISH SPECIES, including virtually all the larger species that contribute to fisheries, plus most of the crayfish, were eliminated from six states of the United States. And assume that this and consequent secondary effects on riverine ecosystems, including several large rivers lying within national parks and forests, were documented in the scientific literature. And let us suppose that the blame for this damage could clearly be assigned to a single type of human activity, undertaken without adequate prior consideration of ecosystem effects.

Now, imagine that decades into the future the exact same activities were proposed for six more states. It is easy to imagine what comes next: Conservationists rush to the barricades, biologists predict the consequences, volumes of correspondence land on the desks of elected officials and bureaucrats, alternatives are proposed, fundraising campaigns are launched....

The second half of this scenario is being enacted right now, not in the continental United States, but just to the south, and the impact stands to be felt in most of the national parks, biosphere reserves and protected areas of the Mesoamerican isthmus, stretching for over 1,000 miles from Chiapas (Mexico) to the Choco (Colombia). This is what will occur in Mesoamerica if current plans for development of hydropower to industrialize the region in the name of free trade are realized. According to an inventory carried out by Conservation Strategy Fund, there are presently 381 dams proposed for the region

(Burgues Arrea 2005) and, while the dams and the economic policies they reflect are being protested, the arguments advanced stem mainly from sociocultural concerns (or, in a few cases, concern for what are essentially touristic resources). The countries potentially affected (Mexico, Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, and Colombia) do not lack for competent biologists, and are well populated by environmental and conservation organizations at all levels from the very local to the global giants. Yet to date almost no one has seen fit to focus on the rivers beyond those reaches that would be directly affected by dams and impoundments, or to draw on the disastrous and well-documented experience from very similar rivers in the Caribbean islands.

The precedent is from the West Indies. The greater part of the aquatic biota of some of the larger West Indian islands has already been eliminated. The best-documented cases are from Puerto Rico and Guadeloupe, where nearly all rivers have been dammed, resulting in complete elimination of native fish and shrimps above some dams, and drastic reductions in every case. In Puerto Rico, this has been documented to result in increases in sedimentation, changes in the aquatic insect community, and increases in algal biomass—in other words, gross alteration of the ecosystem with effects that undoubtedly extend beyond rivers and streams.

Everyone knows about the effects of dams on the Pacific and Atlantic salmons of North America. While the rivers of Mesoamerica may not boast such charismatic fishes, the potential for damage, in terms of the number of species affected, is greater. As a consequence of the narrowness of the isthmus, the rivers of the region are necessarily short and thus intimately connected to the sea. And Mesoamerica, like the Caribbean islands, has been relatively isolated over geologic time, so that the primary freshwater fish fauna is limited. As in the islands, groups of marine origin have had an advantage in dispersal, and many of the "freshwater" fishes of the region are diadromous; that is, they need access to salt water at some stage in order to complete their life cycle.

The habit of diadromy extends to close to 100% of the species of shrimp, which inhabit the river systems up to the highest headwaters, beyond the reach of any fishes. In Puerto Rico, shrimps have been shown to account for the majority of secondary production in streams. Seemingly paradoxically, the higher one climbs, the greater the proportion of the biomass in streams is made up of forms which require access to the sea. One dam on a river mainstem can cause gross alteration of ecosystems over hundreds of miles of rivers, creeks, and rivulets draining thousands of square miles.

In terms of the immediacy of dam threats, one of the most critical watersheds in Mesoamerica is the Changuinola/Teribe, located in Panama's Bocas del Toro Province, and it can be used to illustrate the kinds of situations conservationists need to be more courageous in confronting. The Rio Changuinola and its major tributary, the Rio Teribe, both arise in the La Amistad International Peace Park and Biosphere Reserve (a UNESCO World Heritage site) and flow through the Palo Seco Forest Reserve and the territories of the Naso and Ngobe Indian tribes before reaching the Caribbean, where the Changuinola estuary lies at the center of the 40,000-acre San San/ Pondsak wetlands, a Ramsar site.

Bocas del Toro, located on the Costa Rican border, has historically been isolated from the rest of Panama; only in recent years has it been possible to drive to Bocas from anywhere else in the country. The provincial economy has been dominated by the multinational banana industry, which exports its product by sea from the port of Almirante or through Costa Rica. With the banana business in decline and population growing, the Panamanian government has a logical interest in fomenting development in Bocas del Toro. And it so happens that the inland rivers of the province are considered to represent the most outstanding hydropower resource in the nation.

Most of Panama's electrical supply is oil based and power costs are high, especially in remote areas like Bocas del Toro. Arguments expounding on the need for alternative energy sources on the basis of cost, security, and environmental considerations make sense to the Panamanian public, including those who live in the several urban centers of Bocas del Toro. But it is curious that this concern for cheap, clean electricity for public consumption arises precisely at the moment when Panama is feeling pressure to hitch its wagon to the star of free trade. Initiatives such as Plan Puebla-Panama (former Mexican president Vicente Fox's pet project to industrialize the Mesoamerican corridor) and SIEPAC (the Electrical Interconnection Network for the Central American Nations) provide incentives to develop hydro resources that have been recognized, but left alone, for decades.

Not surprisingly, Panamanian dam proponents oversell hydro dams as a "green" energy technology, most recently under the rubric of the U.N.'s "Clean Development Mechanism." Since the dams, reservoirs, and all associated infrastructure would lie outside La Amistad (although within Palo Seco), the published environmental impact assessments do not consider any impacts to the World Heritage site. In fact, they are presented as a benefit to La Amistad.

The argument goes like this. La Amistad is acknowledged to have problems with land invasion (much of it by indigenous peoples who claim it was always theirs, anyway) and illegal hunting. Dam construction will improve access to the area, thus permitting ANAM (Panama's environmental authority) to better police the park. Better yet, a portion of hydro revenue will be dedicated to this purpose-by building ranger stations, for example. There may be some truth in these arguments (though access is a two-edged sword), but they represent a pact with the devil. We are being asked to accept possible benefits in return for certain damage.

The various species of diadromous fish and shrimps in the Changuinola/Teribe system represent a huge variety of physical characteristics and behaviors. They range from large adult fish such as the bocachica or hogmullet, capable of ascending the most powerful rapids, to bottom crawlers such as the shrimps and various species of gobies, to passively drifting planktonic eggs and larvae. Some species (most famously the American eel) migrate to the sea as adults to reproduce. Others spawn in fresh water and the eggs and/or larvae are carried to the sea. (One of the most spectacular natural phenomena of Caribbean Central America is the "tismiche," the annual upstream migration of massive groups of juvenile shrimps and gobies, hatched in the estuaries.) Some migrate during high water, others during low water. In all cases, our ignorance of their requirements is greater than our knowledge. There is no way in the world to design dam and reservoir systems to accommodate all these creatures; experience in the West Indies suggests that none of them can be maintained with hydro dams in place. (Of course we are told that hydro revenues will also be used to build facilities for investigators, so that presumably we will be enabled to document the extirpations.)

Virtually no historic information exists on the fish fauna of the rivers of La Amistad, in large part due to their inaccessibility. But recently my institution (Asociacion ANAI, a Costa Rican nongovernmental organization) was able to train four Naso and Ngobe parataxonomists to carry out preliminary surveys within the park. They were able to survey 17 sites, using seines, cast nets, and underwater visual censusing techniques. Due to the extreme difficulty of access, more reliable quantitative methods, such as electrofishing, were not an option; some sites required an hour of boat travel upstream through whitewater, a five-hour hike in to a remote village, and then another three-hours on foot the next day to reach the park boundary.

The indigenous parataxonomists found 18 species of fish, of which seven (including four of the five largest species) were diadromous. The proportions of diadromous fish at the study sites ranged from 25% to (in three cases) 100%. In almost all cases, they also found both of the families of diadromous shrimp (Palaemonidae and Atyidae) known from the region.

These figures almost surely underestimate the importance of the diadromous component. In our own surveys in the neighboring Sixaola/Telire and Estrella watersheds of Costa Rica (which also arise in La Amistad and where hydro dam proposals are eventually almost a certainty) we usually find that in swift, rocky streams of the type surveyed in La Amistad the majority of individual fish in samples are small diadromous gobies ("chupapiedras"). Chupapiedras are extremely difficult to capture without electrofishing equipment, or to visually assess; they were the second most abundant fish according to the parataxonomists. Including a full count of these elusive fishes, we found that 70-91% of total fish in Costa Rican streams were of diadromous species.

It would be interesting to have information on biomass, but even without hard data it is easy to see how vital is the linkage of the rivers of upland Mesoamerica to the sea. If we consider that shrimp tend to be abundant, and are by far the largest non-fish aquatic forms, that the largest fish species are mostly diadromous, and that the diadromous chupapiedras are by far the most abundant fish, it can be deduced that these rivers, once cut off from the sea, would be barren environments indeed, populated almost exclusively by insects and a few species of small fish.

Looked at in terms of area potentially affected, the possibilities are staggering. If only the Chan-75 (Gavilan) dam, the lowermost proposed on the Rio Changuinola mainstem, were built, 799 sq mi of watershed and 527 mi of permanent stream within La Amistad would be grossly biologically depleted. To this must be added the effects on the mainstem and tributaries downstream in Palo Seco, the indigenous territories, and below. Elimination of most aquatic production above Chan-75 would also drastically affect those species of fish (some of them valuable fishery resources) that never ascend to the park, but which depend on the gobies, shrimps, and other migratory animals for food.

The worst-case scenario just described for Bocas del Toro is ultimately a very serious threat to all the undammed watersheds on both sides of the continental divide along the entire Mesoamerican isthmus. The possible outcome is the virtual disappearance of the characteristic Mesoamerican river fauna—as has already happened in places like Puerto Rico and Guadeloupe.

The prospect is not hopeless. The Inter-American Development Bank withdrew consideration of financing one of the dams in Bocas del Toro (Bonyic, on the Rio Bon, tributary to the Teribe; Figure 1), citing both cultural reasons and "potential impacts on stream ecosystems" (Montgomery 2005). At least one other major potential lender, HSBC Holdings of London, would find it virtually impossible to finance dams like those described here under their "Freshwater Infrastructure Sector Guideline," which, among other stipulations, specifically prohibits "impacts on World Heritage Sites and Ramsar sites."

Non-biological arguments enter into play. A series of proposed dams on the Pacuare River in Costa Rica, which had the backing of no less a personage than former president and Nobel laureate Oscar Arias, were defeated mainly because of the economic importance of the Pacuare as a whitewater rafting river. Plans for dams on the Usumacinta River of Mexico and Guatemala have been shelved in deference to the historic and archeological importance of sites that would have been flooded.

As in virtually all instances of damming and flooding, there are human displacement issues involved. In Bocas del Toro, as in



Figure 1. Site of the proposed Bonyic Dam on the Rio Bon (Quebrada Bonyic) in Naso Indian territory, Bocas del Toro Province, Panama. Photo courtesy of William O. McLarney.

many if not most cases in Mesoamerica, these issues overlap with the question of indigenous rights. The relationship of Native American societies to parks has often been an uneasy one, and intelligent discussion of the matter has been scarce. We are presented on the one hand with the romantic vision of indigenous cultures as being naturally in harmony with their environment, and on the other with the viewpoint that "the Indians" represent one of the principal threats to protected areas. Neither viewpoint, in its extreme form, is constructive. The situation in Bocas del Toro may be instructive.

The most commonly heard viewpoint (outside of the indigenous communities themselves, which constitute the majority of the population in the province) is that part of the government's job is to keep the Indians out of the park and that, apart from policing, one way to do so is to offer them the benefits of the hydro projects (though these may consist of little more than temporary employment and moderately more affordable electricity for a while). However, large sectors of the Ngobe and the Naso, many of whom live far from the nearest power source, are more concerned with stopping the dams than with their putative benefits. In the field, the ANAI-trained parataxonomists found themselves almost oversupplied with volunteers eager to help hold nets, count fish, and attend workshops in the evening after the field work was completed. When given the opportunity to connect "el parque" with their own lives in a positive way, the indigenous communities responded by working to defend the protected area.

For me as an aquatic biologist, the biodiversity conservation issue transcends lines on a map. But that just happens to be my handle on the question of hydro dams in Mesoamerica. Indigenous communities, whitewater rafters, archeologists, and so on will all defend their own interests first. Those who have a particular commitment to protected areas should be no exception.

