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Patrick T. Hurley Ursinus College, phurley@ursinus.edu

Brian Grabbatin *University of Kentucky*

Cari Goetcheus *Clemson University*

Angela Halfacre Follow This affd additional works at: https://digitalcommons.ursinus.edu/environment_fac

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Gathering, buying, and growing sweetgrass (*Muhlenbergia sericea* [Michx.] P.M.Peterson): **Urbanization and social networking in the sweetgrass basket-making industry of Lowcountry South Carolina.**

Hurley, Patrick T.¹, Brian Grabbatin², Cari Goetcheus³, and Angela Halfacre⁴

¹Environmental Studies, Ursinus College, PO Box 1000, Collegeville, PA 19426

- ²Department of Geography, 1457 Patterson Office Tower, University of Kentucky, Lexington, KY 40506
- ³Department of Planning and Landscape Architecture, 306 Lee Hall, Box 340511, Clemson University, Clemson, SC 29634
- ⁴Department of Political Science, Furman University, 3300 Poinsett Hwy, Greenville, SC 29613

Abstract

Despite the visibility of natural resource use and access for indigenous and rural peoples elsewhere, less attention is paid to the ways that development patterns interrupt nontimber forest products (NTFPs) and gathering practices by people living in urbanizing landscapes of the United States. Using a case study from Lowcountry South Carolina, we examine how urbanization has altered the political-ecological relationships that characterize gathering practices in greater Mt. Pleasant, a rapidly urbanizing area within the Charleston-North Charleston Metropolitan area. We draw on grounded visualization—an analytical method that integrates qualitative and Geographic Information Systems (GIS) data-to examine the ways that residential and commercial development has altered collecting sites and practices associated with sweetgrass (Muhlenbergia sericea [Michx.] P.M.Peterson) and three other plant materials used in basket-making. Our analysis focuses on the ecological changes and shifts in property regimes that result; we detail the strategies basket-makers have developed to maintain access to sweetgrass and other raw materials. This research highlights how land development patterns have disrupted historic gathering practices, namely by changing the distribution of plants, altering the conditions of access to these species, and reconfiguring the social networking that takes place to ensure the survival of this distinctive art form.

Keywords: African American ethnobotany, Nontimber forest products, Suburban natural resource use, North American political ecology

Introduction

There is growing interest in Nontimber Forest Products (NTFPs) and the gathering practices that characterize diverse NTFPs in the United States (Jones et al. 2002; Emery et al. 2002; Robbins et al. 2008). Much of this research has focused on gathering in the Pacific Northwest and on conflicts between timber management strategies and non-traditional resource users (see Love and Jones 2001, McLain 2002; Robbins et al. 2008). This research also documents harvesting of products, such as fungi (Molina et al. 1993; Liegelet al. 1998;), fruits and nuts (Freed 2001), and other plant materials (Butler et al.

2005; Lynch and McLain, 2003) in national forests (Emery and Pierce 2005) as well as the collection of plants on private properties (Price and Kindscher 2007, Ginger et al. 2011), and wild foods (Palmer 2000, Cordell et al. 2004) from environments such as city streets (Jahnige 1999, Gabriel 2006). Among these individuals, several minority populations who gather materials for their household economies have come into conflict with other groups over gathering rights at NFTP sites (Richards and Creasy 1996; Emery 1999, 2002; Brown and Marin-Hernandez 2000; Freed 2001; Jarosz and Lawson 2002, Ginger et al. 2011). More recent research suggests that gathering is a practice not necessarily limited to a particular ethnic or racial group (Robbins et al. 2008), and that the same person may collect NTFPs for both economic and non-economic needs (Emery 1999; Jones et al.2002; Emery et al. 2002).

Global issues of access for indigenous and rural peoples to culturally important natural resources are well-recognized and studied in many parts of the so-called developing world (Zimmerer and Bassett 2003, Robbins 2003) and recently in some developed areas as well (Wehi and Wehi 2010, Ginger et al. 2012). Scholars are also paying greater attention to the ways that changing social and biophysical factors influence access to natural resources associated with NTFPs (Ginger et al. 2011). Still, less attention is paid to the ways that development patterns associated with urbanization disrupt NTFP species, uses, and practices. Indeed, increased urbanization in both the U.S. and around the world is transforming ecosystems (as well as the relationships between people and plants; Theobald 2004, Johnson and Klemens 2005; Head and Muir 2006; Ballard and Jones 2011). The extension of infrastructure and services (e.g., sewer, water, etc) that facilitate urbanization have altered landcover. As denser residential settlements expand, they affect local sites and regional landscapes. Relatively high-density suburban (i.e. ~2 - 8 dwelling units per acre) and lower density exurban forms of land transformation (i.e. between 1 dwelling unit/acre and 1 dwelling unit/16.2 hectares (40 acres), fragment existing forests, fields, and other non-urban vegetative land covers (Theobald 2004, Johnson and Klemens 2005, Lambin and Geist 2006), dramatically altering ecological systems, including plant and animal species dynamics and ecological functions (see e.g., Pickett et al. 2001). For example, lawns simplify habitat structure and species composition (Robbins and Birkenholz 2003) and landowners often plant ornamental shrubs, trees, and flowers that differ from the vegetative cover and composition being replaced (Johnson and Klemens 2005; Head and Muir 2007). Similarly, exurbanization (i.e. urban migration to rural areas) alters the plant and animal communities that live there (Theobald 2004, Lambin and Geist 2006). But how does urbanization alter the ecological conditions that support, and social conditions that facilitate, access to plant communities associated with NTFP gathering practices? And how do gatherers and NTFP users negotiate these changes?

Using the case of sweetgrass basket-makers in the greater Mt. Pleasant area, a rapidly urbanizing area within the Charleston-North Charleston Metropolitan area of the South Carolina Lowcountry (Figure 1), we examine the ways that urbanization has altered the political-ecological relationships that characterize this NTFP and the gathering practices that have supported it. Here African-Americans gather four native plant materials and transform them into baskets using a coil technique passed down within families living in

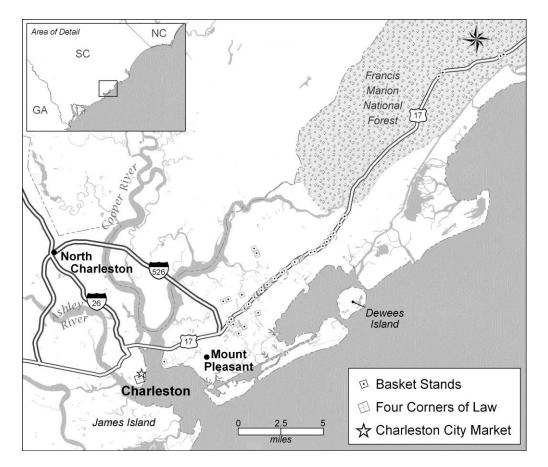


Figure 1. Location of Study Area within Charleston-North Charleston area, SC and SE U.S. Also pictured are sales locations for basket stands (Figure created by Jeff Levy, University of Kentucky).

