Making Maps that Matter?
The Role of Geospatial Information in Addressing Rural Landscape Change

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ABSTRACT
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(Under the direction of Flora Lu)

Rural communities with bountiful natural amenities are attracting unprecedented in-migration. When unmanaged, the ensuing development threatens the ecological and cultural assets that are driving growth and valued by many residents. Despite the availability of geospatial analysis and visualization tools that seem well-suited to aiding community deliberations about land use planning and common pool resources, these tools have rarely been shown to effectively help communities understand and address threats to their landscape. Through a multi-year, mixed-method participatory research process with community partners in Macon County, North Carolina, I have studied the potential of geospatial information to enjoy increased local relevance, become more accessible to local discussions, and better engage local stakeholders.

I co-developed an iterative research process that draws on critical GIS and participatory research traditions, using ethnographic interviews to guide geospatial analysis and mapping. I produced maps and landscape visualizations that successfully contributed to efforts to engage local residents in discussions about their changing community. I also studied how maps contribute to local planning efforts and their effect on attitudes towards planning. I found that maps designed to be relevant to local planning discussions can support more deliberative discussion and successful public engagement, aid in the recognition and articulation of shared community goals that challenge dominant pro-growth narratives, and enhance local capacity for

planning and resource management. Further, the maps produced in community-driven processes both reflect and shape the shifting discursive strategies through which land use planning or conservation advocates navigate amenity migration landscapes. However, simply supplying visual information about growth and development trends in an experimental mail survey did not affect attitudes towards planning measures.

This research addresses critical but often unasked questions about the relationship between research and on-the-ground outcomes. It should be of interest to landscape change researchers who want their findings to inform land use decision making, critical GIS scholars who are interested in applications, participatory researchers interested in GIS and iterative research designs, and local leaders who want to better engage residents in thinking about changing landscapes and growth management.

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LIST OF ABBREVIATIONS and SYMBOLS

Abbreviations

Cowee Community Development Organization	CCDO
Geographic Information Systems	GIS
Honest significant difference	HSD
Land Trust for the Little Tennessee	LTLT
Little Tennessee Watershed Association	LTWA
Little Tennessee Perspectives	LTP
Mountain Landscapes Initiative	MLI
Participatory GIS	PGIS
The Wilderness Society	TWS
Western North Carolina Alliance	WNCA

Symbols

χ^2 Chi square

INTRODUCTION

My motivation for undertaking the work described here stems from my experiences directing the Little Tennessee Watershed Association (LTWA) in Macon County, NC during 2002-2003. When I first arrived, the county was facing rapid, amenity-driven growth of unprecedented proportions. In informal conversations, many citizens were voicing concerns about the effects that this development boom was having on the local landscape and community: the large homes that were increasingly dotting the forested mountainsides, the loss of prime farmland, the creeks and river running red with sediment, and the decline of rural customs were among the frequent complaints.

Despite these widely shared misgivings, talking about growth management had not gained acceptance in the policy arena. The county had not enacted any planning measures to control development; indeed, a 2001 county effort to pass a land use plan had failed in the face of vehement citizen opposition. I learned that this was only the latest in a string of abortive planning initiatives in the county, dating back to the 1970s.

Geospatial research on the ecological effects of rapid, unplanned development was largely absent from the ongoing public debates about land use in Macon County. This absence was particularly striking because the county is home to Coweeta Long Term Ecological Research site, a globally-recognized center for research of this nature. This situation—in which the effects of development on a landscape are extensively researched, but policymaking processes in the same landscape are largely indifferent to this same research—is what I have come to term the "Macon Paradox."

Though both citizen concerns and scientific research pointed to the serious consequences of unplanned development, neither political leaders nor local nonprofit organizations were willing to publicly address planning in the wake of the most recent policy conflict. In fact, the LTWA board of directors strongly discouraged me from addressing land use issues at all, despite the fundamental relationship between land use and watershed health. I soon encountered other residents who were concerned about the lack of robust civic dialogue around planning issues, and together we started a grassroots group, Macon Tomorrow. This group was the first local organization to actively support planning.

In 2003, I began doctoral work at UNC, with the aim of conducting participatory research that could help to address the Macon Paradox. Throughout, I have been motivated by this guiding question: *can geospatial information influence planning/natural resource management decision-making in Macon County—and if so, how?* By *decision-making*, I include any processes, collective or individual, through which actors adopt a position or strategy vis-à-vis planning/natural resource management. The implications of answering this question are not limited to a single county, however; they extend to rural locales across the United States that are experiencing amenity-driven growth.

The development of my research program reflected the context for which it was designed. In more urban jurisdictions with greater existing planning capacity, a participatory study about the role of geospatial information in planning processes might focus on improving the communication of information by government officials and staff. My experience in Macon County had taught me that this approach would not work in a county where the government had yet to enact any substantive land use policy. In such an environment, the success of any planning initiative would depend on demonstrated popular support. Accordingly, my research focused on the use of information by ordinary citizens.

It is also worth clarifying that I do not categorically regard local government planning as a panacea for the challenges facing places like Macon County. Indeed, Macon County has enacted planning ordinances that have very little effect on the problems caused by rapid amenity-driven development, because they do nothing to regulate the pattern of development on the landscape. It is also quite possible to enact land use policies that exacerbate landscape degradation by guiding development into ecologically or culturally inappropriate configurations. Recognizing this, I have been more interested in understanding how geospatial information can help build local capacity for developing meaningful, collective management solutions rather than only its potential to support the development of planning policy per se. "Planning" in this broad sense, can encompass non-profit and community-based initiatives as well government ordinances—any mechanism whereby citizens increase their collective influence over the trajectory of development. To be successful, these planning efforts should address broadly shared local concerns or visions.

Organization of the Dissertation

This dissertation begins with a literature review, in which I introduce the underlying problems that have motivated my research, namely: rapid, unplanned, amenity-driven development that threatens the ecological and cultural assets of rural communities, and the availability of geospatial analysis and visualization tools that are rarely used to help communities understand and address these threats. I suggest that an approach informed both the critical GIS and participatory research traditions can help the GISciences better inform local planning and natural resource management efforts.

The subsequent research chapters explore three separate but inter-related topics, each of which follow from my guiding research question, *can geospatial information influence planning/natural resource management decision-making in Macon County—and if so, how?*

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Chapter Two tests the hypothesis that *geospatial analysis, if conducted within a participatory research process, can produce landscape change information that facilitates local planning dialogues.* I introduce an experimental participatory research methodology designed to produce and present geospatial information in ways that stakeholders will find relevant, accessible, and engaging. I describe the results of the Little Tennessee Perspectives (LTP) project, through which this methodology was employed in Macon County.

In Chapter Three, I test the hypothesis that *exposure to visual information about local landscape change increases support for planning.* The visual information in question was developed through LTP. This analysis measures the effects of simply providing access to geospatial imagery— outside of a participatory research context—on the planning positions of Macon County residents through a split-sample mail survey instrument.

Chapter Four explores how *geospatial imagery both reflects and shapes the planning processes through which it is produced,* thereby both enabling and constraining possible land use outcomes. I focus on three community-based natural resource management/planning projects that took place in the Macon County community of Cowee from 2004 through 2008. I show how the maps produced through each project reveal—and contribute to—the shifting discursive strategies through which planning/conservation advocates navigate this amenity migration landscape.

The research shared here combines multiple methods in the service of an applied problem, and in doing so, addresses some theoretical challenges as well. These findings lay the groundwork for more refined investigations of important questions regarding the role of maps and visualizations of changing landscapes in local planning processes. The following audiences might care about the questions this study addresses, or be interested in these partial answers:

1) Researchers using GIS to study landscape change who are serious about wanting their research to better inform land use decisions;

2) Critical GIS scholars who are interested in how their ideas can be applied in real-world contexts;

3) Participatory researchers who want to incorporate mapping or use an iterative engagement process;

4) Local government officials, planners and planning consultants who are involved in growth management efforts, especially in places where planning capacity is low and residents are unfamiliar with or resistant to planning. This project demonstrates how maps can contribute to local discussions about planning and generate interest; and,

5) Grassroots or non-profit leaders who may be interested in some approaches that can help build support for planning and public engagement.

Enjoy.

Chapter 1

Literature Review

1.1 Unmanaged growth, fragmented landscapes, and overcoming the 'tragedy of fragmentation'

Amenity migration is "currently one of the major forces of change in rural America" (Stewart 2002: 369). This phenomenon is characterized by the relocation of increasingly mobile, often wealthy populations from urban areas to rural regions that exhibit high levels of natural (or rural) amenities, including topographic variation, access to water bodies (oceans, lakes or rivers), forests, and open space (McGranahan 1999; Stewart 2002; McCarthy 2007; McGranahan 2008). McGranahan (1999) developed a scale rating counties in the US by natural amenities that has informed subsequent studies investigating the patterns and drivers of amenity migration (Shumway and Otterstrom 2001; Frentz et al. 2004; Rupasingha and Goetz 2004). Nonmetropolitan counties with high natural amenities grew by an average of 120% between 1970 and 1996, while average population growth in rural counties low on the amenity scale was approximately 1% over that same time period (McGranahan 1999). Housing values in high amenity counties reflect this greater demand: in 1990, the median housing value in these counties was 50% higher than average among nonmetropolitan counties; by 2000, that premium had risen to 86% (McGranahan 2008).

The unprecedented influx of people and development into rural areas has profound implications for environmental quality and sense of place/quality of life in these communities (Riebsame, Gosnell and Theobald 1996; Jobes 2000; Hansen et al. 2002; Green, Deller and Marcouiller 2005; Moss 2006b). In-migration affects not only the amount of development in

these areas, but also alters predominant patterns of development, creating "an entirely new land use," characterized as exurban development (Hansen et al. 2005: 1893; Travis 2007). Exurban development has a distinctive morphology: it is low density (6-25 homes per square kilometer, as defined by Hansen et al. 2005), but differs from traditional rural development in its patchiness and encroachment into recently agricultural or forested landscapes. This pattern of development is expanding in high amenity counties (Brown et al. 2005). For example, between 1970 and 1999, the amount of land devoted to exurban development in the Greater Yellowstone Ecosystem outpaced population growth by a factor of six (Gude et al. 2006).

"The frantic pace of land development. . .has caused the destruction of many amenities that people have long enjoyed and taken for granted" (Healy 1976: 4), such as scenic landscapes or water quality. These amenities, along with multiple less visible ecosystem functions, are vulnerable to degradation because they are common pool resources. That is, they are shared among multiple users, they are subtractable (one persons use diminishes the resource for all users), and it is difficult to exclude people from using the resource or to divide it (McKean 1996). Without some coordination among multiple users, even rational individual decisions can result in disasterous collective outcomes for common pool resources (Hardin 1968). Price (1990) has argued that temperate mountain forests, with their multiple benefits, are common pool resources. Even if some of the attributes of a landscape can be divided (such as the land itself), benefits such as water quality or viewsheds cannot be. Similarly, many of the landscape elements important to tourism destinations, and often landscapes themselves, are 'commons' subject to degradation (Briassoulis 2002; Healy 2006; McGranahan 2008).

In a landscape where property is owned by individuals and there is no land use planning or coordination among property owners (such as is the case in many amenity communities), land use decisions are made in isolation. Under this management regime, no provision for the

maintenance of common pool resources can be mandated (Freyfogle 2003), and the "tyranny of small decisions" will often result landscape-scale outcomes that few would have chosen (Odum 1982, quoted in Theobald et al. 2005). Freyfogle describes this as the "tragedy of fragmentation," which "occurs when landscapes are divided into small pieces with no mechanisms available to correct market failures and achieve landscape-scale goals" (2003: 177). This essentially represents a tragedy of the commons (Hardin 1968) within a private property system, because "for the most part, amenities represent assets that are not effectively regulated by markets" (Green, Deller and Marcouiller 2005: 1). "When the benefits of a good accrue to the community as a whole, market mechanisms fail almost entirely" (Freyfogle 2003: 197; Gottfried, Wear and Lee 1996).

The ecological ramifications of the 'tragedy of fragmentation' accompanying amenity migration and exurban development are best brought into focus with a landscape ecology lens. Landscape ecology studies interactions between pattern and process: it recognizes the physical template, biotic characteristics, and natural or human disturbance as the central drivers of landscape pattern (Urban and Keitt 2001, Urban et al. 2000; Urban and Keitt 2001), and then seeks to understand the implications of those patterns for ecological processes (Smith and Urban 1988; Turner 1989; Levin 1992; Lichstein, Simons and Franzreb 2002; and Hennings and Edge 2003). Because exurban development results in significant fragmentation of land cover, it has implications for habitat connectivity, disturbance regimes, biodiversity and other ecosystem functions (Theobald, Gosnell and Riebsame 1996; Turner, Gardner and O'Neill 2001; Jules and Shahani 2003; Hansen et al. 2005; Travis 2007).

Landscape ecology also emphasizes the scale at which ecological processes occur. The implication is that the management of common pool resources must match the scale of the process of interest. For example, watershed conservation should be conceived of (and

implemented) at the watershed scale, not at the scale of the individual parcel or political unit. Water quality suffers from the cumulative impacts of (poorly managed) development, particularly because the negative effects of development accumulate downstream (Bolstad and Swank 1997). Increases in development and impervious surfaces, the result of many, separate development decisions within a watershed, have been consistently linked to decreases in the biotic integrity of fish and macroinvertebrates (Arnold and Gibbons 1996; Sponseller, Benfield and Valett 2001; Sutherland, Meyer and Gardiner 2002; Snyder et al. 2003). Theoretically, if land uses within a watershed were managed to protect water quality, this would prevent individual land uses that would lead to cumulative declines in water quality over the long term.

How do we overcome the 'tragedy of fragmentation' in amenity landscapes? To be sure, the fragmented ownership pattern common in rural areas of the US represents an imposing challenge for the maintenance of landscape-level goods. Land use planning through local governments is one of the most promising mechanisms for providing the necessary coordination among property owners to protect common pool resources (Bengston, Fletcher and Nelson 2004; Theobald et al. 2005).

Local land use planning provides one of the few points of intervention in a fragmented landscape that can provide for coordination across multiple owners and larger scales, thereby preventing or mitigating degradation to common pool resources[1]. In the US, most authority for implementing land use restrictions on private property rests not with the federal or state governments but with municipal governments at the local—town, city, or county—level (Dalton, Hoch and So 2000; Porter 2008). Although local governments seldom map to

[1] Dale et al. (2000) provide a thorough summary of ecological principles that can inform the management of landscapes, with a focus on the importance of local land use decision making. "Only certain patterns of land use, settlement, and development, building construction or landscape design are compatible with local and regional hydrology and geomorphic conditions, as well as biogeochemical cycles" (Dale et al. 2000: 652). Their work clearly appreciates the importance of influencing actual land management decisions, but treats the socio-cultural aspects of that project much more simplistically than it does the ecological ones (Cronon 2000).

ecological boundaries and are therefore not ideal management units, their purview regarding land uses represents a unique opportunity for intervention in a strong private property system (Dale et al. 2000; Freyfogle 2003).

Land use planning has its roots in long-range physical planning and mapped proposals "for the future development of the community, together with a program for implementing the plan" (Kaiser and Godschalk 1995: 369). In a review of the genealogy and trajectory of the field of land use planning, Kaiser and Godschalk (1995) identify a contemporary hybrid concept of planning that draws on land use design, land classification plans, verbal policy plans, and development management plans, and evinces a growing interest in urban design and community participation.

Broadly speaking, land use planning "can be conceived as a high-stakes *competition* over an area's future land use pattern" that is "tempered by the need for cooperation" (Berke et al. 2006: 4). Land use planning, then, concerns not just the development of plans, but a consideration of the values motivating the plan, the process of developing plans, implementation of plans, and monitoring and evaluation of outcomes. Berke and colleagues (2006) describe land use planning as a process ideally rooted in local values about what factors contribute to a desirable community and economy, how development should proceed with regard to the environment, and how benefits and burdens of future growth should be distributed. Planning decisions may be informed by planning support systems, which organize and present information about planning options and tradeoffs, often in a spatially-explicit and visual way (Brail and Klosterman 2001).

Together, local values and information can lead to the development and adoption of a long-range or comprehensive plan, "a policy document that guides the location, design, density, rate and type of development within a community over a twenty- to thirty-year time frame"

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(Berke et al 2006: 24). Comprehensive plans rely on a "network of plans" for implementation: plans at multiple scales (areawide land use plans, community-wide plans, and small-area plans) and development management plans and decision-making regarding infrastructure. Areawide plans are often devoted to identifying general areas for conservation and development (Berke et al. 2006: 61). Plans require ordinances or other actions, including incentives, for operationalization.

Local governments, through land use planning programs and associated ordinances, incentives or infrastructure management, can utilize a variety of tools and techniques to manage the location, pattern and density of development in ways that are more protective of amenities and common pool resources (Sargent 1976). Zoning and subdivision ordinances are the most common method of implementing land use plans (Meck, Wack and Zimet 2000). Through zoning, municipalities can designate different areas for different uses, and subdivision regulations specify how larger parcels may be parcelized for residential development. As sustainability has become a more central focus in planning (Berke et al. 2006), growth management strategies, such as open space planning, hazard mitigation, smart growth approaches, and environmental planning to minimize the environmental costs associated with land use changes have become more prominent (Berke 1998; Drucker and Owens 2000; Porter 2008).

In rural communities, there are particular obstacles to using land use planning measures to protect resources/amenities. Rural areas are likely to be without any formal land use planning, often relying on informal, relational controls (Rudel 1984; Rudel 1989; Wilkinson 1999). These may erode quickly when in-migration occurs, making it particularly easy for resource degradation to occur. Rapid population growth is a key variable in whether a rural municipality (town or county) adopts land use planning, often through a comprehensive plan or

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county-wide zoning ordinance (Garkovich 1982; Rudel 1984). This suggests that it is difficult to encourage rural communities to plan in anticipation of, rather than in reaction to, growth.

Sargent (1976) explains that successful rural planning, when it does occur, requires a different approach than planning in urban areas. For example, rural planning should begin with a consideration of what is now commonly referred to as green infrastructure: land for agriculture, wildlife, recreation, etc. should be identified, and the location of development should respect these pre-existing assets. Not only will the resulting plans in rural communities be different than land use plans developed in urban areas, but the approach to planning must reflect the cultural orientation of rural communities. A key consideration is the importance of land ownership in rural communities, and its function as wealth, heritage, social standing and economic resource (Sargent 1976: 140).

Due in part to the importance of property ownership in many rural communities, planning proposals may encounter significant hostility[2] (Graber 1974; Garkovich 1982; McCarthy 2002). In some cases, top-down conservation (and planning) approaches have "alienated many rural people in the US," and therefore, advocates may need to tread more lightly in rural areas than in urban ones out of respect for cultural values (Brosius and Russell 2003: 52). However, this dominant emphasis on private property *rights* rather than *responsibilities* has resulted in the degradation of many common pool resources[3], and ways of effectively working with rural

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[2] Freyfogle (2003) provides an overview of the central role that individual property rights have played in the American psyche and on the landscape itself. His analysis de-naturalizes the ascendant version of property rights in the US, which insists upon a Lockean commitment to unhampered freedom and individual autonomy.

[3] Freyfogle also urges a landscape ecology-informed rethinking of property that recognizes the interdependence between properties. The precautionary principle, he argues, should be levied in favor of nature, not development rights: we should primarily seek to prevent harm to ecosystems and worry less about possible infringements on private property rights. In fact, the ecological damage from decisions made on private land is too serious to continue to ignore, and the automatic right to develop should be eliminated. Because he perceives that cultural understandings of property are largely responsible for the balance of rights and responsibilities that are assumed to accompany property ownership, one of his five key suggestions for promoting a better balance between the two is more meaningful engagement of citizens in deliberations.

communities to protect shared assets must be devised. In cases such as this, meaningful public

participation becomes critical in building support for land use planning (Brosius and Russell

2003; Freyfogle 2003). Sargent (1976: 141) notes that even state and federal mandates may not

be "enforced in rural towns until voters are ready (in their own judgment) to approve" them.

　　　　In this dissertation, when I refer to land use planning, I am referring to a fairly basic

notion that there *is* a role for community- or county-scale management of common pool

resources, although the exact mechanism of that intervention in unspecified. This lack of

specificity mirrors the discourse about planning in the communities in which I have worked. I

have observing many public meetings and conversations about planning in recent years, and

based on these observations, when people (be they members of the public, planners or planning

board members, or elected officials) speak about land use planning, they are most often speaking

about the general idea of exerting *some* control over the amount, type, density or location of

development, in *some* form. The conversation about land use planning in these communities has

typically been so elementary that there has rarely any need for greater specificity about what type

of planning, or what type of plan, might be appropriate. For example, none of the counties I

have worked in have a county-wide comprehensive plan. As one of my community partners

used to say, all meetings about planning in western North Carolina start with the question:

'should there be a government'?

1.2. The (largely unmet) potential of GIS maps, models and visualizations to contribute to the protection of amenity landscapes by fostering more support for planning

1.2.1 The case for maps as new ways to see and think about (changing) landscapes
　　　　Recent advances in mapping technologies and the explosion of spatial data have

revolutionized the way landscape-scale phenomena are visualized and analyzed (MacEachren

1995; Convis Jr 2001; Al-Kodmany 2002; Miller 2006). Geographic information systems (GIS)

enable the storage, querying, analysis and visual display of this growing body of spatially explicit

data. These advances in technology have been called "the most important development in cartography since the early nineteenth century" (MacEachren 1995: 460).

Visual displays of information, including maps, have cognitive advantages over other types of data (Tufte 2001). Mapping can make abstract ideas more tangible: advanced spatial knowledge is difficult to articulate in words but can be easily expressed graphically (MacEachren 1995). Maps and landscape visualizations have to potential to "convey strong messages;…condense complex information and communicate new content; provide the basis for personal thoughts and conversations, contributing to people's memory and issue-awareness; communicate ideas in an instant" (Nicholson-Cole 2005: 258).

These characteristics of maps and visualizations contribute to their widespread use: they have been termed the "common currency" of planning (Orland, Budthimedhee and Uusitalo 2001: 140). They attract attention (Buckley, Gahegan and Clarke 2005), and are widely assumed to be an effective way to reach broader audiences in planning or resource management contexts (Sanoff 2000; Ceccato and Snickars 2000; Brail and Klosterman 2001; Al-Kodmany 2001 andAl-Kodmany 2002; Baker and Landers 2004; Verburg et al. 2004; Appleton and Lovett 2005; Nicholson-Cole 2005).   Visualizations can provide a "common language to which all participants—technical and non-technical—can relate" (Al-Kodmany 2001: 112). Further, maps and land use models with a future orientation can contribute unique information to policy discussions (Myers and Kitsuse 2000; Wachs 2001; Sheppard 2005).

GIS systems and data may be especially appropriate for investigating and "visibilizing" landscape changes in amenity communities (Wilson, Wouters and Grammenos 2004). Commonly available data of potential interest include population growth and census data, land-use land-cover and development trends, and property records. GIS analysis and landscape visualization are also well suited to investigating some of these trends. Landscape visualizations

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make it possible to see and understand patterns at scales beyond the normal range of human perception (Golledge 1993). Through mapping, then, the scale and potentially the condition of common pool resources can be recognized, as can the appropriate scale of management (Hanna, Folke and Mäler 1996; Costanza and Folke 1996; Hanna 2003). For example, researchers have explored the potential benefits of engaging US fishermen in fisheries management through mapping exercises (St. Martin and Hall-Arber 2008). Further, there is often data available at multiple spatial scales and at different points in time, which enables analysis of changes over time and the consideration of relationships among attributes of interest.

Sheppard (2001) has called for the development of ethical guidelines for the use of emerging analytic and visualization technologies. Visualizations should be accurate, representative, clear, interesting and legitimate. The proposed ethical code includes appropriateness in terms of context and realism, community input on the issues addressed, the use of more than one presentation mode, the availability of non-visual information on the same subject, avoiding 'special effects," and capturing responses/evaluations so future visualizations can be improved (2001: 196).

1.2.2. The need for more useful maps
Despite their well-recognized potential to inform local land use discussions, there is little evidence that maps and visualizations are effective in this task. Neither is there much understanding of "how and under what conditions such information makes a difference" (Innes 1998: 54). Sheppard (2005: 639, 641) summarizes the research needs:

> Despite the widespread use of landscape visualizations in planning and design, findings on responses to them are generally not scientifically documented or comprehensive…There is also the important issue of how the use of visualization could influence relevant policy, either directly through presentations to key decision-makers and policy-makers or indirectly through public opinion and collective individual actions. Again, however, there is little scientific information on such policy responses in the visualization literature.

Speaking specifically about land use models, Couclelis (2005: 1368) argues that "land use models could be much more useful than they currently are in supporting land-use planning." Couclelis perceives clear benefits to utilizing the tools of modeling, GIS and visualization in land use planning, but is frustrated by the sizeable gulf between modeling and plan-making. Especially given the fundamental importance of public support for planning/coordination in communities without a history of planning, I believe that the public, not just planners and decision makers, should be included in the pool of stakeholders who could benefit from more relevant and future-oriented modeling. Further, she observes that the degree to which GIS, models and visualizations have been employed to affect the conceptual scope of local and landscape-scale land use planning, rather than simply mechanize its tasks, is surprisingly low. Of course, Couclelis is primarily talking about models designed for planning, not models that study the effects of development on ecological processes or common pool resources. Those, presumably, are too far beyond the disciplinary divide to even critique.

Some visually-oriented alternative future scenarios have been developed with more attention to informing policy (Hunter et al. 2003; Steinitz et al. 2003; Baker and Landers 2004; Hopkins and Zapata 2007). They provide some anecdotal evidence that designing geospatial analysis and visualization to be relevant to land use planning (for example, by including decision makers in modeling efforts) may result in improvements in land use policy.

For example, Steinitz and McDowell (2001) developed visual 'alternative futures' that contributed to the passage of an open space protection bond in Monroe County, PA. And, researchers in the Willamette River Basin in Oregon have included decision makers and the public in the design of mapped scenarios, resulting in a salmon recovery management plan that uses some of the results to guide their future management (Hulse, Branscomb and Payne 2004). However, in neither case were the mechanisms by which the visual material contributed to

policy were not the object of study. Also, the researchers in Oregon observed that the time- and data-intensive process of engaging with decision makers and the public to create maps, models and scenarios that could inform local decisions makes transferability difficult. They conclude that "making the information developed by publicly funded environmental research useable by the public for resolving complex local land and water use trade-offs is an enduring challenge, one that remains largely unmet" (2004: 340). A paucity of examples suggests this continues to be true.

Thus, while it is not unreasonable that "[i]mproved access to scientific information could help decision makers anticipate the potential consequences of rural land-use change and in doing so, avoid unintended ecological effects" (Theobald et al. 2005: 1906), there has been almost no evaluation of whether land use change models, maps or visualizations affect attitudes, the quality of public participation, or outcomes on the landscape. The literature reviewed earlier on the contributions of maps to public processes is largely anecdotal and makes many assumptions about the role of maps and visualizations in public processes[4].

1.3. Opportunities for producing more relevant and accessible GIS maps

Having reviewed the landscape and planning challenges facing amenity migration communities and the (seldom capitalized on and poorly understood) availability of geospatial technologies that may contribute to local decision making, our task is to consider how these tools can be better integrated into planning and resource management processes in rural communities. In this section, I review two avenues for potentially improving the applicability of GIS to local land use management/planning processes:

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[4] Appleton and Lovett (2003 and 2005), Sheppard (2005) and Nicholson-Cole (2005) are among those actively involved in testing some of these assumptions.

* Critiques of commonly-practiced GIS. Although many of these critiques have been well known for years, many continue to apply to maps, models and visualizations about changing landscapes. I consider two basic thrusts of critique:
    i) Critical GIS, which concerns the theoretical paradigm that guides GIS
    ii) Participatory GIS, which focuses on improving access to GIS

* Participatory research as a means of integrating mapping into broader participatory frameworks.

1.3.1. Critiques of commonly-practiced GIS

Writing just before the widespread availability of desktop mapping software, Harley 1989: 1) argued for "an epistemological shift in the way we interpret the nature of cartography." "Much of the power of the map," he observed, was that "it operates behind a mask of a seemingly neutral science" (1989: 7). This perspective on mapping provided a foundation for the GIS and Society debates of the 1990s. The emerging GIS technology was derided by critics for its black-box processing (users did not know or could not change some internal calculations), the creation of sharp graphics that can lead to false sense of certainty, a blind reinforcement of existing power imbalances, and privileging certain ways of knowing by under-representing or ignoring knowledge and perspectives that were not easily incorporated into its field- or grid-based structure (Harley 1989; Aitken and Michel 1995; Pickles 1995; Rundstrom 1995; Sheppard 1995; Obermeyer 1998). Further, GIS technology was part of "a broader reconfiguration of the use of information in society" that could marginalize people due to high skill requirements and cost[5] (Pickles 1995: vii). Supporters of the technology responded that most of the critiques were about *applications* of GIS, rather than anything inherent in the programs themselves; they rather snidely urged social critics to engage with the technology if they wanted to improve it (Openshaw 1991).

Schuurman (2000) summarized the debates in an attempt to glean useful insights and set a more forward-looking agenda. She categorized three periods in the debate: the hostility of

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[5] In the last few years, radical changes in access to spatial data and mapping technologies have certainly softened some of these critiques, but questions regarding equity and representation remain (Miller 2006; Elwood 2009).

1990-1994, followed by more theoretically sound and reasonable critiques in 1995-96, and finally an atmosphere of greater collaboration and more nuanced discussion in the late 1990s that has led to (uneven) interest in addressing critiques. For example, it was eventually acknowledged that GIS was *neither* always empowering *nor* marginalizing—outcomes of using the technology depended on the context (Harris and Weiner 1998). These debates spawned two major responses among scholars, Critical GIS and Participatory GIS, each of which is discussed in turn. Both offer some useful perspectives on enhancing the relevance and accessibility of GIS, models and visualizations about changing landscapes.

a) Critical GIS

Critical GIS has proposed some paradigmatic changes to conventional geospatial analysis; these address some of the issues that may be limiting their usefulness in planning contexts. Critical GIS considers the 'impacts of GIS technologies on people' by bringing critical perspectives about representation, hierarchy, context, and reflexivity into conversation with the technology (Harvey, Kwan and Pavolvskaya 2005). Although these theoretical advances have done much to situate geospatial technologies within social theory, critical GIS and conventional, analytic GIS have remained distant (Schuurman 2000; Kwan 2002b). In the past decade, critical theorists have been laying the groundwork for more robust engagement between the divergent paths of critical and analytic GIS. This has included encouraging mixed qualitative-quantitative methods research more generally (Tashakkori and Teddlie 1998), delinking methods from epistemologies (Rocheleau 1995; Pavolvskaya 2006), and reimagining 'hybrid' linkages between social-cultural and spatial-analytic approaches (Kwan 2004).

Feminist geographers have provided notable leadership in supporting the integration of (reimagined) GIS and qualitative methods, arguing that GIS offers unique tools that could usefully inform critical analysis (McLafferty 2002; Kwan 2002a and 2004; Bell and Reed 2004;

McLafferty 2005; Pavolvskaya 2006). Kwan outlines a convincing rationale for including GIS

within the toolbox of critical and feminist researchers: it can support feminist activism, help

"identify complex relationships across geographical scales," link individual experiences to larger-

scale forces, and help construct "different spectator positions" and "new visual practices"

(2002a: 650). Geospatial technologies can be adapted to tell embedded stories of place and

personal experience, and offer a "means of storytelling and a technology for self-expression"

(Kwan 2007: 25). Pavlovskaya (2006) deconstructs the idea that GIS is a strictly a quantitative

endeavor, for example citing the non-quantitative roots of GIS and the centrality of visualization

as both a means and an end within much spatial analysis.