It is difficult to get a handle on how many protected areas in Mesoamerica stand to be affected, but La Amistad is not alone. Among the areas that would be affected by existing dam plans are such other high-profile areas as the Rio Platano Biosphere Reserve in Honduras. Presumably most of them have as part of their justification something similar to this, the first justification presented for the establishment of the La Amistad Biosphere Reserve: "to protect a significant example of the biological diversity of one of the richest faunal and floral zones which still remains largely unaltered in the Republic of Panama" (Alvarado 1998).

The promise made is to UNESCO, which entity has typically eschewed aggressive "enforcement" measures. Government agencies throughout the region are under enormous economic and political pressures to close their eyes to biodiversity issues of the less-visible sort. Conservation in Mesoamerica has traditionally focused on the tropical forest (of which, lest we forget, the rivers are a part), and some organizations may have been lulled and backed into what amount to conflicts of interest. For example, the Mesoamerican Biological Corridor project was at one time listed as a "satellite project" of Plan Puebla-Panama-which can perhaps be seen as parallel, on the regional scale, to policing La Amistad with the aid of hydro power revenues. The aquatic and fishery biologists of the nine affected countries have been inexplicably asleep on the headwaters-to-the-sea connection. And the various affected parties have not been talking with each other very much.

There are, perhaps, in every potentially affected watershed—and certainly in every one that I know about—local groups and individuals taking on the hydro dam issue on the basis of, if not biology, then cultural/indigenous concerns, local economics, recreation, etc. This is as it should be, and protected area advocates and managers need to find their place in this spectrum, at every level from the most local to the regional.

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William O. McLarney, ANAI, Inc., 1120 Meadows Rd., Franklin, North Carolina 28734; anaiinc@dnet.net or anaital@racsa.co.cr

Targeting Conservation Easements to Reduce Impacts of Private Land Development on Protected Areas

Tony Prato

Introduction

ECONOMIC GROWTH CAN ADVERSELY AFFECT THE ECOLOGICAL INTEGRITY of protected areas. Changes in ecological processes and natural resources stemming from economic growth include alterations in the availability of energy, water, and nutrients; lower soil and water quality; greater incidence of exotic species; reduced biodiversity; increased exploitation of species; and more fragmented landscapes (Adger and Brown 1994; Ojima et al. 1994; Turner and Meyer 1994; Vitousek et al. 1997; Pimm and Raven 2000; Solecki 2001; Foley et al. 2005; Ikerd 2005).

Counties in the western United States containing protected areas (i.e., national parks, national monuments, wildlife refuges, and wilderness areas) are growing more rapidly than counties without such areas (Rasker et al. 2004). Undeveloped private lands adjacent to these protected areas are especially vulnerable to economic growth, particularly rural residential development. Between 1970 and 2000, rural residential development in the Montana and Wyoming portions of the Greater Yellowstone Ecosystem, which includes Yellowstone and Grand Teton national parks, increased 400% (Williams 2001). This development has degraded and fragmented current and potential grizzly bear habitat on private lands in the ecosystem. Continuation of this trend could jeopardize grizzly bear recovery in the region (Johnson 2001). Double-digit growth in residential subdivisions adjacent to the National Elk Refuge in Jackson, Wyoming, has diminished winter range for the 10,000 elk that use the refuge, and has displaced corridors that they use to reach summer range in Yellowstone and Grand Teton national parks (Howe et al. 1997). Cumulative impacts of residential development and resource extraction on lands surrounding Glacier National Park in western Montana threaten the park's natural resources (Keiter 1985; National Parks Conservation Association 2002; Prato 2003b).

A primary way land trusts can control economic growth and protect natural resources on private lands adjacent to protected areas is through conservation easements. A conservation easement is a legally binding agreement between a private organization and landowner that limits certain types of land uses or prevents development from occurring on that property. It requires the landowner to voluntarily donate or sell certain property rights, such as the right to subdivide, to a private organization, such as a land trust, or a public agency. Cash compensation, tax benefits, and/or the desire to retain the open space character of a property are primary reasons why landowners grant conservation easements. As of 2000, more than 1,260 land trusts protected about 1 million ha of land in conservation easements in the United States (The Nature Conservancy 2003).

A combination of limited budgets and increasing ecosystem threats from economic growth make it imperative to target the acquisition of conservation easements to maximize ecological values per dollar expended on easements, or, equivalently, to maximize the efficiency of conservation easements. This paper discusses several targeting criteria for developing efficient easement acquisition plans.

Identifying an efficient easement acquisition plan does not mean a land trust will be able to purchase all the conservation easements called for in the plan. This can occur due to unwillingness of some landowners to sell conservation easements or inability of landowners and land trusts to reach agreement on the prices and terms of easements. This article focuses on criteria for developing efficient easement acquisition plans, not the barriers to achieving those plans.

Current targeting methods

Newburn et al. (2005) developed and compared four criteria for allocating a fixed conservation budget to private land conservation efforts. These criteria are applicable to the selection of parcels for conservation easements. The four criteria are: value-only targeting, value-loss targeting, value-cost targeting, and value-loss-cost targeting. Newburn et al. (2005) point out that "Any targeting approach that ignores either vulnerability [of parcels to development] or costs [of the conservation program] will result in suboptimal targeting." The valueonly, value-loss, and value-cost targeting criteria are suboptimal or inefficient in this regard because they ignore vulnerability of parcels to development and/or costs of acquiring easements. In particular, valueonly targeting considers the ecological values of easements, but ignores both the costs of acquiring easements and the vulnerability of parcels to development. Value-loss targeting considers the ecological values of easements and the vulnerability of parcels to development, but ignores the costs of acquiring easements. Value-cost targeting considers the ecological values of easements and costs of acquiring easements, but ignores the vulnerability of parcels to development.

Only the value-loss-cost targeting criterion considers all three elements: the ecological values of easements, the vulnerability of parcels to development, and the costs of acquiring easements. The original valueloss-cost targeting criteria proposed by Newburn et al. (2005) had two deficiencies. First, it assumed that development of a parcel resulted in a total loss of ecological value. Second, it did not consider how to make easement acquisition decisions over multiple time periods. Both deficiencies were alleviated by Newburn et al. (2006).

The targeting criteria discussed here extend the work of Newburn et al. (2005, 2006) by allowing a land trust to develop an efficient easement acquisition plan when: (1) the ecological values of conservation easements cannot be measured in monetary terms; (2) ecological values of conservation easements for different parcels are spatially correlated; and (3) the probabilities of parcels developing are unknown. The targeting criteria described here rest on two assumptions: that there are only two types of parcels, undeveloped and developed, and that once a parcel is developed it cannot revert back to an undeveloped state (i.e., irreversibility).

Value-loss-cost criterion

Since the targeting issues and criteria described here build on the value-loss-cost targeting criterion developed by Newburn et al. (2005), this section describes that criterion. Applying the criterion to conservation easements implies that parcels are selected for easements based on the ratio of the expected loss in ecological value to easement acquisition cost. Expected loss in the ecological value of a parcel integrates the ecological values of easements and the vulnerability of parcels to development. In particular, the value-loss-cost criterion selects parcels having the highest ratio of expected ecological loss (S_U=PV_U) to easement acquisition cost (C), where P is the probability that an undeveloped parcel is convert-

ed to its highest-valued permitted developed use, and V_U is the ecological value of the parcel in its undeveloped state. Considering only permitted developed uses of a parcel eliminates uses that are disallowed by zoning restrictions (e.g., residential and commercial development cannot occur on parcels located in the 100-year floodplain). The original value-loss-cost criterion described by Newburn et al. (2005) assumed that development of a parcel results in a complete loss of ecological value. For a conservation budget of B (i.e., the amount of money the land trust has to spend on acquiring conservation easements), the original value-loss-cost targeting selects parcels for which $S_U/C \ge k^*$ or $S_{U} \ge k C$, where k C is the critical line and k* is the slope of the critical line (see Figure 1). The term k* increases (decreases) as B decreases (increases).

If the ecological value of a developed parcel is greater than zero, then development of that parcel results in a partial loss in ecological value. In this case, the expected

Figure 1. Value-loss-cost targeting criterion, where k^*C is the critical line, $S_{u_1} = P_1V_{u_1}$ is the expected ecological loss for parcel 1, $S_{u_2} = P_2V_{u_2}$ is the expected ecological loss for parcel 2 when parcel conversion results in a full loss in ecological value, $S'_{u_1} = P_1(V_{u_1} - V_{D_1})$ is the expected ecological loss for parcel 2, and $S'_{u_2} = P_2(V_{u_2} - V_{D_2})$ is the expected ecological loss for parcel 2, when parcel conversion results in a partial loss for parcel 2 when parcel conversion results in a partial loss in ecological value.



ecological loss from development of a parcel is S'_U = P(V_U – V_D) = P Δ V, where V_U is the ecological value of the parcel if undeveloped and V_D is the ecological value of the parcel if converted to its highest-valued permitted developed use. Since development of a parcel is likely to reduce its ecological value, Δ V > 0. The revised value-loss-cost criterion evaluates parcels for acquisition based on the ratio of P Δ V to C.

Figure 1 illustrates the application of the original and revised value-loss-cost criteria to two hypothetical parcels. A dot in front of the parcel number designates the combination of S₁₁ and C for that parcel. For example, parcel 1 has an expected ecological loss of S_{U1} with the original value-losscost criterion, an expected ecological loss of S'_{U1} with the revised value-loss-cost criterion, and an easement acquisition cost of C₁. Parcel 2 has an expected ecological loss of S_{U2} with the original value-loss-cost criterion, an expected ecological loss of S'_{U2} with the revised value-loss-cost criterion, and an easement acquisition cost of C2. The original criterion selects parcels 1 and 2 for acquisition because $S_{U1} > k*C$ and $S_{U2} >$ k*C.

When parcel development results in only a partial loss of ecological value (as opposed to a full loss), it is still optimal to acquire parcel 1 because $S'_{U1} > k*C$. However, it is not optimal to acquire parcel 2 because $S'_{U2} < k*C$. Therefore, parcel 2 is selected for easement acquisition when development results in a full loss in ecological value but not when it results in a partial loss in ecological value for the relationships illustrated in Figure 1. In general, the revised value-cost-loss criterion can result in a different selection of parcels for conservation easements than the original valueloss-cost criterion.

Accommodating non-monetary ecological values

Parcels have ecological value because they provide ecosystem services that are typically not valued in the market place. Although economists have developed nonmarket valuation procedures for estimating the monetary value of ecosystem services (Prato 1998), use of these procedures is beyond the reach of most land trusts. Consequently, land trust managers generally cannot express the ecological value of parcels in monetary terms. Under these circumstances, the value-loss-cost criterion cannot be applied unless ecological values of parcels are evaluated in non-monetary terms. The latter can be done provided the land trust is able to score parcels based on the ecological value of the multiple ecosystem services they provide. For example, if a land trust is able to score ecological values of parcels (with and without development) between 0 and 100, where 0 implies no ecological value and 100 implies maximum ecological value, then V_U and $V_U - V_D$ are between 0 and 100. Undeveloped parcels are then selected for easements based on the values for PV_U/C or $P(V_U - V_D)/C$. When ecological values are scored in the above manner, these ratios are expressed in terms of expected units of ecological loss per dollar spent on easement acquisition. Other things equal, the higher these ratios, the more desirable are the parcels for conservation easements.

Land trusts can assign scores to V_U and V_D using a multiple-attribute evaluation (MAE) procedure in which the ecosystem services provided by parcels are the attributes. Application of a MAE procedure would require the land trust to: (1) enumerate the multiple ecosystem services provided by parcels; (2) develop measurable indi-

cators for all ecosystem services; (3) measure the indicators and determine their relative importance (or weights); and (4) use a utility function to calculate scores for V_U and V_D for all parcels. The utility function integrates the indicators for ecosystem services and their weights. Prato (2003a and 2004) describe MAE procedures in more detail.

Accounting for spatial correlation in ecological values

Ecological values of parcels are spatially correlated when the ecological value of a conservation easement on one parcel depends on whether or not nearby parcels have easements. Selecting an optimal easement acquisition plan when there is spatial correlation among ecological values necessitates comparing the overall ecological value of alternative spatial patterns of easement acquisitions. To illustrate this procedure, suppose a land trust wants to select an optimal easement acquisition plan from a set of three mutually exclusive, financially feasible easement acquisition plans, namely $\{A_1, A_2, A_3\}$. Each of the three plans in this set represents a particular spatial pattern of easement acquisitions. A plan is financially feasible provided its present value cost is less than or equal to the present value of the conservation budget. Stated differently, financial feasibility requires

$$PV[C(A_i)] \le \sum_{t=0}^{T} B_t (1+r)^{-t}$$

for all i=1, 2, 3, where PV[C(A_i)] is the present value acquisition cost of plan A_i and

$$\sum_{t=0}^{T} B_t (1+r)^{-t}$$

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is the present value of the budgets available for acquiring easements over a planning horizon of T time periods.