several formerly rural settlements near Mt. Pleasant. Baskets made by forebears of these families were once used to winnow rice on Lowcountry plantations, and are among the most widely recognized artifacts of *Gullah* culture, which is based on blended traditions and backgrounds that developed among enslaved Africans and their descendants along the southeastern North Carolina, South Carolina, Georgia, and northern Florida coasts (Pollitzer 1999, National Park Service 2005). Despite the disappearance of rice production in the early 1900s, baskets of different types have remained a regular sight along U.S. Highway 17 in Mt. Pleasant and along sidewalks in Charleston since the 1940's (Coakley 2006). According to popular wisdom, supported by news and magazine articles, this distinctive art form (Rosengarten et al. 2008) is threatened with extinction by rampant residential and commercial development associated with suburbanization. But, as Hurley et al. (2008) suggest, this story is more complicated than the simple disappearance of a plant from the landscape.

In this article, we use grounded visualization, the integration of GIS and ethnography (Knigge and Cope 2006, Hurley et al 2008, Cope and Elwood 2009), to detail the ways that residential and commercial development has altered collecting practices associated with sweetgrass (*Muhlenbergia sericea* [Michx] P.M. Peterson) and other plant materials

employed in basket-making. We describe how more than five decades of suburbanization has altered the ecological and social landscapes of basket-making focusing on ecological changes effecting species presence/absence and shifts in property regimes influencing access—and the strategies basket-makers have devised to maintain access to sweetgrass and other raw materials. While a connection has been drawn between changing gathering practices and the livelihood of basket selling for some time (see e.g., Hart et al 2004, Hurley et al 2008), knowledge about the ways basket-makers accessed specific harvesting sites and analysis of the social networks that connect artists and sellers to gatherers has been limited. This article moves beyond a general consideration of increasing problems associated with access to a direct consideration of patterns of landscape change on historic harvesting sites and adaptive strategies for maintaining supplies from new areas.

Study Context and Methods

STUDY BACKGROUND

Enslaved Africans made baskets on South Carolina rice plantations, and their descendents have depended on the basket-making tradition for various cultural uses and economic values. Baskets were one of several technologies adapted to North American environments by enslaved Africans, which helped fuel the early economic growth of Charleston, SC and its rural surroundings (Carney 2001). The tradition survived as a utilitarian craft during the lean years following emancipation, and was transformed into a commodity in the early 20th century by sewers who promoted the historical, cultural, and aesthetic value to Charleston area tourists and residents (Coakley 2006, Rosengarten 1992, 2008). Despite the disappearance of rice fields and rural landscapes along the South Carolina coast, basket sales remain an important part of the household economy and basket-making is an essential element of the identities of many Lowcountry African Americans (National Park Service 2005).

Sweetgrass (*M. sericea*) is the signature resource used in basket-making, but the craft relies on four plant materials that historically occurred in local woodlands and wetlands. Basket-makers bind and sew together rows of sweetgrass (*M. sericea*)¹, longleaf pine needles (Pinus palustris P. Mill), and black rush cuttings (Juncus roemerianus G. Scheele) with strips made from palmetto fronds (Sabal palmetto [Walter] Lodd. ex Schult. & Schult.f) (Twining 1978; Figure 7, A). Sweetgrass typically constitutes the bulk of each basket, and currently is the most difficult material to obtain (Hart et al. 2004, Grabbatin 2008). These resources were acquired through personal or familial collecting efforts or purchased from gatherers from one or more of the rural settlements outside the historically small town of Mt. Pleasant (Derby 1980, Hart et al. 2004). Sweetgrass (M. sericea) occurs naturally in clumps landward of the second dune line at beaches and in the interface between wetlands and woodlands (Ohlandt 1992; Gustafson & Peterson 2007). Based on herbaria records, published literature, and earlier interviews with basket-makers, it appears that sweetgrass was found in the recent past in a number of places in the greater North Charleston-Charleston metro area (Figure 2; Hurley et al. 2008).

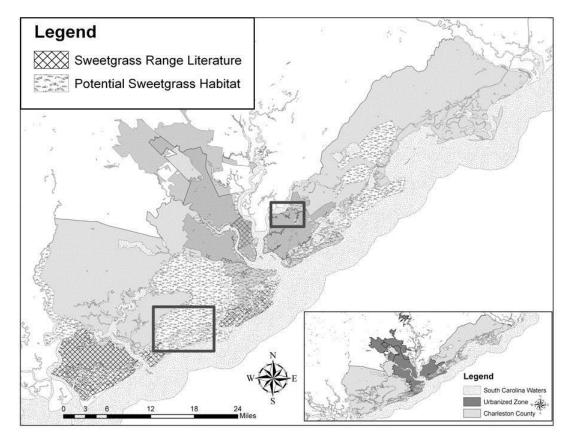


Figure 2. Range of sweetgrass (See Hurley et al. 2008 for methods discussion; Figure created by Norm Levine, College of Charleston).

Today, however, the Town of Mt. Pleasant is South Carolina's fifth largest city and one of the state's fastest growing metropolitan areas (U.S. Census 2009). Over the past two decades, the greater Mt. Pleasant area has experienced rapid residential growth and geographic expansion through annexation. This growth, however, has been shaped by a geography of historic rural African American settlements and largely white-owned farmlands (Figure 3). Growth was particularly strong following Hurricane Hugo in 1989. Between 1990 and 2008, the town's population increased from 30,108 to an estimated 65,472 (US Census 2009). Likewise, the town's area has grown to encompass 108.5 square kilometers (41.9 square miles) (US Census 2000). Residential subdivisions increasingly encroach on the area's historic rural African American settlements and, in at least one case, have replaced an entire community (Figure 2 inset). These new subdivisions include numerous upscale planned communities, many with gated entries and extensive walls or fences, and panoramic views of tidal marshlands. Others feature golf courses and/or waterfront parcels with private docks. Thus, development potentially occurs in the places where sweetgrass is most likely to have grown naturally (Hurley et al. 2008). It also has resulted in dramatic changes in patterns of land use and land ownership.