Despite the increasing recognition that GIS is a technique that can "engage alternate

knowledge," there have been relatively few instances of bringing critical theory and geospatial

analysis together in practice (Harris and Harrower 2006: 2). There are some exceptions to this

rule. For example, a study of forest change in Nepal used interviews and aerial photography

interpretation, illuminating areas of consistency and discrepancy between the two methods

(Nightingale 2003). Interviews and GIS analysis were combined to map informal economies in

Moscow, illustrating that traditional analytic GIS can operate on more contextualized data

(Pavolvskaya 2002). 'Missing' data describing the social landscapes of fishing communities and

fisheries has been mapped and vetted by fishermen in a participatory research project (St. Martin

and Hall-Arber 2008). Remote sensing and ethnography have been combined to study

perceptions of cultural landscapes (Jiang 2003), and GIS has been applied in an historical study

of changing Wisconsin landscapes (Heasley 2003).

Critical quantitative geographies is a recent adaptation within critical geography that builds on

these examples and is designed to "explore the possibilities for crossing the boundary of and

forging creative connections between critical/qualitative and analytical/quantitative geographies"

(Kwan and Schwanen 2009: 262). The critical quantitative geographies framework gives encouragement and structure to researchers interested in moving beyond epistemological and methodological divisions between critical and quantitative approaches that have persisted for years, and offers a more cohesive theoretical framework for deploying geospatial analysis and GIScience in service of critical projects. This emerging field suggests that fruitful and mutually-enriching interactions can occur between GIS and a range of critically-motivated research questions. Critical quantitative geographies seeks to address questions such as: how can quantitative methods "take people's lived experience into account," how can sociocultural and political contexts be made explicit in quantitative analysis, and what is the potential for reflexivity in quantitative research (2009: 262).

Critical GIS research has undoubtedly enriched academic theory, but this work has seldom been directed towards providing on-the-ground benefits to individuals or communities (Martin 2001; Pain 2003). Participatory GIS, which can be categorized as a subset of Critical GIS that is less theoretical and more applied, provides some insights on using GIS for community purposes (Dunn 2007).

b) Participatory GIS

A second major response to the GIS and Society debates was public participation (PPGIS) or participatory GIS (PGIS). There are multiple definitions of P/PGIS. When conducting an inventory of organizations involved in PPGIS, Sawicki and Peterman (2002: 24) included organizations which "a) collected demographic, administrative, environmental or other local-area databases, b) do something to the data to make it more useful locally. . ., and c) provide this information to local nonprofit community-based groups at low or no cost…." PGIS has been defined more broadly as GIS that is "easily understood by all citizens, relevant to public policy issues and available to all sides of public policy debates" (Barndt 1998: 105).

Representing a range of practices, the major contributions of PGIS have been democratizing GIS practice by involving more diverse constituents in mapping and empowering grassroots knowledge through GIS production (Harris and Weiner 1998; Sieber 2000b; Craig, Harris and Weiner 2002; Dunn 2007). However, a limitation of PGIS projects is that they typically "do not utilize GIS functionality for advanced spatial analysis" (Weiner, Harris and Craig 2002: 11).

PGIS efforts have enabled grassroots organizations to better support their objectives through mapping and the creation of data relevant to their goals (including watershed protection, landscape conservation, forest management, and local design) (Denniston 1994; Barndt 1998; Craig and Elwood 1998; Al-Kodmany 2001; Sieber 2000b; Convis Jr 2001; Fox et al. 2005). Access to GIS has been said to have the potential to "positively transform" grassroots organizations (Sieber 2000b: 778). Participatory mapping has in some instances been able to answer concerns about representing more diverse forms of knowledge into GIS by incorporating narratives (Offen 2003) and has yielded new and unique information about communities for decision making (Smith 2003a).

Although local communities are often very enthusiastic about maps and mapping projects, they may lack the technical skills to maintain databases or the capacity to apply mapping software to topics of local interest after 'experts' are no longer involved (Elwood and Leitner 1998; Wood 2005). In some cases, GIS has frustrated community members and researchers due to technological problems, an inability to blend local knowledge with the existing database structure, or extensive time requirements (Barndt 1998; Fox 2002).

Further, the definitions of 'public' and/or 'participation' in PGIS have not always been clearly or consistently defined, nor has the purpose of participation vis-à-vis empowerment (Schlossberg and Shuford 2005). In fact, critical evaluations of PGIS processes have found that those initiatives "may not be as attentive to issues of access, power relations, and diverse

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knowledge claims as the critiques of GIS that fostered participatory GIS in the first place,"
(Elwood 2006b: 700). Therefore, perhaps "a GIS which is vested in the interests of the people
(as defined by them) through an approach based on GIS in *participatory research* may be more
successful and achievable than a truly 'participatory GIS'" (Dunn 2007: 632, emphasis added). It
is this broader field of participatory research to which we turn next.

1.3.2. Participatory Research

a) Background on Participatory Research

Both the critical GIS and PGIS frameworks reviewed above are primarily concerned with GIS as
a mapping technology. Participatory research (PR), though not specifically conceived around
GIS projects, represents a potential framework for integrating GIS maps, models and
visualizations into local planning and resource management in amenity communities. PR has
roots in education, community planning, public health and natural resource management (Lewin
1948; Freire 1981; Israel et al. 2003; Wilmsen 2008). There are many definitions of participatory
research, but Wilmsen (2008: 11) has identified three common characteristics of PR efforts: "the
production of knowledge through some formal process … the participation of non-scientists in
research processes, and … concern[ed] with social change."

PR acknowledges the empowering potential of thoughtful participatory processes, but is
also dedicated to accomplishing research objectives and producing knowledge—new knowledge
that may play an important role in making good environmental decisions. Gaventa (1988: 19)
describes the motivation for participatory research this way:

> Participatory research attempts to break down the distinction between the
> researchers and the researched, the subjects and objects of knowledge
> production, by the participation of the people-for-them-selves in the process of
> gaining and creating knowledge. In the process, research is seen not only as a
> process of creating knowledge, but simultaneously, as education and
> development of consciousness, and of mobilization for action.

There is an increasing interest in undertaking participatory research, due in part to "impatien[ce] with the gap between knowledge production through conventional research and the translation of this research into interventions and policies" (Viswanathan et al. 2004 :1). As such, there are two core ideas that characterize CBPR, identified in a recent literature review of community-based participatory research approaches in the field of public health: " 1) the reciprocal co-learner relationship between the researcher and the researched, and 2) the immediate and direct benefit of using new knowledge for taking collective action and effecting social change" (Viswanathan et al. 2004: 25).

This review assessed sixty studies in the US and Canada for the degree of community involvement in research as well as the quality of research design and outcomes. Most of the projects in this study were initiated by researchers, not community members, and funding was typically applied for prior to engaging with community members. Nearly half of the studies involved the community in setting priorities and generating hypotheses, and most involved nonscientists in the selection of methods. Of 30 intervention studies, the vast majority had community members involved in intervention design and implementation. However, due to publishing limitations, it was difficult to obtain many details about the collaborative process.

PR is problem-driven. Accordingly, projects are often mixed-method, drawing upon an array of qualitative and quantitative approaches in an effort to more fully address stakeholder concerns. PR encourages reflexivity, and acknowledges that neither the researcher nor the subjects of the research can be separated from their positions (Haraway 1988; Pain 2004). Of particular concern is the engagement of voices that have not been heard before, and which may challenge dominant cultural narratives. In addition, PR scholars are attentive not only to the research process itself, but to outcomes, as illustrated by a focus on evaluation (Dunn 2007; Wilmsen 2008; Wulfhorst et al. 2008).

It is important to distinguish between PGIS, on one hand, and the use of GIS maps, models and visualizations within a PR process, on the other. In the former, participants are typically involved directly in mapping (data collection or cartography), while in the latter, participants may be involved in mapping, but are also engaged in other phases of a research project, of which GIS and maps may be only one component. There are multiple stages in a research process that can benefit from participation by non-researchers; conversely, it may not be necessary to involve stakeholders in any particular phase in order to meet objectives.

The greatest challenge facing participatory researchers is that the concept and practice of participation are by no means straightforward. Indeed, the rationale for and appropriate means of conducting participatory processes around planning/natural resource management issues has been the subject of considerable debate, as reviewed below.

b) Participation: why and how?

Participation is widely viewed as critical to effective and legitimate decision making, particularly regarding complex and pluralistic issues, such as the protection of common pool resources. Issues such as this represent 'wicked problems,' as described by Fischer (1993: 173)—that is, they have "no unambiguous or conclusive formulations and thus …no clear cut criteria to judge their resolution." They are complex, uncertain, non-reducible, collective, and vary in space and time, all factors that muddy decision making (Dryzek 1987). For example, competing concerns of property rights and public goods are often perceived to be incompatible and incommensurable (Smith 2003b: 21). In these circumstances, passive methods of preference aggregation, such as surveys or referendums, may produce suboptimal results (Dryzek 1996; Allmendinger 2002).

In such pluralistic contexts, participation is credited with making a variety of contributions. It may improve the effectiveness of decision making by more honestly reflecting

the values of those participating, empowering marginal populations, or contributing to social change (Sanoff 2000: 12; Taylor et al. 2004). Participation has a "transformative potential" (Eckersley 1992: 10), and may be able to overcome stalemates when combined with conflict resolution techniques (Sanoff 2000). Participation can foster new, creative ideas for solving complex problems and generating a sense of community (Innes 1992).

Community members "are uniquely qualified and capable to investigate their lives experiences, should have the opportunity, as co-learners, to generate relevant knowledge," and have a right to "the means of knowledge production" (Viswanathan et al. 2004: 22-23). Participation can also enhance research. Community members can provide "descriptions, rich in detail, of the local social context and real-world constraints" surrounding the research, "establish congruence between the study and local reality (i.e. increasing face validity)," and improve participation because the research is more "likely to be context sensitive and culturally relevant" (Viswanathan et al. 2004: 23).

Not all forms of participation are equally effective, however; a process may be dubbed "participatory" while failing to achieve any of the potential benefits described above. Innes and Booher summarize the case against the "[l]egally required methods of public participation in government decision making in the US—public hearings, review and comment procedures in particular…" (Innes and Booher 2004: 419). These methods, they argue,

> do not work. They do not achieve genuine participation in planning or other decisions; they do not satisfy members of the public that they are being heard; they seldom can be said to improve the decisions that agencies and public officials make; and they do not incorporate a broad spectrum of the public. Worse yet, these methods often antagonize the members of the public who do try to work with them. These methods often pit citizens against each other.... They also increase the ambivalence of planners and other public officials about hearing from the public at all.

These prevalent participation methods remain rooted in a modernist, rational, technocratic planning paradigm that many scholars have observed to be fundamentally flawed

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(Dryzek 1987; Goldstein 1996; Smith 2003; Bond and Thompson-Fawcett 2007). Critiques of these approaches reflect a growing recognition that the design of participation processes can have a decisive effect on those processes' outcomes, and as such merits greater attention (Senecah 2004). Therefore, recent decades have witnessed a proliferation of new participation approaches centered on the principles of collaboration, deliberation/dialogue, and inclusivity (Innes and Booher 2004; Senecah 2004; Bond and Thompson-Fawcett 2007). These approaches, including communicative or collaborative planning, draw upon theories of communicative rationality and deliberative democracy, which posit that a collective conscience or generalized will can emerge through a genuine process of reflection and discourse (Pelletier et al. 1999; Allmendinger 2002, Dryzek 1996; Smith 2003; Eckersley 2004: 117), as well as neopragmatism, which is primarily concerned with "how practitioners construct the free spaces in which democratic planning can be institutionalized" (Hoch 1996: 42) Smith argues that "it is only through encountering other perspectives and value orientations that we are able to come to reflective judgments," and also to "more legitimate and trustworthy forms of political authority" (2003: 25, 58). Deliberative participatory approaches have been characterized as particularly "oriented towards the public recognition of common goods" (Smith 2003: 63) and overcoming collective action problems, making them relevant to issues of common pool resource management in a mixed-ownership landscape. In land use planning contexts, Burby (2003) found that more meaningful participation resulted in better plans and more effective implementation.

Participation has also become an important consideration in natural resource management during recent decades. This shift primarily reflects the rise of community-based natural resource management, which, along with the associated concept of community-based conservation, emerged in the Global South in reaction to failures and injustices of top-down

conservation/development projects (Berkes 2004). Goals of participation in such projects often

include: developing management strategies that improve community well-being while

simultaneously maintaining ecological sustainability, improving communication between

stakeholders, increasing efficiency of management and implementation, encouraging local

commitment to the resulting plan, and benefiting from the inclusion of local/indigenous

knowledge (Kapoor 2001; Lane and McDonald 2005; Wilmsen 2008).

c) Critiques of participation/PR

Despite the increased reliance on public participation in planning and natural resource

management, along with the rise of more deliberative or community-centered approaches,

participatory processes continue to sustain serious critique for failing to empower communities

or achieve their social and environmental goals (Hayward, Simpson and Wood 2004; Cooke and

Kothari 2001). One of the most enduring critiques concerns the degree of agency that is actually

accorded to participants. Arnstein (1969) conceived of participation as a ladder, the rungs of

which led increasing public agency in planning decision making. The lowest rung of the ladder

represented little more than manipulation, and progressed through therapy, informing,

consultation, placation, partnership, and delegated power until reaching citizen control. Pretty's

(1995) typology of participation in development projects is very similar to Arstein's ladder in

planning: he offers a yardstick for whether participation in these efforts is manipulative, passive,

consultative, exchanged for material incentives, functional, interactive, or self-mobilizing.

Brosius and Russel (2003) have pointed out that, in many cases, participation still ascends only to

the lower rungs of Arnstein's ladder. For example, they note that simply collecting information

from the public is not really participation, particularly given that results are seldom returned to

participants.

In addition to critiques about the structure of participation and the degree of agency a process yields to participants, questions of 'who participates' have received attention in PR and in community-based natural resource management processes. Cooke and Kothari, editors of *Participation, The New Tyranny (*2001), trace the widespread adoption and spread of participatory methods within NGOs and international institutions, critiquing both the tools of participation and its theoretical limitations. An inability to deal with the complexities of power dynamics (within communities and otherwise) are to blame for some failures (Botes and van Rensburg 2000; Cooke and Kothari 2001). The term *community* in much community-based natural resource management is often ill-defined and seldom seriously considered (Agrawal and Gibson 1999). Communities are dynamic (McDermott 2001; Ng'weno 2001) and heterogeneous (Li 2001), rather than static and homogenous, although they have often been treated as such. The roles of gender, social standing, and access in participation, as well as resource use and conservation, have been too often overlooked (Meinzen-Dick and Zwarteveen 2001). Taking part in lengthy participatory processes, in particular, can present a daunting logistical obstacle for many citizens (Fainstein 2003).

The quality of participatory decision-making has been questioned. Deliberative processes have been criticized for lacking any concrete way to make decisions or any theory of how decisions might be reached, and a process that is too amorphous or open-ended can result in bad decisions (Healey 1997; Smith 2003). Without careful implementation, participation strategies can "reinforce and reproduce existing socio-political structures" by only focusing on "the voices and values of those who are most articulate and easily accessible in a community" (Hayward, Simpson, and Wood 2004:104; Botes and Van Rensburg 2000; Kapoor 2001). Participant homogeneity can also lead to NIMBYism (Fainstein 2003: 180). Participatory projects often create dichotomies that may not be useful or accurate; for example, lumping

behaviors as morally good or bad, or people as local versus outsider (Giles 2001). Insisting on these categories can mask the power differentials being perpetuated locally by discourses or institutions and can prohibit finding solutions (Kothari 2001).

Concerns have also been raised about the environmental consequences of participatory decision-making. Though it has been touted as an effective way to address common pool resource issues, more participation and an open process will not necessarily result in more ecologically sustainable choices (Mathews 1996; Fainstein 2003). Indeed, a number of environmental advocates and scientists have voiced their disillusionment with community-based participation approaches over the years, claiming that it compromises conservation goals (Terborgh 1999; Redford and Sanderson 2000; Cox 2006).

Finally, even if well-conceived, participation may succumb to external factors such as lack of public interest, participation fatigue, and lack of integration into larger governance structures (Kapoor 2001). This latter challenge can prove particularly daunting, since management institutions such as local governments are rarely designed to incorporate findings from participatory processes (Innes 1992).

d) Responses to criticisms

Practitioners and academics have responded to these recent criticisms of participatory practice with calls to adapt and be more mindful of social dynamics. Project managers are urged to consider the 'who, what, where and how' of participation, as well as 'why do people participate' and 'what is the result' (Hayward, Simpson and Wood 2004: 98). Agrawal and Gibson (1999) suggest that *institutions*, rather than *communities*, should be the unit of analysis/intervention. A focus on process as well as outcomes can improve opportunities for adaptive management (Cleaver 2001). Similarly, participation as both a *means* and an *end* of community-based work offers more flexibility and can lay the groundwork for future co-

management of natural resources or other more involved management schemes (Chuenpagdee, Fraga and Euán-Avila 2004; Hayward, Simpson and Wood 2004). Anthropological fieldwork techniques are well suited to exploring local social dynamics, and can provide guidance on issues of community and participation (Brosius and Russel 2003).

Participatory efforts should be adaptive, have internal critique mechanisms, and include locally meaningful evaluation (Giles 2001: 165). Morrissey (2000) addresses the difficulty in measuring and understanding the impacts of participation throughout a community-based project by providing indicators of the overall process and specifying benefits to individuals, group capacity, policies and decision making. She provides a thorough set of measures for each indicator that help to overcome some of the well-grounded complaints regarding the difficulty of assessing participatory projects. These offer much-needed guidance in many realms beyond conservation projects.

Despite the ongoing struggle to get it right, the contributions of participatory approaches should not be ignored—in some cases community empowerment, in some cases successful projects, in many cases a better understanding of the resource management issue if not complete solutions, and in many cases, more open discussions (Chuenpagdee, Fraga, and Euán-avila 2004; Berkes 2004). Although participatory processes face numerous potential pitfalls, it is often necessary and desirable to involve local communities in decision making, and efforts to improve practice and outcomes are well justified. In the next section, I discuss how a participatory research approach can help to integrate geospatial information into local planning/resource management decision-making processes.

1.4. Articulating a participatory approach for developing and using GIS maps/visualizations in planning processes and resource management efforts

To be useful in a participatory planning process, geospatial information needs to be "understandable, believable, and relevant" (Nickerson 2003: 105); comprehensive, current, and well organized (Barndt 1998); socially meaningful, appropriate to the issue at hand, practical (Innes 1998), and "congruent with decision makers' needs in terms of timing, content, and form of presentation" (Dietz, Ostrom and Stern 2003: 1908). These criteria can be distilled to three central requirements: geospatial information must be *relevant* (meaning both salient and readily apprehended), *accessible* to participants, and delivered in an *engaging* manner. When considered together, the Critical GIS/PGIS and PR literatures suggest ways that these requirements may be more successfully met.

Critical GIS lays the theoretical groundwork for improving the integration of GIS with participatory planning by calling for geospatial analysis to draw upon data that are qualitative/attitudinal/experiential, not just quantitative/biophysical; respect multiple perspectives, not just those of "experts;" acknowledge the context(s) in which it is produced and used; and be conducted with greater reflexivity. The paradigmatic shift signaled by these critiques is necessary, but not sufficient, for making GIS more relevant, accessible, and engaging in practice.

PGIS offers a partial means of putting the mandates of critical GIS into practice: involving stakeholders in the mapmaking process can help record their perspectives and experiences, contextualize the analysis, and promote researcher reflexivity by putting local and "expert" knowledge on a more equal footing. While participants may find geospatial information produced through PGIS more relevant, accessible, and engaging than conventional GIS, this information is not necessarily better integrated into local land use planning or resource management efforts; to accomplish this, we must turn to participatory research.

Through debates between advocates and critics of participatory research/management, a more nuanced view of participation has emerged in these fields—one that can help to "make real in practice the stated goals of critical geography" (Pain 2003: 653). Incorporating diverse perspectives into GIS has been recognized to require consideration of who is included or excluded by a participatory process, the nature of their participation, and the relationship of the process to local power structures. The architects of a participatory process should ask not only whether geospatial analyses reflect the perspectives and experiences of local stakeholders, but *which* stakeholders are represented. They should consider opportunities for participation not only (or even necessarily) in the production of the maps, but throughout the planning process in which the mapmaking is embedded: for example, in setting the mapmaking agenda and/or in the subsequent use of the maps. Collaborative planning offers some techniques for doing this. A multi-phase, adaptive approach to participation can also foster reflexivity on the part of GIS practitioners by respecting competing knowledge claims and enabling the critique of "expert"-produced maps. Finally, a fully-realized participatory process must itself be contextualized—designed with consideration not only to power dynamics within the project, but those existing in the environment where the project will take place. Decisions to align the process with certain local interests while challenging others should be made consciously, not inadvertently.

PR represents a particularly amenable framework for bringing GIS to bear on local discussions about common pool resources and growth management because, while it responds to critical GIS calls for greater inclusivity, interdisciplinarity, reflexivity, and context-sensitivity, it also maintains an important role for the researcher. While emphasizing that local stakeholders, particularly those from marginalized groups, deserve greater inclusion in the research/management initiatives, PR recognizes that professional/scholarly researchers/analysts are also crucial partners in these initiatives. The goal is not to privilege local knowledge over

scientific knowledge or vice versa, but to foster productive synergies between them. Indeed, it is inaccurate to assume that stakeholders always favor more participatory methods—on the contrary, they may sometimes feel that "objective," scientific analyses will best serve their interests (Cumming, Guffey and Norwood 2008).

This means that geospatial analysis can take place within a participatory framework and nonetheless rely on highly technical analyses and data sources that can contribute specialized data that may be necessary to inform judgments about complex ecological/landscape issues. GIS can contribute to planning processes both by empowering local perspectives and by illuminating systemic landscape phenomena—the two functions need not be mutually exclusive. In fact, together, they may be quite powerful.

By bringing local knowledge and agendas together with geospatial analytic capabilities, GIS-in-PR is uniquely suited to challenging hegemonic constructions of space—for example, by empowering participants to define intermediate scales of analysis or management between the private parcel and the county/municipal boundary. Further, the participatory production of more relevant or new information may lead to other, more diffuse changes, including increased capacity, empowered advocates or change in discourses (Innes 1998). Through such approaches, the potential of maps and models as narratives or stories of alternate futures can perhaps be activated (Guhathakurta 2001; Nassauer and Corry 2004; Couclesis 2005). Like Nassauer and Corry's work (2004: 354), this participatory approach to visualization "reflect[s] an essential optimism about the ability of humans to make better decisions in the context of new information."

Conducting geospatial analysis in the service of PR can benefit not only local stakeholders, but researchers as well. PR demonstrates that the results of "serious" academic work need not sit on dusty shelves, but can be used for societal and ecological benefit.

Collaborations with non-scientists can yield innovative questions about changing landscapes, and novel approaches for investigating those questions that researchers would be unlikely to come up with themselves. GIS in PR is ideally a means of "invent[ing] with the people the ways for them to go *beyond* their state of thinking" (Horton and Freire 1990: 98).

Through a participatory research framework, critically informed GIS can potentially be incorporated into planning and natural resource management initiatives. Ideally, the result will be engaging participatory processes through which stakeholders participate in producing relevant, accessible information that can guide management decisions. If this is accomplished, both local resource management and the field of geospatial analysis stand to benefit tremendously.

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Chapter 2

**Articulating a participatory approach to critical GIS:
a case study from the Southern Appalachians**

Abstract

This paper introduces an iterative, participatory research methodology for generating maps about the changing landscape that 1) make visible resident's concerns about development, 2) are accessible to residents and decision makers, and 3) are relevant to local discussions about growth management. Through a case study in a rapidly growing Southern Appalachian county, I explore how participatory research can both help to bridge between critical and analytic research traditions and encourage more rigorous engagement of (critical) research agendas with the needs of community's.

The research process involved ethnographic interviews to identify salient topics regarding growth; geospatial analysis and mapping; focus groups to refine information and imagery for local audiences; and a deliberative meeting format to encourage thoughtful discussion about changing landscapes. This methodology was tested in a community with a history of contentious debates about land use policy, and succeeded in generating locally-relevant maps and analysis that have influenced the local discourse about planning. The approach contributed to the recognition that many residents shared similar concerns about unmanaged development, and the consideration (but not adoption) of policies to address newly mapped citizen concerns.

2.1. Introduction

"It's a very, very moderate plan with few restrictions."

> Joe Stark, Macon County Planner, referring to a proposed county-wide land use plan which would leave 90 percent of Macon County in an open-use district, with no restrictions on land use (Smoky Mountain News ([Waynesville], 7 November 2001)

They were loud and emotional, and they packed the Macon Community building to overflowing last Thursday night. Approximately 700 opponents of the land-use plan being considered by Macon County commissioners attended the meeting organized by Macon County Concerned Citizens, applauding speakers who defended property rights and demanded a referendum on the plan.

> Smoky Mountain News ([Waynesville], 23 January 2002) account of a meeting on same plan

When I first moved to Macon County, North Carolina in early 2002 to work for a local conservation organization, a proposed county-wide land use plan had just failed in the face of public distrust and hostility (Cho, Newman and Bowker 2005; Cumming, Guffey and Norwood 2008). This was not the first time that land use planning had been hotly debated locally: growth pressures from amenity migration had engendered conflict over land use planning throughout the Southern Appalachian region in recent years (Smoky Mountain News [Waynesville], 9 May 2001; Jonsson 2006).

Later the same year, a small group of community residents who believed planning was important to maintaining a high quality of life (myself included) began to define the problem not as one of planning, per se, but as the lack of meaningful participation in discussions about planning. In other words, we sought to improve the success of land use planning processes by finding more effective ways to engage local stakeholders. This group believed that many residents privately lamented the outcomes of rapid development, but felt uncomfortable expressing that view publicly: there was little space for public engagement outside of contentious meetings, and according to the dominant narrative in the county, land use planning was a very

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radical idea. Further, we believed that a lack of information about growth trends made it difficult to build a foundation for discussion, and if more people considered the long-term consequences of continued, unmanaged growth, more residents would support planning. Therefore, two key needs identified by this group were 1) documenting and validating local concerns about rapid development and 2) improving local access to information about growth trends.

Some of the local growth trends of interest had been thoroughly studied by researchers at the Coweeta Long-Term Ecological Research[6] site in southern Macon County (e.g.Wear, Turner and Flamm 1996; Bolstad and Swank 1997; Wear and Bolstad 1998; Pearson, Turner and Drake 1999; Gragson and Bolstad 2006; Burcher, Valett and Benfield 2007). However, through conversations with local leaders, I discovered that this research was largely unfamiliar despite its substantive relevance. This disconnect reflects what I call the "Macon Paradox": the ecologically rich landscape of Macon County and the Southern Appalachian region has been the subject of extensive research about land use change trends and their long-term consequences, and yet that landscape continues to be degraded by unplanned land use change. This paradox reflects a much broader problem: land use models and other research about landscape change are not typically well-positioned to be referenced by residents of fast-growing communities or local policymakers (Couclesis 2005), although it is at the local level that most land use decisions are made (Porter 2008). So, although there is a substantial and growing body of geospatial research about land use change, particularly in rapidly growing areas, there is little evidence that such research has informed local land use policy (Theobald et al. 2005).

Given the needs identified by local residents and the fact that there was potentially relevant research available that had not been brought to bear on local planning issues, local

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[6] The Coweeta LTER is one of the longest standing environmental studies in America, and focuses on biogeochemical cycling and watershed ecosystems.

partners and I designed a participatory research project, *Little Tennessee Perspectives*, to meet these needs[7]. Our goals were to 1) assess local perspectives on the changing landscape and 2) produce and share information on development trends that reflected those concerns and was accessible and relevant to local stakeholders. In this way, we hoped to generate geospatial information that would be better positioned to inform the local discourse about land use planning and therefore the community's future.

In this paper, I argue that situating the production and deployment of maps about changing landscapes within participatory research increases their relevance to local planning discussions. I further argue that PR provides a real-world context for addressing some of the concerns of critical GIS traditions that heretofore have seldom been applied in the field. I begin by situating this approach theoretically, considering critical and feminist prescriptions for improving GIS. I propose that participatory research is a way to meet some of those critical goals and also to direct some of the power of GIS for community purposes. I then introduce the study site in more detail and share the iterative methodology co-developed with community partners (which includes interviews, GIS, focus groups, and meetings). I report the results of each phase, including selected maps and visualizations produced through this iterative process. In the discussion, I review how participatory research contributed to the production of maps about landscape change that were grounded in citizen perspectives, were relevant to local land use issues and fulfilled some mandates of critical GIS. I also consider some of the challenges encountered as this project unfolded, and conclude by identifying practical and theoretical concerns that merit further attention.

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[7] By this time, I had left my job to pursue graduate school. From this new perspective, the unfortunate confluence of factors regarding planning in Macon County provided a good opportunity to explore how to better contextualize geospatial analysis of changing landscapes. I adopted a participatory research approach to investigate how such information could be made more relevant to local land use debates.

2.2. Situating my approach theoretically

GIS maps, visualizations and land use models produced through conventional analytic approaches, such as those employed at Coweeta, are widely acknowledged to have the potential to inform local discussions of policy/planning (Sanoff 2000; Ceccato and Snickars 2000; Al-Kodmany 2001 and 2002; Baker and Landers 2004; Verburg et al. 2004; Appleton and Lovett 2005; Nicholson-Cole 2005). However, there is little research on how visualizations may inform policy responses (Sheppard 2005), and they may be inaccessible to stakeholders or otherwise fail to reach their latent potential (Barrett 2003; Theobald et al. 2005; Couclesis 2005). More awareness of the social context in which these techniques are developed and used may increase their success at informing local policy deliberations.

The social context of GIS has, in fact, been the focus of considerable debate since the emergence of the technology in the early 1990s. Critical researchers questioned the social implications of GIS: how it was situated in society, who used these emerging tools, for what purposes, and what were the effects in terms of empowerment and marginalization (Haraway 1988; Openshaw 1991; Pickles 1995; Schuurman 2000). The GIS and Society debates, as they came to be known, spawned some adaptations within GIS practice (participatory GIS is described below). However, the debates largely succeeded in exacerbating existing divides between critical/qualitative and analytic/quantitative geographies. Geospatial analysis continues to be largely undertaken by quantitative, positivist researchers answering questions that are little modified by the concerns of critical researchers (Kwan 2002a; Williams and Dunn 2003).

Since then, however, an extensive critical and feminist literature has challenged these epistemological and methodological binaries (Rocheleau 1995; Tashakkori and Teddlie 1998; Kwan 2002a and 2004, Harvey, Kwan and Pavolvskaya 2005; Pavolvskaya 2006; Knigge and Cope 2006). These authors suggest that GIS is not just as a tool of positivist science: "[s]imilar

to other research methods, GIS is neither strictly quantitative nor qualitative but may be meaningfully used in different types of research" (Pavlovskyaya 2006: 2010). In fact, GIS is an important tool that can explore and represent critical agendas. Drawing upon these past bridge-building efforts, the emerging field of *critical quantitative geographies* seeks to address such questions as: how can quantitative methods "take people's lived experience into account," how can sociocultural and political contexts be made explicit in quantitative analysis, and what is the potential for reflexivity in quantitative research (Kwan and Schwanen 2009: 262)?

Questions such as these seem very useful for addressing the need for greater accessibility and relevance of landscape change research; however, they have not been applied in this context. Despite theoretical advances in bringing critical perspectives to bear on analytic/quantitative geographies, corresponding field studies remain few (Harris and Harrower 2006). Several scholars have identified the need to increase the relevance of critical research outside the academy (Martin 2001; Pain 2003; Fuller and Kitchin 2004). Kitchin and Hubbard admonish that "[i]f critical geography is serious about its (emancipatory) intentions, then it needs to reconceptualize how it can engage (and participate) with marginalized populations, opening new, alternative routes for 'doing' geography" (Kitchin and Hubbard 1999: 196).