For simplicity of exposition, suppose a land trust has identified three future spatial patterns of parcel conversions in the absence of new conservation easements, namely $\{G_1, G_2, G_3\}$. If the land trust can assign probabilities to G1, G2, and G3, say P_{G1} , P_{G2} , and P_{G3} , respectively, then the expected ecological losses with the three spatial patterns of parcel conversions are $P_{G_1}L(G_1)$, $P_{G_2}L(G_2)$, and $P_{G_3}L(G_3)$, respectively. PGi is the probability of pattern Gi and L(G_i) is the present value ecological loss with pattern G_i. The optimal easement acquisition plan for a planning period is the one that minimizes the maximum expected present value ecological loss from parcel development subject to the conservation budget for that period. For example, if $P_{G_2}L(G_2)$ exceeds $P_{G_1}L(G_1)$ and $P_{G_3}L(G_3)$, then G₂ has the maximum expected present value ecological loss. In this case, the optimal acquisition plan is to acquire conservation easements in a manner that circumvents the pattern of parcel conversions implied by G₂. Referring to Figure 2, the optimal easement acquisition plan is to acquire easements on parcels 1, 3, 6, 9, and 16.

Handling uncertainty

Uncertainty regarding future spatial patterns of parcel conversions implies the land trust cannot assign probabilities to G_1 , G_2 , and G_3 . Although not considered here, it is also possible to account for uncertainty in the cost of acquiring easements. Uncertainty about patterns of parcel conversion necessitates using a different procedure to determine the optimal parcel acquisition plan than the one used in the previ-

| \mathbf{x}_1 | | X3 | y1 | | y3 | |
|----------------|----------------|-----------------|------------|------------|----------|-------------|
| | x ₆ | | - | y 6 | | |
| | | | y 9 | | | |
| | | x ₁₅ | | | | y 16 |
| | cauisit | x_{15} | b C | nversi | on patte | y_{16} |

Figure 2. Spatial pattern of easement acquisitions with plan A_1 (panel a), and the spatial pattern of parcel conversions with G_2 (panel b).

ous section. Selecting an optimal easement acquisition plan under uncertainty is explained assuming that there is spatial correlation in the ecological values of parcels (see previous section).

Panel a of Figure 2 illustrates a hypothetical, feasible spatial pattern of easement acquisitions for an area consisting of 16 parcels, referred to as A1. The x-entries in the grid indicate that A₁ involves acquiring easements on parcels 1, 3, 6, and 15. Panel b in Figure 2 illustrates a particular future parcel conversion pattern referred to as G₂. The y-entries in panel b indicate that parcels 1, 3, 6, 9, and 16 convert to developed uses with G₂ in the absence of conservation easements. With three feasible acquisition plans (i.e., A₁, A₂ and A₃) and three future parcel conversion patterns (i.e., G1, G_2 , and G_3), there are nine possible combinations of feasible acquisition plans and future conversion patterns.

The expected present value ecological loss for A_1 given G_2 occurs is determined by summing the present value ecological losses for all parcels with that combination. Present value ecological losses are determined by evaluating the matches and mismatches between A_1 and G_2 . In particular, there is a match between A_1 and G_2 for parcels 1, 3, and 6 because the plan acquires easements on parcels 1, 3, and 6, and these parcels

would be developed without the easements. There is a mismatch for parcel 15 because A1 acquires an easement for this parcel, but G₂ indicates the parcel is not developed even without an easement. Additionally, there is a mismatch between A1 and G2 for parcels 9 and 16 because the plan says not to acquire easements on those parcels, but those parcels would be developed without conservation easements. Therefore, the present value ecological loss avoided with A1 when G2 occurs is the sum of the present value ecological losses for parcels 1, 3, and 6 (i.e., those for which there is a match) designated as ΔV_{12} . Repeating this procedure for all nine combinations of $\{A_1, A_2, A_3\}$ and $\{G_1, G_2, G_3\}$ gives a 3x3 matrix of values for ΔV (see Table 1).

A common criterion for making decisions under uncertainty is the minimax criterion. The minimax criterion selects the easement acquisition plan that minimizes the maximum present value ecological loss from future conversion of parcels from undeveloped to developed states unless the social cost of those conversions is unacceptably high (Bishop 1978; Prato 2005). The first step in determining an optimal easement acquisition plan based on the minimax principle is to identify the easement acquisition plan that results in the maximum present value ecological loss for each

| | Future | parcel conversions | ons pattern | |
|---|----------------------|----------------------|----------------------|--|
| Easement acquisition plan | G ₁ | G_2 | G ₃ | |
| A ₁ | $\Delta V_{11} = 58$ | $\Delta V_{12} = 65$ | ΔV_{13} =85 | |
| A ₂ | ΔV_{21} = 40 | $\Delta V_{22} = 55$ | ΔV_{23} = 50 | |
| A ₃ | ΔV_{31} = 75 | $\Delta V_{32} = 30$ | ΔV_{33} =45 | |
| Acquisition plan that results in the maximum present value ecological loss, shown in parentheses | A ₃ (75) | $A_{2}(65)$ | A ₁ (85) | |

Table 1. Hypothetical present value ecological losses for three easement acquisition plans and three parcel conversion patterns.

future parcel conversion pattern. This step shows that the maximum present value ecological loss with G_1 is 75 for A_3 , with G_2 is 65 for A_2 , and with G_3 is 85 for A_1 (see the last row of Table 1). The second step is to select as the optimal plan the one that results in the minimum ecological loss of the three maximum ecological losses identified in the first step. Therefore, A_2 is the optimal easement acquisition plan for the values of ΔV given in Table 1.

Since land values and ecosystem services are likely to change over time, the land trust should periodically update the optimal parcel acquisition plan. To illustrate how updating is done, suppose the land trust has operated for five years under the initial optimal acquisition plan (i.e., the spatial pattern of parcel acquisitions determined using the minimax principle for the first five-year period). Updating has five steps. First, a revised set of developable parcels for the second five-year period is determined by excluding parcels for which conservation easements were purchased or conversion to developed uses occurred during the first five-year period. Second, the set of possible parcel acquisition plans and set of future spatial patterns of parcel conversions are determined based on the revised

set of developable parcels. Third, the present value cost of the easements acquired during the first five-year period is subtracted from the initial present value budget to obtain a revised present value budget as of the beginning of the second five-year period. Fourth, the set of spatial patterns of parcel acquisitions determined in the second step is screened to eliminate parcel acquisition patterns that are not financially feasible based on the revised present value budget. Fifth, an optimal easement acquisition plan is determined for the second five-year period by applying the minimax principle to the revised set of spatial patterns of parcel acquisitions and revised set of future spatial patterns of parcel conversions. This adaptive planning procedure is repeated as often as the land trust updates the optimal parcel acquisition plan.

Data and information requirements

The original value-loss-cost criterion requires a land trust to specify the probabilities of parcels converting to developed states (P), and estimate the ecological values of parcels in their undeveloped states (V_U). Additionally, the revised value-loss-cost criterion requires a land trust to estimate the ecological values of parcels in their developed states (V_D). Both criteria require information on the present value cost of acquiring and maintaining easements and annual conservation budgets over the T-period planning horizon, as well as specify a discount rate (r).

Estimating the ecological values of parcels can be streamlined by incorporating parcel information in a geographic information system (GIS) and incorporating the GIS dataset and parcel selection criterion in a spatial decision support tool. A spatial decision support tool is a knowledge-based system that integrates data, information, and evaluation methods for the purpose of identifying and evaluating solutions to complex problems involving spatially distributed information (Djokic 1993). Having such a tool would make it easier for land trusts to develop and update optimal easement acquisition plans based on the procedures and informational requirements described above.

The value-loss-cost and minimaxbased uncertainty criteria have different data and informational requirements. In the absence of spatial correlation among ecological values of parcels, use of the valueloss-cost criterion requires a land trust to specify the probabilities of parcels converting to developed uses, or, in the presence of spatial correlation, the probabilities of different future spatial patterns of parcel conversions. Use of the uncertainty criterion requires a land trust to estimate the present value ecological loss for each combination of easement acquisition plan and future spatial pattern of parcel conversions. Both criteria require the land trust to estimate the present value acquisition costs for parcels.

It may be easier for a land trust to specify alternative spatial patterns of parcel conversions than to estimate the probabilities of parcel conversions, unless conversion probabilities have already been estimated in land-use change studies for the area of interest. Specifying all future spatial patterns of easement acquisition requires eliminating from consideration: (1) parcels unsuitable for development because of their soil type, slope, and/or location relative to water bodies, floodplains, and environmentally sensitive areas; (2) parcels for which landowners are not interested in donating or selling conservation easements; and (3) easement acquisition patterns that are unaffordable due to limited conservation budgets. Limited budgets would eliminate many developable parcels from being considered for conservation easements, especially in areas where landowners are not willing to sell conservation easements without cash incentives from land trusts.

Summary and conclusion

This paper describes two kinds of criteria a land trust can use for targeting acquisition of conservation easements: a valueloss-cost criterion and an uncertainty criterion. Use of the value-loss-cost criterion requires a land trust to specify the probabilities of individual parcels converting from undeveloped to developed states, or if there is spatial correlation in ecological values of parcels, the probabilities of future spatial patterns of parcel conversions. The optimal easement acquisition plan with the valueloss-cost criterion is determined by minimizing expected ecological loss from parcel conversions subject to the conservation budget. Using the uncertainty criterion when there is spatial correlation in ecological values of parcels requires a land trust to specify alternative spatial patterns of parcel acquisition and alternative future spatial patterns of parcel conversion. Both criteria

accommodate full or partial ecological losses from parcel conversion from undeveloped to developed states, and allow ecological values of parcels to be measured in monetary or non-monetary terms.

Although these criteria described here are flexible enough to accommodate a wide range of conditions, they have relatively high informational requirements. Before adopting these criteria, land trusts should determine whether or not the benefit of applying the criteria (i.e., maximizing ecological value per dollar of easement acquisition cost for a given conservation budget) exceeds the additional informational cost. If so, then application of the criteria results in a net gain. Otherwise, application of the criteria results in a net loss.

The conservation easement targeting criteria described here can be adapted to protected areas. For example, preserving biodiversity, which is a high priority for most protected areas (see IUCN 1994 and Davey 1998), can be given a higher weight than other ecosystem services in determining the overall ecological value of retaining parcels in an undeveloped state. This adaptation would increase the likelihood of acquiring conservation easements on private land parcels that are critical to preserving biodiversity. For example, much of the growth in rural residential development in the Greater Yellowstone Ecosystem has been concentrated in more remote rural areas (Glick and Haggerty 2000; Hansen et al. 2002). One study showed that 320 of the 400 new homes randomly sampled in Gallatin County, which covers a portion of the ecosystem, were constructed in prime wildlife habitat (Glick and Haggerty 2000). This ecosystem, and others experiencing rapid loss in open spaces and private land development, would benefit from the design and implementation of easement acquisition plans that target the preservation of biodiversity.

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- Tony Prato, Center for Agricultural, Resource and Environmental Systems (CARES), 212 Mumford Hall, University of Missouri, Columbia, Missouri 65211; pratoa@ missouri.edu

Island-specific Ecological Release of Small Mammals in Lake Michigan and Potential Consequences for Ground-nesting Birds: The Importance of American Beech (Fagus grandifolia) in Structuring Small-mammal Communities

J.N. Rosemier and D.J. Flaspohler

Introduction

ISLAND AREA HAS THE POTENTIAL TO ALTER COMMUNITY AND ECOSYSTEM PROCESSES relative to the mainland (Wardle et al. 1997). Such differences include species composition (MacArthur and Wilson 1967), demographics (Adler and Levins 1994), and niche shifts (Crowell 1983). A suite of characteristics associated with island populations of rodents has been reported and collectively given the name "island syndrome" (Adler and Levins 1994). Island-related changes in density, morphology, and behavior are thought to result from the smaller area relative to the mainland, and the isolation of the island from the mainland. Observed changes in the structure of island populations of small mammals are thought to result from ecological release from interspecific competitors and predators found on the mainland but not on the islands (Adler and Levins 1994). Additionally, potential for dispersal is often limited on islands.