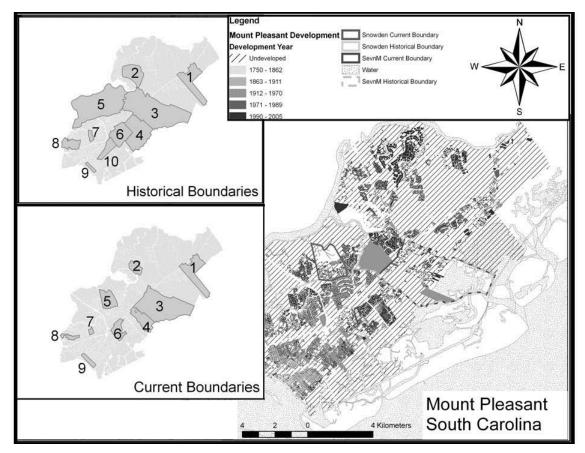


Figure 3. Location of Ten African American Settlements within Greater Mt. Pleasant area and residential development trends. Insets highlight the comparative cases of Seven Mile/Hamlin and Snowden (Figure created by Norm Levine, College of Charleston).

Growth in Mt. Pleasant also has transformed the area's socio-economic and racial demographics. Over a century ago, African Americans comprised roughly 70 percent and whites just 30 percent of the population in South Carolina's coastal counties (U.S. Census 2007). By 1990, the percentage of African Americans in Charleston County and Mt. Pleasant had declined to 34.9 and 15.7 percent respectively (US Census 1990). Today, African Americans comprise 31.9 percent of Charleston County residents (US Census 2006) and just 7.3 percent of the population in Mt. Pleasant (US Census 2000). With this increase in development and associated socio-demographic change, Mt. Pleasant land values have increased dramatically, leading to gentrification pressures in historic African American settlements (Hurley et al. 2008). While gentrification pressures have important implications for sewing and selling baskets (see Hurley and Halfacre *Forthcoming*; Hurley et al. 2008), we focus here on the consequences of development for *the gathering* of the key natural resources used in baskets.

METHODS

Our project uses grounded visualization, a methodological and analytical approach that integrates ethnographic data with GIS (Knigge and Cope 2006, Hurley et al. 2008; Cope and Elwood 2009), to interrogate the social and ecological processes that accompany land-use and landcover change (Fox et al. 2002, Madsen and Adriansen 2004). First, we

interviewed 26 basket-makers (out of 84 contacted) from the four main sales locations in the area (Figure 1). We asked basket-makers how they dealt with the impacts of urbanization on their access to their raw materials, including asking informants to describe where, how, or from whom they had acquired raw materials in the past and how resource aquisition had changed. These interviews built on data previously gathered between June 2002 and January 2003 for an earlier study of basket-makers' views of and roles in sweetgrass management (Hart 2003; Hart et al. 2004) and 23 interviews (60 invited) in 2003 about collecting strategies. Fifteen respondents from the 2002 study participated in 2003. We used convenience and snowball sampling techniques in each study, with most interviewees identified through visits to basket stand. Given our focus on documenting historic gathering sites, our study does not rely on species vouchers.

Second, between August 2007 and March 2009, we conducted oral history interviews, community tours, community presentations, and field mapping exercises with residents from ten African American settlements (Figure 3 inset).² In our oral history interviews with basket-makers and elderly residents, questions focused on mapping historic resource sites and current settlement boundaries as well as the ways local human-environment interactions have changed over time. We specifically asked residents how basket-making, with particular emphasis on gathering strategies, had changed.

Third, we use historic aerials, ranging from 1949 to 2006, to explore the spatial configuration of historic land-uses and landcovers associated with sites identified through interviews and tours, the location of places where sweetgrass was gathered in the past, and provide further context about social-economic connections among settlements. Using this information, we examine the ways that changes in gathering practices relate to the trajectories of change in landcover, land-use, residential and commercial buildings, and property regimes that can be observed in or inferred from air photos overlain with contemporary property boundaries.

Finally, these methods were supplemented with document analysis, participant observation, and attendance at key community events. Over several years, we attended local government meetings, visited basket-makers in their homes, and surveyed numerous newer local subdivisions. We analyzed government land-use documents, reviewed community planning workshops, examined subdivision governance and marketing materials, and followed reporting on basket-making and development in area newspapers and magazines.

Results

KINSHIP SUPPLY CHAINS

Generations of basket-makers have relied, in part, on family members and friends to acquire plant material (Twining 1978, Derby 1980, Rosengarten 1986, Hart et al. 2004), but today, more than ever, harvesting has become a business for some collectors. In our interviews, 18 basket-makers said that family members are instrumental in acquiring materials. They cited husbands, cousins, children, siblings, parents, and in-laws who help supply plant material. Further, 18 of our informants indicated that they currently collect

at least one of the four materials. All but two rely on someone else to provide at least one of the materials. For example, basket-maker Vera Manigault collects most of her materials, but described how various family members help her out: "my brother, he go out and get it and he give me grass and stuff, you know. My son, all of `em get the material for me, some bring palm." Sweetgrass scarcity in the surrounding area, health problems, and old age prevent many from collecting their own materials. Thus, Emily Johnson described a group of collectors as "mens that are nice enough to try to keep the craft going for different families and the sweetgrass basket weavers." In contrast, Mae Hall described her reliance on "older men who are…probably retired too and they've been doing this all of their lives… It's a way for them to make extra money." Henrietta Snype, a basket-maker who collected materials as a child, said, "[harvesting's] hard work… That's why I don't have any problem paying for it."

Even among basket-makers who say they buy materials, it is clear that networks of kinship and friendship create loyalties that determine which basket-makers are able to get grass and how much they are charged for it. For example, Robena Blake occasionally has to pay cash for her material, but described the advantages of having relatives help out: "if it's relatives I don't have to pay, if it's somebody I don't know then, you know, I try to buy some sweetgrass from them." These examples indicate that family members can cut down on costs of obtaining sweetgrass and provide a safety net for basket-makers who still collect on their own. It is important to note, however, that while family and community loyalties can connect basket-makers to resources, these networks can also exclude some basket-makers. One basket-maker, who is not from Mount Pleasant and has no family ties to the area, described how she is shut out of sweetgrass distribution networks, making it difficult for her even to find collectors who will sell to her.

CHANGING ECOLOGIES, CHANGING PROPERTY REGIMES

During earlier decades, mostly prior to the onset of widespread urbanization, collection took place within several of the surveyed settlements' historic community boundaries, including Snowden, Seven Mile/Hamlin, Remley's Point, Six Mile, and Four Mile (Figure 3). Importantly, our informants indicated during community tours and in their oral histories, that they specifically found sweetgrass much nearer to their communities than is apparent from Figure 2.