One way of involving non-academics in "doing geography" is represented by participatory GIS[8] (PGIS). PGIS "involves local communities in the creation of information to be fed into the GIS and subsequently used in spatial decision-making which affects them"(Dunn 2007: 619). However, critical evaluations have found that PGIS projects "may not be as attentive to issues of access, power relations, and diverse knowledge claims as the critiques of GIS that fostered participatory GIS in the first place" (Elwood 2006b: 700). Therefore, it has been suggested that "a GIS which is vested in the interests of the people (as defined by them) through

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[8] For more information about PGIS applications, see Craig, Harris and Weiner 2002 and Sieber 2000b.

an approach based on GIS in *participatory research* may be more successful and achievable than a truly 'participatory GIS'" (Dunn 2007: 632, emphasis added).

This more comprehensive approach to participation has roots in education, community planning, public health and natural resource management (Lewin 1948; Freire 1981; Israel et al. 2003; Wilmsen et al. 2008). There are many definitions of participatory research (PR), but Wilmsen (2008: 11) has identified three common characteristics of PR efforts: "the production of knowledge through some formal process … the participation of non-scientists in research processes, and … concern[ed] with social change." Thus, PR "involves those conventionally 'researched' in some or all stages of the research, from problem definition through dissemination and action" (Pain 2004: 652). PR has sustained serious critiques (Cooke and Kothari 2001; Hayward, Simpson and Wood 2004), but it often remains necessary (and sometimes even desirable) to involve local communities in research and decision making; therefore, efforts to improve practice and outcomes are well justified. With its attention to context, reflexivity, and lived experience, PR is well suited to grounding geospatial analysis in citizen perspectives, promoting accessibility to a broader audience, and enhancing relevance to local land use issues. Further, in the interdisciplinary, problem-driven context of PR, novel ways of bridging between critical and analytic GIS traditions may be revealed.

2.3. Study Site

The physical and cultural landscape of the Southern Appalachians has been changing dramatically in recent decades. Attracted by natural beauty and rural character, unprecedented numbers of amenity migrants have moved into the region (Gragson and Bolstad 2006; McGranahan 2008; Culbertson 2008), bringing new cultural and ecological challenges to a region that has little experience in growth management. Macon County, North Carolina exemplifies this phenomenon. Between 1990 and 2000, the permanent population of the county grew at

26.8%, faster than projected and faster than any of six other counties in the region (US Census Bureau 2002). Property values in the county increased nearly 40% between 1999 and 2003, and in recent years, seasonal housing units have accounted for more than half of all new residential development (LTLT 2004). At the same time, water quality and forest connectivity have suffered as a result of unplanned development (LTWA 2003).

Figure 2.1. Location and regional context of Macon County

The following interview excerpts capture common perspectives on the rapid growth in Macon County:

> I feel like we're giving up a lot in Macon County...We're just losing things that we used we didn't even think about it. I mean I don't know anybody that rabbit hunts anymore. There's no place to go, no place to run your dogs. That used to be a big deal around here. You could go about anywhere you wanted to go, and at least if somebody had seen you on their land hunting, they'd either holler to you to come have a cup of coffee when you get done or something, and now they got these damn yellow No Trespassing signs. I don't know - I think we lose a little bit every day.
>
> <div align="right">Mike Breedlove (2005)</div>

> This was an almost completely just local rural area when we came twenty years ago, and you know, you can just see the changes. It's all the new houses especially in the last say five or so years. The development has been major. We felt like this, this northern end of the county is much less impacted than some other parts, but it's just, it's coming so fast. I mean, if you had told me twenty years ago that that farm over there could potentially have thirty houses on it, or that this road could have seven---I wouldn't have believed it.
>
> <div align="right">Susan Ervin (2004)</div>

The dominant political narrative in Macon County at the time was pro-growth and anti-regulation, while citizens who voiced concerns about the effects of unmanaged growth (including negative impacts on natural or cultural heritage or quality of life) had typically been marginalized (Smoky Mountain News [Waynesville], 9 May 2001; 16 April 2003; 23 July 2003). For example, the county planner was accompanied by a deputy to local meetings about the

county-wide land use plan in 2002 due to threats of physical violence (Smoky Mountain News [Waynesville], 23 April 2003). This atmosphere and its affect on the local discourse is summarized by an interviewee:

> I've always had a philosophy, and I've told my children this when I was raising them and I've said this to many politicians, listen to the people who aren't talking. The majority of people don't like to come to public meetings. They don't like public speaking. They're not comfortable, and they're not going to get embroiled in a controversy... And if they're in favor of zoning, they're not going to go…into a room of people that are against it and stand up and be pro.
>
> Wilma Anderson (2005)

2.4. Using PR to guide critically-oriented geospatial analysis: the Little Tennessee Perspectives methodology

In this paper, I describe how PR was used to generate information about the rapidly developing (and contested) landscape that "visibilized" (Wilson, Wouters and Grammenos 2004) residents' concerns about development, was relevant and accessible to citizens throughout the county, and could foster more effective citizen engagement in discussions about growth management. The work described here is one component of a larger project, Little Tennessee Perspectives (LTP), taking its name from the Little Tennessee River, which bisects the county. LTP was designed by myself, another graduate student and local partners; fieldwork took place in 2004-2005. The goal of the overall project was to foster an inclusive, informed and ongoing public discussion about the changing landscape in Macon County, North Carolina. A longer term goal was to build local capacity for planning. Although it is beyond the scope of this paper to discuss the entire process[9] in detail, the mapping process I describe here was accompanied by the production of a short documentary video capturing local perspectives on growth and development. A diagram of the entire iterative, participatory methodology is shown in Figure 2.2.

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[9] The project is discussed in more detail in Cumming, Guffey and Norwood 2008 and Cumming and Norwood forthcoming.

Figure 2.2. Little Tennessee Perspectives iterative methodology

This study was conceived as a PR project that used quantitative GIS to address community concerns in critical ways, not a PGIS project. Instead of involving people hands-on in the manipulation and visualization of existing data or building new databases directly from local input, our approach involved residents in setting the agenda for geospatial analyses, critiquing the visual presentation of those analyses, participating in conversations about the changes being illustrated, and using the results in a variety of venues. In other words, ethnographic interviewing is a source of data on local *values and concerns* that then *sets the agenda* for quantitative GIS analysis. Other case studies combining ethnography and GIS have shown how mixing methods can be used to triangulate results, foster new knowledge production, or reveal new opportunities for theory-building and the representation of marginalized views (Pavolvskaya 2002; Jiang 2003; Nightingale 2003; Kwan and Ding 2008; St. Martin and Hall-Arber 2008). Further, 'grounded visualization' has been modeled as a successful approach to integrating GIS and qualitative/ethnographic methods in an iterative manner (Knigge and Cope 2006).

In order to represent the perspectives of local residents involved in planning issues and foreground the production of practical material that addressed local needs, LTP was developed in collaboration with a group of community partners[10]. Although I had prior experience in the community, I did not assume that we knew the most salient questions regarding growth management in the community or the optimal approach to engaging residents. Our local partners were the county planner and representatives of the planning board, the local land trust,

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[10] Briggs (1989) offered four modes of participation, summarized by Viswan et al: contractual (whereby researchers contract for services from community members), consultative (wherby community members are asked for guidance prior to the research project), collaborative (whereby researchers and community members "work together on a study that is designed, initiated and managed by researchers," and collegiate (whereby researchers and community members "work together as colleagues, each with different skills to offer for mutual learning, to develop a system for independent research among local people"). In this model, LTP fits best within the collaborative mode of research, but has some characteristics of collegiate, especially given the emphasis on mutual learning that researchers and community members fostered together.

a grassroots community organization, and a regional environmental organization[11]. This group helped shape the overall research agenda, breaking down the typical divide between researcher and community (Gaventa 1988). Our partners helped to conceive strategy, provided us with support in overall project planning and logistics, and in some cases were gatekeepers to others we would need to reach if our process was to gain legitimacy among residents.

Once we had reached agreement on overall goals, methodology and timing, we completed the university's review process for human subjects research and began conducting ethnographic research with local stakeholders[12]. Using a combination snowball and purposive sampling methodology (Bernard 2002, Patton 2002), we conducted semi-structured interviews with 50 residents in Macon County who were recommended by their peers as having an important perspective on the changing landscape and, taken together, were representative of the demographics of the county. Interviewees included long-time landowners, realtors, amenity migrants, property rights advocates, and conservationists, among others. This format allowed us to elicit views in the relative intimacy of an interview rather than in a contentious public meeting. Questions covered connections to Macon County, perceptions of change due to increases in development (both positive and negative), and visions for the county's future. Interviews were audio-recorded and transcribed. Using an open coding methodology (Patton 2002) in Atlas/ti software, we identified the most often cited concerns about how the landscape was changing.

While interviews were being conducted, I was also gathering data on growth and development from a variety of standard sources, including county, state and federal databases. Obviously, these data are biased towards a certain reading of the landscape (for example, the

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[11] Collaboration with representatives of local organizations and professional staff is recommended in PR, and has often been operationalized through the development of a partner committee such as the one described here (Viswanathan et al. 2004).

[12] Slightly less than half of the studies reviewed by Viswan et al involved community members in setting priorities for research, although most studies did involve community members in the selection of methods.

types of data available and the categorization of it was determined by entities with a largely administrative function (Scott 1998)), but I felt the material would contribute new information to the public conversation about planning and could be used without dominating other perspectives of place. The data were then imported in ArcGIS 8.1, and I conducted routine cleaning and data management tasks.

After the ethnographic analysis of interviews and the GIS pre-processing was complete, I investigated how to 'map' the most widely-shared concerns about the changing landscape (as expressed in the interviews and revealed through the coding). I created maps, visualizations and other graphics that either related directly to these most-cited concerns or took advantage of my more 'expert' knowledge of the available data to compare/juxtapose trends in ways that might expand the conversation about land use planning in the community.

To refine the resulting maps, we convened five focus groups[13] of local residents, recruited through newspaper ads and flyers (Langford and McDonagh 2003). In this phase of the process, our goals were to ensure that the maps and analyses were relevant to local concerns, accurately represented local perspectives, and were clear to a lay audience. Draft maps were projected onto a screen, and participants were asked a series of questions about the maps, including: did they understand them, what changes would make them more clear, and was the subject matter relevant and important to their experience in Macon County? Also, I solicited suggestions for other maps or information that should be added. Based on this feedback, as well as comments from partners, I revised the maps and generated new maps as necessary.

At this stage in the process, we felt confident that we had produced maps about the changing landscape that effectively portrayed widely-shared local perspectives on development.

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[13] Margaret Browne, a fellow graduate student at UNC, organized the focus groups and recruited residents, who were paid a small stipend for participating in the two hour meetings. In addition to critiquing the maps, focus group participants also provided feedback on a draft of the documentary video.

Working with our partners, we planned public meetings in four different communities around the county. Because Macon County is mountainous, and the travel times between different communities can be greater than 45 minutes, we chose to conduct multiple meetings in order to give everyone who wanted to participate a reasonable opportunity to do so.

Each meeting followed the same agenda: 1) open with a welcome, 2) present a 15-minute slideshow of the maps about landscape change trends, 3) screen the 30-minute documentary video based on the interviews, 4) break up immediately into small group discussions that invited meeting participants to critique the presentation, discuss their visions for the future and share ideas for enhancing participation, and 5) reconvene the full group for a facilitated discussion in which shared visions and potential next steps were identified. The deliberative meeting format was designed to avoid common problems with public hearing-style meetings by providing a more collaborative atmosphere that would encourage dialogue and foster a respectful atmosphere (Innes and Booher 2004; Senecah 2004; Cox 2006; Bond and Thompson-Fawcett 2007; Walker 2007).

The meetings were videotaped for later analysis, and we also captured quantitative and qualitative feedback from participants through post-meeting evaluation forms and short exit interviews with selected participants. Following the meetings, we refined the maps further based on feedback from this larger audience, and shared a 'final version' of the presentation with interested citizens, decision makers, and other organizations in the area through the production of a DVD that also featured the documentary video.

To evaluate project outcomes, we tracked media coverage in two newspapers (one local and one regional), and conducted follow-up interviews with our community advisors to evaluate the entire process. Since representativity is always at issue in participatory research, we also

tested our findings through a mail survey, which was sent to a random sample of Macon County residents in 2007.

2.5. Results

2.5.1 Results from the interviews

Throughout the interview process, we observed that interviewees felt comfortable and were largely eager to discuss the subject of planning and growth management. Most were appreciative that someone (even a student) wanted to listen to their views on this topic of local importance. Although our goal was not specifically to focus on marginalized voices, over the course of the interviews it became clear that many people felt they had not had a voice in the local planning processes before, even if they faced no systematic barriers to participation.

The coding identified widely shared concerns about the increasing rate of development. The need for increased planning to protect the rural landscape was shared by the vast majority of interviewees. The changing pattern of development, specifically increased development on steep slopes and ridgetops, was the most often mentioned specific concern. Other major topics of concern[14] included the influx of wealthy outsiders; loss of farmland; loss of sense of community; and loss of informal commons for hunting and walking.

2.5.2 Results from the focus groups

The focus groups demonstrated that stakeholder input can be useful in refining geospatial information about changing landscapes for public consumption. Feedback helped us to clarify visualizations, prioritize maps for the public meetings, and reduce technical jargon. In nearly all cases, focus group participants favored maps that included more orienting information, such as towns and roads. For example, even if a series of maps all depicted the same area, they wanted locations labeled on each one. Participants emphasized the need to carefully explain

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[14] Most interviews had more trouble remarking on the positive effects of growth. These included contributions of new in-migrants to the community through civic engagement and volunteerism, as well as increased shopping options.

each legend rather than assuming that the audience would read and understand it on their own, which accords with the split attention effect (Kalyuga, Chandler and Sweller 1999). When using sub-county maps to illustrate a topic, participants preferred to see a locator map showing the smaller area highlighted on the county map first before proceeding to the sub-county area. In keeping with other research about visualization techniques, participants expressed a preference for more realistic images when given a choice (MacEachren 1995). We were encouraged to use photographs as much as possible, or to pair photographs and maps together.

Maps of trends were favored over static maps. For example, maps depicting increasing housing density over time or land subdivision over a period of years were popular. However, a map series that illustrated change in land use with classified LandSat imagery was generally found to be confusing. Based on this feedback, I removed this material from the presentation despite the fact it is commonly used by research scientists studying land use change. I also removed references to land use projection models, taken from published academic studies[15]. Given the limited time available for the public presentation, I found models to be rather difficult to adequately explain and felt that participants' tendency to focus on questions about the model itself distracted from the more general point about development trends that I was trying to convey. I also removed a fly-through video of parcelization because participants did not find the animation enhanced the clarity of the map (Harrower 2007).

2.5.3 Resulting maps and visualizations
Here, I share two examples of the widely-shared concerns we encountered through interviews and the resulting maps/geospatial analysis that were generated in response to those concerns. In each case, an exemplar quote from the interviews provides the justification for the

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[15]Wear and Bolstad (1998) developed a land use change model to forecast development in the Upper Little Tennessee watershed in 2030, which has been very influential in my work.

analysis, followed by an explanation of the geospatial analysis I undertook. Afterwards, I share

the resulting maps.

1) Changing pattern of development: building on the mountains

> If we don't do something every one of our mountains is going to be the
> same. I told my grandson, I said, you better go ahead and take some
> pictures of these mountains right now while there's not a house on
> everyone of them.
>   Claudette Dillard (2005)

Macon County, like other counties in the region, has long hosted many vacation

homes—a trend that began in 1960s—but these homes tended to be small and relatively

unobtrusive. Newer homes constructed during the most recent wave of development beginning

in the 1990s have typically been larger, more visible and located at higher elevations[16]. At the

time of this project, there were no regulations restricting the subdivision and development of

rural land in Macon County, including developments on steep slopes or ridges.

The deep and widespread concern about unmanaged development on steep slopes and

ridges expressed in interviews prompted a new analysis that I had not considered previously: a

viewshed analysis, which would identify areas of the county that were most visible from the

roads. A viewshed analysis calculates what is visible from an input feature, often a single point

(such as the top of hill or from a local landmark), based on line-of-sight calculations using a

digital elevation model (Fisher 1996). Cumulative viewshed analysis calculates viewsheds from

multiple points, and has been used in archaeological studies to examine whether a small number

of archaeological sites were visible from each other (Wheatley 1994).

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[16] This trend was commonly remarked upon by LTP interviewees. For example, one interviewee noted that "[i]t used to be that people who came here came because they loved the mountains, and they wanted a mountain cabin, and they wanted a quiet place, and now I'm seeing more and more of the bigger houses" (Ervin 2004).

In this case, a cumulative viewshed surface[17] was calculated from the entire length of the roads in Macon County. This computationally intensive process took three weeks and resulted in a grid reflecting the number of times each cell of the digital elevation model could be seen from points along the roads. I referred to this layer as the *community viewshed*—it identifies the places in the county that are cumulatively most visible from the roads, and is a good approximation, therefore, of the places likely to be most visible to the most people. The general accuracy of the analysis was verified with partners and focus group participants. I also conferred with our community partners about the concept of *viewshed* to ensure that it was not already a flashpoint for arguments. Not a term that was generally used, it seemed an appropriate concept to introduce it as long as it could be clearly explained.

By overlaying the US Forest Service and current property boundaries layers onto the community viewshed, it became clear that only a small proportion of the county was both privately owned and in the most highly visible class[18]: just 3.5% of the county was in the most visible class, and only one-third of that was privately owned. I used this viewshed map, then, as a way to focus other analyses, including examinations of subdivision patterns in these highly visible areas—a novel use. As shown below, basic build-out scenarios for already-subdivided portions of the most highly visible, privately-owned hillside in the county were generated in a photo manipulation program[19], as shown in Figure 2.5. These analyses and visualizations were designed to encourage residents to think about the longer-term outcomes of development on the most visible mountainsides, as well as throughout the county.

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[17] This analysis was completed with the ArcInfo vshed function. The input layers were class 1, 2 and 3 roads from the NC DOT and a 30m DEM. Many thanks to Bev Wilson who helped me run this analysis.

[18] The resulting cumulative viewshed grid was classified into four categories using a standard deviation classification. The designation *most visible* refers to those cells that were more than 3 standard deviations more visible than the mean visibility.

[19] These build-out images were created by Ursula Lang, a landscape architect, using Adobe Photoshop.

Figure 2.3. Cumulative viewshed map, highlighting location of the most visible, privately owned hillside in Macon County

Figure 2.4. Property lines on most visible hillside, 2005

Figure 2.5. Fulcher Vistas build-out scenario

2) High degree of non-local/out-of-state property ownership

When I first started [surveying] we did a lot of farms and divisions for families where they would split up family places. Then it evolved into subdivisions…
<div align="center">Lamar Sprinkle (2004)</div>

I have to say that seventy-five percent of the people in the community now are people that came in here [not born in Macon County].
<div align="center">Wilford Corbin (2005)</div>

The local people feel threatened by the suburbanization and the 2nd home development and all that.
<div align="center">Bill Crawford (2004)</div>

Another common concern among interviewees related to increases in the number of properties owned by part-time residents. To map this concern, I analyzed the county parcel database[20] to determine the proportion of parcels and acreage in the county that was owned by nonresidents. I defined local residents as those whose tax bills went to addresses within the county, and nonresidents as those whose tax bills went elsewhere. Analysis revealed that 43% of the properties in Macon County, representing 38% of the private acreage, were owned by people who lived full-time outside of North Carolina. Further, analysis revealed that people from every state owned property in Macon County, and that 24% of the parcels in the county were owned by full-time residents of Florida.

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[20] Macon County maintains a website where GIS data may be downloaded for free; this has been a valuable resource for my research. I undertook several steps to clean up the property database prior to making calculations about property ownership.   The first step involved removing duplicate entries from the database. There would be duplicates if a single property had more than one entry in the database because it was bisected by a road, for example. The database also required significant cleaning to be able to sort out state and zip codes. This was largely due to inaccuracies in data entry, such as city, state and zip being entered into the wrong columns.

Figure 2.6. Number of Macon County parcels owned by residents of each state, 2005

Figure 2.7. Land ownership in Cowee Township

2.5.4 Results from LTP Meetings

The LTP meetings were marked by engaged discussion and a generally positive atmosphere; this was in sharp contrast to typical meetings about land use in the county in previous years, which tended to be loud, antagonistic and full of bullying rhetoric. The deliberative format and small group discussions afforded all participants the chance to speak and encouraged a generally productive, fair and respectful dialogue[21]. Most were visibly excited to have information presented that was relevant to their experiences and reflective of their concerns. Little time was spent complaining about the changes to their community or summarizing what was wrong, as often happens in public meetings. The information we presented seemed to equip participants to move forward and embark on a new type of discussion: one focused on how the community could deal with the changes that were happening.

Evaluation forms completed by 48% meeting participants[22] echo observations of the meetings. The participatory research model was able to produce images that enjoyed a high degree of salience in the community. Based on evaluation forms, 100% of attendees found the geospatial information presented to be relevant and interesting, and 97% found the information understandable. Just over 91% reported that they learned something new, most commonly

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[21] The entire meeting process, which included the documentary and small group discussions in addition to the landscape change presentation, was overwhelmingly considered "a good vehicle for community discussion." It is impossible to completely separate the role of the different meeting components. Our experience suggests that the qualitative-quantitative approach, combining the documentary (which was composed entirely of local residents reflecting on the changes they saw and their hopes for the future) and the presentation of maps and geospatial analysis, was very engaging.

[22] Most of the participants were couples, and based on observations, most couples completed only one evaluation form.

about the *rate* of growth. One meeting participant offered that residents were "hungry for data" about how their community was changing. Others commented that the maps provided "relevant information—a chance for opening a dialogue," and noted the "the power of projected growth."

2.5.5 Beyond meetings: effects of community-oriented maps on the discourse and practice of land use planning

Both the products (maps, statistics, analyses) and the process (the PR process, with its focus on inclusion) of LTP have been influential following the public meetings in August 2005. The products have continued to be used and referenced by community residents, area nonprofits, and local governments. Statistics on growth and development generated through the project have been cited in three local newspaper editorials[23] and the project itself has been the subject of at least 12 newspaper articles. This coverage was quite positive and suggests that LTP succeeded in producing relevant, understandable information about a timely issue. In addition, this material has contributed to grassroots organizing in favor of more growth management: statistics, maps, visualizations and photographs from this research have been used to supplement letters to the editor, grant applications, and membership appeals by our community partners and other concerned citizens in the region.

This project appears to have elevated local awareness not only of landscape change as an issue, but geospatial analysis as a tool. Longer-term results of LTP suggest that once communities and leaders become familiar with the types of geospatial data that exist, there is significant demand for locally-relevant information about changing landscapes. For example, at a June 2007 workshop for local leaders sponsored by the regional council of governments, "having access to reliable information about trends in growth and development" was selected as the most pressing need among 18 of 33 attendees; the interest in information about growth trends has been partially attributed to the influence of LTP.

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[23] One editorial, entitled "Thoughtful conversation started," observed that "the statistics and data projections add compelling evidence of the scope of change happening all around us" (Franklin Press [Franklin], 23 August 2005).

Although the goal of LTP was not policy change but improved dialogue, the project did have influences on local policy. A number of LTP participants were emboldened, at least in the short-term, to become stronger advocates for land use planning. This was evident during a public hearing on a proposed planning ordinance (a 'high impact ordinance' which would regulate particularly noxious land uses) that took place shortly after the LTP meetings. Twelve of thirteen speakers at the meeting spoke in favor of the ordinance, and they all urged the commissioners to seriously consider more comprehensive land use planning. All of these pro-planning speakers (and the individual who spoke against planning) had participated in LTP. The maps and visualizations produced became a focus of intense debate on the Macon County Planning Board, and contributed to the county's first formal (albeit abortive) consideration of a steep slope ordinance (Guffey 2005; Franklin Press [Franklin], 2 May 2006). We subsequently learned from multiple contacts that the documentary and maps from LTP were among the campaign materials that helped to elect new, pro-planning county commissioners in neighboring Jackson County: these leaders have since enacted the most progressive development regulations in the region (Lyons 2008, Shelton 2007).

In follow-up interviews, our community partners reflected that the maps and analyses produced through LTP's iterative, participatory process exceeded expectations in elevating local concerns, achieving local relevance and encouraging discussions about the future. Several credited LTP with effectively raising the regional bar for public engagement in land use policymaking.

For example, when local leaders in Cowee Valley, in northeastern Macon County, wanted to encourage residents to articulate a vision for the valley, they utilized a participatory engagement effort with the author, suggesting that LTP influenced some conceptions of participation and engagement in Macon County. Further, a variation of LTP's participatory

research design was adopted in 2007 by the first official multi-county planning initiative ever

undertaken in the region, the *Mountain Landscapes Initiative: Region A Toolbox.* Both of these

processes are discussed in more detail in chapter four.

2.6. Discussion

The participatory research methodology modeled by LTP illustrates the benefits of using

PR for (conventional and critical) GIS, and also how GIS can improve outcomes of PR. This is

a relatively rare example of 'doing' critical GIS in the field. By linking local concerns and

experiences of place with geospatial analysis, LTP attempted to activate the unmet potential of

both geospatial analysis about changing landscapes to inform planning and of critical/feminist

GIS to represent marginalized perspectives.

Benefits of this approach

Situating quantitative GIS analysis within a participatory research process resulted in the

production of maps and analyses that enjoyed local relevance, as indicated by feedback from

focus group and meeting participants, as well as multiple subsequent uses of LTP

imagery/information (e.g., media, use by citizens, nonprofits, or governments). Topics of local

concern were identified through ethnographic research, then explored and illustrated through

geospatial analysis. Ongoing conversations with our community partners, input from focus

groups, and feedback from public meeting participants led to refinements in the maps: clarity to

local audiences increased and they became more targeted towards shared community concerns.

In other words, LTP drew on local perspectives to enhance, clarify, and 'ground truth' GIS. In

these ways, PR may help geospatial technologies be more successful in achieving their latent

potential to contribute to planning conversations.

LTP offered participants accurate, relevant and accessible information about some of the

landscape changes in the community, which provided a strong foundation for productive

conversations. "Access to relevant information" is one of three key requirements for

meaningful public participation (Cox 2006: 84), and here, the provision of relevant visual

information promoted more productive and fair dialogue by encouraging participants to engage

with the material and share their own perspectives (Walker 2007). After their initial use in the

public meetings, the maps seem to have become "gradually embedded in the understandings of

the actors in the community, through processes in which participants, including planners,

collectively create meanings," supporting a "new model" of information in communicative

planning (Innes 1998: 53).

LTP illustrates how PR can be employed to 'do' critical GIS. The mapping was rooted

explicitly in lived experiences of place, and attempted to 1) raise consciousness by highlighting

shared concerns of local residents and 2) link individual and community experiences to larger-

scale forces of amenity migration and exurban development (Kwan 2007; Kwan and Schwanen

2009). The expert, technical apparatus of quantitative geospatial analysis and mapping helped to

legitimize local concerns about the changing landscape in the public discourse. By making

visible landscape degradations that were locally significant, LTP foregrounded views that had

previously been effectively de-legitimized by pro-growth leadership and marginalized in formal

decision-making processes.   This use of mapping supports "new configurations of space,

subjectivity and power" (kanarinka 2006, quoted in Kwan 2007: 28) that can be used for

"countering the dominant practices" (Kwan 2007: 28), in this case, amplifying the voices of

average residents who perceive negative impacts from unplanned growth.

The viewshed analysis map is perhaps the best example of how LTP contributed to a

critical GIS agenda. Through mapping and visualizations, LTP encouraged residents to

recognize an issue of shared concern: steep slope development. Prior to LTP, the conventional

wisdom in Macon County was that the majority of residents cared more about property rights

than about the negative impacts of development on steep slopes or mountainsides. Through mapping and the deliberative public process in which the imagery was shared, local residents recognized for the first time that many residents held similar views about the importance of respecting the mountains by not building on them.

The maps served as an *image event* (DeLuca 1999), simultaneously validating individually-held concerns, challenging assumptions about public sentiment, and suggesting the possibility of collective response. If 'feminist visualization is grounded in the view from a body…versus the view from above, from nowhere, from simplicity" (Kwan 2002a : 649), then it is reasonable to interpret the viewshed map as the view from the community: a unit larger than the individual that, LTP proposed, had a legitimate perspective. "[M]apping previously unmapped phenomena . . .makes these phenomena and relationships visible and, therefore, theoretically and politically significant. 'Positioning' them within GIS space, indeed, performs an ontological function: it creates the landscapes and worlds that embrace these processes." (Pavolvskaya 2006: 2016). By scaling "concern from the personal/local level up to larger contexts" (Kwan 2007: 30), these images opened up new opportunities for considering collective responses to a pattern of development that few involved in LTP found acceptable but had not been a focal point for citizen action. While LTP was not successful in achieving policy change that would answer local concerns about steep slope development, it did influence the local discourse about planning in some important ways which are further discussed in the fourth chapter.

The iterative participatory research methodology modeled by LTP enabled refinement of ideas and data throughout the course of the project while empowering participants to critique maps and geospatial analyses—a role usually reserved for academics. This back-and-forth process included progressively more citizens as the project unfolded, and initiated opportunities

for community capacity-building. This is a potential outcome of critical GIS projects that has sometimes been documented (e.g. Elwood 2006b and Kwan 2007), but deserves more attention.

The LTP process also demonstrates how situating GIS within a PR framework can help address the need, identified by critical researchers, for greater contextualization and reflexivity within GIS. Especially through intensive interactions with community partners, the depth of perspective gained through ethnographic research, and the amount of time spent in the community over the course of the process, PR fundamentally emphasized awareness of the landscape context—both physical and sociopolitical. Evaluation mechanisms were built into the project so that we (the researchers and community partners) would take the opportunity throughout the project to interrogate our own perspectives. Because the public discourse about growth management was very contentious, to be effective, we had to be aware of how we were positioning ourselves in relation to these debates. In other words, the realities of PR fieldwork made positionality a practical as well as theoretical consideration.

Not only did PR improve the practice and outcomes of GIS and support critical GIS practice, but GIS analysis offered some unique perspectives on the changing landscape that contributed to fulfilling the goals of PR or critical research, as well. For example, maps attract attention and provide an engaging medium for capturing and expressing local perspectives. GIS enabled the measurement of locally-salient trends that would not have otherwise been possible (for example, by allowing us to track how and where land subdivision was taking place in the county). By quantifying change, GIS provided structure and a sense of immediacy to concerns that had previously been discussed only in general and subjective terms. GIS introduced a new type of analysis into public discussions that was well-received. Further, mapping offered some concrete outcomes that are sometimes lacking in PR projects, for example providing material

(images and statistics) that continue to be used by local stakeholders, contributing to local capacity for planning.

These outcomes stand in contrast to the results of many land use modeling and geospatial analysis efforts. With little connection to the lived experiences of residents in the study community, it is not surprising that many technically sophisticated modeling efforts fail to inform policy development. Even if the results of these models are encountered by lay stakeholders or even planners, our research suggests that the information is likely to be difficult to understand or at scales and resolutions that are not useful for informing discussions or policy.

When assessing LTP's design and outcomes based on the best practices for community-based participatory research studies established by Viswanathan and colleagues (2004), this PR effort proves to have been generally well-designed and exceeded the degree of collaboration found in the majority of the research projects assessed[24]. The authors identified two important components of successful community-based participatory research: 1) the development of a reciprocal co-learner relationship between the researcher and community members, and 2) the generation of new knowledge that can be of immediate and direct use to the community. To address the first issue, we established a structure for sharing decision-making (the community partner committee, with meetings to develop the project and subsequent meetings to adapt our methods and plans as the project evolved) and designed a research process that could overcome previously-identified barriers to participation. The transfer of the project data to the community, through a public archive, was discussed and agreed to in the initial project meetings. However, because the research process was undertaken by a small group of collaborators, there

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[24] This assessment of community-based participatory research found that researchers collaborated with community members to design the research project 47% of the time, and that researchers sought funding for projects prior to engaging with community members in most projects. LTP was designed with community partners prior to seeking funding and relied fundamentally on input from local residents.

was less emphasis than perhaps, in retrospect, there should have been on formalizing timelines, plans and expectations.