Studies examining the island syndrome have primarily focused on small mammals. Many small mammals are habitat generalists, with large demographic and ecological plasticity (Adler 1996). This allows relatively rapid changes to their ecology once introduced onto an island. In addition, other island taxa may be indirectly affected by island-related changes in small-mammal demography. For example, if ecological release on islands results in higher densities of small mammals relative to the mainland, island populations of groundnesting songbirds may face unusually high nest depredation rates. Nest depredation accounts for approximately 80% of all nest

failures for open-cup nesting passerines and has the potential to shape patterns of habitat selection, coexistence, and the evolution of life-history traits of birds (Martin 1988, 1993).

Ground and shrub-nesting birds in temperate deciduous forests are exposed to a variety of bird and mammalian predators (Schmidt et al. 2001), with *Peromyscus* spp. being documented as common nest predators (e.g., Guillory 1987; Maxson and Oring 1978). For example, nest failure of dark-eyed juncos (*Junco hyemalis* L.) in Virginia was positively correlated with deer mouse density, suggesting that mice influence the reproductive success of this species (Flaspohler et al. 2000; Ketterson et al. 1996). This suggests that ground- and shrub-nesting birds breeding on islands may face unusually high nest depredation rates compared with the mainland where densities of predators are often higher.

Artificial nests are commonly used to compare relative rates of nest depredation among different habitats (Major and Kendal 1996). Although artificial nests are of limited use when estimating absolute rates of depredation on natural nests (e.g., Wilson et al. 1998), they have proven to be useful in estimating relative rates of depredation (Villard and Pärt 2004). By considering relative rates, the effect of over- or underestimation of absolute rates stemming from the use of artificial nests may be minimized. Additionally, the ability to manipulate the abundances and distribution of artificial nests allows a high degree of control, especially when natural nests are rare or difficult to find (Wilson et al. 1998).

Sleeping Bear Dunes National Lakeshore is located in the northwestern part of the lower peninsula of Michigan. It consists of North Manitou Island and South Manitou Island, with areas of approximately 33 sq km and 20 sq km, respectively, and approximately 290 sq km on the mainland. The forests at the national lakeshore are classified as northern hardwoods, although the species composition varies among the islands and the mainland. Vegetation analysis on the two islands shows distinctive differences in species composition, especially in trees over 10 cm diameter at breast height. The forests on South Manitou are composed of 10% American beech and 47% sugar maple (Acer saccharum Marsh.), while North Manitou is 33% American beech and 46% sugar maple (P.M. Hurley, unpublished data). Understory vegetation

structure also differs, with South Manitou having a higher level of herbaceous cover and North Manitou having a higher level of seedling and sapling cover.

We tested the null hypotheses that (1) there are no differences in the abundance of small mammals between the two Manitou islands in northern Lake Michigan and the mainland; and that (2) there are no differences in rates of artificial nest depredation on the islands compared with the mainland.

Methods

Zebra finch (Taeniopygia guttata Vieillot) eggs were used to simulate veery (Catharus fuscescens Stephens) eggs. The veery was selected because it is a common ground-nesting bird on the islands and mainland. Zebra finch eggs (~16.9x12.8 mm) are smaller than veery eggs (~22.9x16.9 mm; Moskoff 1995), but readily obtainable commercial eggs were more similar to veery eggs than other species that have commonly been used in artificial nest studies (e.g., Japanese quail, Coturnix japonica Temminck & Schlegel). Real eggs were used in addition to the artificial eggs to mimic olfactory cues that may be associated with natural nests. Real eggs were left unwashed and kept in a refrigerator until they were placed in the artificial nests. Artificial nests constructed of dried grass were obtained from a craft distributor (Nicole Quality Value, Mount Laurel, N.J.). These nests were approximately 10 cm in diameter, 5 cm deep, and were similar in size to natural veery nests. Artificial eggs were made using gray Plasticine (Hobbycraft Canada, Concord, Ontario), which was rolled by hand into a shape and dimension similar to veery eggs. A small paper clip was then inserted into each egg, and the eggs were wired into the artificial nests to

minimize their loss. Each nest consisted of one artificial and one zebra finch egg. Latex gloves were worn at all times when the eggs and nests were being handled to minimize human scent contamination.

Four artificial nest grids each were located within the national lakeshore in beech-maple forests on the mainland. South Manitou, and North Manitou. Grids were a minimum of 1 km apart and were chosen using a digital vegetation cover type map such that all grids were located in similar forests. Each 200x200-m grid consisted of five parallel transects onto which nests were placed at 50-m intervals for a total of 25 nests per grid. The 50-m spacing was intended to limit the probability of a single predator depredating more than one nest. Artificial nest points were located at each interval using two random numbers: the first determined the distance from the transect (1-10 m in 1-m increments), and the second determined the direction from the transect (90° right or left of the transect). Artificial nests were placed in the leaf litter to simulate natural nests. No additional attempt was made to conceal the nests so as to avoid any bias associated with differences in concealment. Flagging was used to assist in relocation of the nests, but it was at least 25 m from any nest to minimize visual cues that predators may have associated with the nests. Simple sketches were also made for each nest to assist in relocation.

The veery breeding season lasts from approximately 1 June through 15 July. Artificial nest trials were performed on the mainland between 29 May and 10 June, on South Manitou between 31 May and 12 June, and on North Manitou between 15 June and 27 June. Logistical constraints precluded performing the artificial nest study at the same time at all three locations. Nests were monitored after 6 days and again after 12 days, approximating the incubation period for the veery. A higher frequency of nest monitoring was avoided to reduce predator attraction to nests resulting from the presence of humans.

Successful nests were those that did not experience a depredation event after the 12-day exposure period. Artificial nests considered depredated if the were Plasticine egg had marks on it or if the zebra finch egg was destroyed or missing. Depredated nests were removed to avoid potential bias from predators learning the location of and returning to previously depredated nests. Plasticine eggs from depredated nests were collected and teeth marks were compared with teeth from a collection of small mammal skulls to determine the species responsible for the depredation event. All nests were removed after the 12-day monitoring period.

Small-mammal trapping was carried out between 20-24 June on the mainland, 25-29 June on South Manitou, and 1-4 July on North Manitou. One trapping grid was centered in each artificial nest plot. Small-mammal trapping occurred after the artificial nest study had been completed between 29 May and 27 June. Each trapping grid was 90x90 m, with traps spaced at 15-m intervals to create a 7x7 grid of traps. One 9x9x23-cm Sherman live trap (H.B. Sherman Traps, Tallahassee, Fla.) was placed at each trap station for a total of 49 Sherman traps per grid. These traps were covered with an insulating/waterproofing material and contained a single piece of cotton (i.e., nesting material) to minimize animal mortality in the traps. Additionally, nine Havahart traps (152 cm x 152 cm x 406 mm) were placed evenly on each grid to sample larger mammals. Flagging was

placed near each trap to aid relocation. Traps were baited with a mixture of peanut butter and rolled oats. Baited traps were used because the goal of this study was to establish an index of small-mammal abundance for each site rather than absolute density.

All animals were handled according to the American Society of Mammalogists guidelines (Animal Care and Use Committee 1998). Traps were checked daily in the early morning, and all captured animals were identified to the species level, weighed, and assigned to an age class. Age class was determined by pelage color for mice (Peromyscus spp.; Whitaker 1997) and weight for eastern chipmunks (Tamias striatus), and animals were designated as juvenile, sub-adult, or adult. Captured animals were also ear tagged with serially numbered Size 1 Monel ear tags (National Band and Tag Company, Newport, Ky.) for future identification. We compared the age classes of Peromyscus spp. and eastern chipmunks captured at each location to determine whether the age structure of small-mammal populations differed over the two-week period.

Comparisons of artificial nest depredation rates were made among the islands and the mainland using CAPTURE (Otis et al. 1978). Population estimates were calculated for both mice and eastern chipmunks using NOREMARK (White 1996). *Peromyscus* spp. were pooled due to difficulty in distinguishing the deer mouse (*Peromyscus maniculatus* Wagner) from the white-footed mouse (*Peromyscus leucopus* Rafinesque) in the field and the ecological similarity of the two species (Schnurr et al. 2002). Lincoln-Peterson population estimates of small mammals on the islands and the mainland were compared using multiple analysis of variance (MANOVA) (SAS Institute Inc. 1989). Age structure of *Peromyscus* spp. was compared among the three locations using hierarchical log-linear analysis in SPSS (SPSS Inc. 1998). Planned orthogonal contrasts (mainland vs. South Manitou and North Manitou; North Manitou vs. South Manitou) were then made using a G-test. Age-class comparisons of chipmunks between North and South Manitou were made using a Student's t-test (SAS Institute Inc. 1989). For all analyses, an alpha of <0.10 was considered statistically significant.

Results

After 6 days, the mean number of nests depredated out of 25 on North Manitou was significantly higher than on either mainland South Manitou or the (F_{CALC}=10.87, *p*=0.004, df=11; Figure 1). Since nearly all of the nests on North Manitou were depredated after six days, analysis of nest success on this island was limited to the 6-day depredation rate. After 12 days, nearly all nests on the mainland and South Manitou were depredated, and depredation rates were not statistically significantly different between these two locations (tstat= 0.37, *p*=0.72, df=6; Figure 1).

Examination of depredated Plasticine eggs indicated that *Peromyscus* spp. were responsible for most of the nest depredation on both islands and the mainland (Table 1). Eastern chipmunks, gray squirrels *(Sciurus carolinensis* Gmelin), and northern flying squirrels *(Glaucomys sabrinus* Show) accounted for a small proportion of artificial nest depredation events on both islands, but these species were not responsible for any known nest depredation events on the mainland and were never captured there. The mainland did have higher rates Figure 1. Mean number of artificial nests depredated after 6 and 12 days on the mainland, North Manitou Island, and South Manitou Island at Sleeping Bear Dunes National Lakeshore, Michigan. Error bars represent one standard error. Each location consisted of four independent grids, each consisting of 25 artificial nests. On Days 6 and 12, bars with the same letter are not significantly different (p>0.05). On North Manitou Island, nearly all nest were depredated after 6 days. Therefore, no Day 12 analysis was available for this island.



| | Peromyscus spp. | Eastern chipmunk | Raccoon | White- tailed deer | Unidentified Avian | Unknown |
|------------|--------------------|---------------------|---------|-----------------------|-----------------------|---------|
| Mainland | 77% | 0.0% | 13% | 1% | 0% | 9% |
| S. Manitou | 88% | 2% | 0% | 0% | 0% | 10% |
| N. Manitou | 87% | 3% | 2% | 0% | 2% | 6% |

Table 1. Percentage of artificial nests depredated by different predators on the mainland, North Manitou Island, and South Manitou Island at Sleeping Bear Dunes National Lakeshore, Michigan. Each of these three locations consisted of four independent grids, each consisting of 25 artificial nests.

of raccoon (*Procyon lotor* L.) depredation, and all three locations had nests that were removed completely and assigned to an "unknown" category. Other predators such as white-tailed deer (*Odocoileus virginianus* Boddaert) and birds played relatively minor roles as artificial nest predators.

Indices of population sizes of Peromyscus spp. among the mainland, South Manitou, and North Manitou were not significantly different (F_{CALC}=0.83, p=0.25, df=11; Figure 2). Variation in capture success within each location was high and may have reduced the chances of detecting differences in population sizes among the three locations. Eastern chipmunk population estimates among the mainland, South Manitou, and North Manitou (0, 5.9 ± 3.1, and 11.3 ± 3.1, respectively) were significantly different (F_{CALC}=4.94, *p*=0.03, df=11; Figure 3). No chipmunks were captured on the mainland

during the trapping period, despite occasional sightings on the mainland.

Hierarchical log-linear analysis of Peromyscus spp. captured at each location revealed that age classes were more evenly distributed on the mainland than either of the two islands, where most of the individuals captured were adults (p=0.004). Planned contrasts of this data suggest that the mainland contained proportionately more non-adult mice than either of the islands (G_{CALC} =6.71; p<0.01) and that the two islands did not differ from one another (G_{CALC} =0.09; p>0.05). However, no statistically significant differences were seen in the age distribution as inferred from mean body weights of eastern chipmunks on South Manitou versus North Manitou.