We used to go to Boone Hall and collect sweetgrass, Brickyard—we call that place The Point. I don't know where the point is between Brickyard and Boone Hall in the back, but that's where we used to go and collect sweetgrass. *Interview with basket-maker, August 4, 2007*

Comments such as these identify places in and around African American settlements where sweetgrass and the other materials were found and gathered (Figure 4). When viewed within the historical context of landcover and land-use change, they point out the importance of once extensive woodlands and forest habitats in areas adjacent to or surrounded black settlements characterized by cleared smallholder agricultural fields (Figure 5). Indeed, this spatial relationship became a recurrent theme among informants, highlighting the extent to which current communities represented an ecological shadow of their former selves.



Figure 4. Transformation of areas where sweetgrass was historically collected. Snowden community in the upper panel, Seven Mile/Hamlin is shown in the lower panel. Dark green and red boundaries (Snowden and Seven Mile/Hamlin respectively) indicate the historic extent of communities, while the brighter red and green boundaries highlight their current extent.

To better understand the historic spatial relationship between community woodlands and land-uses, let us briefly consider historic land-use/cover patterns relative to the historic boundaries identified by our informants (Figures 4 and 5). These patterns highlight the relationship of cleared land to forests and woodlands. First, nine of our ten study communities were characterized by a historic core dominated by agricultural fields, widely dispersed trees, and varying degrees of small forest clusters (Seven Mile/Hamlin in Figure 4). In comparison to large fields used by white "truck" farmers (i.e. trucked to more distant urban markets), fields in rural African American settlements are characterized by much smaller fields, landholdings, and potentially more diverse crops (Figure 5). Second, where these communities did not directly border waterways or white-owned truck farms, they were surrounded by marsh, forested woodlands, and what appear to be areas of scrubby "unmanaged" vegetation. In some cases, these woodlands represent buffers between our study communities and nearby truck farms. Likewise, buffers sometimes separate one African-American settlement from another, while in

other cases one buffer type separates the settlement from a nearby marshland or watercourse (Figure 4, Seven Mile/Hamlin and Figure 5, Remley's point, respectively).

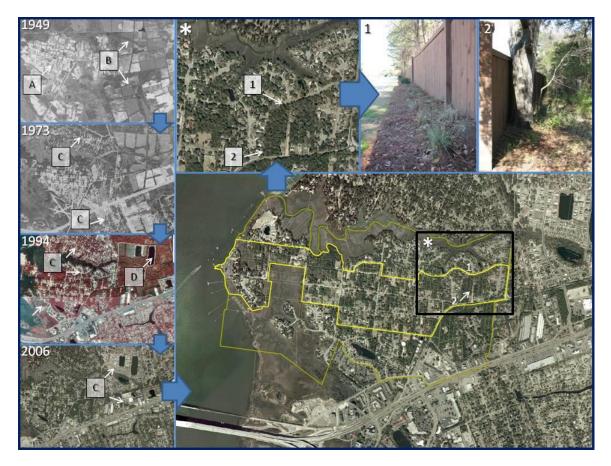


Figure 5. Changing development trends in Remley's Point, including community woodlands. (A) Small community farm fields. (B) Nearby white, truck farms with larger fields. (C) Residential development around the community. (D) Changes to agricultural lands include borrow-pits. (*) Community areas now cut off from nearby waterways, by development and associated fencing (1) while sweetgrass appears in subdivision landscaping (2).

Many community woodlands were critical resource sites during earlier periods. They included diverse plant communities, such as those associated with live oak (*Quercus virginiana*) and sabal palmetto, which are characteristic of Lowcountry maritime forest. There were also wetter areas and patches of longleaf pine forests that could be found in close proximity to rural settlements where basket-makers lived. In the former, sweetgrass could be found and in the latter pine needles easily gathered. Areas of maritime forest provided quick access to palmetto. Likewise, bulrush was frequently found and easily accessed in tidal marshes either directly adjacent to communities, such as the creek in the eastern side of the Snowden community (Figure 4), or easily reached through woodlands that separated the settlement from the water. Informants also reported finding sweetgrass growing in close proximity to many of the areas on truck farms where they may have worked picking crops.

While it is unclear how widespread gathering once was, our informants made it clear that basket-making families and others in these settlements also took part in collecting a number of wild medicinal plants, wildflowers for sale in local markets, as well as nuts from trees and shrubs in neighborhood yards, dispersed throughout their communities, and in the surrounding community woodlands. For example, family compounds and individual yards historically included apple, pear, and pecan trees, while muscadine grapes (*Vitis rotundifolia* Michx), wild blackberries (*Rubus cuneifolius* Pursh), huckleberries (*Gaylussacia frondosa* [L.] Torr. & A.Gray), and the seeds of the chinquapin tree (*Quercus muehlenbergii* Engelm) could be found in the nearby woods. Others talked about the collection of "life everlasting" (*species unknown*), "snake root" (*Ageratina aromatic* [L.] Spach), and other plants for use as home remedies against common colds and other ailments, while several described the collection of magnolia blooms (*Magnolia grandiflora* L.) and other wildflowers by "flower ladies" who would carry them to Charleston to sell them alongside baskets (see Coakley 2006).

Often community woodlands and forests may not specifically have been owned by African Americans. Instead, these lands were owned by whites in the area—including some absentee landowners—and access to NTFP resources appears to have been an accepted local practice, including through access arrangements that were approved by the owners of particular properties or because access was not monitored. In other cases, communities believed they owned these lands. Regardless of their specific ownership, community woodlands and forests largely functioned as de facto resource commons.

Today, however, urbanization is transforming these resource commons and thus sweetgrass collection. By using contemporary and past community boundaries to examine air photos (Figures 4 and 5), we are able to make better sense of how residential growth has altered the extent and spatial configuration of community woodlands and forested areas, as well as access to nearby marshlands. Let us briefly consider the specific cases of Snowden and Seven Mile/Hamlin, which represent divergent development patterns. A key aspect is the transition from farmland to suburban housing. For example, though their development histories are different, Snowden and Seven Mile/Hamlin share similar histories of NTFP use and a loss of access to community woodlands, (Figure 3). By 2006, Snowden was surrounded by predominantly upscale subdivisions (Figure 3 and 4), while in the Seven Mile/Hamlin area expansive residential subdivision is relatively new. Here, residential developments are being built both within the core and on the margins of the community. In both Snowden and Seven Mile/Hamlin there is a recurring theme: new housing developments are built on properties identified as woodlands that were within historic community boundaries and from which any number of NTFPs-not just sweetgrass and basket-making materials-were previously collected. While some harvesting still occurs in Mt. Pleasant, most harvesters have branched out into other counties, such as sites in Beaufort and Colleton, and states other, such as Georgia and Florida, to find this locally disappearing resource.