LTP also met many of the best practices identified under the second point, above. LTP promoted more systemic views of local challenges, provided "regular feedback loops" between researcher and community, and has successfully contributed to long-term relationships with a focus on capacity building. In some cases, participation in LTP engendered the "formation of critical consciousness," and local perspectives were fundamental to decision making within the research process. LTP did foster further research, although the longer-term outcomes of LTP (some of which are discussed in the fourth chapter) were somewhat unpredictable from the initial project. However, LTP did not succeed in reforming underlying political structures.

Challenges to this approach

This participatory process, although generally successful in meeting our goals, also encountered challenges. I first reflect on some issues related to the production of the maps, and then consider challenges related to the overall project.

a. Production of maps

A key tension in this project resulted from combining critical and analytic approaches. I not only wanted to make maps that represented and validated commonly-held concerns, but also to encourage residents to think about long-term consequences of rapid growth by providing kinds of information that had been absent from the conversation before. Thus, I found that my roles as 'participatory researcher' and 'expert' were sometimes in tension with one another. Mapping as it evolved in LTP required negotiation between a) documenting and mapping concerns as they were expressed in interviews, and b) challenging local residents to think more about the long-term consequences of growth in light of their values and concerns.

The degree of congruence between available GIS data and local concerns speaks to this tension, as well. Some changes and trends are harder to map than others; conversely, sometimes

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data was available, but residents did not find it compelling[25]. Negotiating these tensions and mis-matches between data and concerns required some flexibility, including representing some concepts through more clear data sources, graphics or photographs. A basic but useful lesson from LTP is that pairing maps with photographs facilitates the communication of more general concepts while also providing some of the site-specificity that the public seems to prefer.

b. Process challenges

Beyond the production and deployment of the maps, we encountered other challenges as well.

The most significant challenge of the LTP process is, ironically, a by-product of our general success. Researchers and community partners alike were largely taken by surprise when a great majority of meeting participants expressed support for land use planning. Therefore, we were not prepared for the mobilizing effect of LTP and did not capitalize on the energy available in the immediate aftermath of the public meetings. Similarly, we did not anticipate the degree to which the maps would take on a life of their own after the project.

However, there was enough momentum, even largely unguided, to threaten local elites who had an interest in the status quo of minimal regulation. The generally pro-planning sentiments identified through LTP were resisted by some local leaders. For example, the project's merits were debated on the local planning board: LTP was maligned as being "funded by grants," "not factual at all," and supported primarily by radicals, not average citizens (Franklin Press [Franklin], 19 August 2005; Franklin Press [Franklin],25 October 2005).

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[25] For example, focus group participants did not favor the LandSat imagery. This data is commonly a central feature in studies of landscape change, and most appropriate for studies at the regional scale because of its cell size (30m). Focus group participants' negative reaction could be due to the scale-mismatch (see Theobald 2005, Theobald et al. 2005 for a discussion of this issue), unfamiliarity with the grain, or the way I explained the maps. To accommodate my interest in linking local concerns about development to the longer-term outcome of those trends, therefore, I drew upon different sources of data to represent changes over time. For example, I used a point file of home locations that was organized by decade to show development, and illustrated parcelization over time.

Questions about "who participates" in a PR project are no doubt familiar to anyone engaged in participatory research. Although we were quite successful in conducting interviews with residents who represented the diversity of the county, neither the focus groups nor the public meetings were completely representative of the demographics of the county. While we made efforts to include everyone who wanted to participate (including considerable advertising in a variety of formats (newspaper, radio, flyers), sponsoring multiple meetings across the county, and fostering a positive and respectful atmosphere at our events), there are always questions about how the vagaries of participation influence the representativity of outcomes. LTP's iterative design to some degree anticipates and corrects for this: by providing multiple, different types of opportunities for input, including interviews and focus groups, we were able to represent the views of residents who would not normally come to meetings.

In the wake of overwhelmingly positive response from meeting participants and resistance from policy makers, then, our community partners wanted to know how representative LTP meeting participants were of residents throughout the county. We therefore undertook a large mail-based sample survey to verify our findings. The survey also provided a novel way to further investigate the design and deployment of maps and visualizations about changing landscapes (discussed in chapter three). Although an in-depth analysis is beyond the scope of this paper, the survey confirmed high levels of support for planning among the general population (Cumming 2007). This additional research effort proved useful in answering questions about how LTP participants varied from average Macon County residents (i.e., not very different in terms of support for planning) although results of the survey were not available until two years after the initial PR work.

2.7. Conclusion

Given that many communities are struggling with the challenges of rapid exurban development, approaches that can foster more inclusive, informed discussions about local land use planning are in serious demand. The approach modeled here illustrates that analytic GIS, thoughtfully situated, has some important contributions to make to communities facing rapid landscape change. This should be of interest to planners or civic organizations who develop and use GIS maps and visualizations in public processes. GIS can be a tool for identifying shared resources; elevating marginalized concerns; quantifying and legitimating diffuse, incremental aspects of degradation; fostering productive discussions about local planning issues; and altering discourses about planning so they are more reflective of local perspectives, not just elite self-interest. Situated within a PR process, GIS may contribute to local capacity for planning.

There are many areas deserving further research. These include:

1) How to better generate information about rapidly changing landscapes that is relevant to community discussions about policy? This is a question that has been most thoughtfully considered in terms of influencing attitudes and behavior regarding climate change (Sheppard 2005; Nicholson-Cole 2005). Areas for further research include both how to develop visualizations that communicate effectively and how to best use them in (local) planning processes. Questions of audience (local residents, local leaders, elected officials), process (what opportunities for engagement do stakeholders find meaningful, transformative, burdensome? how much interest is there in helping to create that material vs. just using it?), presentation (print-outs vs. slideshows vs. interactive digital media? in-person vs. online vs. mail), and timing (when in a planning process is information on changing landscapes most useful?) are also important.

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2) How to better engage stakeholders in amenity migration communities in inclusive, productive and forward-looking discussions about managing growth?

3) How to better integrate local perspectives into mapping and analysis. Local perspectives of place are a rich and largely untapped source of data that may improve mapping while potentially contributing to more successful citizen engagement and on-the-ground outcomes (St. Martin and Hall-Arber 2008). How can analytic techniques combine with qualitative methods to represent experiences of (changing) place in more compelling ways?

This project indicates there is much potential to map and deploy local perceptions of place in ways that may motivate communities to more seriously and thoughtfully consider the longer-term and larger-scale consequences of isolated land use decisions. Martin (2001: 190) contends that "human geography has a moral duty to engage with public policy issues and debate" and that researchers have an "obligation to apply our ideas in the pursuit of the betterment of society." Sheppard (2005: 648), referring to climate change, has argued that "the persuasive use of visualizations, together with other tools and approaches, is justified if they can be effective, and may even be vital" for encouraging policy responses. "If we accept the premise that maps can 'work,' we have an obligation to facilitate their use" (MacEachren 1995: 11).

For many residents in rapidly growing rural communities, including Macon County, poorly managed development is an urgent and deeply felt issue. In my experience, many believe that unplanned development diminishes their quality of life and degrades the landscapes they care about, but do not know if there is anything that can be done about it. By conducting geospatial analysis that is more grounded in social contexts and more attentive to local perspectives, it is possible that communities might more seriously consider growth management strategies that better reflect local values and can contribute to overcoming the Macon Paradox identified earlier in this paper.

Figures for Chapter 2

Figure 2.1. Location and regional context of Macon County.

Figure 2.2. Little Tennessee Perspectives iterative research process diagram
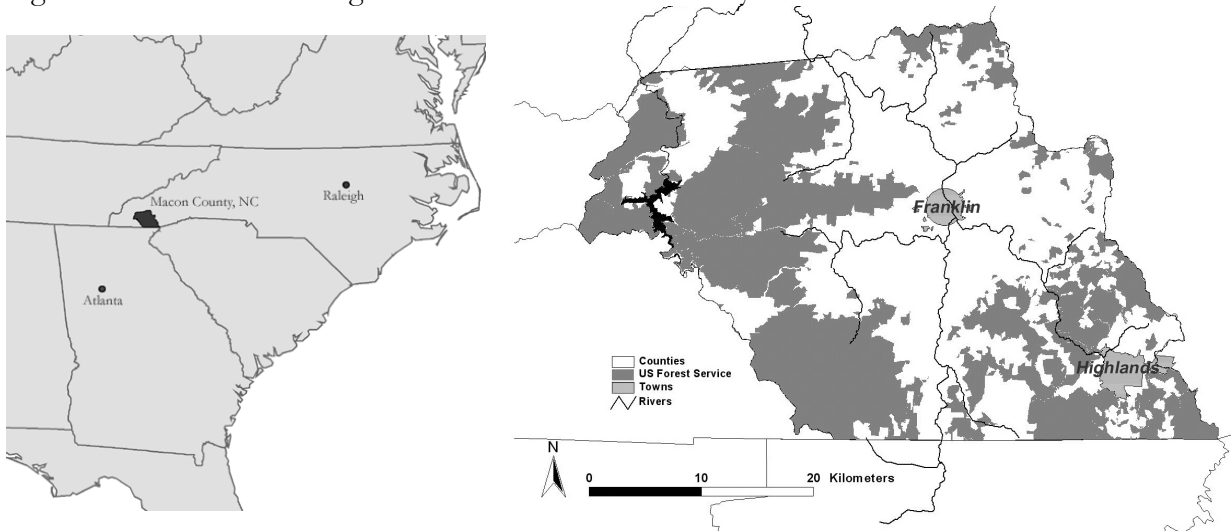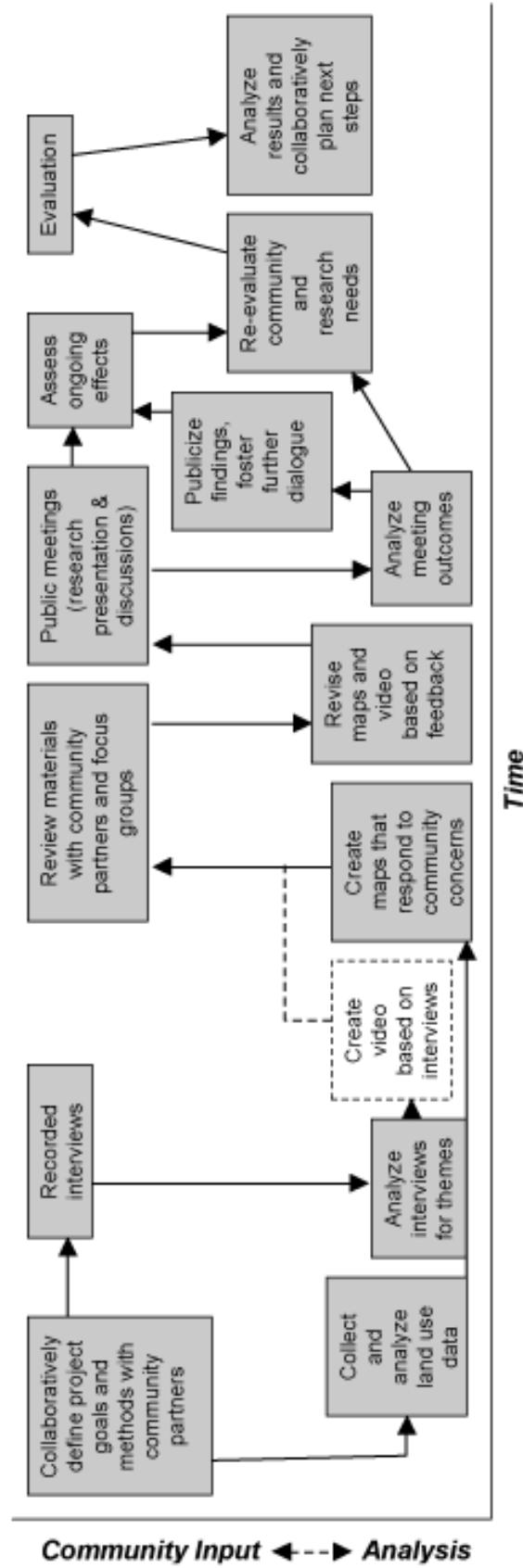
Figure 2.3. Cumulative viewshed map, highlighting location of the most visible, privately owned hillside in Macon County
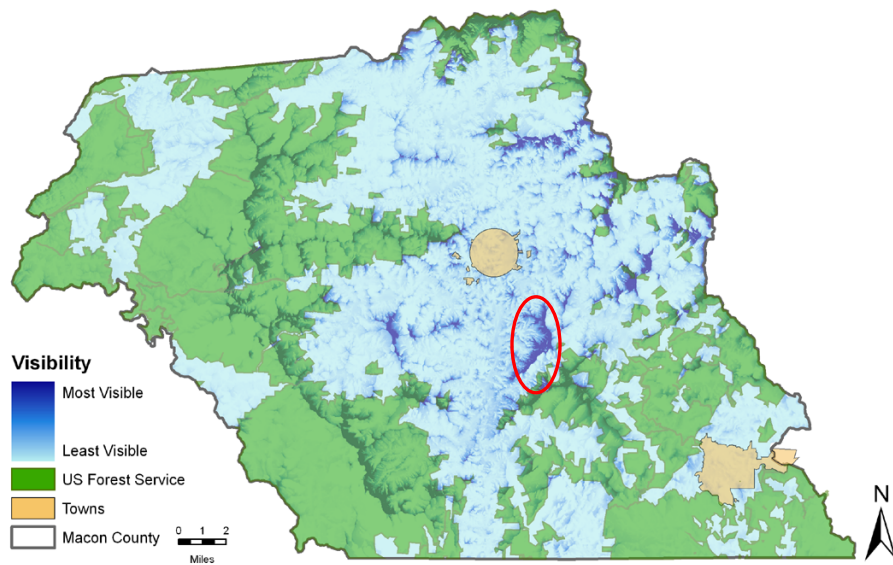
Figure 2.4. Property lines on most visible hillside, 2005

Figure 2.5. Fulcher Vistas build-out scenario

Figure 2.6. Number of Macon County parcels owned by residents of each state, 2005.
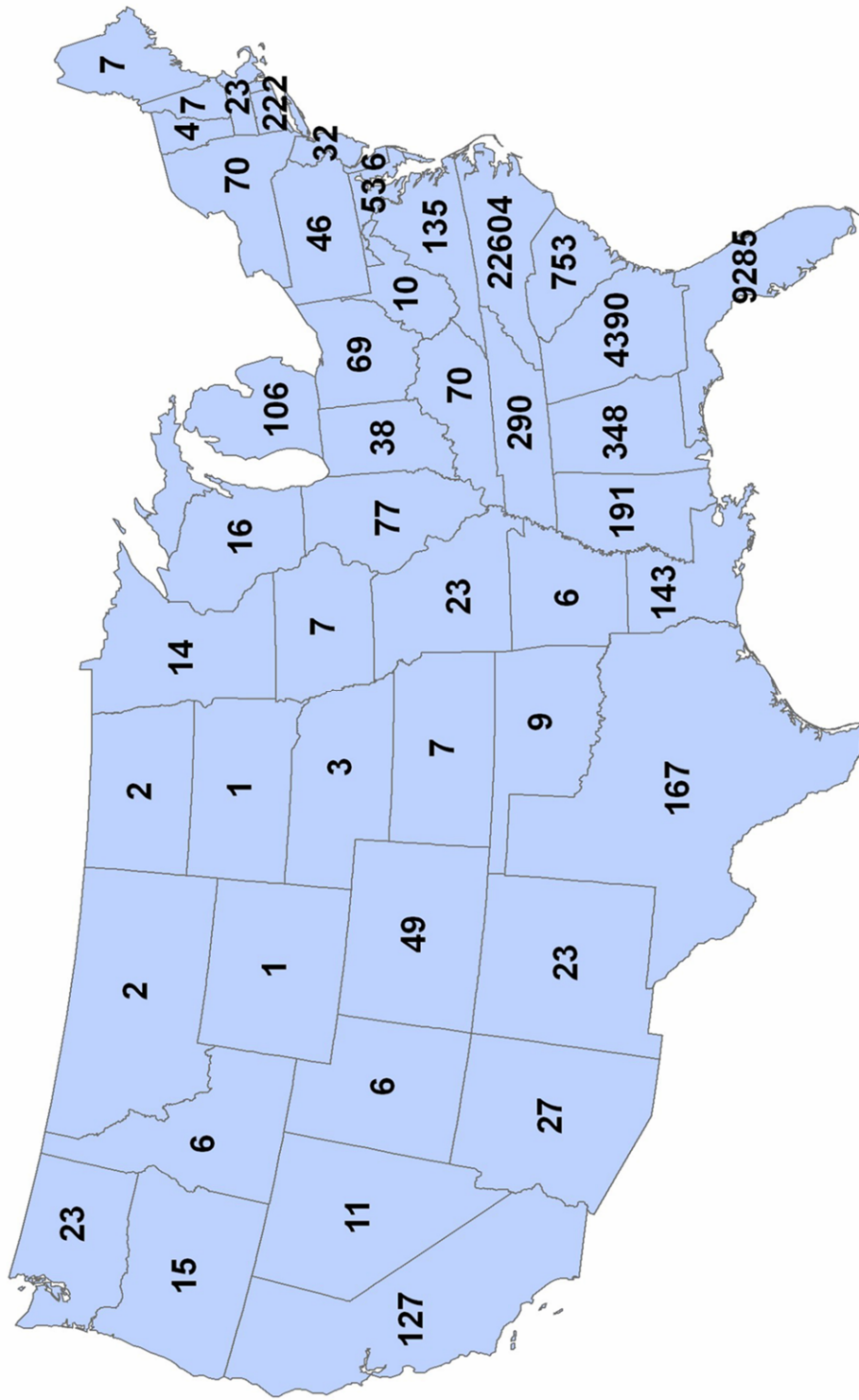
Figure 2.7. Land ownership in Cowee Township.
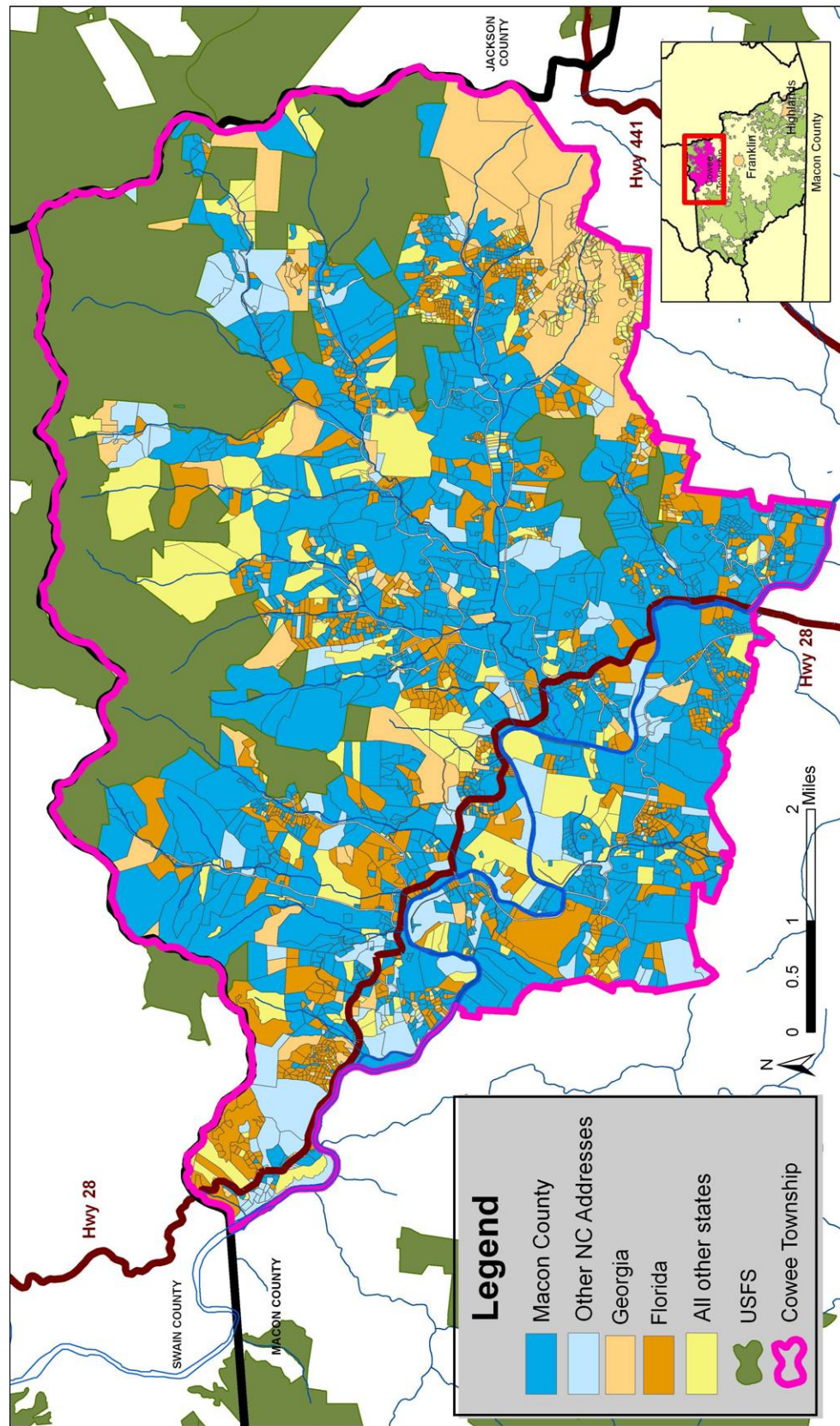
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Chapter 3
Does visual information about changing landscapes affect attitudes towards land use planning in a rapidly growing rural community?

Abstract

It is often taken for granted that studying development trends in areas experiencing rapid growth is useful for informing land use decision making. However, little is known about the effect of visual information about changing landscapes on attitudes toward land use planning. In this study, I assessed the effects of including visual information about development trends on attitudes towards planning through an experimental mail survey of residents of Macon County, NC.

The survey found high levels of support for a variety of planning measures overall, a surprise given historic antagonism towards regulation, but the inclusion of maps in half of the surveys did not affect attitudes about growth management options. However, significantly higher support for planning was found among respondents who received the maps and also reported that they found the maps to be clear, useful or important. Further, this effect was particularly pronounced among members of multi-generational local families: within this group, receiving the maps substantially increased the probability of support for planning, compared to similar respondents in the control group.

Given that increased depth of local roots has typically been associated with decreased support for planning, this effect is noteworthy. We suspect that multi-generational residents are more likely than newcomers to equate growth with a decreased quality of life, and therefore more likely to support planning when thinking about growth trends. The positive influence on

planning support for multi-generational residents, however, was balanced by a negative effect

among a subset of the population for whom the maps prompted stronger opposition to

planning. We speculate that these respondents found the maps threatening. These findings have

complex implications for the deployment of visual information about land use change, and

underscore the need for further research.

3.1. Introduction

There has been significant debate in Macon County, North Carolina, both formally in

policy discussions and informally among residents, about how the community should respond to

rapid population growth. Land use regulations to address the unprecedented development

pressure have been proposed multiple times in the last decade, but no land use plan has been

approved. The public discourse about whether or not to plan has been characterized both by a

lack of certainty about what the majority of residents think[26], and a lack of accessible

information about how the county is growing. Public officials have had little access to

information about growth trends themselves[27], and have made little effort to provide such

information for citizen consideration in planning processes. Pro-planning advocates in the

community hypothesized that if people were more informed about the pace and trajectories of

unplanned growth, support for planning measures would increase.

In this paper, I share selected results of a 2007 mail survey of Macon County residents

that was designed to assess local perceptions of land use change and attitudes towards growth

management. This paper focuses on how the inclusion of visual information about growth and

development trends in half of the surveys affected attitudes towards planning options. Other

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[26] Through fieldwork in this community, we have observed that both pro- and anti-planning advocates claim to represent the 'silent majority' of county residents, those who do not go to public meetings.

[27] At a meeting of government leaders convened in June 2007 by the Region A Council of Governments, the most-requested resource needed to support planning was better access to information about growth trends, which was deemed a higher priority than financial/technical assistance or information on resident attitudes.

results from the survey are forthcoming, and some are reported in Cumming 2007. I hypothesized that residents who received surveys containing visual depictions of growth trends (the study population) would express greater support for land use planning measures than those who received surveys that were otherwise exactly the same but did not include this information (the control population).

In the next section, I briefly introduce the concept of amenity migration and the rationale for integrating geospatial information about development trends into studies about attitudes towards growth management. I then provide background on the study community, the development of the survey instrument and the survey administration. I present the results of the analyses, and then discuss the implications for deploying visual information about growth trends in communities struggling with growth management challenges. I conclude with suggestions for future research aimed at supporting more informed and productive local planning processes in communities experiencing amenity migration.

3.2. Background: Amenity Migration and Contentious Debates about Planning

Rural communities across the nation are struggling to deal with rapid population increases due to amenity migration. Amenity migration is a phenomenon characterized by the relocation of increasingly mobile populations from urban areas to rural regions exhibiting high levels of natural (or rural) amenities, including topographic variation, access to water bodies (oceans, lakes or rivers), forests, and open space, (McGranahan 1999; Stewart 2002; McCarthy 2007; McGranahan 2008). This often-unprecedented influx of people and development is "currently one of the major forces of change in rural America" (Stewart 2002: 369), and has profound implications for environmental quality, sense of place and quality of life in these communities (Sofranko and Williams 1980; Riebsame, Gosnell and Theobald 1996; Jobes 2000; Hansen et al. 2002; Moss 2006b). Despite significant development pressure, many such

communities lack even rudimentary land use planning regulations to manage new development (Rudel 1989; Marcouiller, Clendenning and Kedzior 2002). Fundamental changes to community composition and landscape pattern often lead to community conflicts about how (or whether or not) to enact land use regulations (Graber 1974; King and Harris 1989; Jensen and Field 2005).

Numerous studies have examined the pattern, rates of change and trajectories of rapid development in rural landscapes (Rowntree, Greenwood and Marose 1993; Wear, Turner and Naiman 1998; Hansen et al. 2002; Staus et al. 2002; Hunter et al. 2003; Schumaker et al. 2004). In many cases, these geospatial analyses and land use models take as their starting point the goal of informing land use planning and policy making. This is a worthy goal, and presenting geospatial analyses through maps and other visual formats has been frequently cited as an effective way to reach broader audiences and thereby help inform public planning processes (Al-Kodmany 2001; Appleton and Lovett 2005; Sheppard 2005). It has been argued that participation in planning processes "can be greatly enhanced by the appropriate use of computer-based visualization" (Hamilton et al. 2001: 843). For example, visually-oriented alternative future scenarios have been developed with the goal of informing policy in multiple communities (Hunter et al. 2003; Steinitz et al. 2003; Baker and Landers 2004; Hopkins and Zapata 2007).

However, despite some (largely anecdotal) evidence about the role of such visual information on planning outcomes, the potential of these tools to inform land use planning has seldom been realized (Couclesis 2005; Hansen et al. 2005; although see Steinitz and McDowell 2001). The proliferation of studies about how landscapes are being transformed by suburban or exurban development has not necessarily translated into more relevant or accessible information about changing landscapes for local decision makers or stakeholders (Theobald 2002). In fact, at a 2007 meeting of local leaders convened by the Region A Council of Governments in Western

North Carolina, improved access to information about development trends was the resource most often requested by local leaders.

Amenity migration has been examined not only through geospatial analysis, but also through attitudinal research: a number of studies have attempted to characterize stakeholder attitudes toward population growth and land use planning in communities experiencing amenity-driven growth. Like geospatial research, research about local views has been seen as potentially benefiting subject communities by diffusing conflicts among local stakeholders and informing local policymaking (Healy and Short 1979; Broussard, Washington-Ottombre and Miller 2008). Length of residence in the community is a commonly-identified factor influencing attitudes towards planning in communities experiencing significant in-migration: many studies find that newcomers are more likely to support growth management than long-term residents (Blahna 1990; Green et al. 1996; Johnston et al. 2003). Other studies have found more support for limiting growth among long-term residents (Smith and Krannich 2000), and similar levels of support among these two groups for preserving sense of place (Fortman and Kusel 1990). Other socio-demographic traits such as education, gender, age, income, land ownership, and year-round or seasonal residency have also been related to support for growth management, with educated, female, older, higher-income, small-lot owning, seasonal residents more likely to support planning (Clockerham and Blevins Jr 1977; Green et al. 1996; McLeod, Woirhaye and Menkhaus 1999; Jensen and Field 2005).

Geospatial and attitudinal research on amenity migration have not heretofore been integrated: studies of attitudes have not explicitly tested the effect of exposure to visual information about local landscape changes on views regarding land use planning. Overall, there has been very little attention paid to how visualizations—if they were available—might affect public opinions regarding the material being presented or influence policy outcomes (Sheppard

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2005). If "differences in perceptions of community change would logically translate into different levels of support for policies to manage growth and development," (Jensen and Fields 2005: 263), then presenting information about growth trends to a randomly selected group of residents might be expected to affect their perceptions of change and therefore their reported support for planning. Especially in communities with little history of planning, widespread public support is typically a necessary precursor to the adoption of policy (Sargent 1976). Therefore, understanding how maps about changing landscapes affect stakeholder attitudes towards planning merits investigation. By incorporating visual information about landscape change into a split sample attitudinal survey, the study described here considers exposure to landscape change information alongside other demographic and attitudinal variables as a potential predictor of support for planning.

3.3. Study Community

Macon County is located in western North Carolina, within the ecologically rich Southern Appalachian mountains, and was among the highest scoring North Carolina counties on McGranahan's (1999) Natural Amenities Scale. Nearly half of the county is managed by the Nantahala National Forest, and the Great Smoky Mountains, the nation's most visited national park, is just a short drive to the north. The Upper Little Tennessee River, home to three threatened and endangered species, bisects the county as it flows northward, creating a wide and scenic valley (LTWA 2003).

This amenity-rich landscape has attracted many in-migrants in recent decades, resulting in high rates of population growth: 26.8% between 1990 and 2000, the fastest in the region (US Census Bureau 2002). Macon County exemplifies some of the challenges rapid growth poses for amenity communities. Land prices and home prices have risen so high, so quickly that many locals feel priced out (Sloan 2005; Cochran 2007). Exurban development threatens ecosystem

services, including water quality and biodiversity (Bolstad and Swank 1997; Hansen et al. 2002; Hansen et al. 2005). Here, like communities throughout the southern Appalachians, amenity migrants are most often second-home owners or retirees from Florida or the Atlanta metro area, and they build new (larger than average) homes in parts of the landscape that have typically been avoided by longer-term residents, for example preferentially choosing steep hillsides (because of the views) or floodplains (to be near water) (Cumming, Guffey and Norwood 2008). These changes have sparked ongoing and contentious debates about whether or not the county should enact land use regulations (Cho, Newman and Bowker 2005; Cumming, Guffey and Norwood 2008).