Other captured species included southern red-backed voles (*Clethrionomys* gapperi Vigors), gray squirrels, northern flying squirrels, and northern short-tailed Figure 2. Mean estimated population sizes of mice (*Peromyscus* spp.) on the mainland, North Manitou Island, and South Manitou Island at Sleeping Bear Dunes National Lakeshore, Michigan. Each of these three locations consisted of four independent grids, each with a 7x7 grid of small-mammal trap stations. Error bars represent one standard error. At each location, bars with the same letter are not significantly different (p>0.05).

Figure 3. Mean estimated population sizes of eastern chipmunks (*Tamias striatus*) on the mainland, North Manitou Island, and South Manitou Island at Sleeping Bear Dunes National Lakeshore, Michigan. Each of these three locations consisted of four independent grids, each with a 7x7 grid of small-mammal trap stations. Error bars represent one standard error. At each location, bars with the same letter are not significantly different (*p*>0.05).

shrews (Blarina brevicauda Say), but these species were not caught in sufficient numbers to estimate population sizes. In addition, these species were never implicated as nest predators.

Discussion

Many authors have questioned the use of artificial nests to estimate rates of nest depredation of natural bird nests. Factors such as human scent contamination (Donalty and Henke 2001); lack of adult scent and incubating activity; presence of eggs but not nestlings; differences in camouflage; lack of adult defense; differences in the size, color, or odor of eggs (Wilson et al. 1998); attraction of different suites of predators; differences in the location of nests (Zanette 2002); and the ability of some predators to learn to search for artificial nests arranged in a regular pattern (e.g., a grid; Willebrand and Marcstrom 1988) may result in dis-



crepancies between artificial and natural nest depredation. However, there appears to be a growing consensus that artificial nests are valuable for measuring nest depredation at local scales (Roper 1992) and detecting trends in relative reproductive success in birds (Wilson et al. 1998; Villard and Pärt 2004).

Our study suggests that some interesting community processes are occurring at Sleeping Bear Dunes National Lakeshore. Small-mammal communities differ among the Manitou islands and the mainland. However, the differences that we identified were only partly consistent with predictions of ecological release of small mammals on both islands. On North Manitou, eastern chipmunk population densities were higher than on either South Manitou or the mainland. North Manitou Island also had significantly higher depredation rates on artificial nests after six days than either South Manitou or the mainland. In terms of small-mammal populations and artificial nest depredation rates. South Manitou resembled the mainland more than it did North Manitou. We had predicted similar patterns between the islands and differences between the islands and the mainland. If ecological release of small mammals occurred on both islands, it was either manifesting itself in different ways or was obscured by other phenomena that are simultaneously acting on small mammals on the islands. For example, island-specific population fluctuations may have obscured the effects of the island syndrome. In some cases, it has been suggested that intraspecific competition resulting from elevated population densities may increase and thereby overcome any effects resulting from lack of interspecific competition on islands (Crowell 1983). However, on the Manitou islands, population densities of the major artificial nest predator (Peromyscus spp.) did not appear to be elevated, and although population densities of eastern chipmunks on North Manitou were higher than on the mainland, they did not appear to be the dominant nest predator.

Historically, South Manitou has lacked a population of white-tailed deer. In contrast, North Manitou went through several decades (1940s-1980s) of extremely high deer densities while it was a private game reserve with supplemental winter food provided (Case and McCullough 1987). These populations have persisted, and deer are still present on North Manitou. Mainland deer densities have historically been intermediate between the densities on the two islands. American beech is approximately three times more abundant on North Manitou than on South Manitou (D. Flaspohler, unpublished data). We hypothesize that the preference of deer for sugar maple

over American beech (Case and McCullough 1987) has favored beech recruitment on North Manitou relative to South Manitou and led to the greater dominance of beech on North Manitou compared with South Manitou or the nearby mainland. This beech dominance and associated greater abundance of beech seed may be supporting the higher relative densities of chipmunks that were observed on North Manitou, potentially increasing competition with mice for food resources. This, in turn may explain the higher level of artificial nest depredation by mice on North Manitou relative to the mainland and South Manitou. This study suggests a potentially important role of American beech in structuring forest communities, although other possible mechanisms behind these observations may exist. Clearly, further work would be valuable in beginning to uncover the mechanisms observed at the national lakeshore.

In addition to the competitive relationships discussed above, it is possible that mammals on the islands have a later reproductive season than those on the mainland because of the close proximity to Lake Michigan. If this is accurate, population estimates of Peromyscus spp. on the mainland may have been somewhat inflated relative to those on the islands, because the breeding season had apparently already started on the mainland (as evidenced by the relatively even distribution of age classes on the mainland). Relatively few juvenile and sub-adults were captured on the islands, and it is likely that they had not experienced the same reproductive output when they were sampled. However, both islands appeared to be fairly similar in the distribution of age classes, both for Peromyscus spp. and for eastern chipmunks. Later sampling of mammals on the islands

may have provided a more detailed representation of relative population sizes, particularly between the mainland and the islands.

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- J.N. Rosemier, School of Forest Resources and Environmental Science, Michigan Technological University,1400 Townsend Drive, Houghton, Michigan 49931; jnrosemi@ mtu.edu
- D.J. Flaspohler, School of Forest Resources and Environmental Science, Michigan Technological University,1400 Townsend Drive, Houghton, Michigan 49931; djflaspo@ mtu.edu

ENVIRONMENTAL JUSTICE

GILLIAN BOWSER, GUEST EDITOR

Through the Eyes of a Child: The Many Aspects of Environmental Justice

Gillian Bowser

I REMEMBER THE MOOSE. The moose was standing in the dappled sun of a late Wyoming afternoon and it stood squarely in the middle of a path between my five-year-old feet and a patch of huckleberries. As a five-year-old from Brooklyn New York, the moose represented such otherness that the tableau—moose, berries, shafts of sun, and my dusty Pro-Keds sneakers—has remained crystal clear for decades. In my mind, that moose represented every-thing different from my city home and everything pivotal to the career I ended up choosing.

What is environmental justice? When asked this question, most people refer to low-income neighborhoods where health impacts are the primary concern and the environment is a surrounding that is evil, with toxins moving up the food chain and concentrating in human populations. However, here, in this special edition of The George Wright Forum, we take a step back and define environmental justice through the eyes of a child. Environmental justice is the access to curiosity in discovering the sweetness of huckleberries, the challenge of hiking a dusty trail in battered sneakers, and the indomitable barrier of a moose in the middle of a path. From curiosity to exposure to stereotypes, we need to explore the barriers that make access to environmental resources, such as huckleberries or a

moose, more difficult for some ethnic groups to achieve than others.

What is the concern for environmental justice? The American public is rapidly changing and the environmental challenges facing our nation's protected areas are increasing. Early on, the history of the environmental movement moved in a different direction from the common experience of ethnic groups such as African Americans or Native Americans. The National Park Service Act of 1916 was passed 25 years after the battle at Wounded Knee; ten years after the enactment of Jim Crow laws in the South, and within 25 years of the lyrics made famous later on by Billie Holiday: "these trees, what strange fruit they bear...." The Wilderness Act of 1964 was within a year of the Civil Rights Act of 1963. Yet it

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wasn't until the end of the tumultuous sixties that the idea of parks and access to resources for even the urban poor was articulated-not by the grand names, like Leopold or Muir, often associated with parks and preservations, but by the release of The Race for Open Space in 1960 by the Regional Plan Association in New York City. The tie between urban development and decay and the coining of the term "open space" was the start of a movement recognizing that urban dwellers-often poor and minorities-needed recreational opportunities near by to cure urban ills. People connect to parks through reflection, recreation, and even gardening in ways that were beneficial to the urban lifestyle. The 1978 addition of recreation areas to the management units of the National Park Service were intended specifically to address the goal (as articulated in 1971 by the Advisory Board on National Parks, Historic Sites, Buildings and Monuments) of "providing outlets for urban frustration and constructive activities for youthful energies ... we have an obligation to give these people the chance to share in a bit of open space and fresh air." Yet to this day, most minorities associate parks with fear, crime, a feeling of being unwelcome, and an uncomfortable history.

In the following collection of papers, the authors explore two related questions: What is environmental justice, and how does it relate to natural resources? And: Why is the connection to open space important to all people? This question was first posed in the scholarly work *Justice and Natural Resources* (Mutz, Bryner, and Kenney 2002) where environmental justice was explored in the context of natural resources themselves rather than environ-



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mental toxins. The idea of fairness of access and other social inequalities was noted not only in terms of where parks are but how they are maintained and managed. Clearly, the equitable access to natural resources, or even the right to make traditional use of those resources (as was granted in the case of Alaskan Natives) did not exist in all communities, so the question of justice, as clearly outlined by a 1994 executive order by President Clinton, was that the environment was to be equally accessible for all Americans. The papers presented here examine that access, starting with a broad presentation of typical stereotypes to personal stories and interviews.

The first broad step is an understanding to how the demography of the United States is rapidly changing around our parks. Hispanic populations are exploding in the Southeast while African Americans are appearing in states as remote as Montana (Peterman, this volume). As these populations change around the parks, the stakeholders involved with the parks and impacted by management actions, has also changed. In a recent study of Northeast parks in the Northeast, my colleagues and I found that many parks were surrounded by communities whose Hispanic populations had increased by more than 200%. In contrast, parks in the western states, such as Padre Island National Seashore in Texas, showed less change in Hispanic population, but a dramatic shift in the population age as retirees moved into the area. As these demographics shift, the stakeholders also shift and the relevancy of parks to those local populations is declining (Schuett and Bowser, this volume).

The second step in exploring environmental justice is the issue of curiosity and acceptance. Three papers here emphasize the issues of youth and their ability to explore natural resources and be comfortable. Henry F. Howe reviews the cultural roots of ecology and current ecological paradigms to explore their role in introducing youth to ecological curiosity. Then, Corliss Wilson Outley explores her research on children within inner cities and discusses their views of environmental quality and how their perceptions affect the use of open spaces. These articles mirror recent news releases in the media regarding the decline in park visitation, and also touch upon new technologies, like podcasting and cell phone stations, that fundamentally change how visitors experience parks.

The goal of this collection of papers is to encourage reflection. Environmental justice is not the simple siting of toxic sources near one neighborhood or another. Environmental justice is also about the open access—perceived or hidden—of all people to America's natural resources. If we connect only one culture to that environmental history, we risk the alienation of a rapidly growing majority. It is instructive to reflect that the youth interviewed by Outley will be the generation managing the parks in the year 2016—the hundredth anniversary of the National Park Service. It is sobering to

think that the parks whose nearby communities have the fastest-growing Hispanic populations don't have basic regulatory signs in Spanish, and yet those are the stakeholders who will be voting for that park's budget in 2016. Imagine, as we head towards the centennial celebrations of the founding of the National Park Service, that the management and visitors to parks must look very different from the current employees and visitors for parks and protected areas to survive. A failure to recognize the complexity of perceptions this new group of citizens will have towards parks, and the barriers created by those perceptions, can be as fatal to the parks themselves as the perceived overcrowding of the 1990s and the current challenges of global climate change.

But lastly, remember the moose. As a young African American from an urban jungle, that moose was a barrier between me and the desired huckleberries of my future. By 2016, all inner-city youth should have access to such huckleberries, so that they in their turn can become stewards, and look forward to sharing the day when they take their five-year-olds' hand and lead them carefully down the dusty trail, past the moose, to the treats beyond.

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Gillian Bowser, Department of Recreation, Park, and Tourism Sciences, Texas A&M University, 2261 TAMU, 210 Francis Hall, College Station, Texas 77843-2261; gbowser@tamu.edu

Fear of the Boom Box: Death Knell for Our Public Lands?

Audrey Peterman

A 1994 ARTICLE IN *National Parks*, the magazine of the National Parks Conservation Association, addressed the National Park Service's need to reach out to racially diverse communities and harness the power of this fast-growing demographic group. Each of the four letters published the following month in response to the article intensely decried the effort, and some used vituperative language to describe what they saw as the inevitably negative effects that would result.

"Please do not (defile) our oases...." "We come to these places to get away from the problems caused by ethnic minorities...." "Bringing more blacks and Latinos into the parks would only lead to an increase in robbery, murder and other crimes...." "If blacks and Latinos do not enjoy this type of recreation, then do not force them...."

When we first saw the article and the letters in 1995, my husband Frank and I had just returned from a life-altering, 12,000-mile, 40-state trip around the country, visiting national parks from coast to coast. Awestruck by the unworldly beauty of Acadia, the Grand Canyon, Yellowstone, Yosemite, Olympic, Zion, and the Petrified Forest, among other national parks, we had been equally astounded to find ourselves the only Americans of color among visitors. (It wasn't until we reached Olympic that I saw another black woman.)