At the same time, these developments do not entirely eliminate woodlands and forests within their boundaries (Figure 4). Still, the proliferation of new subdivisions often

includes fences and gates that physically—or socially—separate African Americans from places once associated with community woodlands, their resource commons, and harvesting (Hurley et al. 2008). This is the case in Remley's Point (Figure 5), where one new subdivision—complete with a street named "Overseer's Retreat"—built a fence along the entire length of its boundary with the historic community (Figure 5 insets). Thus, access to sweetgrass governed by new property regimes may be a more important issue than the plant's disappearance. We now turn to a discussion of current gathering practices and supply chains that illustrate how much access to NTFPs, particularly to sweetgrass, has changed in response to this emerging property regime.

CHANGING PLANT(ING) REGIMES AND THE IMPORTANCE OF SOCIAL NETWORKING New Niches for Sweetgrass

As Mt. Pleasant has transitioned from a largely rural to suburban area, another transformation has occurred, which complicates the NTFP story. Sweetgrass is reappearing throughout the South Carolina Lowcountry as a popular landscaping cultivar, promoted for its showy purple flower (Figure 6, D and F). The proliferation of cultivated sweetgrass would seem to be a solution to the "problem" of reduced abundance of this plant, but these plantings are not necessarily accessible or useful as raw material for basket making. The cultivars and management techniques used by landscapers often produce plants that are of marginal quality—difficult to harvest, and less than ideal to work with. In one instance, 2,000 sweetgrass seedlings were planted on James Island's McLeod Plantation in an effort to "farm" sweetgrass for basket making (Nixon 1993). According to basket-makers and the Historic Charleston Foundation, the sweetgrass grew for the first few years and then died off. Harvesters raised doubts about the cultivation methods and appropriateness of the site, saying the use of fertilizer and poor soils negatively affected the quality of the grass and their ability to harvest effectively.

The weeds started to set in [at McLeod]... [In its natural habitat] the pine needles regulate the weed overgrowth, the sweetgrass can get through 'cause it's so skinny...most other vegetation can't. So it sort of regulates itself, it don't get overgrown. *Interview with basket-maker, August 25, 2006*

More recently, basket-makers were invited to harvest sweetgrass planted along the roadways of Kiawah Island and along the connector between Spring and Callawassie islands. At Kiawah Island, landscape plants were good enough that harvests have taken place a second time (Figure 7, C). However, Nakia Wigfall referred to the plants along the connector as "sweetgrass on steroids," indicating that they were generally very tough, difficult to harvest because fertilizers were applied, and thus of poor quality for use in baskets.

While grass that is planted as landscaping is typically heavily fertilized, causing the stems to become dry and brittle, often making it of little use for basket making, landscape ecologist Karl Ohlandt has restored grass to maritime wet grasslands on Dewees Island and has plans to do the same on Spring Island (Hunt 2006).



Figure 6. Ecological conditions associated with sweetgrass distribution in the study area: (A) in the wild at the interface of a wetland and forest, (B) seed collection from plants within a woodland area, (C) as a landscaping plant at a local nursery, (D) planted along walkways on the Charleston peninsula, (E) cultivated garden in basket-maker backyard, and (F) ornamental in a commercial parking lot. (Photos by authors, Inset A by Julia Carter)

Basket-makers also are growing sweetgrass on their own properties. Ten respondents have tried to grow their own sweetgrass, but for those who have been successful the few plants they have in their yards provide an inadequate, and often laughable, amount of materials to meet their year-round needs. For example, Elijah Ford said, "Some people got a few hills, but it takes more than a few hills if you want to stay in business... [Laughs] You know what I'm saying." Henrietta Snype referred to the "one little clump" she has growing in her yard as, "nothing to hoop and hooray about. [Laughs] Probably can't make even a pair of earrings with that, but it's growing, so far." This discrepancy between the amount of sweetgrass cultivated in yards and the amount needed to make baskets reflects the disappointment of most basket-makers in their efforts to grow a meaningful supply of material for their craft.

A small number of basket-makers have successfully grown sufficient amounts of sweetgrass on their own property. For example, Barbara McCormick lives in a longleaf

pine savanna on the edge of Francis Marion National Forest and has been able to grow sweetgrass in relatively large quantities. She describes her cultivation methods:

<u>Basket-maker</u>: See some people they plant it and then they keep it clean. <u>Interviewer</u>: Keep it clean?

<u>Basket-maker</u>: I just let mine go wild like in the woods, it's one area I don't cut it, I don't go in there and clean it out, nothing... I just let nature take its course, and mine is doing pretty good. I get me a nice size bundle last year...So my husband said he's gonna get some more plot and stick it...I said, I wish I could get the whole area planted, then I wouldn't have to travel [*Laughs*]



Figure 7. Links between harvesting and basket-making: A) bulk materials and the creation of a basket, B) finished baskets on a roadside basket stand along Highway 17, C) harvesting landscaped grass at Kiawah Island, D) delivering pine needles to a basket-maker at her stand. (Photos by authors)

This basket-maker attributes her success to the fact that she is growing sweetgrass in its natural habitat (Figure 6, A). Other basket-makers living in communities where development patterns have severed their historical relationship with nearby woodlands maintain small cultivated gardens of sweetgrass within their yards (Figure 6, E). Based on community tours and interviews, this trend, however, is not widespread.

These concerns about cultivation and the usefulness of grass are compounded by concerns among scientists over the potential long-term impacts of introduced cultivars on biological diversity. Both Karl Ohlandt and Danny Gustafson have concerns about landscaped sweetgrass that is non-native, given "it can break down genetic combinations that make native plants adaptable to local environments." (Hunt 2006). In response to this concern and the wider need for resource supplies for basket-makers, there now is an effort underway with the Dewees Island Property Owners Association to collect seeds from native plants in order to propagate a supply for basket-makers and landscapers (Johnson 2007; Figure 6, B).

Connecting Peoples and Plants: (Re)Negotiating Access to Plants

The development boom since the 1970s, particularly during the 1990s, has transformed former plantations and farms into residential neighborhoods and resort communities (National Parks Service 2005) reconfiguring gathering practices and strategies. Harvesters have had to renegotiate access to historic sites, negotiate access to new sites, or branch out to new locations, with varying degrees of success (Table 1). For example, the harvests at Kiawah Island in 2008 and 2009 discussed above (Figure 7, C) have reopened access to plants within a private, gated island community. In contrast, one respondent explained how access to historic harvesting areas on Seabrook Island was renegotiated but then discontinued when gathering (or gatherers) was perceived as a disturbance to life on the island. Basket-maker Elizabeth Mazyck describes her experience:

We used to go to [Seabrook] Island and the people live in great big houses. I guess one day we started laughing and having fun—and one morning this man come out the house... I say, "Oh he must've had a bad night." [Laughs] So the next time we couldn't go back out there cause they don't want you in the front of their house...they stop us to go in there, and there was some nice grass, there was beautiful grass, when it dries it's golden beautiful grass. We miss that.