3.4. Survey Goals, Development and Administration

3.4.1 Goals

The survey was designed to explore values and attitudes among Macon County residents towards a variety of growth management options, with the goal of informing local policy discussions. It is an extension of an intensive, participatory research process conducted in Macon County between 2004 and 2005, the Little Tennessee Perspectives[28] (LTP) project. LTP was designed by myself and another graduate student, along with a small group of community partners, to foster a more inclusive, informed and ongoing discussion about the changes taking place in the community as a result of amenity migration. Through a sample survey, we hoped to

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[28] Little Tennessee Perspectives included interviews, documentary production, focus groups, geospatial analysis and structured public meetings. These meetings included a short presentation on the changing landscape (population growth, trends in development), a documentary featuring local residents sharing their perspectives on growth and the future, and a structured, small-group discussion format. At four meetings attended by more than 170 residents in 2005, strong pro-planning sentiments were expressed by the vast majority of meeting attendees, and the tone of meetings themselves was much more civil than that of previous planning meetings in Macon County. The more extensive, less participatory apparatus of a mail survey was adopted following Little Tennessee Perspectives in response to two seemingly incongruous occurrences in Macon County—on one hand, the LTP participatory research process, which identified strong pro-planning attitudes among a large number of residents; and on the other, the continuation of sometimes rowdy and hostile public hearings where many speakers decried even modest land use regulations in defense of private property rights (Cumming 2007). Within a year of LTP's completion, a proposed subdivision ordinance that would address some of the top concerns resulting from the LTP process (including concerns about the pattern of new development and safety of steep slope development) was shouted down by those opposed to regulation.

gain a better understanding of public attitudes about land use planning, which would be of use to community leaders. The survey also provided an opportunity to potentially validate results from the LTP participatory research process.

The provision of maps and other information about the changing landscape had been highly valued by LTP participants[29], and we wanted to include similar information in the survey as well. Several of our community partners also wanted to know whether providing information about the pace and trajectory of growth in the county would influence support for planning. Investigation of this practical question also responds to calls for more exploration of the effects of visual information on attitudes and policy development (Sheppard 2001, Sheppard 2005, Nicholson-Cole 2005). Therefore, the survey was designed to allow us to test responses to visual imagery, as described below.

3.4.2 Instrument Development

All the questionnaires contained four sections: 1) perceptions of change, 2) questions rating statements of values, 3) questions about land use planning and policy-making, and 4) demographic and land-ownership questions. Half included four additional pages of questions about preferences for maps illustrating growth trends. This 'maps section' was inserted between sections 2 and 3, preceding the questions about land use planning that comprise the response variables in this study. This split sample design allowed us to explicitly explore how geospatial data about changing landscapes affected attitudes towards land use planning while simultaneously learning more about the types of information about landscape change and amenity migration that were of interest to the public. Also, inserting the visual information into the questionnaire ensured that responds would look at it, which could not be guaranteed if the information was included as a separate enclosure.

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[29] Based on evaluations from LTP meeting participants and conversations with community partners.

The development of the experimental maps section drew upon previous research through the Little Tennessee Perspectives project that identified 1) development trends that were salient to local residents and, 2) visual representations of those trends that were understandable. The questions in this section were designed to provide insight into the types of information about changing landscapes that are accessible, useful or important to stakeholders—topics which have received little attention from researchers (for exceptions, see Orland, Budthimedhee and Uusitalo 2001; Appleton and Lovett 2003 and 2005). Questions pertaining to clarity, importance and usefulness were adapted from Sheppard's guidelines for effective and ethical visualizations (Sheppard 2001).

The maps section included:

1) questions about the appropriate spatial and temporal scale of information designed to inform land use planning decisions;
2) four sets of full-color maps/visualizations, about which respondents were asked to rate how clear, useful, important, and surprising they found the images to be;
3) two questions about the relative usefulness of different types of data representing landscape change in the county over 50 years;
4) a question about places in the county that were personally important; and
5) an opportunity to comment on the maps and information presented.

The questionnaire was designed following Dillman's principles of visual layout to increase clarity (Dillman 2007). We also included locally-specific information and full-color graphics to increase interest and boost response rate. The instrument was refined through cognitive interviews with three local residents, who were asked to complete the questionnaire and then to explain the thought process they went through when answering each question (Willis 2005). Through this process, we were able to identify and correct ambiguities in wording and to clarify and simplify the layout of the instrument. We then pre-tested the questionnaire with a convenience sample of 40 Macon County residents, which enabled us to further refine the questions and design (Dillman 2007).

3.4.3 Survey Administration

The survey was mailed to a random sample of 1800 addresses of full-time Macon County residents, 900 of which were randomly assigned to receive questionnaires with maps. Addresses were selected using a random number generator from a list of full-time postal delivery addresses[30], forty percent of which were successfully matched with names and phone numbers. Administration followed the Dillman Tailored Design Method (Dillman 2007). Questionnaires were hand-numbered to allow us to track response and manage follow-up mailings. Questionnaires, along with a cover letter hand-signed by both researchers, a dollar bill, and a stamped return envelope, were placed into hand-addressed and stamped envelopes. Follow up mailings followed Dillman's recommendations[31].

Eight hundred sixty-six respondents returned surveys, and seventy were returned as undeliverable by the post office. Of those returned, 811 were useable, yielding an effective response rate of 46.8%. Survey responses were entered into a customized database. Following data entry, five percent of the surveys were rechecked for accuracy, and an error rate of less than one error per survey, or 0.5%, was found. Data was exported into a spreadsheet and recoded as necessary. Additional data processing and statistical analyses was completed using R statistics package and SAS 9.2.

The survey received a reasonably good response rate for a mail survey, particularly when compared to results of other surveys completed in the region (an academic survey about willingness to pay for conservation easements in the county in 2003 received a 34% response rate (Cho, Newman and Bowker 2005) and a survey conducted by a local nonprofit in 2002

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[30] This list was purchased from a mailing list service recommended by social science researchers at UNC Odum Institute.

[31] The initial mailing was followed one week later by a reminder postcard to all recipients. Two weeks after that, those who had not responded were sent another copy of the survey (with another individually signed cover letter, handwritten address and stamped return envelope). Recipients for whom we had telephone numbers were called once, and asked to return their questionnaire. Those who had not responded two weeks after the second survey mailing were sent a final postcard encouraging them to participate.

received a 32% response rate (Elias 2004)). Survey respondents are somewhat older and more educated than residents in the county.

3.5. Results

3.5.1 Socio-Demographic Profile

Table 3.1 presents the demographic profile of the study and control groups. In the total sample (study plus control), the average age of respondents was greater than 60; there were only 112 respondents under 39 in the entire sample. The sample was evenly split between men and women. Slightly less than half of the sample (43%) had a college degree. We found that length of residence in the county was bimodal: 315 respondents reported that their family had been in Macon County for three or more generations, while 374 had only been in the county for one generation and only 81 respondents had been in Macon County for two generations.

The control surveys were more likely to be returned, probably because they were four pages shorter. Women were more likely to return the control survey, but in the study population, men and women are represented in equal numbers.

Table 3.1. Demographics of Respondents

	Study Population (received maps) n=389	Control Population (did not receive maps) n=422	Combined Sample n=811
Gender			
Female	186	239	425
Male	191	173	364
Age			
< 25	4	6	10
25-39	58	44	102
40-59	133	146	279
60-79	164	191	355
80+	26	31	57
Generations family has been in county			
I'm the first	167	207	374
Two	42	39	81
Three or more	161	154	315
Education			
Did not finish HS	27	28	55
HS / GED	89	83	172
Some college	101	134	235
College	102	102	204
Graduate degree	66	62	128

Columns may not sum to 811 because not all respondents answered all demographic questions.

3.5.2 Analysis

The analysis explores the effects of the maps section on attitudes towards land use planning in four steps. The first examines aggregate differences between the study and control populations. The second examines variation within the study population. The third examines differences between two sub-groups within the study population and the control. The fourth utilizes a logit regression to model predicted support for planning from a combination of demographic and map variables. After an explanation of the response variables, I will explore each analysis in turn.

Two response variables are used throughout this study: *D12* and *plan.support* (see Table 3.2). *D12* is a single question that asks to what degree respondents would support increased

land use planning[32] in Macon County to help protect the mountain landscape. Response

categories comprised a 5-point Likert scale ranging from 'strongly oppose,' coded as 1, to

'strongly support,' coded as 5; the mean response for the entire population was 4.07. *Plan.support*

is a simple cumulative scale ranging from 0-20, with a mean of 14.4 for the entire population. It

was created by summing the number of positive responses to twenty separate questions about

land use planning tools and strategies, including D12. All of these questions followed the

experimental maps section. The components of *plan.support* are given in Table 3.6. On average,

residents supported 14 planning policies and did not support six.

Table 3.2. Response variables

	D12	Plan.Support
How measured?	5-pt Likert scale (strongly oppose=1 to strongly support=5)	Simple cumulative scale combining 20 separate questions about land use planning
Range	1 to 5	0 to 20
Mean	4.07	14.4
Standard Deviation	1.13	5.25

I. Differences between study and control population

H1: Respondents receiving the maps section, and therefore seeing visualizations and maps representing recent growth trends in Macon County, are more supportive of planning than those in the control group who did not receive that information.

To test our hypothesis, we ran *t-tests* to determine if there were differences in the level of

support for planning between the study and control populations. No statistically significant

differences in support for planning were found (*plan.support* ~ *maps* p-value = 0.1622; *D12* ~

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[32]We provided a definition of land use planning directly before this question in the survey.

maps p-value = 0.5196). In fact, the average support for planning was slightly but not statistically lower in the study population than in the control.

Exploratory data analysis did reveal that there was considerable variation in the study population regarding the reported clarity, importance and usefulness of the four maps/visualizations of growth trends. This finding led to an investigation of whether any differences in support for planning were linked to variations in how clear, useful or important respondents found the maps section; a new hypothesis was formulated based on our initial findings.

II. *Variation within study population*

H2: Among respondents in the study population, those who reported that the maps were more clear, useful or important, are more supportive of planning than those who reported that the maps were less clear, useful or important.

To explore these relationships, we first created three new variables that captured patterns in responses to map clarity, usefulness and importance. Figure 3.1, below, illustrates the creation of the new variables. As mentioned above, the maps section included four sets of questions that featured maps and visualizations of growth trends. Respondents were asked to rate their agreement (on a 5-point Likert scale, ranging from strongly disagree to strongly agree) with each of the following statements: 1) these maps are clear, 2) these maps illustrate changes in Macon County that are important to me, 3) these maps would be useful to me if I was thinking about whether or not to support land use planning in Macon County, and 4) I find this information surprising. An example of one of the four questions, with the maps and prompts, is given below in Figure 3.2. Results from each of these four questions were combined to produce three new map-based variables—*map.clear*, *map.use* and *map.import*[33]—that captured the number of four possible times a given respondent agreed that each of the maps were clear, important or useful.

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[33] Note: we did not include 'surprise' in these analyses because it was designed to capture a different dimension of reaction to the maps.

For example, the possible values of *map.clear* range from 0 to 4, reflecting the number of times that a respondent *strongly agreed* or *somewhat agreed* that each of four maps in the maps section was clear.

  Map.clear, *map.use* and *map.import* were used as explanatory variables themselves, and also the basis of binary variables that segmented the study population further into two groups, those who either agreed three or four times that the maps were clear, or those who agreed zero, one or two times that the maps were clear. This same process was repeated for map usefulness and map importance. We examined how support for planning varied among the groups and compared the demographic profiles of these groups. A demographic description based on map.import is given in Table 3.3.

Figure 3.1.   Creation of map variables
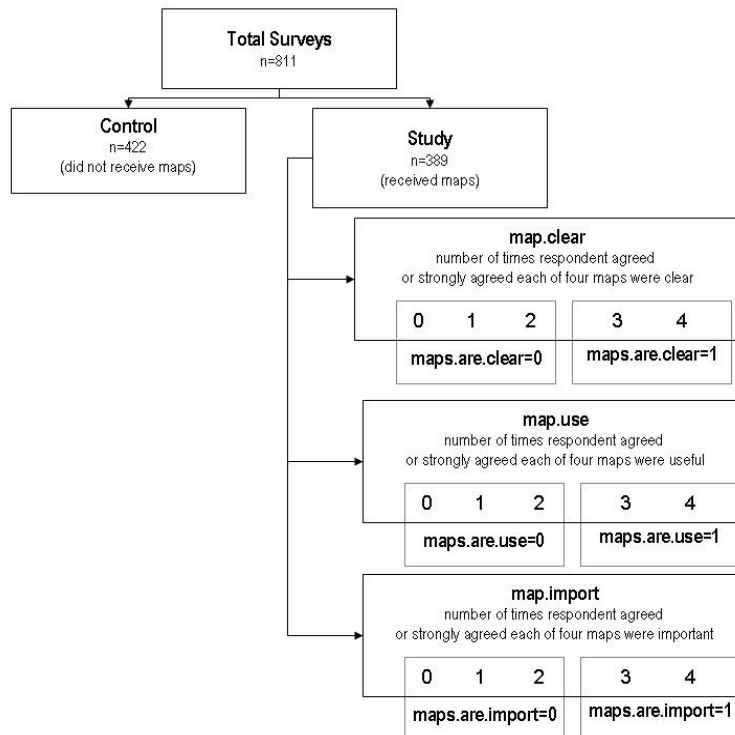
Note: map.clear, map.use and map.import each contain all of the observations from the study population (n=389).

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Figure 3.2. Example question about map clarity, importance and usefulness from the experimental maps section, with the distribution of responses.
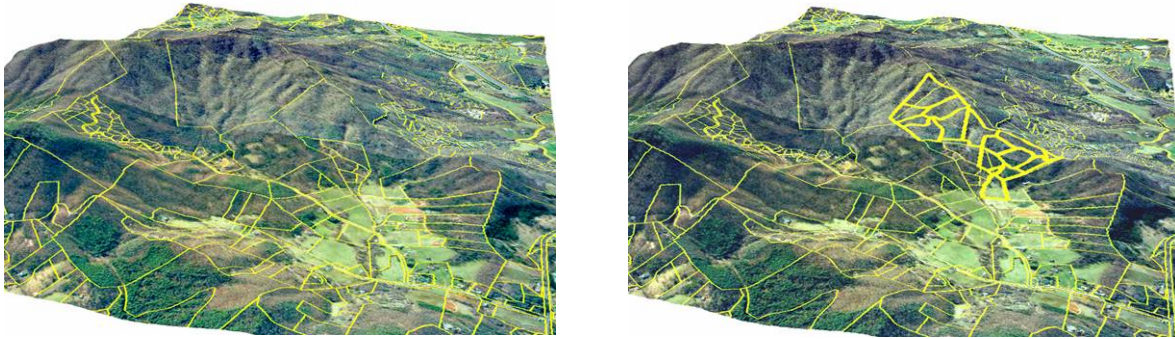
Question prompt: These two maps show a property subdivision in Macon County that occurred between May 2005 and March 2006. The yellow lines are property lines, shown on an aerial photograph of the land. Looking at the maps, please rate your agreement with the following statements.

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
These maps are clear.	20	47	47	162	96
These maps illustrate changes in Macon County that are important to me.	14	20	68	142	128
These maps would be useful to me if I was thinking about whether or not to support land use planning in Macon County.	15	28	52	148	131

Table 3.3. Demographics Profiles of Selected Groups

	maps.are.import	*maps.not.import*
Gender		
Females	126 (67.7%)	60 (32.3%)
Males	140 (72.3%)	51 (26.7%)
Age		
< 25	3 (75%)	1 (25%)
25-39	42 (72.4%)	16 (27.6%)
40-59	99 (74.4 %)	34 (25.6%)
60-79	114 (69.5)	50 (30.5%)
80+	14 (53.8%)	12 (46.2%)
Generations in Macon County		
I'm the first	117 (70%)	50 (30%)
Two	29 (69%)	13 (31%)
Three or more	117 (72.6%)	44 (27.4%)
Education		
Did not finish HS	13 (48%)	14 (52%)
HS / GED	55 (61.8%)	34 (38.2%)
Some college	68 (67.3%)	33 (32.7%)
College	81 (79.4%)	21 (20.6%)
Graduate degree	55 (83.3%)	11 (16.7%)

Percentages are row percentages

Using these new map-based grouping variables, several statistical tests were used to determine if support for planning varied among respondents in the study population. These analyses involve only respondents who received maps, not the entire sample. Comparisons were performed by *t* tests, χ^2 statistics, ANOVA and Kruskal Wallis χ^2 tests. These tests revealed statistically significant variation in support for planning by preferences for the maps. I will first report findings from analyses using D12, the single question about support for planning as the response variable, and then explore analyses using *plan.support,* the composite variable.

a. Response variable: D12

Table 3.4. Distribution and ANOVA results for D12 by map rating groups

Would you support increased land use planning in Macon County to help protect the mountain landscape? This would impose some limitations on what landowners could do with their property.	maps.are .import n=245	maps.not . import n=96	maps.are . clear n=215	maps.not . clear n=129	maps.are . use n=228	maps.not .use n=109
strongly support (5)	114 (46.5%)	26 (27%)	103 (48%)	37 (29%)	103 (45%)	35 (32%)
somewhat support (4)	100 (40.8%)	37 (38.5)	81 (38%)	58 (45%)	96 (42%)	41 (38%)
neutral (3)	12 (4.9%)	16 (16.6%)	12 (5.6)	16 (12%)	10 (4.4%)	16 (15%)
somewhat oppose (2)	10 (4%)	4 (4.2%)	9 (4.2%)	6 (4.7%)	11 (4.8%)	4 (3.7%)
strongly oppose (1)	9 (3.6%)	13 (13.5%)	10 (4.7%)	12 (9.3%)	8 (3.5%)	13 (12%)
overall mean (on a 5-pt scale) and confidence interval	4.22 ± 0.12	3.6 ± 0.26	4.2 ± 0.14	3.79 ± 0.21	4.2 ± 0.12	3.74 ± 0.24

percentages are column totals
Kruskal Wallis χ^2:

      maps.are.import vs. maps.not.import: 28.4054, df = 4, p-value = 0.00001032
      maps.are..clear vs. maps.not.clear: 15.7124, df = 4, p-value = 0.003430
      maps.are.use vs. maps.not.use: 22.1075, df = 4, p-value = 0.0001908

Kruskal-Wallis chi-square analysis was employed to test the null hypothesis that there

was no difference in attitudes towards land use planning, as expressed in question D12, between

respondents who had different reactions to the maps. We found significant differences in

support for planning based on differences in response to the maps section, and therefore we

rejected the null hypothesis. As an illustration, Table 3.4 above gives responses to question D12 by map preference groupings. For example, those in the group with higher ratings of map clarity were 40% more likely to 'strongly support' planning than those in the group with lower ratings of map clarity (48% vs. 29%). Similarly, those who rated maps as less important were nearly four times as likely to 'strongly oppose' planning as those who rated the maps as more important (13.5% vs. 3.6%).

b. Response variable: plan.support

Both *t* tests (using binary grouping variables) and ANOVAs (using ordinal grouping variables) indicate that these map variables have significant effects on plan.support, as well.

T tests of plan.support by the dummy variables *maps.are.clear, maps.are.use* and *maps.are.import* indicate significant differences among groups (Table 3.5). Those who reported that the maps were clear a majority of the time supported an additional three planning measures compared to those who found the maps clear less than half the time. Similarly, those who found maps important a majority of the time supported an average of four additional policies compared to those who did not find the maps important.

Table 3.5. *T* tests of differences in *plan.support*

	Clear	Useful	Important
Mean of <u>not</u> clear, useful or important	12.14	11.82	11.2
Mean of <u>are</u> clear, useful or important	15.07	15.02	15.19
95% CI of difference in mean	-4.03 to -1.81	-4.4 to -1.99	-5.2 to -2.74
test statistics	t=-5.17, df=287	t= -5.25, df= 214	t=-6.38, df=177
p.value	4.31 x 10-7	2.59 x 10-7	1.47 x 10-9

ANOVAs echoed the findings of the *t* tests, identifying significant differences in plan.support by ratings of map clarity (f 19.8, pr(>F) 8.1×10^{-15}), usefulness (f 18.9, pr(>F) 3.8×10^{-14}) and importance (f 15.8, pr(>F) 5.3×10^{-12}). Tukey HSD (honest significant difference in

means) analysis, for example, found that those who rated the maps most clear (map.clear = 4) supported nearly eight more planning measures than those who found the maps least clear (map.clear = 0) (a difference of 38.55% on a 20 point scale), and those who found the maps most important (map.import = 4) supported 6.5 more planning measures than those who found the maps least important (map.import = 0) (a difference of 32.5% on a 20 point scale).

Kruskal Wallis and χ^2 tests were also used to explore differences in support for the components of *plan.support*. The twenty separate questions that together make up *plan.support* are given in Table 3.6, below. Average responses to each question are then given for the study population, grouped by the binary variable maps.are.import. The significance of the difference in support for each planning measure between the two groups is reported in the last column. All of the questions, except for the second and fourth—which concern property rights specifically—vary significantly by this grouping.

Table 3.6. Components of *plan.support* and variation in support based on map importance ratings

Prompt	maps.are. import =1 n=269	Percent supporting statement	maps.are. import =0 n=115	Percent supporting statement	test statistic df p-value (KW tests unless otherwise stated)
The public should have a role in developing guidelines for how individuals use their land [a]	204	75.8%	63	54.8%	13.017 1 0.000308
An individual should be able to do whatever he/she wants with his/her own property [a]	140	52.0%	48	41.7%	2.59 1 0.107
Choice a) of a) the community should restrict building on steep slopes and b) people should be able to build houses anywhere [b]	244	90.7%	87	75.7%	χ^2 15.3 1 0.0000895
Choice b) of a) developers have a right to build anything, anywhere and b) I have a right to look at mountains not covered with houses [b]	251	93.3%	101	87.8%	χ^2 3.17 1 0.075
Measures to ensure new development fits in with the community [a]	230	85.5%	76	66.1%	19.85 1 0.00000836

Requirements to ensure that enough affordable housing in available [a]	190	70.6%	60	52.2%	7.36 1 0.006642
Standards to improve the appearance of development along highways [a]	220	81.8%	74	64.3%	5.61 1 0.01778
Improved water quality protection and erosion control measures [a]	243	90.3%	83	72.2%	20.11 1 0.000007286
Incentives for building new houses closer together [a]	115	42.8%	29	25.2%	5.97 1 0.01448
Zoning [a]	168	62.5%	45	39.1%	5.4 1 0.019
Would you support planning to protect the landscape? [a]	214	79.6%	63	54.8%	19.475 1 0.00001019
Incentives that encourage landowners to voluntarily conserve their land [a]	223	82.9%	70	60.9%	24.66 1 0.00000068
Shielding outdoor night lighting [a]	154	57.2%	43	37.4%	10.22 1 0.00138
Requiring developers to pay part of the cost of new roads and schools [a]	216	80.3%	67	58.3%	7.2 1 0.0069
Regulations that allow more development in some areas and less in others [a]	164	61.0%	39	33.9%	22.49 1 0.0000021
Limiting building on steep slopes [a]	226	84.0%	65	56.5%	16.43 1 0.0000503
Limiting how tall new buildings can be [a]	214	79.6%	66	57.4%	14.54 1 0.000137
Limiting building on ridgetops [a]	224	83.3%	70	60.9%	22.47 1 0.000002126
Regulations on how land can be subdivided and developed for multiple homes [a]	224	83.3%	69	60.0%	17.7 1 0.0000252
Should Macon County's leaders do more or less to address growth [c]	221	82.2%	71	61.7%	16.4 1 0.0000512

a. 5-point Likert scale of strongly oppose to strongly support. Responses of somewhat support or strongly support result in a point for plan.support, except for D7, in which somewhat or strongly oppose is considered a positive response.

b. Choice question—respondents choosing the pro-planning statement received a point towards plan.support.

c. 3-point scale of *less*, *the right amount*, or *more*. Responses of *more* result in a point towards plan.support.

Given the significant differences in support for planning found between respondents

who generally favored the maps versus those who generally did not, I returned to the entire

survey sample to investigate how these two groups compared to the control population.

Therefore, I developed two additional, related hypotheses.

H3: Respondents who received the maps and found them clear, important or useful are <u>more</u> supportive of planning than those in the control group who did not receive maps.

H4: Respondents who received the maps and did not find them to be clear, important or useful are <u>less</u> supportive of planning than those in the control group who did not receive maps.

I tested for differences in support for planning using these categories. Significant

differences among groups are given in Table 3.7, below. Because the differences between

respondents in the study population have already been established, they are not discussed here.

Table 3.7. Significant differences in support for planning between the control and study population sub-groups

	Mean of *D12*	p value of difference from control	Mean of *plan.support*	p value of difference from control
Control	*4.10*	---	*14.44*	---
Maps are clear	4.20	0.5578	15.06	0.2956
Maps aren't clear	3.79	0.0025	12.14	0.0002
Maps are useful	4.20	0.5026	15.02	0.3277
Maps aren't useful	3.74	0.0002	11.82	0.0064
Maps are important	4.22	0.3692	15.18	0.1463
Maps aren't important	3.61	0.0009	11.20	0

Those we found maps to be clear, useful or important are *not* more likely to support

planning than respondents in the control group. However, there is considerably *less* support for

planning between those who did not respond favorably to the maps compared to the control

population. Thus, this group exhibits significantly less support for planning than either those

who favored the maps or those who did not receive the maps.

IV. Logistic Regression

We also performed logistic regressions[34] to help us better understand the effects of the map variables on support for planning. An initial logit model was designed to test whether the map variables were a significant predictor of support for planning when demographic variables were also being considered.

H5: Reactions to the maps is a significant predictor of support for planning when considering demographic variables.

```
Logit model:

glm(formula = D12.binary ~ maps.are.clear + maps.are.import + maps.are.use
+ E1 (gender) + E2 (age) + E4 (generations in Macon County) + E8
(education) + E9 (own property), data=maps_only)
```

Table 3.8. Logit model results

Coefficients	Estimate	Std Error	T value	Pr(>|t|)
Intercept	-0.49	0.88	0.307	0.5791
Maps.are.clear	0.057	0.297	0.037	0.845
Maps.are.import	0.750	0.327	5.26	0.021 **
Maps.are.use	0.266	0.329	0.652	0.419
Gender	-0.248	0.260	0.912	0.339
Age	0.124	0.154	0.648	0.420
Generations	-0.074	0.142	0.269	0.604
Education	0.296	0.116	6.519	0.010 **
Land ownership	-0.022	0.412	0.0029	0.9568

McFaddens R-squared/likelihood ratio: 0.18
Log likelihood: -196.1126 (df=10)

In these analyses, which focused only on the study population, two explanatory variables emerged as key predictors of increased support for planning: *map importance* (rather than clarity or usefulness) and *education*. Predicted probabilities based on the model estimate that respondents who rated maps as important a majority of the time have a 79% probability of supporting planning, compared to a 64% probability among those who rated maps as important less often, holding all other variables at their means. Respondents with more education are also more likely to support planning. Respondents with less than a high school degree have a 60% probability of

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[34] The logit models were run using a new binary variable based on D12, with 1 = would strongly support or somewhat support land use planning, and 0 = somewhat oppose, strongly oppose or neutral.

supporting planning, compared with an 79% probability of supporting planning for those with a college degree, holding all other variables to their means. This finding concurs with previous research about the effect of education on support for planning.

Further exploration of the data with other logit models revealed that the significance of *generations* varied depending on which dataset we were using: it was a significant predictor of support for planning in the control group and the combined sample (p = 0.000245 and p=0.00183, respectively), but not, as shown above, in the study population. This suggested an interaction between generations and the maps, which was investigated with another logit model.

This model confirmed that the interaction between *generations* and *map importance* is a significant predictor of support for planning. Predicted probabilities based on the model estimate that among multi-generational residents who received the maps section (n=199), those who rated the maps as more important demonstrate considerably more support for planning relative to multi-generational residents who rated the maps as less important. Respondents in this group have a 79% probability of supporting planning, compared to a 50% probability for similar multigenerational residents who did not rate the maps as important, controlling for the effects of education and other demographic traits (see Table 3.9). In other words, the maps have a strong, positive effect on support for planning for a majority of the multi-generational residents who received them. This interaction results in a probability of support for planning among these residents that is basically equal to that of newcomers. Multi-generational residents are not significantly more likely to rate maps as important than first generation residents, but when they do, there is a more pronounced effect

Table 3.9. Predicted probability of supporting planning among residents in the study group

	maps are not important	*maps are important*
First generation	70.8%	79.3%
Two or more generations	50.3%	79.2%

Without the interaction term in the model to estimate planning support, increasing length of residence in Macon County, measured in terms of generations, has a negative effect on support for planning. But, when the interaction between generations and map importance is considered, the relationship of generations to planning support is no longer significant. In other words, generations ceases to have a discernible effect on support for planning in the study population. By contrast, in the control and entire sample, increasing generations has a negative effect on support for planning.

Examining demographic and other predictors of support for planning

Given the varying effects of the maps on subgroups of the study population, it is difficult to estimate the total effect of the maps. One way to do this is to compare logit models predicting support for planning that use only demographic explanatory variables, but to run them on different datasets (the study population, the control population, and the whole sample). When we ran models using only the control population, demographic/non-map explanatory variables explained 19% of the variation in the responses. For the whole sample, this figure drops to 15%, and for the study population, demographic variables alone explain only 12% of the variation (see Little Tennessee Perspectives iterative methodology, below). Therefore, the maps are complicating the expected demographic effects and reducing how much variation in support for planning they alone explain. Political ideology was not specifically tested for in any of the logistic regression models.

Table 3.10. Variation explained by demographic variables only

Dataset	Percent variation explained
Study population	12%
Control population	19%
Entire sample	15%

3.6. Discussion

I discuss the findings according to each of the hypotheses, in turn, and then consider

implications for deploying visual information about changing landscapes in public efforts.

Hypotheses
H1: Respondents receiving the maps section, and therefore seeing visualizations and maps
representing recent growth trends in Macon County, are more supportive of planning than those
in the control group who did not receive that information.

Our initial hypothesis, that the inclusion of maps portraying growth trends would have a

positive influence on attitudes towards land use planning, was not supported by the analysis.

This suggests that simply supplying visual information about growth trends—in this context, at

least—is unlikely to affect support for growth management. The lack of an aggregate effect of

the maps on support for planning indicates, therefore, that assumptions about the role of visual

information in informing attitudes and decision making about land use planning require further

specification and interrogation. Although conventional wisdom suggests that if people are

uninformed about rates of change and long-term consequences, then providing information

about those dynamics can inform decision making, this study indicates that this is at least a more

complicated process and that perhaps visual information about changing landscapes is actually

unimportant to attitudes about planning.

This is one of the first formal tests of the influence of maps and visual imagery about

changing landscapes on attitudes towards land use planning, and our results underscore the need

for further research in this area. This survey only tested one set of information, and employed

one delivery mechanism. It is possible that the maps in the experimental survey did not include

the 'right' kind of information, or did not present them in the 'right' way; perhaps there would

have been different results if the selection of maps was different. However, because the material

included in the survey was generated through an iterative participatory process aimed at

producing salient and understandable maps in the study community, it seems reasonable to

suggest that these included images pictured relevant trends in a clear way. Further research is

clearly need to identify the circumstances, if any, in which the provision of maps and visual

information about growth trends are effective at informing attitudes towards planning.

H2: Among respondents in the study population, those who reported that the maps were more
clear, useful or important, are more supportive of planning than those who reported that the
maps were less clear, useful or important.

However, among the study population, the pattern of responses to questions within the

experimental maps section *is* related to significant differences in support for planning. Those

who responded favorably to the maps in terms of clarity, usefulness, or importance are more

supportive of planning than respondents who did not. Thus, although just seeing the maps has

no aggregate effect on attitudes towards planning, there is a very strong correlation between

thinking maps are important, clear or useful and supporting planning. It is likely that underlying

demographic traits relate both to map preferences and support for planning: for example,

respondents with more formal education are more likely to rate the maps important than those

with less education, and also more likely to support planning. However, we know from our

analysis that the maps are having some effects that are different from the effects of

demographics: recall that when comparing models on the study, control and entire sample that

the maps obscured the influence of demographic traits. Therefore, response to the maps is

measuring something other than demographic traits, and is not capturing completely

endogenous variation.