Returning home to Florida, we couldn't stop talking about the national park system. This, surely, was among the greatest gifts our country could give to its citizens our most compelling landscapes preserved for our enjoyment and inspiration, along with the relics of Native cultures and the salutary places in our country's history. Who needed to go anywhere else on vacation when there was so much in our own country to discover?

Our friends and relatives, that's who. Many of them had been uneasy when we told them our plans to hike and camp in national parks, amazed that we would make ourselves so vulnerable. Their concern was less about our being attacked by wild animals and more about being accosted by hostile white men. Frank and I had responded that we did not feel a need for protection since, as Americans, we were merely going out to see our country. Wasn't that every American's right?

While we were busy telling them how completely pleasurable our trip was, the letters in *National Parks* magazine woke me up to the fact that the hostility our friends "perceived" was indeed real. There are people who don't want their Great Outdoors



experience to include the diversity they experience in the cities, or the changing face of America.

In the ensuing 11 years expended in trying to bridge the gap so that the national parks and public lands are attractive and welcoming to African Americans and Latinos, we have found a tremendous drag on both sides.

The mainstream environmental segment, including public land management agencies and nongovernmental organizations, whose job it is to reach out to these "non-traditional" users with a public information campaign, instead bemoan the "lack of interest" in communities of color, who have not been informed to begin with. Despite all evidence to the contrary, they persist in expressing that "all Americans fondly remember our experiences in the national parks...." Outreach programs are small, sporadic and are the first to be cut because "we just don't have the budget."

Simultaneously, many African Americans have been slow to embrace the outdoors and believe "environment" has nothing to do with them. Appeals highlighting the connection between natural resource protection and our air and water have been met with, "White people are going to have air, so we're going to have air. There are more pressing things I have to worry about." Even the 2005 catastrophe on the Gulf Coast has not been recognized as an example of how disastrously black and poor people can be affected by environmental decisions in which we are uninvolved.

A jarring conversation this year with a colleague who is also president of a prominent non-profit made me realize how far we still have to go. I was explaining to him that, when we take African Americans to the parks, they are just as awestruck as anyone, and as motivated to help conserve them. We're all human beings, and share a common humanity, including a reverence for

great natural beauty,

"So, does that mean everyone has to visit the parks?" he challenged. "Does that mean we have to have the boom boxes and everything?!"

I gently reminded him that boom boxes have been out of style for a while, and almost everybody uses an iPod. Moreover, we have visited more than 100 units of the national park system and I have never once heard a boom box. We are also seeing many more visitors of color. This Columbus Day weekend in Sequoia National Park, I saw so many African Americans and Latinos, I finally had to stop running up to every one of them and talking to them.

The premise of the offensive boom box carried by marauding urbanites is just as damaging and offensive as the expectation that people in the great outdoors should show hostility to African Americans. These stereotypes are reinforced by mass media images of outdoor activity, which show only white people participating. Although conservation and protection of our environment is the most fundamental issue linking Americans and all humans, the all-white group on the cover of the 2006 "Earth Day Issue" of *Vanity Fair* magazine dramatically illustrates the schism in America's thinking about the environment: Environmental protection is the forte of white people. "Environmental justice," addressing the ill effects of pollution overwhelmingly experienced by the poor, is the forte of people of color. Never the twain shall meet.

This false dichotomy almost completely ignores the superhuman effort being put out by many African American and Latino groups around the country, who are doing everything they can—including investing their own money—to raise awareness that public lands exist for our recreation and enjoyment. If public land managers and NGO leaders can get over their fear of the boom box and support these emergent leaders, we could conceivably succeed in protecting our treasured places for the sustenance of future generations.

Audrey Peterman, Earthwise Productions, Inc., 450 Piedmont Avenue, Suite 1512, Atlanta, Georgia 30308; EarthWS@aol.com

Managers' Perceptions of Issues in Serving Racial and Ethnic Minorities in Urban Parks

Michael A. Schuett and Gillian Bowser

Introduction

One of the key recommendations in *The National Park Service in the 21st Century* (2004), a report compiled by the National Park System Advisory Board, concerns diverse populations. According to this document, NPS should "tell America's story as one of diverse cultures interacting with and depending upon the natural world." They suggest "that all parks should be interpreted in terms of both their natural and cultural values, including their values to all Americans" (National Park System Advisory Board 2004:12). Basically, the reports stresses that parks and their management should reflect an understanding of the significance of each landscape as a culturally formed montage of habitat and human behavior, an interaction between changing natural processes and people.

In considering this statement, how can NPS incorporate the values of all Americans in its various park units? How is this story being told? Do Americans feel they have a connection (physical or psychological) to the national parks, especially those parks in or near changing, diverse urban populations? Is this an issue of environmental justice or marketing? What future strategies should be considered to make the visitor experience more inclusive and integrate those individuals who have traditionally been under-represented (Hispanics, African Americans) as visitors in NPS park units? These questions raise important issues about the continued challenge the NPS faces as it strives to preserve many social, cultural, and natural resource treasures for a changing American population.

Some researchers would argue that the record of accomplishment for our natural resource agencies and its relationship with

certain under-represented populations is problematic. It is a challenge that could be discussed through the lens of environmental justice. Bryner (2002) discusses several frameworks that have been used and agreed upon by scholars to explore the causes and characteristics of this type of environmental justice. One of these frameworks is social justice, which discusses a lack of access to natural resources and their benefits. In referring to specific benefits, one that is important is to have the ability to experience the social and cultural history contained in our national parks. As increases in minority populations change the face of population centers across the nation, park managers in or near urban settings are confronted with new ways to figure out how to attract and meet the needs of an increasingly diverse and eclectic customer base.

In a review of the literature on underrepresented groups and the use of U.S.

national parks, Floyd (1999) points out that national park visitation by racial and ethnic minorities, especially African Americans, is lower compared with that of whites. (See also Rodriguez and Roberts 2002, as well as Gomez 2003, for comprehensive literature reviews on ethnicity and recreation.) In highlighting several specific studies, a brief overview of research on minority park visitation, Northern Arizona University's nationwide study Survey of the American Public (2003), found that 36% of white non-Hispanic Americans, 33% of Asian Americans, and 27 % of Hispanic Americans reported visiting a national park in the last two years, while visitation for African Americans was comparatively low at 13%. In examining reasons for some of these visitation differences by various under-represented groups, Roberts (2003) studied visitation by Latinos and African Americans at Rocky Mountain National Park. She found that individuals experienced several types of constraints to park visitation, including the culture of NPS; perceived discrimination, discomfort, and safety; and lack of knowledge or awareness. In urban parks, Gobster (2001) investigated visitor usage and found that racial and ethnic minorities and whites participated in similar activities, yet minorities still feel a sense of discrimination by police and park staff in the park setting. In a related study that assessed social science needs of urban park managers, Harris and Lorenzo (2000) found that managers expressed a need for more social science research (e.g., research on visitor expectations), technical assistance, and training opportunities to serve their clientele in urban park settings.

Given the body of research on minority park visitation and a growing need for park managers to serve all visitors, more information is needed from those who interact with customers on a regular basis. Several questions need to be explored: Are racial and ethnic minorities aware of national parks in or near urban areas? How can the visitor experiences become more "relevant" for racial and ethnic minorities? What strategies could be used to make under-represented visitors feel more welcome, or at least a part of the park experience? Therefore, the purpose of this study was to obtain preliminary feedback from NPS urban park managers and administrators on serving racial and ethnic minorities.

Methods

Between November and December 2003, open-ended, semi-structured interviews were conducted in three one-hourlong focus group/conference calls with thirteen individuals. Participants included managers in urban-proximate national park units and administrators. As used in this study, the definitions of race and ethnicity followed those of Floyd (1999:2):

- *Race:* a social group distinguished or set apart, by others or by itself, primarily on the basis of real or perceived physical characteristics.
- *Ethnicity:* a social group set apart on the basis of culture or nationality characteristics.

The following criteria were used to choose study participants: (1) experience as a manager in an urban park unit, (2) expertise in program delivery or administration with urban park units, and (3) availability for the study. Managers represented the following NPS units: Martin Luther King National Historic Site, Golden Gate National Recreation Area, Santa Monica Mountains National Recreation Area, New York Harbor Parks, Gateway National Recreation Area, Death Valley National Park, and Cuyahoga Valley National Park. Administrators represented the following NPS offices and programs: the Rivers, Trails and Conservation Assistance Program, the WASO (Washington headquarters office) Natural Resource and Education divisions, the Pacific West Regional Office, and the Midwest Regional Office. The interviews were recorded and transcribed verbatim. Each phone call utilized the same interviewer, asking the questions in about the same order. The conference call questions were based on the current literature as well as input from managers and a team of academic researchers. The following questions and areas related to serving racial and ethnic minorities were explored:

- What are the critical issues facing park and recreation managers?
- What are current visitation levels at your park?
- Describe design/programs/planning features made to attract visitors.
- Explain the factors that prevent agencies from better serving visitors.
- Elaborate on strategies colleges and universities can use to better recruit and train potential employees.
- What are your research needs?

Findings

Thirteen individuals participated in the calls. The transcripts yielded approximately 120 pages of data. These data were analyzed using content analysis, and all data were aggregated. In order to secure reliability and validity, four independent researchers examined the transcripts for frequency of word usage and common words and phrases. The following themes emerged from the analysis.

Interaction and connection with local communities. The issue of improving relationships with communities was a repeated observation that surfaced in several of the respondents' comments. The point was driven home many times: NPS managers felt that they must do a better job of connecting with local schools, citizens, and partners. NPS managers agreed that they should obtain more input on programs, establish local advisory boards (if feasible), develop more partnerships, and constantly be aware of whether local citizens have been exposed to—and if they care about—what the park has to offer.

NPS personnel felt that they must work with specific groups that have not previously participated in planning and program development so that they can modify programs and displays to appeal to diverse groups. Managers felt more support is needed for community-based programs so that these programs remain a high priority for the entire park unit, and not just the site manager.

Managers stressed the fact that relationship-building is a long-term process and takes a great deal of time and effort. Communities are eager for results and want to see them in a tangible format. Still others felt that greater interaction with communities, although nothing new, needs to be reinforced. Several comments stressed the need to obtain information from the community on the programs and services they desire by strengthening current relationships:

> ... communicate a job vacancy, to communicate activities that are going on in the park. And even on top of communicating their activities, to finding out from those folks in the community

what type of activities that they might even be interested in to help them prioritize even their time.... We have to make that connection with our population to show that ... you put a rainbow of color across the U.S.

Lastly, the interaction between the communities and NPS is a goal that pays off over time and reaps benefits into the future:

> ... and that's some of what I have seen in other parks as well, as I've traveled and talked with other park managers and community leaders.... [H]aving that liaison to that community group, has provided the opportunity to establish a longer-term relationship and ... gives the community an opportunity to get to know other park's staff or other resources within the park....

Commitment to a diverse workforce. NPS managers were adamant that the agency must demonstrate a stronger commitment to diversity recruitment and retention in all aspects, i.e., from policy to resources. Seasonal and veteran NPS employees may need new skills, requiring cultural sensitivity training, to relate better with diverse employees, visitors, and communities. Managers also felt that employees, programs and initiatives that effectively deliver results in enhancing employment diversity through local communities must be supported. Managers and administrators felt it was desirable to work toward establishing a more diverse workforce, reflecting the demographics of local communities. Park staff will need to help create policies and an infrastructure that will make employment diversity and retention a staple within the system. Respondents also felt that there is an additional need for more resources to support efforts in recruitment and retention. These programs will require

additional funding and time from park superintendents.

One did feel that this desired goal was quite a challenge:

... [W]e're not going to be truly relevant unless ... our own organization reflects a diversity of the community and people who really understand how to connect the park to those communities. The second part, which we're all struggling with, is that we have so many well-intentioned employees in the Park Service who want to try to answer that question of relevancy, and in their own way, they took a launch here and launch there ... there's really not a strategic sort of strategy in place or the infrastructure to sustain it.

Another closely related problem relating to a diverse workforce was commitment. Managers felt support was lacking from within the agency and among the administrators as well:

> I think the most critical issue is commitment. Lack of or whatever there might be, by staff in parks and also by this administration. And it goes as far back as some of us on this phone conversation, [who have] been with the National Park Service for over 30 years. It's, you know, certain individuals or the organization itself unwilling to dedicate the time, the staff, and the ability to even use non-traditional ways of recruiting and hiring methods to even go out and make any effort. You know, this is the sort of a thing that we have been talking about forever.