Other communities where grass was not harvested historically have opened their "gates" to collecting. On Dewees Island basket-makers have gained access to sweetgrass restoration and preservation sites through the efforts of the community association and the help of the island's landscape ecologist Karl Ohlandt. Harvesting is permitted in these areas because plant health is bolstered by this practice. Basket-makers suggest that their harvesting methods are good for sweetgrass plants, helping them to grow back fuller and healthier. Ohlandt agrees, "as the plant grows, it dies and the accumulation of dead growth can choke out the plant. Cutting it gets rid of some of the material, but pulling it

Table 1. Responses from 26 basket-maker interviews in 2006 and 2007 concerning the people and organizations who were involved in providing access to the four basket materials. Responses for Federal Land Managers speak to pine needle collection in Francis Marion National Forest, where no sweetgrass is obtained. Some basket-makers decided not to share this information and others gave more than one answer.

Land manager	Number*
City of Charleston	7
Hunting Clubs	5
Federal Land Managers (NFS & USFW)	10
Private Neighborhood Associations	2
Private Businesses	2
Friends/Family	9
Unsanctioned Access	2
*N = 26;however, some respondents did not answer and others gave more than one answer.	

out is the best way to manage the growth" (Ohlandt in Johnson 2007). Through Ohlandt's efforts, this ecological understanding of harvesting and plant health was translated into a management strategy on this private barrier island. Similar efforts were undertaken at Spring Island, a gated community on a sea island near Beaufort, when Ohlandt joined the staff there. Basket-makers also harvest in non-residential areas, such as a hunting club in Hardeeville ,where the longleaf pine forest understory is managed with prescribed burning and sweetgrass harvesting. Here harvesting is open to the entire basket making community during the summer months. While permits are required, they are easy to obtain and basket-makers can collect large quantities of grass in a single trip at this large acreage site.

More broadly, just as family and community ties play a role in connecting harvesters and basket-makers, these bonds also play an important role in gaining access to new harvesting sites. Sometimes this includes family involvement in the development process itself, albeit if only temporarily. For example, Vera Manigault explains how family members locate and arrange access to new harvesting areas: "Like for instance my brother and them they work, you know, clearing off land and stuff and they find it." Other times, community members pick up resource supplies on their travels through areas with easy roadside access. For example, during field work for the project, a community member walked up to a basket stand and handed a bag of pine needles to the sewers he had gathered on a drive home through the nearby national forest (Figure 7, inset D). Likewise, new friendships are providing links to new harvesting sites outside the region. One basket-maker described how a friendship has opened up access to a steady supply of sweetgrass and pine needles; "I do have a friend who lives on the outskirts here in Savannah [who] normally allows our family to go and retrieve those materials... On his plantation, he has a lot of pine trees, and also the sweetgrass grows on the forested land.

So I retrieve that myself." While this basket-maker acknowledged the wider problem with accessing sweetgrass, this arrangement provided a sufficient supply.

Area business and customers are contributing to a new network of personal agreements that supply grass. Elizabeth Mazyck described one business owner who allowed her to harvest and a customer who heard how difficult sweetgrass is to find, and decided to plant some to supply her favorite local artist:

...there's an insurance company up there, [the owner] had a lot [of grass] around their office building, and they was gonna move from there and she gave me all the big hills and I bring it and plant it in my yard, but it doesn't grow as nice as where she had it at... And one of my other customers she lives up in Buck Hall, she's got some hills growing there. She just moved here from some other state and she found out the shortage we have and so she's going to try to grow some on her property.

These arrangements may not be unique; at least one other basket-maker indicated that a customer has planted sweetgrass and plans to allow her to harvest it in the near future. Regardless of how widespread they are, for some basket-makers these types of relationships are an important link in the supply chains that support their craft and sales.

Discussion and Conclusions

Our analysis reveals the relationship of basket-making communities to a particular set of economic conditions that regulate land-use, the distribution of associated land covers, and a wider set of *rural* gathering conditions prevalent in the past. Our community tours revealed a portrait of historic gathering practices that relied on sweetgrass, longleaf pine, and palmetto fronds found in community woodland commons. In fact, gathering these NTFPs was just one of several practices commonly associated with woodlands and one component of household production. In these rural African-American settlements, economies were also characterized by subsistence gardens, small-scale farming, seasonal labor on larger white farms, and low-wage jobs in nearby cities, such as Charleston.

Today, while sweetgrass appears to be available on larger parcels in more distant parts of the county (see e.g., Hurley et al. 2008), it still exists within Mt. Pleasant and specifically in areas identified as historic collection sites. However, these lands now are controlled and managed by a greater number and diversity of landowners (Hurley et al. 2008). These landowners may or may not maintain and/or plant sweetgrass within forested areas, in their lawns, or as part of their landscaping. Indeed, land development patterns and the associated property boundaries that result in former collection sites, particularly where sweetgrass may still be present, underscores the extent to which an entirely new property regime—one characterized by both greater numbers of landowners, often from outside the area, *and* collectively owned subdivision commons—is emerging across the study area (Figure 5).

Sweetgrass harvesting persists both in the study area and beyond, despite the fact that rapid land development has displaced its habitats, enclosed sweetgrass within new property regimes, and largely resulted in an absence of "publicly owned or protected" harvesting areas. On the one hand, collecting has expanded from a primarily local activity to a regional one. Today, sweetgrass is gathered from a number of other southeastern states. On the other hand, basket-makers have (re)negotiated access to both historical and new collection locations, where they can gather wild sweetgrass and other key materials. These areas are found within Mount Pleasant and on nearby barrier islands with upscale gated communities, such as Kiawah and Dewees islands, in Charleston County.

Despite the popular wisdom that sweetgrass is disappearing, basket-makers are still finding the plants they need to continue this tradition. Networks of exchange based on friendship, kinship, and entrepreneurship continue to connect basket-makers with gatherers and resource supplies. Since there are difficulties finding and accessing sweetgrass in the Mt. Pleasant area, gathering has expanded beyond the community woodlands and waterways near the neighborhoods where harvesters and basket-makers live. Traditional relationships between people who specialize in collecting sweetgrass and people who only make baskets remain important because harvesters bring sweetgrass *home* to Mt Pleasant.