H3: Respondents who received the maps and found them clear, important or useful are <u>more</u> supportive of
planning than those in the control group who did not receive maps.
H4: Respondents who received the maps and did not find them to be clear, important or useful
are <u>less</u> supportive of planning than those in the control group who did not receive maps.

The nature of the relationship between maps and support for planning is elucidated

somewhat by comparing the two subgroups of the study population (those who thought maps

were important and those who did not) to the control population. Although we did not find

higher support for planning in the subset of the study population who favored maps compared to the control group, we did find significantly *lower* support for planning among those who received the maps and did not think they were useful, clear or important, compared to the control population. This suggests that rather than the maps having a hypothesized positive effect on support for planning, the maps in fact depress support for planning for a certain population. In other words, the map section demonstrates only a negative effect on attitudes towards planning.

Although we cannot be completely certain about why this is, it is reasonable to speculate. Perhaps the information presented in the maps section was threatening. The power inherent in mapping (Wood 1992) could likely contribute to a negative reaction to the material. The maps illustrated that someone had taken a serious interest in analyzing the Macon landscape, and since the survey provided only little information about the origins of the maps and information, respondents could find the analysis unnerving. For example, the maps use data that laypeople are unlikely to be familiar with, including satellite imagery and digital parcel data. Especially in a place like Macon County, where there has been an active property rights group, illustrating information about specific, privately owned properties may have elicited more negative reactions[35] among some respondents. Or, perhaps some respondents felt that including such maps was a deliberate attempt to bias results. They perhaps believed that only planning advocates would use maps about landscape change, and therefore the design of the survey was biased towards planning; this may have activated opposition to planning. Of course, some respondents could have found the depictions of growth trends appealing, therefore influencing them to reject potential growth management strategies because they are looking forward to more

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[35] Although property records are well known to be public information, use in maps such as this may not be considered a 'polite' use of the data.

population growth and development in the county. It is impossible to know based on this research, and therefore requires further investigation.

H5: Reactions to the maps is a significant predictor of support for planning when considering demographic variables.

The interaction between generations in Macon County and ratings of map importance is unexpected and striking. This interaction results in multi-generational residents expressing levels of support for planning that is as high as newer arrivals, contradicting results in the literature that have found a negative effect of length of residency on support for planning (Green et al. 1996). When supplied with information about changes in their community, longer-term residents who find that information to be important, useful and clear (71%) demonstrate significant increases in their probability of supporting planning. Although this effect does not apply to all multigenerational residents, it does apply to the majority of them.

Multigenerational residents, relative to newcomers, may be more likely to associate increased development with a loss of sense of place/quality of life, and therefore are more likely to support planning when confronted with information about rapid growth in their hometown. When information about trends in development is made explicit and available, as through the visual information in the survey, these residents are more aware of the trends than they otherwise would be (Tversky and Kahneman 1981). This counterbalances an initial, more negative reaction to land use planning among this group. Further, both the impacts depicted by the growth trends and the relative impact of the maps and visualizations themselves may be larger for multigenerational residents. First-generation residents of Macon County have likely moved from more urban areas and are more familiar with growth—and with visual depictions of growth—than are multigenerational residents.

Implications for Use of Landscape Change Data in Public Planning Processes

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The significant variation in support for planning between respondents who generally favored maps and those that did not raises important questions about the use of maps and other information about growth trends in planning processes. I see three implications for the use of maps and information about growth trends in local policy debates: audience, visual format, and delivery.

A basic implication is that different people respond in different ways to visual information. This complicates the process of using such material in a public arena, and underscores the need for a more nuanced understanding of people's preferences for information. It is often assumed that the problem with information is that people don't have enough access to it. This seems to be true in the case of most multigenerational residents—they are unlikely to have encountered this type of information before, and demonstrate significant increases in support for planning upon seeing it. Previous research has found that multigenerational residents are more likely than newcomers to feel that growth negatively affects their quality of life (Cumming 2007), and may therefore have the most to gain from well-designed growth management strategies. If visual imagery about changing landscapes can help these residents draw connections between their values and policy, it may increase the likelihood that communities will respond more effectively to amenity migration's challenges.

On the other hand, this survey finds that there are some people for whom the visual information presented here activates negative responses to land use planning. More information is not necessarily better, especially if certain types of information may be threatening. With a more nuanced approach to deploying information, we can improve understanding of what information a given group is likely to respond favorably or unfavorably. This, in turn, can aid the development of more diverse strategies for engaging residents in conversations about growth management or other issues of local salience.

However, within the general population, even visual information that communicates more effectively may not influence that population's positions on policy. This analysis has treated the visual information presented in the maps section as a single body of information to which respondents had either generally positive or negative responses. For the purposes of this analysis, that approach was sound. There was, though, variation[36] in the reported clarity, importance and usefulness of each of the four maps/visualizations. The last of the four questions, which featured photographs rather than maps, for example, was nearly universally thought to be clear, important and useful to respondents, while on average 16% percent of respondents found the other three *not* clear, useful or important. The point is that even respondents who did not generally favor the maps in the experimental section responded favorably to the photographic images. This suggests that while more realistic imagery can communicate more successfully to a broad audience, that information may still not have the expected affect on attitudes. Some people may have already made up their minds about planning, and are unlikely to change their minds even if new information, which we expect to increase support for planning, is presented in an understandable way.

3.7. Conclusion

This survey has explored the influence of visual material about changing landscapes on support for planning in a rural community experiencing amenity migration using a novel experimental approach. Whether or not to plan is an important issue for many such communities. Encouraging people to think about the long-term cumulative impacts of growth before those impacts lead to irreversible loss of the rural landscapes that people value is an enormous challenge. Researchers studying trends in development should consider how their

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[36] This variation deserves attention in its own right, and has implications for the production of maps and visual imagery about landscape change for use in public processes. I will explore these findings further in future research.

findings can be used to inform local policy making: residents are an especially important audience for such information in rural communities without a history of planning.

Although previous research in the same community has found stronger and more positive reactions to similar maps that were embedded in a participatory process (see the second chapter of dissertation), it is impossible to reach everyone with more intensive, participatory formats. Although we did not find aggregate effects of the maps in the survey, a wider and more systematic dispersal of material is possible in written form (or online). This material may be useful to some residents, and should not be discounted. However, it is clear that widespread assumptions about the value of providing information, especially visual information, should be interrogated.

More research is needed to inform the effective deployment of visual information about changing landscapes in local planning processes. Areas for further research include both of how to develop visualizations that communicate effectively and how to best use them in (local) planning processes. Questions of audience (local residents, local leaders, elected officials), process (what opportunities for engagement do stakeholders find meaningful, transformative, burdensome? how much interest is there in helping to create that material vs. just using it?), presentation (print-outs vs. slideshows vs. interactive digital media? in-person vs. online vs. mail; photos vs. maps vs. 3D imagery), and timing (when in a planning process is information on changing landscapes most useful?) are also important.

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Chapter 4
Maps as evidence of community responses to amenity development: evolving strategy and shifting scales in Cowee Valley, North Carolina

Abstract

Amenity migration is increasingly recognized to have serious consequences for rural communities, from rising land values to rapid development to environmental degradation. However, little is known about how communities respond to landscape and community changes or attempt to shape landscape outcomes. Land use planning is likely to be contested in these communities, and land use regulations may lag for decades behind growth pressures, or never materialize. Thus, fully understanding community responses to amenity migration in rural landscapes requires examining the strategies and implications of a broader range of stakeholder-led initiatives—not just the success, failure or effectiveness of formal policies.

This paper examines maps produced through three stakeholder-led participatory planning processes in western North Carolina to understand how rural communities facing amenity migration seek to manage growth. Although the concerns about development that have motivated the three projects have varied little, the maps generated through these processes identity and focus on different parts of the landscape and offer different solutions. The strategies stakeholders have adopted have rather effectively addressed some (more site-scale) concerns about the changing landscape, while foregoing other (landscape-scale) concerns. Because these maps are both reflective and constitutive of local values and agendas, the shifting strategies of local advocates for planning and landscape protection can be revealed through a critical analysis of the maps.

Results provide insight into the opportunities for and constraints on planning processes in an amenity migration landscape in the absence of government policy. Because many communities facing significant rates of amenity migration lack effective land use planning, more attention must be paid to understanding how residents can protect what they care about in the face of unregulated growth.

4.1. Introduction

"Cowee is a really, really, really special place. And it's still so rural. What's going on at the south end of the county has not touched us in Cowee yet."
> Deborah Thomas (2004), a recent in-migrant to Cowee Valley

"As good as your development plan is, you are destroying a whole lot of mountain land in Macon County."
> Narelle Kirkland (2005), a Macon resident,
> opening a question-and-answer session with
> the developer of Wildflower

On July 28, 2005, more than 200 residents of Macon County, North Carolina crowded into the un-air-conditioned gymnasium at Cowee Elementary School. They came to hear from the developer of Wildflower—a 1500 acre mountaintop, gated subdivision—and to ask questions about his plans. Most of the meeting attendees were from Cowee Valley, an unincorporated rural community of approximately 2000 residents and 30,000 acres where the development would be built. The overflow crowd testified to the importance of the issue to the residents; the atmosphere was apprehensive and sometimes hostile. Taped to the wall, a map highlighted some initial lots in the new development. Before the meeting started, people crowded around the map, wanting to see where the development would be, how it related to where they lived, how the currently undeveloped forest would change into home sites for the very wealthy.

Figure 4.1 Macon County residents study a map of the Wildflower development.

        None of eighteen residents who spoke during the meeting expressed support for the

development. The speakers raised questions about various impacts: traffic, road access, water

quality and quantity, night lighting and how 400-500 additional homes would affect the

volunteer fire department. The county planner reminded the crowd at a tense moment that

> what [the developer] is doing is well within his rights as far as county
> regulations. There are no county regulations. . . In my office, I have 30
> years of subdivision regulations that have been written and proposed and
> have never been enacted because the public will wasn't there…The only
> thing that we can do as a community to ensure that we have the kind of
> development we want is to push for some regulations, some reasonable
> controls. If somebody comes in here and does something we don't like,
> every one of us is to blame.

        There are two key points to note about this meeting. The first is that it was not required.

There were no county regulations mandating any type of public review of the development: it

did not matter that this was the largest development in the history of the county, or that the

platted home sites included steep slopes and ridge tops. In 2005, there were few regulations

governing any aspect of development outside of the incorporated towns in Macon County, and

none[37] that affected the design of a development like Wildflower. There have been efforts to

enact county-wide land use plans in Macon County dating back to the 1970s, but none had been

adopted, leaving local residents with effectively no control over their landscape. The developer

himself pointed this out midway through the meeting.

> Haywood County [where I am also doing a development] has a lot of
> regulations that Macon County doesn't have….and residents in Haywood
> County have a lot more control over their destiny than residents in this
> county.

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[37] At the time, Macon County had an 'Excellent Quality Waters' ordinance that placed some limits on impervious
surface coverage within 500 feet of certain creeks in the northern portion of the county and restricted point source
discharges; this ordinance did not otherwise restrict development.

The second point of interest is that this meeting, which clearly addressed a topic of importance to the community, was not sponsored by the county government. It was sponsored by a grassroots planning advocacy group, Macon Tomorrow. The steering committee of Macon Tomorrow had arranged for the Atlanta-based developer to come and talk to residents who were alarmed at the scale of the development planned for Cowee Valley. They hoped this would encourage more public dialogue about planning, which they saw as a pressing need. No elected public officials attended the meeting.

Wildflower was a *condensation point* in the local discourse about land use planning, particularly in Cowee Valley, providing a concrete symbol of the rapidly developing landscape (Nelson 2001). Wildflower was the first subdivision in Macon County to prompt citizen outcry, and perhaps for the first time, many residents of Cowee felt the immediacy of the development pressure that had been growing in the southern part of the county and region. Although few of the speakers connected concern over Wildflower to planning, one of the final comments did, suggesting to the audience that Wildflower provided an opportunity "to think about the kinds of the things the county should start addressing" so they could be prepared for future developments. The local press conducted an informal poll following the meeting, and found that all of the fifteen residents they spoke with agreed that the county needed land use regulations (Smoky Mountain News ([Waynesville], 3 August 2005).

Although much more has been written about exurban development and amenity migration in the Rocky Mountains (Nelson 2001; Hansen et al. 2002; Walker and Fortmann 2003; Travis 2007), the Southern Appalachians also struggle with these issues (LTLT 2004; Culbertson 2008). Land use planning has been extensively debated in western North Carolina for the last decade: major developments, like Wildflower, and multiple smaller instances of landscape degradation have sparked protests periodically throughout the region (LVW 2008;

TRVW 2009; (Smoky Mountain News [Waynesville], 23 January 2002; Christian Science Monitor, 20 June 2006; Franklin Press [Franklin], 14 July 2006; Smoky Mountain News [Waynesville] 07 February 2007). Public concerns about development often lead to land use planning: one study of northeastern communities found that "a single proposal to develop land prompted the adoption of land-use controls in most communities" (Rudel 1989: 133). This was not the case in Macon County following the meeting about Wildflower, nor has it been true in most other counties in the region. In fact, no county in southwestern NC has a comprehensive land use plan, and most have no land use policies that would address affect the design of such a development.

A strong local narrative of independence, historic resistance to and continuing unfamiliarity with regulation, and an unwillingness of most local elected officials to restrict development contribute to this lack of policy response (King and Harris 1989; Stedfast 1999; Smoky Mountain News [Waynesville] 9 May 2001; Freyfogle 2003; Franklin Press [Franklin] 14 July 2006). A lack of policy response, however, does not mean that residents do not care. It is clear to anyone listening to conversations in rapidly growing communities in this region that residents are very concerned about the development that is taking place and the changes it brings; these casual observations are confirmed by years of ethnographic and survey research in the region (Cumming 2007).

This paper, then, is concerned with how rural communities[38] facing amenity migration address these challenges, and particularly with what the dynamics of stakeholder-led planning efforts are where formal land use regulations are minimal to nonexistent. My motivating questions are: *can community stakeholders concerned about unmanaged growth influence the course of*

[38] For the purposes of this paper, 'community' refers to residents who live within the study area. This paper largely focuses on residents who participated in three public processes, rather than the entire community. Participation among community residents is considered in more detail later in this paper.

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development without the support of a formal policy framework? And if so, how? Since the Wildflower meeting described above, maps (and other visual representations of the landscape) have played a central role in shaping local stakeholders' responses to landscape change. These maps serve as a lens for understanding the evolution of planning discourse and strategy in the community during that time. In this paper, I apply a critical analysis, informed by discourse theory, environmental communications and critical GIS, to maps produced during three participatory planning processes that took place in Cowee between 2005 and 2008. Although the three processes functioned at three different scales (county, township and region, as will be discussed), they all included public processes specific to Cowee, and it is on the processes in Cowee that this analysis focuses.

I begin by introducing the phenomenon of amenity migration and briefly reviewing the literature concerning land use planning in amenity and rural communities in the US. Then, I consider the functional and discursive role of maps within participatory planning processes, establishing maps as a compelling object of study vis-à-vis planning processes. I then introduce Cowee Valley, and the three participatory research processes that comprise this case study. I analyze selected maps generated through these three processes using a framework informed by critical theory, answering questions about whose voices are represented, what perspectives are legitimized, and how the maps were deployed in the public process and subsequently. In the discussion, I consider how the maps, and the processes they represent, shifted over time and the implications of those changes in focus for landscape protection, growth management and local capacity for planning. Finally, I emphasize the importance of doing research that might inform future planning efforts in similar communities struggling with the challenges of rapid and unmanaged growth.

4.2. Amenity migration, exurban development and land use planning

Amenity migration is increasingly understood as a distinct and important trend in rural areas—several books and articles in recent years are devoted to the understanding what drives it, as well as its economic impacts and landscape consequences (Jobes 2000; Green, Deller and Marcouiller 2005; Moss 2006a). Amenity migration is characterized by the relocation of increasingly mobile populations from urban areas to more rural regions exhibiting high levels of natural (or rural) amenities, including forests, open space, hilly topography and water bodies (McGranahan 1999; Stewart 2002; McCarthy 2007; McGranahan 2008). This unprecedented influx of people and development is "currently one of the major forces of change in rural America" (Stewart 2002: 369), and has profound implications for many aspects of rural life, including environmental quality and sense of place (Sofranko and Williams 1980; Riebsame, Gosnell and Theobald 1996; Jobes 2000; Hansen et al. 2002; Moss 2006a; Travis 2007). From 1970 to 1996, population in rural communities with high amenities grew an average of 120%, compared to rural communities with low amenities which grew by 1% (McGranahan 1999). For example, population in amenity-rich Teton County, Idaho grew 124% between 1970-1997 (Rasker and Hansen 2000).

In these landscapes, land use change and development is rapid, but often unmanaged: historically, land use conflicts were few and could largely be managed through informal relationships (Sargent 1976; Rudel 1989; Marcouiller, Clendenning and Kedzior 2002). Because most land use decisions are made at the local level, and rural land use outcomes have significant ecological implications, a lack of local policy response may often result in landscape degradation due to the cumulative, often-unintended consequences of uncoordinated land use decisions (Hansen et al. 2005, Moss 2006b).

The profound changes to community composition and landscape pattern that amenity migration brings often lead to community conflicts concerning land use planning (Graber 1974;

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King and Harris 1989; Cloke and Little 1990; Jobes 2000; Jensen and Field 2005). Attitudes towards growth and development have been studied in many communities (Clockerham and Blevins Jr 1977; Fortman and Kusel 1990; Green et al. 1996; McLeod, Woirhaye and Menkhaus 1999; Smith and Krannich 2000). However, there is sparse research and little theory to inform our understanding of how these attitudes might influence policy or how communities choose to respond to rapid growth. There has been some analysis of how planning proceeds in rural areas. Zoning, subdivision regulation and comprehensive plans are most often chosen to guide growth (King and Harris 1989). Researchers examining the effectiveness of formal land use planning techniques in the rural Rocky Mountains found that zoning and subdivision ordinances are somewhat effective, and that land purchase is "extremely effective," while taxes and fees were least so (Smith and Spadoni 2005: 254).

Periodic calls for more research in this area (for example, see: Healy and Short 1979; King and Harris 1989; Halseth 1996; Smutny 1998; Jensen and Field 2005) have yet to result in a coherent picture of how communities experiencing amenity migration act to protect local assets or manage growth. A recent study of local-scale economic and social changes in the rural west, for example, concluded that there is a significant need to better understand "how can communities prepare and direct growth in a productive and socially/environmentally responsible manner?" (Beyers and Nelson 2000: 472).

Planning theory is largely silent on issues of how communities choose (or not) to plan and manage growth in amenity communities. Rudel (1989) provides one of the most thorough frameworks for understanding how planning happens in rural areas. He argues that planning in rural communities is governed by informal, relational social controls rather than formal land use policies, and finds that rural areas will only begin to use more formal, regulatory planning once population has increased and informal controls no longer work. However, the degree and pace

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of land use change and development that characterizes amenity migration communities introduce additional complexity that was not considered in Rudel's study. There has been more recent work on issues of planning in rural communities in Britain, particularly around the protection of rural character (Selman 2006; Gallent, Andersson and Bianconi 2006), but major differences in the traditions of governance (a strong property rights framework in the US, compared to a history of strong state planning in Britain) render comparisons difficult.

This paper contributes to the understanding of how rural communities respond to amenity migration in a domestic context. I analyze maps produced through participatory planning processes in one community as a way of studying responses to amenity migration. Following Rudel, if planning in rural (amenity) communities is often negotiated through informal means, then a lack of regulation does not mean that communities are not responding to landscape change. The existence of formal policies alone is insufficient to understand these dynamics. I argue that rather than there being a linear transition between informal/relational planning and formal/regulatory planning, local stakeholder-led institutions can take on some of the roles of planning prior to or as a substitute to regulatory planning. The can provide residents with an alternate framework for pursuing local conservation or growth agendas. Therefore, understanding how amenity communities respond to landscape change requires us to consider the strategies and implications of a broader range of stakeholder-led initiatives, including nonprofit[39] and quasi-governmental action, not just the success, failure or effectiveness of formal policies.

4.3. Why maps?

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[39] Amenity communities often attract the establishment of nonprofits due to their natural amenities, which may provide capacity for protection efforts. The special nature of amenity migration communities in this regard is discussed later.

I focus on selected maps produced through participatory planning processes in Cowee Valley because they provide unique insight into how local residents are framing and pursuing strategies to manage rapid growth and protect valued local assets.

Maps are common in planning processes. Visualization, including maps, is the "common currency" of planning (Orland, Budthimedhee and Uusitalo 2001: 140), and provides a "common language to which all participants—technical and non-technical—can relate" (Al-Kodmany 2001: 112). The power of maps and other forms of landscape visualization to inform planning and decision making is widely assumed (Brail and Klosterman 2001; Sheppard 2001; Nicholson-Cole 2005). Maps as visual representations can facilitate exploration of data by making abstract ideas more tangible (MacEachren 1995).

Mapping as a participatory process may help groups reach consensus, engage residents in planning processes, and improve public participation strategies in public policy debates (Innes and Simpson 1993; Barndt 1998; Al-Kodmany 1999 and 2002; Buckley, Gahegan and Clarke 2005; St. Martin and Hall-Arber 2008). Participatory GIS mapping, for example, has proven capable of successfully contributing to many locally-driven planning and conservation processes (Denniston 1994; Craig and Elwood 1998; Sieber 2000a; Craig, Harris and Weiner 2002; McCall and Minang 2005). GIS mapping has "encouraged groups to look at their local community … and what they felt was important in an entirely new way" (Wood 2005: 166).

Maps are a compelling medium of study not only because they are common in planning processes, but because they embed information about the processes in which they were generated. Critical cartography and critical GIS have established that maps are socially constructed, not neutral representations of fact and place (Pickles 1995; Schuurman 2000; Crampton and Krygier 2006). Rather, "maps are a cultural text" (Harley 1989: 7), or "field[s] of concepts" (Wood and Fels 2008: 190). That is, they both reflect and constitute the social

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processes in which they were created, representing some things and not others, privileging some perspectives while obscuring or silencing others (Wood 1992, Crampton and Krygier 2006). For example, St. Martin and Hall-Arber (2008) critique the 'cartographic silences' within much fisheries management: these are due to the unacknowledged 'missing' layers pertaining to social landscapes and community experiences of place and the biases of commonly-available data about physical or natural systems.

"To think of planning. . . as a spatial practice suggests that what planners do is *not* simply to make plans but rather "make space"" (Perry 2003: 151), a task to which maps are well-suited. From a planning perspective, then, maps can be used to articulate alternative landscape outcomes. DeLuca makes the case that images are now central to the rhetoric of environmental movements: through *image events*, environmental advocates can disrupt, and thereby challenge, hegemonic societal discourses (DeLuca 1999). The development and deployment of maps in a participatory planning process can function as a discursive intervention along these lines: mapping can be an attempt to construct, articulate, and enact a particular set of landscape outcomes. These goals may reiterate or challenge the dominant management regime. "If the map is a specific set of power-knowledge claims, then not only the state but others could make competing and equally powerful claims" (Crampton and Krygier 2006: 12). Maps can be "a vehicle for the creation and conveying of authority about, and ultimately over, territory" (Wood and Fels 2008: 190). In fact, Wood has argued that the point of the maps is "to present us not with the world we can *see*, but to point toward a world we might *know*" (Wood 1992: 12).

Finally, maps are particularly important when considering non-state planning initiatives: they play a central role in defining the scale of focus in the absence of a predetermined scale of governance. Although scale has been recognized as a central issue in ecology for a number of years (Turner, Gardner and O'Neill 2001), scholars are increasingly appreciating the degree to

which "scale and scalar politics are central to understanding human-environment relationships" as well (Brown and Purcell 2005: 614). How actors socially construct and deploy scale, particularly in relation to ecological scales, is an important area for further research (Campbell 2007; Haalboom and Campbell forthcoming). Maps and other spatial representations of place are uniquely positioned to provide evidence regarding how scale is being defined and adapted by various actors.

If we understand the communicative function of maps, then, not as "the presentation of stable, known information" (Crampton 2001: 235) but as the social production of knowable worlds, then we can examine them through discourse analysis. The study of discourse, i.e. any "language or system of representation that has developed socially in order to make and circulate a coherent set of meanings about an important topic area" (Fiske 1989: 14), has most commonly focused on verbal communication. However, maps can also be powerful vehicles for the discursive circulation of meanings (DeLuca 1999; Foucault 1977b). Discourse analysis enables the use of "micro-level (linguistic, textual, intertextual) commentary to explain macro-level (society, cultural, ideological) processes…. Therefore…there is a direct link between conversation production of the interaction order and the production of social order" (Jaworski and Coupland 1999: 215).

Using a framework adapted from discourse analysis, this study approaches the production and presentation of maps as communicative events that have both reflected and helped to shape local social and ecological contexts. I focus on maps produced through three participatory planning processes in Cowee between 2004 and 2008. I consider the "speakers" who were represented in the production of a map; the message they sought to convey; the "world" (Ricoeur 1981: 198) or "field of objects" (Foucault 1977a: 199) that the map delimits; the inclusions and exclusions accomplished through this delimitation; the perspective on the

delimited field that is legitimated; and the forum/audience for whom the map is intended (Jakobson 1999). I also examine the response to the map once it has been presented, including ways in which it may have been subsequently reused. In this way, I can elucidate the causes and consequences of the "situated" and "partial" knowledge that the maps represent (Haraway 1988). This analysis affords insight into how perspectives on the changing landscape have been framed in one amenity migration community, the outcomes participants hoped to achieve, and how strategies in support of planning have evolved. Before turning to those processes, I first introduce the study community.

4.4. Cowee Valley

Cowee Valley is an unincorporated township located the northeastern corner of Macon County, North Carolina, as shown in Figure 4.2. Cowee exemplifies the rich natural and cultural heritage of the Southern Appalachians. Nearly a quarter of the township is protected by the Nantahala National Forest. Cowee Creek drains most of the township before flowing into the Upper Little Tennessee River, home to three threatened and endangered aquatic species (LTWA 2003). Cowee is home to significant cultural amenities as well. These include Cherokee, Scotch-Irish and African-American historic sites, well-maintained agricultural fields and picturesque barns (Figure 4.3). The 360-acre Cowee-West's Mill area, at the confluence of Cowee Creek and the Little Tennessee, has recently been designated a National Historic District.

Figure 4.2 Macon County, Cowee Township, and the Cowee-West's Mill Historic District
Figure 4.3 The rural landscape of Cowee

Places like Cowee have attracted considerable development in recent years. Macon County is little more than a two hour drive northeast of Atlanta, and retirees and second home owners, many from Florida or Atlanta, eagerly make the trip to their mountain get-aways.

Between 1990 and 2000, population in Macon County grew by 26.8%, faster than projected and faster than any other county in the region[40] (US Census Bureau 2002). In-migration is anticipated to continue in future decades (OSBM 2008). While population in Jackson, Macon and Swain counties grew by 77% between 1960 and 2000, the number of housing units grew by 335% (LTLT 2004). Forty-three percent of all privately owned parcels in Macon County are owned by people who are not full-time residents; more than half of those are owned by Floridians. Between 2002 and 2007, 384 new parcels were created in Cowee Valley, an increase of 11.7% in just five years; in Macon County, the increase in parcelization was 10.3%[41]. Increasing population and subdivision translate into higher land values as well: in Macon, property values increased nearly 40% between 1999 and 2003 (LTLT 2004).

4.5. Participatory Research Processes

The maps for this study come from three participatory planning processes between 2004 and 2008 that engaged residents in Cowee in considering the future of the area. These are summarized in Table 4.1, below. The goals of each, while not completely overlapping, all involved enhancing dialogue about growth management challenges and fostering the articulation of a community-supported vision for the future. The structure, participants and underlying perspectives on rapid growth identified by each project were similar. Therefore, these successive projects offer a rich opportunity to study one community's response to growth challenges over a period of several years.

Structurally, each process involved multiple, public opportunities for input on some aspect of planning, development, or visioning. And, each employed maps as a central part of the process; the maps in each case were produced in an iterative fashion, and participants had

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[40] In fact, migration accounted for a population increase of 29.2%, because natural deaths exceeded births by 566.

[41] Statistics derived from analysis of the digital Macon County Tax Parcel database

opportunities to critique maps developed by 'experts.' These are the only processes in Macon County that meet both of these criteria, and are also the only example of multiple processes in a single community over the time period. Critical GIS often assumes that state planners or local governments wield great advantage in portraying visions for the future/ development scenarios because of their superior access to mapping technology. Although Macon County does have a full-time GIS administrator, the only maps that have been used in participatory planning processes since 2005 in the county are the ones considered in this paper, which have been generated by non-governmental actors.

Many of the same people participated directly in planning and implementing these three processes. Although the institutions involved vary across the projects, because Cowee is a very small community, it is often the case of actors wearing multiple hats. Most of these local leaders are 'outsiders:' they were not born in Macon County, although many have lived there for more than 20 years. However, the processes themselves have succeeded in engaging both long-time residents and newcomers. They have, in fact, involved a fairly consistent, if slowly growing, group of approximately 20-25 Cowee residents who have demonstrated a willingness to get involved in local planning issues in recent years. This more active group of residents is not entirely equivalent to the participants in each process: each of the three attracted somewhat different people due both to the randomness of participation[42] and also to the variety of engagement strategies employed across the projects.

Another similarity across the projects is the concerns[43] voiced by participants about the effects of growth and development. Some of the concerns identified include the need for more

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[42] Cowee is a small community, and due to advertising and word of mouth, it is likely that most people in the area had at least some awareness of each (Martin 2009), even though of course only a small percentage of the community was involved in any of these processes.

[43] These concerns were gleaned from interviews and analysis of public meetings. For LTP, the concerns reflect all interviews, not just Cowee residents, but only results from the Cowee meeting. For MLI, the concerns reflect only

land use planning; negative impacts of development on rural character, including development on mountainsides; rapid influx of outsiders; loss of farmland; adequate infrastructure; safety of development (road grades, building on steep slopes); rising property values; and loss of informal commons.

While the participants in each of these projects have been overlapping and local concerns about development have remained largely steady since the initial project began in 2004, the emphases and strategies of these three participatory planning processes have been very different—a difference reflected in the maps. Table 4.1 summarizes these processes, and is followed by a short description of each participatory planning process, including how maps and geospatial analysis were used in each.

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input from the Cowee Charrette process. For more information about the analysis of values and concerns, see Cumming 2007.

Table 4.1. Summary information about the PR processes

	Dates	Major institutions/actors	Scale	Major concerns motivating process	Participants
Little Tennessee Perspectives	July 2004-August 2005	Macon Tomorrow, a grassroots planning advocacy organization; community partners representing LTLT and WNCA; graduate student researchers (including author)	*Overall project:* Macon County *Community meeting:* Cowee Township, with consideration of whole county	Negative effects of rapid, unplanned development; lack of citizen engagement in land use planning discussions	*Interviewees:* 50 residents from throughout Macon County *Focus Groups:* 22 *Cowee meeting:* 40 participants
Cowee Mapping	November 2007 – April 2008	CCDO, a long-standing community organization in Cowee; TWS local representative; graduate student researcher	Cowee Township	Protection of rural character; increase community engagement in efforts to protect and enhance Cowee	41 members of the CCDO
Mountain Landscapes Initiative Cowee Charrette	May 2008	Southwestern Commission, the regional council of governments; CCDO, LTLT, WNCA, TWS; private consultants; graduate student researcher	*Overall project:* 7-county Southwestern Commission *Model project site:* Cowee Township and historic district	Negative effects of rapid, unplanned development in region; protection of rural character in Cowee	*Overall project:* 500 residents of WNC *Cowee charrette:* 50 residents of Cowee

CCDO: Cowee Community Development Organization
LTLT: Land Trust for the Little Tennessee
TWS: The Wilderness Society, which maintains a local office in Franklin, NC
WNCA: Western NC Alliance

1. Little Tennessee Perspectives

Little Tennessee Perspectives (LTP) was a participatory research project designed to foster a

more 'inclusive, informed and ongoing' conversation about the changing landscape in Macon

County. Participatory research processes vary, but Wilmsen argues that "they all entail the

production of knowledge through some formal process, they all involve the participation of

nonscientists in research processes, and they all are concerned with social change" (Wilmsen 2008: 11). LTP was planned and implemented by two graduate students, including the author, and a group of local community partners who wanted to foster more citizen engagement in land use planning issues. These partners included steering committee members of Macon Tomorrow, the grassroots organization that sponsored the Wildflower meeting, as well as representatives from the Macon County Planning Board, the County Planner, the Land Trust for the Little Tennessee, and the Western NC Alliance.