Recruitment and employment programs. In a closely related issue, NPS managers agreed that they should work cooperatively with schools, community leaders, and businesses to create programs that will

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make a diverse workforce a reality. NPS must use the educational system as a direct pipeline to accomplish this goal and start these initiatives early in one's educational career. They realize recruitment programs with local elementary and high schools should be enhanced so under-represented students are aware of what NPS offers. Participants agreed that high school students should have opportunities to become part of the agency through specific programs designed to expose them to all aspects of employment within the system. Everyone felt that students should be able to volunteer, obtain academic credit, and, with adequate training, move into positions

as NPS professionals. Partnerships should be established and maintained with historically black and Hispanic colleges so that pertinent academic programs, such as in history, recreation and parks, and so on, become a conduit for students to feed into the NPS system.

Having the ability to recruit students into future positions was a theme that emerged several times:

When minority students, middle school students ... are exposed to a park staff member of their ethnic background ... [then] we have had far more success in reaching out to the community.... [a]nd [strengthening] their relationship with local universities and making them aware of the Park Service in the community and the opportunities that the Park Service offers. Many of our minority staff members were recruited through the student temporary or student career employment programs and they didn't really have a good sense of what they were getting into, when they started it, but it's been very successful and then they reach out to their local communities ... and it really serves as a role model to the student.

Even though workforce programs and policies currently exist in the agency, most felt that more could be done to get administrators to "buy in" to these directives.

Identification of visitor needs/program delivery. Participants agreed that administrators and staff need to identify their audience and provide programs that are more relevant for diverse groups.

> According to one respondent, programs should be created that provide a "threshold experience" for firsttime visitors. These initial experiences are critical to attracting repeat visitors to the park. A connection with the visitor should be sought out by meet-

ing the needs of the entire community through relevant programming. It is not necessarily about more people in the parks but about the quality of the experience and its impact on future generations:

> We're not trying to get new visitors. We're trying to get people to develop a relationship with parks and open spaces and cultural areas, so that it becomes a part of their life. So it becomes something that they pass on to their children, and it is always going to be hard.... [W]e're trying to evaluate this rather quickly, and this is a glacial movement.





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As for getting this message out, information on park programs should be targeted for diverse audiences and placed in appropriate venues to reach these groups, e.g., Hispanic newspapers. It is advisable that the agency coordinate its promotional efforts and make sure the appropriate message is being delivered to the target audience. Those who create effective programs and initiatives should share this information *internally* as well as externally so other staff can benefit.

Enhancement of current research endeavors. The final theme that emerged focused on research. Managers sensed that they needed more ammunition to make their arguments and more information to make decisions. They felt that more research studies are needed on racial and ethnic minorities and urban parks. In particular, they expressed a need for more data to identify many important predictor and explanatory variables, including reasons for visiting parks, barriers to visitation, program and activity preferences, customer satisfaction, media choices, attitudes about the park experience, etc. They also expressed a desire to see more in-depth research methods (such as focus groups) being used, so more detailed information can be collected and analyzed. One manager evidenced the need for more research:

Our fundamental problem is we don't have access to data outside of what we're doing.... [I]f you could find something ... or [someone] to act as a consistent clearinghouse of relevant data that would give a manager ... upto-date information.... [T]here was just no way for our people, or any of us, to get that kind of study input of new and relevant information.... It was suggested that a national clearinghouse be created that would contain research results on under-represented groups by park managers, scientists, and academic researchers. NPS managers should also seek out and collaborate with experts from colleges and universities to identify and conduct relevant research.

In summary, respondents reinforced several key issues throughout the interviews.

- NPS park personnel and administrators may need to learn more about what customers desire;
- Links to communities and educational institutions are a critical source for future employees, research partnerships, social science; and
- Additional efforts should be made beyond what is currently being done to meet the two previous issues.

Just how future suggestions or feedback are integrated into the NPS visitor experience is not for academics to decide, but one that managers and citizens must come to terms with as our changing nation embarks on the preservation and sustainability of the nation's parks by all Americans. As Floyd aptly states: "That nearly one-third of the U.S. population is largely invisible in the national parks raises questions about the parks' future relevance, meaning, and protection in an increasingly multicultural society. The disparity in national park use also raises questions about equity, fairness, and the ability of the NPS to find common ground with the people it is mandated to serve" (2001:11). On the other hand, we must also be sensitive to the fact that fluctuations in park visitation may also be a result of current societal factors, including a rise in electronic entertainment media, which may represent a shift in recreation choices (Pergams and Zaradic 2006).

Future suggestions

The purpose of this study was to obtain preliminary feedback from NPS urban park managers and administrators serving traditionally under-represented visitors from racial and ethnic minority groups. The scope of the results is limited due to the size and composition of the study sample. These results should not be generalized to all urban park units. However, the depth of the interviews unveiled a plethora of information that is worthy of future exploration from a practical and theoretical perspective.

Theoretically, much more work is needed in exploring the relationship between racial and ethnic minorities and the visitor experience. Have minorities been given equal access to our nation's national parks? Do social and cultural barriers need to be removed to improve this situation? If so, what are they and how can they be understood? Is the perception of a lack of access to national parks an environmental justice issue, or could it just be poorly trained staff?

From a practical side, several suggestions were given that can assist managers and administrators in making the access to national parks more fulfilling and more "relevant." Initially, a follow-up study to explore this research question is needed with a more representative sample, not only of managers but of a host of visitors. Given this limitation, several suggestions regarding outreach, which summarize and expand upon the managers' needs and concerns, are proposed in the next section of this paper. Although time and resources are limiting, these types of ideas and suggestions are those expressed by the managers, so administrators need to seek out innovative strategies and incentives to encourage this type of work to become part of park culture.

Based on the comments of the managers and consistent with themes that have emerged from the literature, these research objectives should be honed through individual discussions with managers and be consistent with the organizational mandates of NPS.

Outreach

- Provide incentives for park managers to become more engaged with local communities through neighborhood associations, church groups, civic groups, etc., so they can better interact with and serve racial and ethnic minorities.
- Initiate programs to recruit a more diverse student body from higher education, as well as from secondary schools. Establish a recruitment pipeline with high schools and historically black and Hispanic colleges and community colleges. Increase funding for undergraduate and graduate student scholarships and post-doctoral fellowships.
- Management should seek and identify individuals that are willing to work within communities to recruit minority staff. Employees may need special training to interact at a community level. Managers must receive support and incentives from administration to do this type of outreach.
- Managers may want to consider getting more involved in career fairs and spend some time and resources to provide

field experiences for students via internships. They should encourage the addition of more courses to university and high school curricula that discuss racial and ethnic differences.

• Managers could become knowledgeable about multi-ethnic marketing and seek out publications that may be more effective in getting the word out to potential users.

Research

- Encourage more research, using more in-depth data collection methods, about racial and ethnic minorities, focusing on perceptions of the natural environment; preferences for specific sites, activities, and programs in urban areas; and barriers to park visitation.
- Identify the strategies that are most effective in procuring input and delivering information messages to and from minority group members for planning and program development.
- Learn why racial and ethnic minorities do not often choose recreation and

parks as a major and career. In turn, develop programs to educate recruit minority youth about NPS careers and determine the best practices for managing a diverse work force.

- Seek out additional sources and partnerships for funding to conduct more research. Current funding levels for research from NPS administration and at the park level seem problematic, so new partnerships with nonprofits, higher education, private foundations, and industry are needed to fulfill manager needs.
- Create a clearinghouse of information that contains current articles, data, and other sources on under-represented groups and national parks. A university could be the setting for this type of library.

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- Gillian Bowser, Department of Recreation, Park, and Tourism Sciences, Texas A&M University, 2261 TAMU, 210 Francis Hall, College Station, Texas 77843-2261; gbowser@tamu.edu

The Challenge of Environmental Justice for Children: The Impact of Cumulative Disadvantageous Risks

Corliss Wilson Outley

Introduction

DO YOU REMEMBER THE TIMES WHEN YOUR MOTHER WOULD YELL, "GO OUTSIDE AND PLAY?" Or when you, your family, or friends would get to play outside until the street lamps came on? Or how about the time you watched the lizard as it climbed past your bedroom window? Well, in the past decade many young people in the United States have lost the childhood opportunity to experience nature. Consequently, children today are living in a completely different world in comparison with the world in which their parents and grandparents grew up. This is especially true for poor children of color living in urban settings.

The Children's Defense Fund states that over 21% of children in America live in poverty. Poor families and families of color are more likely to live in communities that are situated close to high-polluting industries, hazard waste facilities, and incinerators. In addition, these families are more likely to live in substandard housing, experience poor indoor and outdoor air quality, and be exposed to deteriorating lead paint and contaminated soil within individual homes and communities. Currently, 16% of white non-Hispanic children live in poverty, compared with 41.5% of blacks and 41% of Hispanic children, and as a result these children live in communities that bear a disproportionate share of the environmental problems that occur in the United States.

The disparity in environmental contamination between majority and minority U.S. citizens is further observed in innercity children's use of space. Space has become a major factor in children's daily lives. Pollution, crime, social ills such as drug deals and gang activity, and lack of play and green spaces are just a few of the problems experienced in inner-city environments.

All of these issues combined have led many scholars to question: Are today's urban conditions detrimental to the development of inner-city children? Have innercity children lost access to natural areas and, subsequently, outdoor play?

Recognizing that childhood is a social construction, the purposes of this article are several: (1) to summarize the environmental justice movement, (2) to analyze the developmental contexts that many children living in inner-city communities confront, and (3) to review the consequences of environmental injustices and their relationship to the future of park management.

Environmental justice movement

The environmental justice movement in the United States began during the summer of 1978 (Bullard 1990). The predominantly African American community in Warren County, North Carolina, protested the selection of a local landfill as the site to dump soil contaminated with PCBs (polychlorinated biphenyls). Many Warren County residents believed that the site was chosen due to perceived lack of opposition by the poor, minority residents living near the site. Warren County took the state to court twice but the federal courts rejected the suits, and hauling of the tainted soil to the landfill began in September 1982.

This gave rise to a joining of civil rights and environmental rights communities as protestors attempted to physically block the path of over 6,000 truckloads of PCB-laced soil. By the end of the six weeks of protesting, over 500 protestors were arrested, making it the first time anyone was jailed in the United States for participating in a landfill siting protest. Consequently, the issue of environmental justice was raised to the national level for the first time in the U.S.

Since this event there have been significant strides in the environmental justice movement, which was given impetus by two early empirical studies:

In 1983, the U.S. General Accounting Office (1983) issued the report Siting of Hazardous Waste Landfills and their Correlation with Racial and Economic Status of Surrounding Communities. The report examined racial and economic characteristics of communities located near four hazardous landfills in the southeastern United States. The report concluded that blacks were disproportionately represented in three of the four communities with hazardous waste landfills, and all four communities had at least 25% of the residents living below the poverty line. • In response to the siting of the Warren County PCB dump, the United Church of Christ's Commission for Racial Justice issued a 1987 report entitled Toxic Waste and Race in the United States: A National Report on the Racial and Socioeconomic Characteristics of Communities Surrounding Hazardous Waste Sites. The report found that the most significant factor for the siting of hazardous waste facilities was race, and a subsequent speech by Benjamin Chavis gave rise to the term "environmental racism."

These studies led not only to an increased production of empirical studies investigating environmental justice claims, but also led to the rise of a grassroots movement and the interaction of local, state and federal policy.

In 1991, the First National People of Color Environmental Leadership Summit was held in Washington, D.C. The summit brought together local grassroots organizers and leaders from around the country dedicated to protecting people of color from unwanted land uses. With the adoption of 17 principles for environmental justice, the grassroots leaders rejected mainstream environmentalism and set forth an ideological framework that represents culture-specific political action.

In 1992, the Environmental Protection Agency issued an environmental equity document, emphasizing that impartiality should guide the application of laws. The document advocated strengthening the relationship with minority academic institutions, hiring more minorities for policymaking positions, addressing the distribution of risk in environmental risk of management, and creating a better database for tracking environmental equity issues.

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However, the document also stated that the data did not support the contention that race was systematically correlated with more risk, except in the case of blood lead levels.

In 1994, the Clinton Administration issued Executive Order 12898, the "Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." It directs each federal agency to develop an environmental justice strategy.