Land development patterns in the greater Mt. Pleasant area have disrupted historic gathering practices associated with sweetgrass, by changing the distribution of plants and by altering the conditions of access associated with the species' distribution in the area. These political and ecological changes associated with urbanization mean that those gathering NTFP resources must navigate a complex set of changing land-uses and property regimes, characterized by diverse landowners, development patterns, and also new plant types. Only in doing so can users and this distinctive art form—and the special people-plant relationships this represents—persist within this rapidly urbanizing area.

The case of sweetgrass basket-making in greater Mt. Pleasant, SC holds key lessons for studies that focus on NTFP practices in urbanizing areas elsewhere. First, the traditional and/or cultural connections of groups long associated with an area may be actively recognized and carried on, in spite of urbanization and associated forms of economic and cultural change associated with this process. Greater attention by planners and policy-makers to the presence of these links and the continuation of land-based activities by long-time residents in rapidly urbanizing areas is needed. Second, the NTFP and crural livelihoods perspective might facilitate more complex understandings of political-ecological changes brought on by suburban and exurban development. Indeed, this case study highlights the uneven and complex changes brought on by these types of development, particularly in areas where there is a strong "sense of place" among locals and developers seek to market aspects of this sense of place.

Literature Cited

- Ballard, R. and G. Jones. 2011. Natural neighbors: Indigenous landscapes and eco-estates in Durban, South Africa. Annals of the Association of American Geographers 101: 131-148
- Brown, B. A., and A. Marin-Hernandez. 2000. Voices from the forest: The Lives and experiences of nontimber forest workers (Voces de bosque adentro: Vidas y experiencias de trabajadores forestales no-maderables). The Jefferson Center for Education and Research, Wolf Creek, OR.
- Burke, M. K., Halfacre, A. C., and Z. H. Hart. 2003. Decline of Sweetgrass Spurs Restoration of Coastal Prairie Habitat. Ecological Restoration 21: 50-51.
- Butler, B., Leatherberry, E., and M. Williams. 2005. Design, Implementation, and Analysis Methods for the National Woodland Owner Survey. USDA Forest Service Northeastern Research Station, Newtown Square, PA.
- Coakley, J. V. 2006. The Flower Ladies: Mothers of Invention. Charleston Magazine, July-August: 158-167.
- Cope, M. and S. Elwood. 2009. Qualitative GIS: A mixed methods approach. Sage Publications, Boston, MA.
- Cordell, K., Betz, C., Green, G., Mou, S., Leeworthy, V., Wiley, P., Barry, J., and D. Hellerstein. 2004. Outdoor Recreation For 21st Century America. Venture Publishing, State College, PA.
- Derby, D. 1980. Black women basket-makers: A study of domestic economy in Charleston County, South Carolina. Dissertation, University of Illinois at Urbana-Champaign, Urbana, IL.
- Duncan, W. H. and M. B. Duncan. 1987. Seaside plants of the Gulf and Atlantic Coasts. Smithsonian Institution Press, Washington, D.C.
- Edgar, W. 1998. South Carolina: A history. University of South Carolina Press, Columbia, SC.
- Emery M. R. 1999. Social values of specialty forest products to rural communities. Pages 25-32. In: S. J. Josiah, ed., Proceedings of the North American conference on enterprise development through agroforestry: Farming the forest for specialty products. Center for Integrated Natural Resources and Agricultural Management (CINRAM), University of Minnesota, Minneapolis, MN.
- 2002. Space outside the market: Implications of NTFP Certification for subsistence use. Pages 302-312. In: P. Shanley, A. Pierce, S. Laird and A. Guillen, eds., Tapping the green market: management and certification of NTFPs . Earthscan, London.
- , and A. Pierce. 2005. Interrupting the telos: Locating subsistence in contemporary U.S. forests. Environment and Planning A 37:981-993
- ———,Ginger, C., Doble, S., and M. R. B. Giammusso. 2003. Special Forest Products in Context: Gatherers and Gathering in the Eastern United States. NE-GTR-306. USDA Forest Service, Northeastern Research Station, Newtown Square, PA.
- Fox, J., Rindfuss, R., Walsh, S., and V. Mishra. 2002. People and the environment: Approaches to linking household and community surveys to remote sensing and GIS. Kluwer. Academic Press, NY.

- Freed, J. 2001. Non-timber forest products in local economies: The case of Mason County, Washington. Pages 67-69. In: M. R. Emery and R. J. McLain, eds., Non-Timber Forest Products: Medicinal herbs, fungi, edible fruits and nuts, and other natural products from the forest. Food Products Press, Binghamton, New York.
- Gabriel, N. 2006. Urban non-timber forest products in Philadelphia. Masters thesis, Temple University, Philadelphia, PA.
- Ginger, C., M. Emery, M. Baumfleck, and D. Putnam. 2011. Access to natural resources on private property: Factors beyond right of entry. Society and Natural Resources DOI 0.1080/08941920.2011.633596
- Grabbatin, B. 2008. Sweetgrass Basketry: The Political Ecology of an African American Art in the South Carolina Lowcountry. Masters Thesis, The College of Charleston, Charleston, SC.
- Gustafson, D. J. and P. M., Peterson. 2007. Re-examination of Muhlenbergia capillaris, M. expansa, and M. sericea (Poaceae: Muhlenbergiinea). Journal of the Botanical Research Institute of Texas 1: 85-89
- Hart, Z. 2003. Stakeholder participation in management of Lowcountry South Carolina sweetgrass (Muhlenbergia Filipes) supplies. Masters thesis, College of Charleston. Charleston, SC.
 - , A. Halfacre, and M. Burke. 2004. Community participation in preservation of lowcountry South Carolina sweetgrass (Muhlenbergia filipes [m. A. Curtis] J. Pinson and W. Batson) basketry. Economic Botany 58: 161-171
- Head, L. and P. Muir. 2006. Suburban life and the boundaries of nature: Resilience and rupture in Australian backyard gardens. Transactions of the Institute of British Geographers 31: 505–524.

——. 2007. Backyard: Nature and culture in suburban Australia. University of Wollongong Press, Wollongong

- Hunt, S. 2006. Save our sweetgrass. Charleston Magazine, October: 138-145.
- Hurley, P. T. and A. Halfacre. 2010. Dodging alligators, rattlesnakes, and backyard docks: A political ecology of sweetgrass basket-making and conservation in the South Carolina Lowcountry. GeoJournal DOI 10.1007/s10708-009-9276-7.
- Hurley, P. T., Halfacre, A. C., Levine, N. S., and M. K. Burke. 2008. Finding a Disappearing Nontimber Forest Resource: Using Grounded Visualization to Explore Urbanization Impacts on Sweetgrass Basketmaking in Greater Mt. Pleasant, South Carolina. Professional Geographer 60:556-578.
- Jahnige, P. 1999. Non-Timber Forest Product Uses and Values In Baltimore, Maryland. Community Resources, Baltimore, MD.
- Jarosz, L., and V. Lawson. 2002. "Sophisticated people versus rednecks": Economic restructuring and class difference in America's West. Antipode 34: 8-27.
- Johnson, E. A. and M. W. Klemens. 2005. Nature in fragments: The legacy of sprawl. Island Press, Washington, DC.
- Jones, E., R. Mclain, and J. Weigand. 2002. Nontimber Forest Products in the United States. University Of Kansas Press, Lawrence, KS
- Knigge, L. and M. Cope. 2006. Grounded visualization: Integrating analysis of qualitative and quantitative data through grounded theory and visualization. Environment and Planning A. 38:2021-2037.