This research process was aimed at a) assessing local values and attitudes towards growth and development and b) providing information that was relevant to the challenges the community was facing. LTP was conceived of at the county scale. The multi-year project involved interviews with fifty stakeholders in Macon County (including 10 from Cowee), five focus groups, four public meetings (including one in Cowee, which, coincidentally, took place in the same gymnasium where the Wildflower meeting had been held the previous month), and a mail survey. This iterative, participatory process is described more fully in Cumming and Norwood forthcoming, and in the second chapter of this dissertation.

Mapping and geospatial analyses for LTP were carried out by the author, with the subject matter of the maps guided by community input. Common themes from the interviews were explored through GIS analysis, and the resulting draft maps were revised based on feedback from focus groups as well as input from community partners. The final maps and visualizations were presented at four public meetings in August 2005, and framed in terms of 'landscape change: understanding change, new patterns of development, and threats to community values.' This presentation directly preceded the screening of a short documentary featuring selected portions of the interviews, which was followed by small-group discussions.

Printed versions of many maps were also available for examination at the meetings. Most maps were at county scale, with selected maps at smaller scales to illustrate themes in more detail.

More than 250 people participated in LTP's public meetings; forty attended the Cowee meeting. The same program was presented at a meeting of the Macon County Planning Board, and subsequently shared with multiple grassroots groups, county governments, universities, and at conferences across the region[44].

2. CCDO Community Mapping

During fall 2007 and spring 2008, I collaborated with a grassroots community nonprofit, the Cowee Community Development Organization (CCDO), to assess the values of its membership regarding the landscape and to foster community dialogue regarding the future of Cowee Valley vis-à-vis development pressure. The CCDO, one of the few remaining community clubs in the county, was originally established in the 1953 to support community activities, including the volunteer fire department (CCDO 2009). Thirty to forty community members, a mix of long-time residents and newcomers, meet monthly for a potluck dinner and a short program on a topic of interest. In the fall of 2007, the organization restructured for the first time in many years, creating a governing board to direct longer-range programmatic objectives. Among the issues motivating the decision to form a board were concerns that Cowee would lose what made it a special place due to continued, unplanned development.

The goals of the project evolved over time based on conversations with the CCDO board. I worked most closely with one board member to design appropriate and engaging exercises, and also sought advice from CCDO members who were active in the area, including a staff member of the local land trust who lives in Cowee. Ultimately, the collaboration involved facilitated discussions, a short written survey to document local concerns and interests, and two

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[44] I estimate that more than fifteen hundred people in the region have seen the presentation on the changing landscape of Macon County.

map-based exercises. The first map exercise focused on geospatial analysis about land uses, property ownership, and the physical template in Cowee that could be used for educational or organizational (e.g., grant writing) purposes. These maps[45] were produced by the author with existing data sources, and revised for clarity and accuracy based on comments from CCDO board members.

The second goal was to document the location and status of locally-valued assets, including historic buildings, working farms, old cemeteries, springs, trails, etc. This directly engaged CCDO members in map production, a common participatory GIS practice (Craig, Harris and Weiner 2002). Base maps[46] were made at two scales, the entire Cowee Township and the Cowee West's Mill Historic District. At the March 2008 meeting of the CCDO, approximately 40 local residents used pens, markers and sticky notes to locate places of local importance on these maps. Several CCDO board members, LTLT staff and researchers met the following week at a 'map party' to consolidate the points. At the subsequent CCDO member meeting, the merged maps were presented for CCDO members to add or amend. Following this meeting, these locations were digitized[47], and information about each site was entered into a database by local stakeholders.

The resulting community asset map has primarily been a tool for members of the CCDO and other Cowee community residents; a large-format print-out has been displayed locally. The digital GIS file is also available for use by local and regional nonprofits and governments. In this format, any GIS analysis/mapping/planning undertaken can now include at least this basic

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[45] These landscape and property maps were shared with the CCDO members through a slideshow and as large-format prints. They have been made available as digital files for use by CCDO board members, the local land trust, and other area nonprofits.

[46] These were printed in two sizes-- large-format maps that could be shared by the group or 11x17 maps for individuals to use. The maps included aerial imagery, roads, waterways, and property boundaries, and the boundary of the historic district.

[47] The collected information was digitized by MLI consultants.

representation of the cultural landscape along with more standard biophysical data (St. Martin and Hall-Arber 2008). The asset map also fed directly into the MLI charrette, as discussed below.

3. Mountain Landscapes Initiative

In fall 2007, the Regional A Council of Governments, which serves NC's seven westernmost counties, sponsored the *Mountain Landscapes Initiative: Region A Toolbox* project (MLI). This unprecedented regional planning process was motivated by requests from local leaders for resources for growth management: the goal of MLI was to "produce a *toolbox* of best practices for planning and development in the mountain region" (MLI 2009). To accomplish this in a region long hostile to planning, MLI was implemented in two phases: a 6-month public outreach process modeled after LTP, followed by a week-long planning charrette[48] that would focus on the top concerns identified by the outreach effort. This project was funded by a community foundation and local governments and businesses. MLI was managed by a staff member of the regional government and a 12-member advisory board. Project staff included an outreach director, a communications director, and consultants from a planning and design firm. The author served as an outreach coordinator.

While planning for the May 2008 charrette, it became clear that Cowee represented many of the challenges of growth management in the mountains that MLI sought to address. MLI project staff and nonprofits working in Cowee, including the CCDO and LTLT, collaborated to designate Cowee as a special focus area, or 'model project,' for the larger effort. This opportunity to focus planning and design expertise on Cowee brought together several local and regional entities, many of whom had not collaborated before. The institutions involved in this effort were the CCDO, the Land Trust for the Little Tennessee, the Western NC Alliance (a

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[48] A charrette, as formalized by New Urbanist planners, is an intensive, multi-day design workshop with built-in feedback mechanisms designed to build consensus and produce plans quickly (MLI 2009.)

grassroots environmental organization), the Macon County Planning Department, the Little Tennessee Watershed Association (LTWA, a nonprofit conservation organization), The Wilderness Society (a national nonprofit with a local office), and Friends of Rickman Store (a group formed around the redevelopment of a historic building in Cowee). Together, this group raised additional funds to sponsor a special three-day charrette in Cowee Valley, and advertised the event throughout the valley.

The maps from the MLI Cowee charrette were created by private consultants from the planning and design team, and revised through the workshop setting of the charrette based on input from Cowee residents. Attendance varied over the course of the three-day workshop. A potluck dinner on the first evening, organized by local stakeholders/LTLT, attracted the largest crowd (about 50). This group included a mix of long-time residents and relative newcomers to Cowee. Over the next two days, smaller numbers of residents attended various sessions of the charrette. Many were from area nonprofits, including LTLT, CCDO, LTWA; unaffiliated residents of Cowee were less well represented in the later portions of the program.

> The things you talked about around the table, they had taken and put on maps; they had taken and made sketches so that you could see what things would look like. And it happens right then, right there… It's like magic.
>
> Norma Ivey, WNCA representative and charrette participant. (Lawrence Group 2008)

These maps were presented, along with other maps from across the seven-county region, at the final public meeting of the charrette, on May 20, 2008. A subset are also featured in the published Toolbox (Lawrence Group 2008). These maps highlight areas within Cowee for concentration of development or conservation effort, and many emphasize site-scale design. Since the publication of the draft Toolbox in summer 2008, several of these maps have been adapted by local nonprofits.

4.6. Analysis

What do the maps created in these three participatory planning processes tell us about planning strategies in the region? In Table 4.2, below, I compare selected maps from each process. Using questions derived from the discourse analysis framework introduced earlier, I interrogate the "communication event" represented by each map.

Questions about the production of the maps
1) Who made the maps? Whose voices are represented in their production?
2) What data was used to make the maps?
3) What is the intended message of the producers?
4) What is the scale? What are the *spaces for action* designated by the map? What is legitimated, included, excluded?

Questions about the consumption/deployment of the maps
5) What was the immediate use of maps? Who was the intended audience? What was the reaction?
6) What were the subsequent uses of the maps? Who participated in this, what was their agenda?

The maps highlighted in this analysis are displayed in Figures 4.4, 4.5 and 4.6. They were chosen because they 1) represent the general style, subject matter and approach to mapping adopted in the process, 2) of the maps used in the process, these images most captured the attention/imagination of those involved[49], and 3) therefore have continued to be influential following the completion of the process in which they were generated.

Figure 4.4. LTP Maps. Map 1a. Community viewshed map identifying the most visible hillsides in Macon County. The hillside features in the subsequent image is circled. Map 1b. Potential build-out scenario on the most-visible, privately owned hillside in Macon County.

Figure 4.5. CCDO Maps. Asset map.

Figure 4.6. MLI Map. Cowee Charrette historic district core scenario.

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[49] This assessment is based on written evaluations of participants in the case of LTP, follow-up interviews with community partners, and observations.

Table 4.2. Critical Analysis of Maps

	1. LTP Map: viewshed and Fulcher Vistas buildout	2. CCDO Map: Asset Map	3. MLI Map: Cowee historic district plan
Production			
Who made the maps? Whose voices are represented in their production?	The author conducted geospatial analyses and produced maps based on themes taken from overlapping concerns of 50 interviewees in Macon County, input of randomly selected focus group participant, and guidance of community partners	Cowee residents attending CCDO mapping workshop produced the content for the map, which was organized by CCDO/TWS/LTLT board/staff and the author, and digitized by MLI team	Planning consultants produced maps based on input from Cowee residents attending MLI charrette
What data was used?	Digital elevation model (terrain), county parcel database, state road network, US Forest Service land. Photos of mountainside housing in the region	Input from residents was collected on paper maps and digitized in GIS; base map data from local and state sources (roads, county parcel database, aerial imagery)	Aerial imagery from county government; design/planning skills/New Urban principles of consultants; perspectives of residents attending charrette; vernacular architecture examples
Intended message of producers?	There are a finite number of very visible hillsides in the area that are privately owned; there are no rules to govern how they are developed; default outcomes may conflict with local values	Cowee has a rich cultural and natural heritage; there are important local assets in Cowee that merit attention and protection	The heart of Cowee can be enhanced by appropriate development that respects the character of the community; protected open space/trails and infill development are compatible
What is the scale?	Map at county scale; photo-based example at site scale	Community/township scale	Historic district/rural node scale
What spaces for action are designated?	Privately owned mountainsides subject to development, especially very visible ones	Particular sites—historic buildings, farms, cemeteries, trails	Particular sites within the core of the historic district that are suitable for development
What perspectives are legitimated?	Public/community concern about building on mountains/ridges; building on privately owned property can have effects on others and may warrant regulation; systemic views of landscape change and land use pattern	The concept of shared 'community assets,' the idea that the community can set an agenda for protection and enhancement, and that some places, even on private property, have value to the community at large; particularistic view of place	More development is a key component of protecting Cowee; the overall plan is more important than individual properties; cluster development and other New Urbanism principles; importance of design

What is excluded?	Other information about the landscape; the intentions of the property owners; non-aesthetic impacts of mountainside development (e.g., water quality)	Assets not easily mapped as points; property boundaries; variation in degree of value for certain points	Property lines; intentions of property owners; management regime; landscape traits; surrounding landscape context
Consumption			
What was the immediate use?	Presented as a slideshow and poster at public meetings, August 2005	The process of creating the map was an end in itself—a community engagement exercise oriented towards a community-supported vision for the future of Cowee.	The process of generating the maps was an end in itself—part of the Cowee charrette goal of working towards a community-supported vision for the future of Cowee. Also, use in Region A Toolbox as an example of the application of sensitive infill development.
What was the intended audience, who viewed them initially?	250 Macon County residents who attended LTP meetings	40 Cowee residents who participated in mapping	50 residents who participated in the Cowee charrette, as well as those who attended the final presentation of the regional charrette. Use in final MLI Toolbox as a case study.
What was the reaction by intended audience? Was it uniform, or did it vary?	Images activated concern/sense of outrage about development; very strong support for planning and near-universal distaste for development pattern portrayed	Enthusiasm on behalf of map makers; a sense of accomplishment	Sense of 'magic' regarding how ideas were mapped onto the area; support for creating a concrete plan/scenario; some felt map is too 'pro-development' or too specific (might threaten certain landowners)
What were the subsequent uses?	Slideshow presented to Macon County Planning Board, other local governments and local and regional nonprofits, who then presented the material to many others and distributed copies; distributed by candidates in a neighboring county running on a pro-planning platform	Displayed at other community events; served as a source of data for the MLI Cowee charrette; contributed to local nonprofit strategic planning efforts	Adapted by local organizations in planning future community initiatives: contributed to an application for NC DOT scenic byway designation, grant writing, and organizational strategic plans.

Who participated in this, what was their agenda?	Those distributing the LTP presentation used the maps and visualizations to promote land use planning	CCDO/other grassroots groups used for educational purposes and to boost civic pride; MLI consultants sought to gain trust of community residents by illustrating their respect for local values; local nonprofits seeking to expand investment in Cowee Valley can use asset map as a guide	Local civic leaders who want to take advantage of momentum produced by community processes to encourage protection of valued assets and revitalization of historic district core.

The analysis reveals several major changes in public planning processes in Macon County between 2004 and 2008. These are summarized below.

1. *Change in scope.* The selected maps illustrate a shift in the scope of planning effort from larger (county or landscape) to smaller (community or site) scales. The LTP maps, as illustrated by the community viewshed map, were primarily focused on Macon County, with smaller scale examples to emphasize points, whereas the CCDO map considers the Cowee township, and the MLI maps focus on yet a smaller scale: the core of the historic district within Cowee.

2. *Change in defined 'spaces for action'.* Spaces for action have been defined differently in these projects, with a shift in emphasis from *spaces for protection* to *spaces for appropriate development.* The LTP maps brought attention to areas of the landscape that were subject to degradation by development, and encouraged participants to consider that *types of places* in the landscape could be the focus of attention/regulation/action. These types of places were largely derived from geospatial analysis of the landscape itself: steep slopes, floodplains, ridge tops. For example, the viewshed map focuses attention on highly visible hillsides, with an example of one such place. These images suggested the possibility that there could be rules governing development that were different for valley land than for mountain land; in fact, it was possible to consider significant restrictions on development on certain types of places, like very steep places, or

highly visible places, completely. This is not a new idea, of course; this is basically zoning. But linking widely held local values to planning and zoning was novel in Macon County.

The CCDO map, by contrast, defines spaces for action not as *types of places*, but as *particular places* of local importance: identifiable local assets throughout the township that people would like to see protected. This local knowledge of the landscape would be inaccessible without participation of the community. The spaces for action identified in the MLI map are specific locations that are suitable for development. Though intended to illustrate transferable design principles, they are applied to specific sites, and the emphasis in the map and in the process is on the *place*, rather than the *type of place*.

3. *Changes in the implied tools.* Related to these changes in the space for action defined by the maps are changes in the tools of planning/action. The tools of planning implied by the maps shift from those commonly associated with state planning (regulation, zoning in LTP) to the tools of land conservation (acquisition, volunteer stewardship) in CCDO, and then in MLI expand to include both the tools of conservation and the tools of development, specifically New Urbanist development (site-level planning, architectural standards). It is not to say that the CCDO and MLI maps and processes specify voluntary methods, rather that they do not directly challenge the management regime (strong private property rights, little to no state regulations).

4. *Change in the degree of institutional support for planning and mapping.* Over the period of interest, there has been increasing institutional support, both from the nonprofit sector and government, for participatory planning and mapping processes. The LTP maps were produced by the author, a student researcher working with an informal committee of local citizens who sought to promote a public conversation about land use planning. LTP was conceived of and implemented outside the official planning framework of the county: it was sponsored by a recently-established, all-volunteer grassroots planning organization. Although the project was

endorsed by the Macon County Planning Board, they had no vested interest in the project. Residents of Cowee Valley, with the facilitation of the author, produced the CCDO maps; the overall process was directed by the board of the long-established community organization. The MLI maps were produced with local input, but generated by professional planners, architects and designers who had been hired by the Southwestern Commission and local nonprofits for the purpose of creating tools for growth management. As more institutions support the concept of planning, the maps reflect this increasing professionalization of both mapping and planning.

5. *Change in how local input is mapped.* In LTP, local concerns voiced through interviews provided the subject matter for geospatial analysis and GIS map production, which were refined by focus groups and input from advisors. I was the map-maker in this case, and filtered local concerns through GIS mapping technology as well as my perception of the issues as one of landscape change and cumulative effects. Community residents interested in protection of local assets understandably see, and map, the landscape in a different way. In the CCDO process, community members again determined the subject matter of the maps, but in this case mapped locally-defined assets themselves, using tools (paper maps and markers) that were at the same time more basic than GIS and more engaging and appropriate to the group. In MLI, local input gathered over the course of the three-day Cowee charrette was used to develop and refine hand-drawn plans for the historic district. These plans, produced by design-oriented planners and architects, focused on concerns of design, architecture and connectivity.

4.7. Discussion

Considered together, the differences in the production and use of the three maps analyzed here reveals changes in planning strategy that reflect shifts in Macon County's planning discourse over the study period.

LTP context, strategy and outcomes

The LTP process, which was conceived of and implemented by stakeholders largely external to local governance institutions, gave voice to a groundswell of local concern about rapid development in the county. The maps generated by LTP presented a generally critical view of development, pointing towards the long-term negative effects of unplanned growth. The project's implicit emphasis was on the need to limit development in certain parts of the landscape, for example steep slopes or shared viewsheds, to protect the rural landscape that people overwhelmingly valued. Though voluntary conservation options were also discussed, LTP primarily presented a case for regulatory planning. Accordingly, the process and imagery were scaled to match the unit of local governance—the county—so as to be most relevant to local policy making.

Prior to 2005, the conventional wisdom in the county was that any public consideration of land use planning would be met with overwhelming hostility (Smoky Mountain News [Waynesville] 9 May 2001; Smoky Mountain News [Waynesville] 23 April 2003); in the wake of the LTP meetings, this assumption began to change incrementally. The LTP maps and process disarticulated growth machine perspectives that growth equals progress (Logan and Molotch 1987), and attempted to rearticulate a shared vision for planning to protect valued assets. An outcome of LTP included fostering more local conversations about the need for formal policy/regulation. The viewshed/Fulcher Vistas imagery introduced above prompted spirited debates on the Macon County Planning Board that led to consideration, but not passage, of an ordinance to regulate development on steep slopes (Franklin Press [Franklin] 2 May 2006). Although LTP was unsuccessful in stimulating policy responses[50] to common concerns, it did shift the local discourse about planning, helping it to become more mainstream. This is due, in

[50] Interestingly, the LTP material reportedly did contribute to the election of pro-planning commissioners in neighboring Jackson County, who proceeded to implement the most stringent mountainside development regulations in the region (Shelton 2007; Lyons 2008).

part, to the successful participatory process LTP modeled, which engaged citizens for perhaps the first time in meaningful public dialogue about development and planning issues, providing an important forum for discussing shared concerns and hopes for the future.

Changing context by 2007

By the time that the CCDO and MLI processes began in 2007, the local planning context had changed—due in part to the influence of LTP, as described above. The concept of planning was no longer considered radical, and had been openly endorsed by leaders in the government, business, and non-profit sectors. Nonetheless, concerns about unmanaged development remained largely unaddressed: advocates of landscape protection had repeatedly failed to secure ordinances to effectively protect the rural landscape of Macon County from the forces of amenity-led development. This lack of progress led to a gradual shift of energy among local actors concerned about development away from county-scale policy towards either smaller (sub-county) or larger (regional) scales of action. From the county scale vision of LTP, advocates of landscape protection changed focus in the CCDO planning process, which was confined to the Cowee Community, and in MLI, a seven-county regional project with sub-county focal sites including Cowee. This could be considered scale jumping, a strategy that may be adopted when progress at one scale is stalled (Smith 1993, Brown and Purcell 2005).

In contrast to planning initiatives, private land conservation had proven to be highly successful: LTLT, the local land trust, has protected more than 10,000 acres in the region since 1999 through property acquisition and conservation easements (LTLT 2007). The Cowee landscape, with its wealth of natural and historical assets, had proven to be particularly fertile ground for conservation, with more than 1,200 acres there protected by 2008. These conservation accomplishments were accompanied by a broader increase of civic energy in Cowee during 2005-07: the CCDO was reorganized and revitalized, and a new community group

arose around the Rickman Store (a historic general store that had been acquired by the land trust).

Changing strategy in CCDO and MLI

All of these contextual shifts—the mainstreaming of planning discourse, the failure of substantive planning policymaking, the success of conservation, and the convergence of local institutional/community interest in Cowee—are evident in the CCDO/MLI processes and imagery. They also contributed to the attractiveness of Cowee as a venue for planning effort. When presented with the opportunity to engage in further community-based planning processes following LTP, local leaders who supported planning chose Cowee as a focus area—not the whole county, and not another community within Macon County. Beginning with the CCDO planning process, the Cowee community itself was posited as a valid scale for planning, and in MLI, energy was further trained on the core of the historic district. Neither of these scales map to the extent at which local regulation would most readily apply (the county), but they do perhaps more effectively capture the scales at which communities conceive of themselves and can set achievable goals. In a recent survey[51] of Macon County residents, for example, 35% of respondents preferred that growth management policies be determined at the community, compared to 27% who chose the county scale.

CCDO members' gravitation toward asset mapping, a mode of cartography lending itself more to use in private conservation than regulatory planning, is understandable given the proven local success of the former and the consistent failure of the latter. In effect, Cowee community members had chosen to focus on valued sites that the community might have a chance of protecting on its own, rather than valued landscape categories/attributes that they saw little opportunity to save without government intervention. The asset mapping did not explicitly endorse the current policy regime, but neither did it explicitly challenge it.

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[51] The survey methodology is discussed more thoroughly in the third chapter of this dissertation.

The MLI charrette in Cowee, and the imagery produced through it, largely followed in the same vein as the CCDO process. The planning endeavor was once again restricted to Cowee Valley—indeed, the primary focus was on an even smaller terrain: the heart of the Cowee-West's Mill Historic District. Again, "spaces for action" were predominantly defined in terms of specific, valuable sites rather than broader landscape classifications (though those were also represented, as discussed further below). Conservation strategies were again promoted, while the laissez-faire regulatory regime was left largely unchallenged.

The MLI charrette differs from the CCDO asset mapping process, though, in that the tools of conservation are joined by tools of planning. The Illustrative Concept Plan produced through the MLI charrette is small-scale and site-specific, but the resulting Toolbox document contextualizes that plan using a valley-wide GIS Land Suitability Analysis, which classifies the Cowee landscape according to conservation/development suitability. The policies whereby this classification could be used to guide future development are not elaborated; nonetheless, the approach is that of planning. The ability and willingness of the MLI consultants to introduce planning methodologies into the project are indicative of the growing institutional support for planning in the region.

MLI did not, however, represent a return to the same dialogue about planning that LTP had initiated. The most striking departure was MLI's perspective on development. While LTP presented development almost exclusively in a critical light, MLI cast development as opportunity. Indeed, the "spaces for action" designated by MLI were consistently spaces where new development could occur. LTP had used modified photographs to critique future development, MLI, working in the same county just three years later, used a similar technique to promote future development. This change reflected another dimension of the discursive

mainstreaming of planning that had taken place: while LTP had largely framed the development industry as the problem, MLI was premised on the compatibility of planning and development[52].

In the space of three years, Cowee residents had taken part in three planning processes: one that introduced a systemic critique of development and promoted planning policy change, a second that adopted a site-oriented, conservation-based approach to planning while avoiding systemic issues, and a third that incorporated this site-oriented approach into a development-friendly planning approach. This evolution has both expanded and constrained possibilities for planning, as described below.

Opportunities

This strategy has had successes regarding protection of the landscape, suggesting that non-state work may substitute, *up to a point*, for state planning. Special sites of high community value may be protected, and smaller-scale issues can be addressed—often more quickly and effectively—than through formal planning processes[53]. For example, there have been several concrete outcomes from CCDO/MLI, including the progress made by local stakeholders in securing some protections for valued sites: including an application to the NC Department of Transportation to designate Highway 28, which runs through Cowee, a Scenic By-way and a successful grant application for signage to mark the entrance to Cowee and undertake pedestrian planning. This is perhaps not unexpected, given the success with land protection through purchase and easement that LTLT has enjoyed in recent years. Further, the mapping work itself has contributed to the articulation of a community-supported vision for the Cowee historic district that seems poised to shape development and protection activities over the next decade and beyond. Consider these assessments of local leaders:

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[52] Indeed, development industry representatives—including realtors, developers, and homebuilders—were involved in every aspect of the project, serving as advisors, clients, and stakeholders.

[53] In this case there are no formal processes, but this is likely to be true even if they did exist.

It [the mapping] has jumpstarted the talk about the core of the West's Mills district. The residents frequently refer to the maps and images, and to the charrette process. The maps helped…to prioritize projects [for future investment] (Guffey 2009).

…the mapping project with CCDO helped raise awareness amongst those residents involved…to more fully appreciate the number of heritage sites in the community (Carlson 2009).

[CCDO's] monthly meetings have grown in strength and attendance…Hopefully the CCDO will begin a more structured approach to accomplishing many of the goals laid out during our community priority process, although we need more resources to accomplish on the ground activities. I do sense a rising consciousness within the community regarding our future, our uniqueness, and what opportunities lay before us. I think the attention from the MLI, the mapping exercises and interviews leading up to it, and the events around the Rickman store have been critical in motivating people in the community (Martin 2009).

Increased access to mapping has allowed local actors to propose their own visions for the future, and has given them to power to disarticulate/rearticulate development forces in light of local values, assets and concerns. Consider the revolution in cartographic control that has taken place in Cowee since 2005. At the Wildflower meeting, Cowee residents were confronted with maps that they did not make and that threatened their community. The developer of Wildflower was in some ways perpetuating the "god trick of seeing all from nowhere" (Haraway 1988: 581), creating a map and foreshadowing a reality that took no responsibility for the externalities created by his development plans. In LTP, Cowee residents again encountered maps that they did not make, but which attempted to reflect their perspectives. During the CCDO process, they participated directly in generating the maps. Finally, in MLI, they had essentially retained a professional staff to make their maps for them.

Rather than having development plans imposed upon them, community members were now guiding the production of development plans themselves. This increased local control over mapping development suggests the possibility, at least, that community members could exert control over the course of development itself, shaping development in ways that makes sense to their lived experiences and values. Further, because maps define the scale of agendas, mapping

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allows non-state entities to propose—and shift—boundaries for focus depending on the

context. "Groups at a disadvantage at one scale will pursue their aims at a different scale,

hoping to turn the balance of power to their advantage" (Brown and Purcell 2005: 610; Smith

1993).

> The values of the people who live in Cowee Valley should govern our future. We should
> have our own farmland protection plan, our own preservation plan, our own
> development plan. We should take control of our future and only go to the county when
> it's necessary
>
> Susan Ervin (2008)

> [Cowee] is unlike any other community that I've worked with in the county, in that the
> residents who are active clearly believe they have a say in the way their community
> grows…They also understand that they have something special, something the rest of
> the county seems to have lost. That wasn't the case five years ago. Motivations?
> Wildflower, a stronger and reorganized CCDO, LTLT focus on the community, MLI
> charrette, and an influx of…the best and the brightest.
>
> Stacy Guffey (2009)

The success of non-governmental planning in Cowee reveals a capacity-building

advantage that amenity-rich communities may enjoy over other rural areas: the amenities attract

institutions and individuals with resources. For example several nonprofit conservation

organizations—ranging from local to international[54]—have invested in the protection and

enhancement for the Cowee area because of its rich natural and cultural heritage. Further,

amenity migrants who come because they are attracted to the landscape may be willing to devote

time and attention to planning efforts. Another source of local capacity may be found among

longtime residents of communities experiencing in-migration who are prompted to participate in

planning processes due to their concerns about growth.

The particular synergy between long-term residents and newcomers in Cowee is

important to the community's capacity. An understanding of the dynamics of participation and

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[54] Including the local LTLT, the regional WNCA, and national organizations such as The Wilderness Society, The Nature Conservancy and World Wildlife Fund.

action in Cowee are informed by Fortman and Kusel's (1990) application of the concept of 'voice', whereby newcomers are often more willing to express concerns (about development) than long-time residents are who less willing to speak publicly. However, in Cowee I have observed that although relative newcomers, rather than multi-generational residents, have provided much of the energy required to plan and implement these processes, project organizers have been very careful to introduce ideas and processes through local voices. In other words, although the majority of those who planned each of these three processes were 'newcomers,' in each case, long-time residents were intimately involved in the conception and design of the processes. Sanction by local residents was perceived as critical to the success of each project, and therefore each of the public meetings/events were opened by long-time residents.

Constraints

However, the turn away from policy change as a planning objective has entailed some sacrifices vis-à-vis local concerns: while stakeholders may be able to protect some sites of special interest, the landscape as a whole remains subject to the tragedy of fragmentation (Freyfogle 2003). As of this writing, there are more planning regulations on the books in Macon County than in 2005, but none effectively address the motivating concerns that were identified through LPT, CCDO or MLI. The systemic nature of the challenges being faced requires a systemic response: spatially explicit, thoughtfully-designed and enforced land use planning to protect landscape-level assets.

The shift in strategy from advocating policy change to promoting non-regulatory community initiatives has also required a shift in the part of the landscape that is targeted. The years since 2005 in some ways amount to a collective "lowering of the gaze" by Cowee residents: their eyes, once more focused on the despoilment of their encircling mountaintops, are now more focused on the rural charm and cultural heritage of the valley. This change should not be mistaken for a unilateral decrease in concern over mountainside development, but can be

interpreted as a decision to focus on a goal that seemed increasingly achievable, rather than one that seemed decreasingly so.

Such changes reflect adaptations by local leaders who supported landscape protection. As those who lack the formal authority to regulate take on some of the roles of planning, different goals are possible than with state-supported action. In other words, if a participatory planning process and the actors within it are not in a position to impose regulation, then their proposals must be widely supported if they are to be acted upon. Therefore, the identification of areas of agreement is practical: nearly everyone in Cowee can agree on enhancing the historic district, whether or not they would support a more comprehensive land use plan for the area. These *boundaries of the possible* are also influenced by the institutional capacities and missions of the non-state institutions who may take on some planning roles. Therefore, in Cowee, in this context, the favored approach has not directly challenged the market-based, non-regulatory governance regime, but suggests either that a better future can be achieved despite these forces, or that these forces can be used to help create a better future.