Over the past twenty years a vast array of issues-including but not limited to lead poisoning, hazard waste siting, landfill siting, national superfund sites, brownfields, contaminated fish consumption, and water and air pollution-have been the primary focus of many grassroots organization in communities of color. The understanding that poor and minority communities were disproportionately burdened with environmental contaminations in comparison with more affluent and non-minority communities has been documented extensively (Bullard 1994). The initial movement illustrated the needs of disenfranchised populations and placed environmental health in a central role in effectively fighting unjust private and public policies and management.

The framework incorporates a strategy modeled after previous social movements. The civil rights movement in particular provides a master frame that validates the struggle for rights by marginalized individuals. Environmental justice movement advocates perceive themselves as second-class citizens to whom governmental and corporate groups do not feel accountable, and claim full rights, from fair community treatment to legal protection (Capek 1993). The framework includes five principles of environmental justice: (1) guaranteeing the right to environmental protection; (2) preventing harm before it occurs; (3) shifting the burden of proof to the polluters; (4) obviating proof of intent to discriminate; and (5) redressing existing inequities (Capek 1993; Bullard 1994).

Finally, a call to abolish environmental racism is also viewed as a significant element within the environmental justice frame, though it is not listed as one of the five principles. Since the environmental justice frame is built around a concept of rights, these elements are applicable to public environmental concern and to the environmental decision-making process. These elements include social issues such as the distribution of resources, the role of values in decision-making, conflict management and resolution, and the inclusion of marginalized groups and perspectives (Opotow and Clayton 1994). The elements of the environmental justice frame are unified by strong emphases on individual and community rights, the democratic process, and respect for individuals and communities. The framework also attempts to answer what contributes to and produces unequal protection. These elements are firmly grounded in fairness and in an understanding of the concept of justice in the United States.

So, what is justice? Bullard (1994) contends that "[e]nvironmental decision makers have failed to address the 'justice' question of who gets help and who does not; who can afford help and who cannot; why some contaminated communities get studied while others get left off the research agenda; why industry poisons some communities and not others; why some contaminated communities get cleaned up while others do not; and why some communities are protected and others are not protected." The concept of justice is viewed as a value judgment based on beliefs about the moral rightness of a person's fate (Cvetkovich and Earle 1994; Cook 1995). Treatment by other people and applications of rules and regulations are judged to be just if appropriate standards are met. These standards are defined by supporting values and morals. In turn, these values are used to evaluate if people's actions and other events can be justified. To understand justice is to understand something that impacts everyone's lives.

Today, the phrase "environmental justice," as it is currently used by grassroots environmentalists, refers to the need to distribute environmental hazards fairly across different demographic groups and to connect environmental issues with social justice concerns (Opotow and Clayton 1994). Though the environmental justice movement focuses on the disproportionate siting of hazards in low-income, minority commu-

nities, it has a deeper, more salient concern in the fair and just allocation of natural resources. The environmental justice movement emphasizes that the natural world is urban as well as wilderness. The movement also asserts that a safe and healthy environment-clean air, water, and land-is a basic right of all individuals and communities. The environmental justice movement goes beyond focusing on specific environmental hazards and represents a community-driven social movement that attempts to address all environmental issues that negatively affect people of color, tribal members, and poor community members. The movement believes that the social, cultural, environmental, and physical health of individuals and communities is at the core of ensuring that each person has the right to live in a clean, safe, high-quality environment. It has drawn attention to our nation's most vulnerable populations-children, the elderly, the poor and other groups-who may serve as victims, and has expanded the environ-



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mental justice definition to take account of places where people live, work, and play by including four interrelated environments: natural, built, social, and cultural. This new vision has dramatically expanded the discourse concerning environmental justice to include disparities in housing, transportation, food, and parks and green spaces.

Environmental injustices and child development

Research has established that the neighborhood environment exerts significant influence on child development. Children's use of neighborhood space, such as streets, parks and playgrounds, contributes significantly to their social, psychological, and physical development. Outdoor play provides opportunities for socializing with and learning from peers, physical activity (Loukaitou-Sideris and Stieglitz 2002), and exploration and way-finding skill acquisition (Moore and Young 1978). Previous studies indicate that inner-city residents are more dependent on public parks and open space than residents of suburban and exurban communities (Loukaitou-Sideris and Stieglitz 2002). At the same time, access to neighborhood parks and playgrounds in low-income, inner-city areas has been compromised by concentration of social and environmental risks such as crime, public use and sale of illegal drugs, and declining environmental quality.

With specific regard to constraints on park use, Taylor (1993) found that among residents of New Haven, Connecticut, parks were perceived as dangerous, drug infested, and not well maintained. In particular, women did not perceive parks as appropriate places for family recreation. Talbot and Kaplan (1992) also found that fear of danger was a deterrent to park use among Detroit-area residents. Moore (1989) observed that fears associated with crime and road traffic among children and parents affect children's travel to playgrounds. West (1993) suggested that use of urban parks outside of one's neighborhood is complicated by having to traverse gang territory.

Barriers to greater use of neighborhood outdoor spaces hold important implications for children and adolescents' sense of personal and community identity (Morrow 2000, 2001). Therefore there is a need to increase understanding of how children perceive environmental quality and how their perceptions affect their use of neighborhood outdoor spaces.

Environmental quality of the neighborhood is also important since the leisure activities of children are more likely to occur in outdoor neighborhood spaces (Taylor et al. 1998; Moore 1989) and because there is greater dependence on public parks and open space in inner-city communities. Access to neighborhood outdoor spaces is threatened by a number of environmental risk factors such as crime, drugs, gang activity (Farver et al. 2000; Shakoor and Chambers 2001; Rasmussen et al. 2004), systemic poverty (Brooks-Gunn et al. 1997; Bradley and Corwyn 2002), traffic dangers (Moore 1989), and pollution (Bullard 1996; Di Chiro 1996). Empirical studies have linked such factors to a range of negative developmental outcomes in inner-city neighborhoods, particularly those of minority status. For example, in a survey of 1,035 elementary and high school students on Chicago's South Side, Shakoor and Chambers (2001) reported that 70% of the students have witnessed a violent crime (robbery, stabbing, or shooting) and 46% had been a victim of one of

eight violent crimes. Farver et al. (2000) demonstrated that children's perceptions of neighborhood conditions correlate with socio-emotional functioning. In their study, children's drawings were used to assess neighborhood conditions. The amount of violent content in the drawings correlated negatively with measures of scholastic competence, peer acceptance, and behavioral content. Violent content correlated positively with external locus of control. Amount of gang activity in the drawings correlated negatively with scholastic competence and peer acceptance and positively with external locus of control. Drug use content correlated negatively with scholastic competence and behavioral conduct. Neighborhoods having high socioeconomic status associate positively with a range of academic achievement outcomes (Leventhal and Brooks-Gunn 2002).

Conclusions

There are real consequences for the children living in inner-city areas. The cumulative disadvantageous risks faced by inner-city children allows for the introduction of a new framework that goes beyond the short-term focus on environmental justice for children by illustrating the importance of structural effects in producing social-psychological factors that may influence children's current and future behaviors. I attest that race and class status interacts with place in a unique way and creates many challenges that lead to residents experiencing cumulative disadvantages.

Consequently, the social and cultural ideology present and the built environmental setting will continue to be shaped by both a history of racial segregation and separation and a deterrent from mainstream ideals. Numerous outcomes result from the simultaneous mediation of race, class, and place. For example, urban children are disproportionately dependent on local environmental experiences. These everyday experiences are an important aspect of the children's lives, yet the majority of the U.S. has no experience with the kinds of neighborhood contexts in which urban children reside. Add to this the fact that many maintain ties through their social network with other poor family members, friends, and neighbors, and the complication for providing safe natural resource experiences increases.

These differences mean that urban children are disproportionately introduced to negative environmental experiences according to their structural background. As neighborhoods continue to become more segregated and poverty more concentrated in urban neighborhoods, the environmental experiences may be laced with a heightened level of fear of the outdoors due to the emergence of cultural practices to restrict children's freedom through parental/guardian control, curfew, and surveillances (Outley and Floyd 2002). In addition, environmental injustices lead many parents to seek alternative play provisions within private markets for their children. Unfortunately, issues of affordability and accessibility will keep many children within the community due to lack of cultural and economic collateral.

As illustrated, children living in innercity areas are affected disproportionately. The exposure of children to these environmental issues has the potential to affect future generations. Access to children's perspectives is significant since children are the "primary consumers" of neighborhood environments and thus are more likely to have more frequent exposure to neighbor-

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hood conditions. Moreover, children and adolescents (along with older adults) are the most vulnerable to risk factors in the neighborhoods, yet historically are often neglected in urban planning and policy decisions. Children and young people are an integral part of just and ecologically sustainable communities. Providing access to children's voices addresses the issue of incongruence and divergence between those who plan or study urban community spaces and those who actually use them.

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- Corliss Wilson Outley, Texas A&M University, Department of Recreation, Park and Tourism Sciences, College Station, Texas 77802-2261; coutley@tamu.edu

The Concrete Jungle

Gillian Bowser

I grew up in a concrete jungle My trees were made of steel Their bones were taut with the Laughter and sorrows Of many long forgotten families. Their leaves were the discarded papers Of yesterday's news, The canopies of each tree Forming the tar paper beaches We called home.

I grew up in a concrete jungle Where our daily transportation Was a city bus on a crowded corner. The old bus driver would let Me collect the tokens, Enjoying my delight in feeding The hungry bus. Only the white folks had the fancy Yellow buses, he would tell me, Those buses actually took kids Home door to school door so they didn't have to run through city puddles In the grey rain.

In older years, we traveled to school by subway, in a haze of sweat Crammed between doors As the legendary A train Danced its way to Harlem. Doo do do ta do dah ... I would hum As the train collected and disgorged Suited business folks Until only the black folk Remained, bogging on into Harlem.

I grew up in a jungle of contradictions Trees grew from small holes in the concrete My father broke open for me. Flowers grew in milk jugs And once even a butterfly Called in for a visit. We could travel the subway To the Coney Island beach Eat hot dogs and Lose them again whipping around the Ancient rollercoaster, And we cooled our feet in the waters of Jamaica Bay In the shadows of Steeplechase park. My mother rode the same train, Ate the same hot dogs And sat in the same shadows Giving me ownership to that patch of Sand, generations old.

I grew up in a concrete jungle by a river A deep mysterious river with Unnamed unseen creatures chasing Floating plastic bottles on the water's surface. In later years, I would tell my friends About that river, And watch them imagine a life Of yachts and marinas,

| Men in white shorts with crisp drinks in | I gi |
|---|------|
| their hands. | An |
| My river was home to the weary barges | 5 |
| and tugboats | Ma |
| Who would blow their horns as I dangled | Wa |
| My feet in my river while resting | Ma |
| at the ankles of the Brooklyn Bridge. | Pro |
| | An |
| I went to school by subways under the | In |
| roots of | We |
| My concrete jungle. | |
| Crammed between the businessmen | Bu |
| In suits, ladies fanning sweating faces, | 1 |
| A man mumbling in the corner, | Ble |
| I could do my homework | Ma |
| Between 59^{th} street and 125^{th} | On |
| As the A trained rattled to Harlem | |
| "Who was Harriet Tubman and | I gi |
| describe the underground railroad" | An |
| the teacher had asked | Yet |
| must be a version of this A train I would | Giv |
| think | Ne |
| rumbling slaves through smelly under- | Du |
| ground tunnels | Yet |
| subdued sparks flashing from its wheels | An |
| Hard to think how the men and their slave- | He |
| chasing dogs | An |
| Got past the token booth collector. | In |

rew up in the concrete forest, d heard Nikki sing of negroes in the south ya mourning our lost innocence, and tched Coltrane sway in a smoky haze. lcolm gone in a jangle of discord, oud black men stood tall and defiant, d my father cried for Martin. that concrete jungle, men with hoods re far away, where fire hoses chased our cousins t we supped at tables with Caribbean spices ssings muttered in many languages. tzo balls and barbeque mixed tacos... rew up in the concrete Jungle d that jungle is always my home. that anchor in memories ves me my rope to explore w jungles and compare their sty depths to my home. always the concrete jungle calls me

d I hear her rumble in my sleep r restless lights tease my eyes d her voice whispers tune to distant car alarms...

Welcome home.



Dedicated to the Protection, Preservation, and Management of Cultural and Natural Parks and Reserves Through Research and Education