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Saving the World One Native Plant at a Time

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Abstract: Wildlife habitat is lost as the human population and land clearing for development increase in the South. Remaining habitats are fragmented and contain high numbers of invasive, exotic plants. Suburban, manicured landscapes often lack the plant diversity and complex vegetation structure important to wildlife. Generally, developers and homeowners replant cleared grounds with exotic plants that don't provide quality wildlife habitat. Instead, individual home or property owners can mitigate wildlife habitat loss in urban areas by landscaping with native plants following proper design principles. Furthermore, many people taking action over a large area (e.g., across a neighborhood) will help connect small blocks of habitat and allow wildlife to move across an urbanized region. Wildlife faculty and students at North Carolina State University, working with other natural resource professionals, developed a program to encourage use of native plants and ecologically sound design principles to retain wildlife habitat in urbanizing landscapes. The program integrates a variety of old and new technology transfer methods including traditional county presentations, Extension pamphlets, a video, an interactive website, and a demonstration landscape.

Key Words: invasive plants, landscape design, native plants, urbanization, wildlife

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Introduction

The human population in the southeastern United States is expected to double between the years 1970 and 2020 from about 40 million to 80 million people (Wear and Greis 2002). As human populations shift from rural to urban communities (United States Census Bureau 2001), an increasing percentage of the Extension client base resides in urban areas. These urbanites are unfamiliar with traditional land uses, such as farming or forest management, but as voters have a large influence on natural resources policy. In this changing environment, traditional Extension programs must be replaced with new programs that more directly target the urban audience.

Concurrent with the increase in human population is drastic wildlife habitat loss across the Southeast. From 1982 to 1997, North Carolina lost 1,001,000 acres, or 5.9% of its total forest area, to land conversion related to population growth and urbanization. Researchers predict an additional loss of 5.5 million forested acres in North Carolina by 2040. Usually, small patches of forest or native plant habitats remain after an area is urbanized; these habitats commonly occur in parks or other natural areas, along streams, or on steep slopes that could not be developed. However, these isolated patches of forest do not sustain populations of many wildlife species, and over time, many factors contribute to degradation of the remnant habitats. Invasive plants creep into the forest, human users and their pets compact soil and disturb wildlife, and natural forces such as wildfire are not allowed to run their course. Additionally, the populations of animals present in isolated patches are at risk of local extinction because of their separation from other populations. Individual animals that attempt to move from one patch to another often are hit by cars or killed by domestic cats or other predators. Therefore, urbanized landscapes are unsuitable for many specialized wildlife species, especially animals that require large tracts of unbroken forest. Pileated woodpecker (*Dryocopus pileatus*), black-and-white warbler (*Mniotilta varia*), scarlet tanager (*Piranga olivacea*), and wood thrush (*Hylocichla mustelina*) are examples of bird species that disappear as areas are developed (Mason et al. 2007).

Forested areas cleared for buildings and neighborhoods are replanted with a limited variety of exotic plants. These landscaped areas are poor quality habitat because they contain low plant diversity, few native plants, and poor plant structure. Bird and butterfly species that require habitats containing a diversity of native plants cannot sustain their populations in these sterile landscapes. The same characteristics that make many exotic plants attractive in urban landscapes – colorful berries, pest-resistance, and tolerance of harsh conditions – make them difficult to contain, especially if they are attractive to animals. Birds and other

wildlife serve as effective dispersers of fruits and seeds and help spread exotic plants across the landscape. For example, autumn olive (*Eleagnus umbellata*) is an exotic plant that produces fruits preferred by birds, but the plant grows and spreads quickly where the seeds are defecated. When an exotic species becomes "naturalized," or when that plant is able to survive, spread, and reproduce on its own, it can invade the native habitat and out compete native species. Approximately 25% of the plants growing wild in the United States are naturalized exotics, some of which have become invasive, growing uncontrolled where native plants otherwise would occur. Native fruit-producing plants may succumb to the competition from invasive exotics, thereby reducing the diversity of food and cover available to birds and other wildlife.