- Lambin, E. F. and H. Geist, eds. 2006. Land-use and land-cover change: Local processes and global impacts. Springer-Verlag, Berlin, Germany.
- Liegel, L., D. Pilz, and T. Love. 1998. The Biological, Socioeconomic, and Managerial Methods and Results in the MAB Mushroom Study. Ambio Special Report Number 9 September: 26-33.
- Love, T., and E. Jones. 2001. Why is non-timber forest product harvesting an "issue"? Excluding local knowledge and the paradigm crisis of temperate forestry. Journal of Sustainable Forestry 13:105-122.
- Lynch, K., and R. Mclain. 2003. Access, Labor, and Wild Floral Greens Management in Western Washington's Forests. Pacific Northwest Research Station, Portland, OR.
- Madsen, L. M. and H. K. Adriansen. 2004. Understanding the use of rural space: The need for multi-methods. Journal of Rural Studies 20: 485-497
- McLain, R. J. 2002. Business as Usual: The exclusion of mushroom pickers in wild mushroom management in Oregon's national forests. Pages 375-384. In: E. T. Jones, R. J. McLain and J. Weigand, eds., Nontimber forest products in the United States. University Press of Kansas, Lawrence, KS.
- Molina, R., O'Dell, T., Luoma, D., Amaranthu, M., Castellano, M., and K. Russell. 1993. Biology, Ecology, and Social Aspects of Wild Edible Mushrooms in the Forests of the Pacific Northwest: A Preface to Managing Commercial Harvest. Pacific Northwest Research Station, Portland, OR.
- National Park Service. 2005. Lowcountry Gullah Culture Special Resource Study and Environmental Impact Statement. National Park Service Southeast Regional Office, Atlanta, GA.
- Nixon, R. 993. Cultures in Conflict: Sea Island Communities are Fighting for Their Survival: Stirring New Hopes Along the Coast of South Carolina. Southern Exposure, Fall: 53- 56.
- Ohlandt, K. F. 1992. Where the sweetgrass grows: The restoration of a maritime wet grassland, incorporating harvesting of Muhlenbergia filipes. Masters Thesis, University of Georgia, Athens, GA.
- Palmer, J. 2000. Recreational Use of Wetlands in Juneau, Alaska. USDAForest Service, Northeastern Research Station, Newtown Square, PA.
- Pickett, S., Burch, W., Dalton, S., Foresman, T., Grove, J., and R. Rowntree. 2001. A Conceptual Framework for the Study of Human Ecosystems in Urban Areas. Urban Ecosystems 1:185–99.
- Price, D. M., and K. Kindscher. 2007. One Hundred Years of Echinacea Angustifolia Harvest in the Smoky Hills of Kansas, USA. Economic Botany 61:86-95.
- Pollitzer, W. 2003 The Gullah people and their African heritage. The University of Georgia Press, Athens, GA.
- Queen Quet. 2006. Frum Cross De Wata: Gullah/Geechee Nation seeing ourstory through the eyes of others. De Conch, February 2006.
- Richards, R. T., and M. Creasy. 1996. Ethnic diversity, resource values, and ecosystem management: Matsutake mushroom harvesting in the Klamath bioregion. Society and Natural Resources. 9:359-374.
- Robbins, P. 2003. Political ecology: A critical introduction. Blackwell Publishing, Malden, MA.

and T. Birkenholz. 2003. Turfgrass revolution: Measuring the expansion of the
American lawn. Land Use Policy. 20:181-194
——, M.R. Emery, and J. L. Rice. 2008. Gathering in Thoreau's Backyard: Nontimber
Forest Product Harvesting as Practice. Area 40: 265-277.
Rosengarten, D. 1986. Row upon row, Sea grass baskets of the South Carolina
Lowcountry. McKissick Museum, University of South Carolina, Columbia, SC.
——, 1992. Lowcountry Basketry: Folk Arts in the Marketplace. Southern Folklore
49: 240-255.
——, 2008. Missions and Markets Sea Island Basketry and the Sweetgrass
Revolution. Pages 128-171. In: T. Rosengarten, and E. Schildkrout, eds., Grass
Roots: African Origins of an American Art. Museum for African Art: New York,
NY.
——, Rosengarten, T., and E. Schildkrout, eds. 2008. Grass Roots: African Origins of
an American Art. Museum for African Art: New York, NY.
Theobald, D. 2004. Placing exurban land-use change in a human modification
framework. Frontiers in Ecology and Environment 2:139-144.
Twining, M. 1978. Harvesting and Heritage: A Comparison of Afro-American and
African Basketry. Southern Folklore Quarterly 42: 159-174
U.S. Census Bureau. 1990. Census fact finder. www.census.gov (Last accessed 16
December 2007).
———. 2000. Census fact finder. www.census.gov (Last accessed 16 December 2007).
——. 2007. Historic census of housing and population: Decennial censuses.
www.census.gov/prod/www/abs/decennial/index.htm. (Last accessed 16
December 2007).
——. 2006. 2006 American Community Survey: Charleston County, SC. (Last
accessed 10 December 2007)
——. 2009. Census fact finder. www.census.gov (Last accessed 7 October 2007).
Wehi, P. M. and W. Wehi. 2010. Traditional plant harvesting in contemporary
fragmented and urban landscapes. Conservation Biology 24: 594-604.

Zimmerer, K.S. and T. J. Bassett. 2003. Political Ecology: An Integrative Approach to Geography and Environment-Development Studies. Guilford Press, NY.

Endnotes

¹ Sweetgrass is from the perennial grass *Muhlenbergia sericea* Peterson [synonyms: *Muhlenbergia filipes*, *Muhlenbergia capillaris* var. *filipes*]. It occurs in sandy maritime habitats on barrier islands and coastal woodlands in the Southeast US (see Gustafson & Peterson 2007 for an overview).

² One of the ten communities in Figure 3 was estimated by the researchers based on historical air photos.