Exotic fruits, while sometimes attractive to wildlife, may not provide the best nutrition for native wildlife. Areas vegetated with only a few invasive, exotic plant species can be harmful because habitats with low plant diversity are poor for wildlife. New evidence from the Midwest indicates birds that nest in exotic shrubs experience poor nesting success (Schmidt and Whelan 1999, Borgmann and Rodewald 2004). Lower nest height, the absence of sharp thorns on exotic plants, and different branching patterns can allow predators easier access to nests built in exotic plants.

Most suburban landscapes are designed to be attractive to people and to suit their lifestyles. Generally, wildlife habitat needs are not considered. Suburban, manicured landscapes often lack the plant diversity and complex vegetation structure important to wildlife. The typical suburban yard is a grass lawn with a few plants representing only two or three species, most of which are exotic. Spaced out, symmetrical plantings ("specimen plantings") have become the norm for landscapes in new suburban neighborhoods. The fragmented nature of plantings in these landscapes causes animals to move frequently as they search for food and cover. Too much movement exposes birds, butterflies, and other wildlife to predators and causes them to use energy important for survival. These landscapes offer poor quality wildlife habitat and harbor only the most common wildlife species such as American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), gray squirrel (*Sciurus carolinensis*), and the common buckeye (*Junonia coenia*) butterfly.

Each individual home or property owner can help conserve wildlife habitat in urban areas by landscaping with a diversity of native plants following proper design principles. When a number of people take action over a large area (e.g., across a neighborhood), they can help connect small blocks of habitat and allow animals to more easily move across an urbanized region.

Wildlife faculty and students at North Carolina State University (NCSU), working with other natural resource professionals, developed a program to encourage use of native plants and ecologically sound landscape design principles to retain wildlife habitat in urbanizing landscapes. The program integrates a variety of old and new technology transfer methods including presentations to traditional audiences (e.g., Master Gardeners, garden clubs), Extension pamphlets, a video, an interactive website, and a demonstration landscape. Significant financial support for development of the program components came from the North Carolina Division of Forest Resources Urban and Community Forestry Program (UCFP).

Extension Pamphlets

Using funds from an UCFP grant received in 2000, we developed a series of three publications focused on the use of native plants to attract wildlife in urban landscapes. The individual publications, *Managing Backyards and other Urban Habitats for Birds*, *Butterflies in Your Backyard*, and *Landscaping for Wildlife with Native Plants*, were based on topics important to gardeners, landscape architects, and other urban landowners. A team of experts from a variety of agencies, organizations, and universities (NC Museum of Natural Sciences, NC Wildlife Resources Commission, NC Butterfly Society, NC Botanical Garden, NCSU, Duke University) was identified to oversee content development for each publication, and a graduate student was hired part-time to organize content and develop graphics. NCSU Communication Services, part of NC Cooperative Extension, was contracted to design the layout for the publications. Hard copies of the publications are distributed to County Extension Centers and during presentations on the topics, and the publications are available in PDF format on the web.

Demonstration Landscape

For many people, seeing is believing. There are few urban landscapes that contain only native plants and that are designed to meet the habitat requirements of wildlife. Therefore, faculty in the NCSU Fisheries and Wildlife Sciences Program decided to create a native plant landscape around the Turner House, the building housing program faculty, graduate students, and administrative staff.

Again using funds from the UCFP, grounds around the Turner House were cleared of all non-native plants (e.g., English ivy, *Hedera helix*; Chinese Privet, *Ligustrum sinense*; Chinese wisteria, *Wisteria sinensis*), soils were ripped and amended, and native plants were purchased and installed. The NCSU Leopold Wildlife Club (NCSU student chapter of The Wildlife Society) assisted with site preparation and plant installation. A walking path and native plants were laid out following a design created by students in a senior-level Horticultural Design course. Bird-feeding stations, a bog garden, and a pond were installed using funds from two NCSU undergraduate research grants and volunteer student labor. A deck, two Leopold benches, three planters and seats, three picnic tables, and a drip watering system were built and installed using Program funds and faculty and student labor. An undergraduate student, to satisfy requirements for the NCSU College of Natural Resources honors program, worked with faculty to develop a brochure. The brochure and plant identification tags located throughout the garden help facilitate a self-guided tour of the landscape by visitors. Currently, the garden contains over 400 individual plants and over 50 native plant species.

"Going Native" Website

Funds received from the UCFP in 2005-2006 were used to develop a website titled *Going Native: Urban Landscaping for Wildlife with Native Plants*. The website presents comprehensive text on topics under the headings *Why Go Native?* and *How to Go Native*. Specifically, *Why Go Native?* describes the ecological problems associated with invasive plants, the changes to wildlife habitat following urbanization (e.g., habitat loss and fragmentation, decreased plant diversity), the typical mistakes made during landscaping, and the benefits of using native plants in urban gardens or landscapes. Further, *How to Go Native* describes mapping and analysis of existing site features (e.g., soil conditions, locations of native and exotic plants), design of a landscape to meet human needs, identification and provision of the needs of target bird and butterfly species, and selection, installation, and maintenance of native plants. A professional script writer assisted with editing and organization of text, a graphics artist created a site logo, and web designers at NCSU designed the layout of text and supporting images.

The third component of the website, *Create Your Own Native Landscape*, is the most unique. Visitors to the website can use checklists, samples of base maps and landscape designs, invasive plant lists and descriptions, and an interactive native plant database to help design their own landscape. The interactive database allows users to search for native plants that fit the specific conditions of their property and their own objectives. For example, a user could query a list of shrubs that grow in moist, sunny conditions and produce fruits attractive to songbirds in the early winter. The web site will be complete in early 2007.

"Going Native" Video

Funds received from a Renewable Resources Extension Act grant were used to create an 8-minute video with the same title as the website. The video will be available in 2007 in hard copy and as a streaming video link from the *Going Native* website. The short video is designed to be used by faculty, Extension agents, natural resources professionals, the media, and other interested parties as an introduction to the issues related to landscaping with exotic and native plants. Interest in the topic generated from the video should lead to more in-depth programming by county agents, possibly as part of Master Gardener trainings.

Using a mix of narration and interviews with experts, the video script covers the ecological problems associated with invasive plants and urban development. Interviewees include three wildlife biologists, a plant ecologist, a landscape designer, and a native plant gardener. Video footage includes shots of native

plant gardens in central North Carolina and shots of the NCSU wildlife program faculty and students preparing and installing the Turner House demonstration landscape.

Program Evaluation

The issue of exotic or native plants in designed landscapes is contentious. Ambiguous terminology (e.g., is a plant naturalized or invasive) and competing financial interests (e.g., wildlife managers versus the nursery trade) further confound the issue. We have discovered that promoting native plants as part of a strategy to improve urban wildlife habitat has allowed us to avoid the combative debate between native and exotic supporters. We believe that native plants must be used to appropriately maintain or restore wildlife habitat in urban landscapes. We provide lists of native plants that can be used as alternatives to known or potentially invasive exotics, making it easier for homeowners to respond to our recommendations.

To date, the program has been an apparent success. We've attempted to inform the public using a variety of information transfer methods, understanding that people from different demographic groups access information in different ways. Approximately 40,000 copies of each of the three Extension publications have been distributed at County Extension Centers and nature centers and during presentations to over 3,000 professionals and laypersons. Before and after surveys of audiences indicate that presentation attendees increased their awareness of the issues related to native and invasive plants, and a high percentage of respondents indicated they would change their behavior. The demonstration landscape, website, and video are new program components and the relative success of each has yet to be determined.

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