> At the closing of the MLI process…one of the [consultants] said after presenting on the Cowee Charrette process "all we need now are the real estate agents." My reaction was 'the last thing we need now are the real estate agents.' Cowee is fine like it is. The challenge is to keep it that way. If we are going to have development, then yes, we need to have a plan to insure that it occurs in a community supported way, and that it adapts to our community vision. However, I'm much more concerned about preserving our current architecture, protecting farmland, building a local food movement, and preserving greenspace [than promoting development].
>
> Brent Martin (2009)

Maps and community capacity
Across these three projects, mapping has encouraged broader public participation by illustrating complex concepts in a fairly accessible way and 'visibilizing' local perspectives (Wilson, Wouters and Grammenos 2004). In this way, maps and mapping seem to have contributed to local capacity for planning. Mapping in these processes has helped to facilitate

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the articulation of shared goals among project participants that have continued to have relevance in the larger community. Mapping has helped to legitimize the community as an appropriate scale for action, and contributed to fostering positive conversations about growth management that stand in contrast to most public meetings on planning in the area. Although outcomes have varied, the spaces for action that have been identified in these projects have both motivated individuals who participated in the process to stay involved. The maps have offered a visual story about threats or possibilities that have proven to be quite compelling to citizens not involved in their initial production, as well.

Evidence of increased capacity can also be seen by the CCDO's unprecedented sponsoring role of the MLI charrette and their subsequent involvement in planning efforts. Susan Ervin (2009), a longtime community partner, summarized the changes in terms of public awareness and involvement this way: "getting the general public involved is still difficult, and most people don't bother, but the group that will speak out has grown somewhat and the principles of smart growth are much more familiar."

The growing availability of mapping software is lowering barriers to use by community organizations: non-state entities, including nonprofits, increasingly have the ability to create maps that represent their perspectives on place (Elwood 2006a; Elwood 2008; Sui 2008). However, analysis of these three processes suggests that the 'power of mapping,' in some cases at least, is less reliant on technology and more on its ability to facilitate discussion. In other words, the technical sophistication that mapping, as a form of analysis, enables seems less important than the legitimation that mapping, as a social process, lends to perspectives. Consider that although geospatial analysis was a part of all three processes, the relative focus on geospatial analysis and GIS decreased. GIS provided a strong foundation for discussion in LTP that can be seen as continuing over the course of the subsequent projects. There was not a need

to replicate all of those analyses in CCDO and MLI, although there was sufficient 'expert' knowledge across the projects had it been considered important. This suggests that those seeking to enhance participation and local capacity might be better off spending less time promoting open access to mapping technology and more time figuring out how to create the processes in which mapping or other engagement methods can be successfully used.

4.8. Conclusion

Guiding development in amenity migration landscapes, whether through formal policymaking or stakeholder-led initiatives, is a daunting challenge for communities such as Cowee. When faced with rapid growth, communities may only have a short window of time in which to make management strategy decisions before valued environmental and cultural assets are significantly compromised. Understanding the choices that local stakeholders make when responding to amenity migration, and the opportunities or constraints engendered by these choices, therefore merits further attention.

Although state capacity for planning is often low in these communities (Olson 2005), significant capacity for non-state planning, attracted by amenities, should not be overlooked. In cases like the one explored here, where there is not a record of formal policy, a critical analysis of local mapping processes can help to reveal how land use planning, growth management and landscape protection goals are being articulated and negotiated by a range of individual and institutional actors.

Maps produced through participatory, community-based processes are often assumed to be straightforward inscriptions of local stakeholders' perspectives. This study demonstrates that this is not necessarily the case; differing project agendas and designs can result in different cartographic outcomes from the same community. A more nuanced understanding of these

mediating factors can improve the development of future planning processes, thereby potentially

helping to achieve desired landscape and community outcomes.

Figure 4.1. Cowee residents study map of the future Wildflower development.

Figure 4.2. Macon County, Cowee Township and the Cowee-West's Mill Historic District
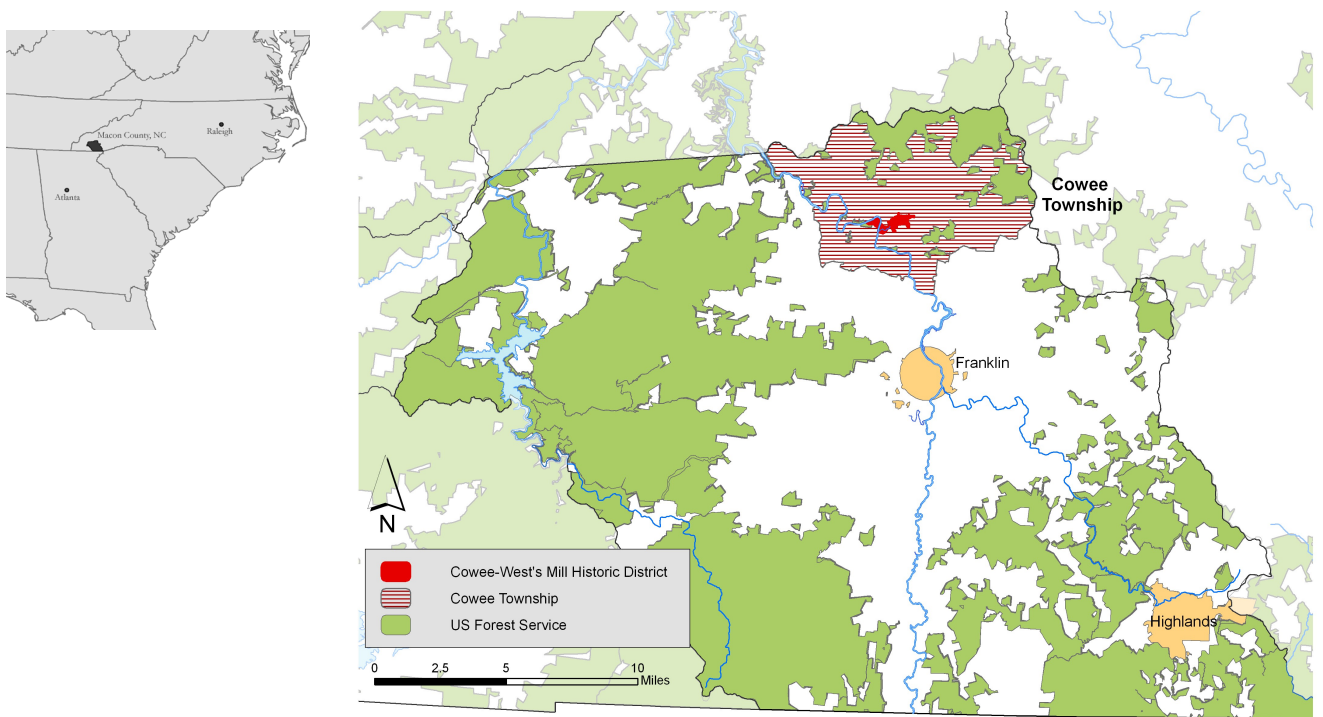
Figure 4.3. The rural landscape of Cowee

Figure 4.4. LTP Maps. Map 1a. Cumulative viewshed map, identifying most visible hillside in Macon County. The hillside featured in the subsequent image is circled.

Map 1b. Potential build-out scenario on the most-visible privately-owned hillside in Macon County.

Figure 4.5. CCDOMap. Asset Map

Figure 4.6. MLI Map. Cowee charrette Historic District core scenario

SNOW HILL INN & SPA WITH
COTTAGES AND WORKING
FARM

← TO THE COWEE MOUND

CLUSTER NEIGHBORHOOD
DEVELOPMENT WITH
COMMUNITY GARDENS &
LIVING WATER SYSTEM

WEST'S MILL
HISTORIC DISTRICT
SENSITIVE INFILL

CRAFT VILLAGE BEHIND
RICKMAN STORE

CULTURAL AND HISTORIC
TRAIL SYSTEM

POTENTIAL RIVER ACCESS

GREEN SPACE
ENHANCEMENT & TRAIL

ENHANCEMENT OF
EXISTING SCHOOL
PROPERTY

PROPOSED NC 28 SCENIC
HIGHWAY IMPROVEMENTS

CHURCH EXPANSION

GATEWAY IMPROVEMENTS:
• CHURCH PARKING LOT LANDSCAPING &
  EXPANSION
• STREET TREES
• IMPROVED GAS STATION SIGNAGE AND CANOPY
• INFOMATION KIOSK FOR VISITORS

COTTAGE
HOMES

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CONCLUSION

As the research described here illustrates, maps can matter. There is great potential to use GIS, modeling and visualization more effectively in local planning or resource management processes. In particular, ample opportunity exists for more contextualized, intentionally relevant mapping to support the protection of common pool resources in communities experiencing amenity migration.

Over the multiple projects described here, more relevant maps have contributed to more successful public engagement. An iterative, participatory approach to mapping, like the one modeled in Little Tennessee Perspectives (Chapter 2) keeps the attention on the problem—in this case degraded landscapes and a lack of meaningful public engagement—rather than sometimes distracting technical complexities. The geospatial imagery produced has provided a substantive basis for dialogue, and supported more deliberative discussions about community futures through which new voices could be heard. Maps provided residents with an opportunity to reflect on the changing community and articulate their own positions in relationship to it. Mapping has lent credibility to subaltern perspectives, legitimating and elevating concerns about unplanned development. Some of these maps have been used by local stakeholders to advocate for more planning.

Maps have helped people conceptualize phenomena that are otherwise difficult to see or comprehend, appreciate new connections at landscape scales, and articulate visions of what landscapes are possible. In Cowee (Chapter 4), maps enabled non-state actors to define the scale of action, enhanced local awareness of heritage sites, gave structure to the articulation of goals,

and supported community capacity to protect the area. At the same time, these maps have also deemphasized certain agendas.

In the mail survey (Chapter 3), maps affected support for planning in different ways among different subpopulations; clearly assumptions about the use of visual information need to be tested and refined. However, the interaction between multigenerational residency and the maps suggests that such visual representations of change may make the most difference to the population often hardest to reach through conventional planning efforts.

What about maps makes them matter?

Over the course of this research, maps that had certain characteristics have repeatedly proven effective in attracting attention and informing discussions. These maps were:

1) Locally specific. Maps of places that people recognize are popular. It is important for residents to feel that the maps were made for them, not that they are incidental consumers of maps made for other purposes. This also encourages participation.

2) Relevant to people's lives. The participatory approaches and ethnographic methods employed in this research have provided access to local values and perspectives, and through this, analyses were tailored to resonate with local perceptions and experiences. This approach made it possible to bring sophisticated geospatial analysis into local discussions without overwhelming people or dominating conversations with technology. Maps about issues that are relevant to people's lives attract interest and can encourage people to see and think about those issues in a different way.

3) Simple. Simple maps were often better received than complicated ones: the medium should not distract from the message. Maps that seem overly simple to those familiar with geospatial analysis can be revelatory to others. To show relationships, it proved more effective to use successive maps/layers rather than putting everything on one map.

4) About property. Stakeholders in this research process were drawn to maps which featured property lines. Property as a unit of analysis is very effective because most people are already familiar with property maps. In general, the grain or unit of analysis should be something that people understand. In our experience, polygon features were more easily understood than grids; this presents challenges for translating land use research that is often grid-based. But, as the viewshed series illustrates, pairing the two can be effective.

5) About trends. Maps illustrating trends over time caught the attention of multiple audiences. In most cases, it seems that the general impression given by the map (or map series) is more important and lasting than any specific information about rates of change.

6) About which they can ask questions. Providing stakeholders with the opportunity to interrogate maps and visualizations is a critical part of making maps that matter. Stakeholders should feel comfortable asking questions and have a chance to request more information. This increases credibility and legitimacy. An iterative, back-and-forth process is especially well-suited to this task, and although time-consuming, can help produce maps that are poised to influence discourses about critically important and timely topics.

Overcoming the Macon Paradox?
The Macon Paradox—in which the effects of development on a landscape are extensively researched, but policymaking processes in the same landscape are largely indifferent to this same research—is not just an unfortunate situation in one community, but indicative of a fundamental problem in the relationship between landscape change research, resource management, and land use planning. Many communities are struggling with amenity migration or other land use challenges, and this research suggests that geospatial tools *can* contribute to more effective discussions about these important topics if more thoughtfully positioned. Research must be more relevant and accessible, planning must be more deliberative and oriented towards longer-term trends, and citizens must be more effectively engaged if research about

changing landscapes is to fulfill its potential to inform planning discourses and policy. The energy devoted to developing more precise modeling algorithms and realistic visualizations may well be misplaced if there are no effective and reliable methods for integrating the results into decision making.

Therefore, how maps are used—that is, the civic process they inform—deserves more attention. Exploring how to make maps that matter more involves both 1) making better (more relevant, clear, accessible) maps or visualizations and 2) learning how to use them more effectively in planning processes. The only sensible way to achieve these objectives is through applied research; interdisciplinary, participatory, multi-sited, long-term studies are needed. Areas that seem particularly promising for future research include participatory modeling and scenario development, with an explicit focus on how maps and visualizations are used by stakeholders and in decisions—both during short-term processes and over longer time frames. There seems to be an important role for applied researchers who know enough about *maps*, *landscapes* and *community processes* to serve as intermediaries who can help to activate the potential of these promising tools. Of course, this is all time consuming and hard, but it is necessary.

Another avenue for further research involves creating data layers that reflect experiences of place, not just the biophysical template and infrastructure. If local values and perceptions of place are to guide development, then we need to be able to integrate them more effectively into decision making; in some cases, this means that they need to mappable, just like roads or steep slopes. Further, there is a need to evaluate the potential for interactive mapping (non-expert user manipulation and creation of data) to inform local planning decision making. And, because not everyone can or will go to public forums, it remains worthwhile to pay more attention to how to effectively present information about changing landscapes in less participatory contexts, as well.

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What really matters?

I complete this writing endeavor feeling that the research described here has contributed in some ways to the vital work to which my community partners have dedicated themselves. Over time, I have come to believe that any one particular map or participatory exercise is not that important, but that the overall process into which these maps and exercises have been integrated has mattered. Having the time and the energy and the resources to investigate these questions has mattered, and underscores just one aspect of the potential benefits of a more participatory approach to academic research. It is impossible to completely isolate the role of the maps (except in the survey analysis) from the larger processes in which they were embedded. This is somewhat frustrating from an academic perspective where the goal may be to determine with much specificity when and how these maps have been important. On the other hand, this means that they did play an integral role in a process many people have contributed to and cared about. In other words, the real meaning of these maps and this work is not their contribution to this document. These maps have mattered to the extent that they have played a role in a larger, more important and still unfolding story of one community's efforts to protect their natural and cultural landscape.

Appendix One

List of analyses and maps shared during the public presentations for the Little Tennessee Perspectives research project.

1. Macon County population growth and projections, 1990-2020
2. Land ownership of Macon County by state, including percent of parcels and land owned by people who live in other states
3. Number and locations of homes, 1950-2005
4. Number of parcels in Macon County, 1980-2005
5. Change in average parcel size
6. Location, number and acreage of Macon County contained by official subdivisions
7. Rates of subdivision
8. Changing patter of development illustrated by photographs of the region
9. Changing elevation of homes by decade
10. Valued local resources (based on interview analysis)
11. Viewshed analysis, parcelization on most visible hillside, and potential build-out scenario

2007 Macon County Opinion Survey on Land Use and Growth

A Research Project of
Gabriel Cumming and Carla Norwood
University of North Carolina at Chapel Hill

Thank you for taking the time to complete this important survey! Your opinions about growth and land use matter to us. The questions in this booklet should take about 20 minutes to complete—please answer each question carefully. We will keep your individual responses confidential, but we will share the overall results of the survey responses with local leaders and the general public.

Again, thank you for sharing your perspectives on Macon County.

Macon County, North Carolina

Questions About How You See The Area Changing

In this section, we want to understand your views on growth and development in Macon County. There are no right or wrong answers—we just want to know what you think about these issues. PLEASE MARK THE ANSWER CHOICE THAT MOST CLOSELY REPRESENTS YOUR OPINIONS.

1. How do you feel about the pace of home building in Macon County?
___ I am not concerned about it at all.
___ I am concerned that it is too slow.
___ I am concerned that it is too fast.

2. In 2005, Macon County's full-time population was 32,148. How many *more* people do you think can comfortably move to Macon County?
___ 0
___ 1,000
___ 5,000
___ 10,000
___ 20,000
___ 40,000
___ 60,000
___ Other (___
___ As many as want to move here

3. Do you think increases in population are causing changes to the community or land?
___ Yes ___ No

IF YES: Please briefly describe one change that you think is especially significant.
_____
_____
_____
_____

4. Who do you think has studied how Macon County is likely to change in the future?
___ No one
___ Local leaders (planners, commissioners)
___ University researchers
___ Other (___
___ Don't know

5. PLEASE INDICATE HOW STRONGLY YOU SUPPORT THE FOLLOWING STATEMENT:
The changes brought by growth are inevitable; there is nothing we can do about it.
___ Strongly oppose
___ Somewhat oppose
___ Neutral
___ Somewhat support
___ Strongly support

PLEASE CONTINUE TO THE NEXT COLUMN ⤴

6. PLEASE INDICATE HOW STRONGLY YOU SUPPORT THE FOLLOWING STATEMENT:
Growth brings new opportunities to the county, so we can improve our quality of life.
___ Strongly oppose
___ Somewhat oppose
___ Neutral
___ Somewhat support
___ Strongly support

7. PLEASE INDICATE HOW STRONGLY YOU SUPPORT THE FOLLOWING STATEMENT:
As the county grows, we will lose the things that made this place special.
___ Strongly oppose
___ Somewhat oppose
___ Neutral
___ Somewhat support
___ Strongly support

8. Is recent growth in population and home building making the following things in Macon County better or worse?

	Better	No Change	Worse
Close-knit community	☐	☐	☐
Water quality	☐	☐	☐
Ability of young people to make a living	☐	☐	☐
Scenic beauty	☐	☐	☐
Places where I can walk	☐	☐	☐
Economy	☐	☐	☐
Rural character	☐	☐	☐
Access to places where people can hunt	☐	☐	☐
Affordability of housing	☐	☐	☐
Other ___	☐	☐	☐

9. How much do you think the way land is used (for example: farming, development, or forestry) affects water quality in local creeks and rivers?

____ None
____ Only a little
____ Somewhat
____ Very Much
____ Don't know

10. What do you value about living in Macon County? Please rate your agreement with each statement.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
I value the lack of restrictions on my property rights here	☐	☐	☐	☐	☐
I feel connected to this area because my family has lived here a long time	☐	☐	☐	☐	☐
Spending time outdoors here makes me feel healthy and happy	☐	☐	☐	☐	☐
I appreciate the richness of the natural environment here.	☐	☐	☐	☐	☐
I value the land here because I make my living off of it	☐	☐	☐	☐	☐
I am part of a close-knit community of family and friends here	☐	☐	☐	☐	☐
I am attracted to the beauty of this landscape	☐	☐	☐	☐	☐
I value this landscape as part of God's creation	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐

Statements by Macon County Residents

The following quotations are adapted from interviews with Macon County residents. These residents were talking about why they like living here, how they see the county changing, and what they hope will happen in the future. PLEASE INDICATE HOW STRONGLY YOU SUPPORT EACH STATEMENT.

1. "This land was settled by my ancestors, and I'm the seventh generation… and it's still all in one tract with the family. Hopefully it stays that way."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

2. "We fell in love with the area. That's how we ended up in this part of the country."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

3. "If people have property and pay their taxes, then I feel like basically they should do what they want to with it."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

4. "You know, it's your home, and your roots are here, and you feel tied to the land. Because of childhood experiences and growing up on it, it becomes part of you."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

5. "One of the biggest things I like about Macon County is the freedom from the tight [land use] restrictions that I grew up with in the major cities. There is no law against everything that you do around here."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

6. "It's hard to find a place that has more to offer if you are drawn to nature and mountain life."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

7. "People definitely need to think about what it is they really like and value about a place and commit to protecting those few things at all costs."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

8. "The biggest thing that we have going in Macon County, as far as the economy, is what's done with real estate and development. We certainly don't want to stop that."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

9. "I feel like we're giving up a lot in Macon County. We're just losing things that we used to not even think about. I think we lose a little bit every day."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

10. "Things change whether you like it or not."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

11. "Let Macon County become whatever it will become. I don't want control of it."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

12. "I hope it will develop, but I hope it will be a good place to live...have it so people can stay here and not have to leave to make a living."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

13. "If we don't do something, every one of our mountains is going to be the same. I told my grandson, I said you better go ahead and take some pictures of these mountains right now, while there's not a house on every one of them."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

14. "As an old timer and one who has roots here, I guess people like me would like to see it stay the same. But we've got to do some land planning or something to curtail the growth or regulate the growth so that we still maintain our good clean environment and good way of life we all enjoy."

____ Strongly support
____ Somewhat support
____ Neutral
____ Somewhat oppose
____ Strongly oppose

Your Opinions About the Future of Macon County

In this section, we want to understand your opinions about policies that could affect how Macon County grows in the future. We are asking how you feel about a wide range of tools for shaping future growth and development—regulatory, voluntary, and participatory.

1. To what degree would you favor the establishment of a county incentive fund that would pay property owners to keep their land in forest or agriculture? For example, some other counties in North Carolina use such funds to buy and protect farmland.

___ Would favor very strongly
___ Would favor somewhat strongly
___ Neutral
___ Would not favor very much
___ Would not favor at all

IF YOU WOULD FAVOR THIS FUND, how much would you be willing to pay to support it *each year?*

___ 0   ___ $20
___ $1   ___ $50
___ $5   ___ $100
___ $10   ___ Other _____

2. Did you attend any public meetings about land use or development issues in Macon County during 2006?
___ Yes   ___ No
IF YES, did you speak?
___ Yes   ___ No

3. Do you think Macon County residents should have a public conversation about the county's future, where everyone is given a chance to contribute their ideas?
___ Yes   ___ No

4. How would you feel most comfortable sharing your opinions about growth with county leaders? PLEASE CHECK ALL THAT APPLY.
___ Speaking at public meetings in town
___ Speaking at meetings in fire departments or community clubs
___ Written surveys like this one
___ Making written comments at a meeting
___ Small group discussions at a meetings, where someone records my comments
___ Sending in photographs that show types of development that I think are desireable and types that are undesireable
___ Other (_____

PLEASE CONTINUE TO THE NEXT COLUMN

5. Do you have ideas for encouraging more people to participate in discussions about the county's future?

_____
_____
_____

6. PLEASE INDICATE HOW STRONGLY YOU SUPPORT THE FOLLOWING STATEMENT: The public should have a role in developing guidelines for how individuals use their land.
___ Strongly oppose
___ Somewhat oppose
___ Neutral
___ Somewhat support
___ Strongly support

7. PLEASE INDICATE HOW STRONGLY YOU SUPPORT THE FOLLOWING STATEMENT: An individual should be able to do whatever he/she wants with his/her own property.
___ Strongly oppose
___ Somewhat oppose
___ Neutral
___ Somewhat support
___ Strongly support

8. Which statement is closer to your point of view? PLEASE CHOOSE ONE.
___ The community should restrict building on steep slopes to ensure water quality and public safety
___ People should be able to build houses anywhere, no matter how steep the slope is.

9. Which statement is closer to your point of view? PLEASE CHOOSE ONE.
___ Developers have the right to build anything anywhere in the county.
___ I have a right to look at mountains that are not covered with houses.

PLEASE CONTINUE TO THE NEXT COLUMN

10. If the following policies were being considered in Macon County, how would you feel about each one?

	Strongly Oppose	Somewhat Oppose	Neutral	Somewhat Support	Strongly Support
Measures to ensure that new development fits in with the community	☐	☐	☐	☐	☐
Requirements to ensure that enough affordable housing is available	☐	☐	☐	☐	☐
Standards to improve the appearance of development along highways	☐	☐	☐	☐	☐
Improved water quality protection and erosion control measures	☐	☐	☐	☐	☐
Incentives for building new houses closer together in new developments, so that other areas of the property can be left open	☐	☐	☐	☐	☐
Zoning	☐	☐	☐	☐	☐

The definition we are using when we refer to land use planning is: *a public process through which citizens and local governments define goals for how land will be used in the future.*

Please use this definition of land use planning when thinking about the following questions.

11. Do you think you are more or less supportive of land use planning than the average Macon County resident?
___ More supportive
___ About the same
___ Less supportive
___ Don't know

12. Would you support increased land use planning in Macon County to help protect the mountain landscape? This would impose some limitations on what landowners could do with their property.
___ Strongly support
___ Somewhat support
___ Neutral
___ Somewhat oppose
___ Strongly oppose

13. How interested are you in each of the following types of information about growth and development in Macon County?

	Very Interested	Somewhat Interested	Not Interested	Don't Know
Population growth	☐	☐	☐	☐
Projected number of new homes	☐	☐	☐	☐
Images of how future developments might look, based on current trends	☐	☐	☐	☐
Maps of places in the county most likely to develop in the future	☐	☐	☐	☐
Effect of more growth on tax base	☐	☐	☐	☐
Effect of more growth on water quality	☐	☐	☐	☐
How quickly land is being subdivided	☐	☐	☐	☐
How other communities have dealt with rapid population increases	☐	☐	☐	☐

14. Are there other types of information about growth and development in Macon County you would like to know?

_____
_____
_____

PLEASE CONTINUE TO THE NEXT COLUMN

About Yourself

1. What is your gender?

____ Female ____ Male

2. What is your age? PLEASE CIRCLE ONE.

Under 25   25-39   40-59   60-79   80+

3. Were you born in Macon County?

____ Yes ____ No

4. How many generations of your family have lived in Macon County (permanently or part-time)?

____ I'm first generation ____ 2 ____ 3 or more

IF YOU ARE THE FIRST, where did you move from?

____ City: _____ State: _____

____ I moved to Macon County _____ years ago

5. How many people currently live in your household, INCLUDING YOURSELF?

____ adults   ____ children (under 18)

6. Are you a permanent resident of Macon County?

____ Yes ____ No

IF NO: Where is your permanent residence?

City: _____ State: _____

How much time per year do you typically spend in Macon County?

____ weeks   OR   ____ months

7. What is the name of the community where you live in Macon County?

8. What is the highest level of education you have completed?

____ Did not finish high school
____ High school degree / GED
____ Some college
____ College degree
____ Graduate degree

9. Do you or your spouse currently own land in Macon County?

____ Yes ____ No

If YES, how many acres?

____ acres

PLEASE CONTINUE TO THE NEXT COLUMN ⬏

10. Do you have any plans to build a new home, for yourself or someone else, in Macon County in the next 5 (five) years?

____ Yes ____ No ____ Don't Know

11. Have you bought or sold any land in Macon County in the last 10 (ten) years? PLEASE CHECK ALL THAT APPLY.

____ Yes, sold ____ Yes, bought ____ Neither

12. Have you heard of the *Little Tennessee Perspectives/Macon County Voices* project, which was conducted in Macon County during 2004-05?

____ Yes ____ No

IF YES: how did you find out about the project? PLEASE CHECK ALL THAT APPLY.

____ Media (newspaper, radio)
____ Word of mouth
____ I was interviewed
____ I attended one of the meetings
____ Other

What kind of effect has the project had on Macon County?

____ Very positive
____ Somewhat positive
____ No effect
____ Somewhat negative
____ Very negative
____ Don't know

Is there anything else you would like to add? We welcome your comments below.

Thank you very much for sharing your ideas and opinions. Using the enclosed, stamped envelope, please return this survey to *Macon County Opinion Survey, UNC Chapel Hill, Campus Box 3275, Chapel Hill, NC 27599.*

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15. If the following policies were being considered in Macon County, how would you feel about each one?

	Strongly Oppose	Somewhat Oppose	Neutral	Somewhat Support	Strongly Support
Incentives that encourage landowners to voluntarily conserve their land	☐	☐	☐	☐	☐
Shielding outdoor night lighting so people can see the stars	☐	☐	☐	☐	☐
Requiring developers to pay part of the cost of new roads and schools	☐	☐	☐	☐	☐
Regulations that allow more development in some areas of the county and less development in others	☐	☐	☐	☐	☐
Limiting building on steep slopes	☐	☐	☐	☐	☐
Limiting how tall new buildings can be	☐	☐	☐	☐	☐
Economic development programs aimed at providing quality jobs	☐	☐	☐	☐	☐
Limiting building on ridgetops	☐	☐	☐	☐	☐
Regulations on how land can be subdivided and developed for multiple homes	☐	☐	☐	☐	☐

16. If you were interested in building a home in Macon County, what features would you look for when choosing a homesite? Please rate how desirable each of these features would be to you.

	Desirable	Neutral	Not Desirable
Nice views	☐	☐	☐
Affordable land	☐	☐	☐
Privacy	☐	☐	☐
Water frontage	☐	☐	☐
Neighbors nearby	☐	☐	☐
Protects the environment	☐	☐	☐
Level land	☐	☐	☐
High elevation	☐	☐	☐
Close to town	☐	☐	☐
Near National Forest	☐	☐	☐
Gated community	☐	☐	☐
Know how nearby land will be used	☐	☐	☐
Other _____	☐	☐	☐

17. Do you think that county leaders pay enough attention to citizens' opinions on land use issues?

____ Yes
____ No
____ Don't know

18. Should Macon County's leadership do more or less to address growth?

____ They should do *less*
____ They are doing the right amount
____ They should do *more*

19. If research about how the county was likely to grow in the future were available, do you think county leaders should use it to help make decisions about the future?

____ Yes
____ No
____ Don't Know

20. If local landowners wanted voluntarily to keep their land undeveloped, how could the local government or other organizations help them achieve that goal?

_____
_____
_____
_____
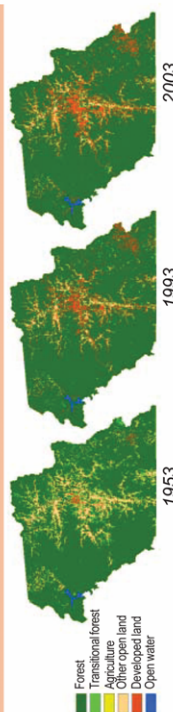
PLEASE CONTINUE TO THE NEXT COLUMN ⬏

Below are two series of maps that represent changes in how land in Macon County has been used over time. Please look at each series, and then answer the questions below it.

- Building Locations
US Forest Service
Towns

1953   1993   2003

SERIES A. These maps show the approximate number and location of homes in Macon County between 1953 and 2003. Source: Historic aerial photographs and maps.

6. Looking at the maps in Series A, above, please rate your agreement with the following statements.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
These maps are clear.	□	□	□	□	□
These maps illustrate changes in Macon County that are important to me.	□	□	□	□	□
These maps would be useful to me if I was thinking about whether or not to support land use planning in Macon County.	□	□	□	□	□
I find this information surprising.	□	□	□	□	□

Forest
Transitional forest
Agriculture
Other open land
Developed land
Open water

1953   1993   2003

SERIES B. These maps show the major land uses in Macon County, such as forestry or development, between 1953 and 2003. Source: Satellite imagery and historic aerial photographs.

7. Looking at the maps in Series B, above, please rate your agreement with the following statements.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
These maps are clear.	□	□	□	□	□
These maps illustrate changes in Macon County that are important to me.	□	□	□	□	□
These maps would be useful to me if I was thinking about whether or not to support land use planning in Macon County.	□	□	□	□	□
I find this information surprising.	□	□	□	□	□

Maps and Images of the Changing Landscape

In this section, we are trying to understand what types of images or information about growth and development are most useful to Macon residents. PLEASE LOOK AT EACH IMAGE OR GROUP OF IMAGES, READ THE INFORMATION PROVIDED, AND ANSWER THE QUESTIONS.

For questions that ask about land use planning, please use this definition: *a public process through which citizens and local governments define goals for how land will be used in the future.*

Below are photographs and maps that show different size areas, from smaller to larger. These are only examples of each size area, or scale—please think about the size being shown rather than the particular locations.

Photo A. Local Site Scale   **Photo B.** Community Scale   **Photo C.** Larger Area Scale

1. If you could look at images that showed the expected changes in housing development over the next 10 years at any of the scales represented in the photographs above, which scale would interest you the most?

____ Photo A   ____ Photo B   ____ Photo C   ____ Don't know   ____ Not interested

Look at the maps below to answer the next three questions. The dotted red lines show how each map relates to the others.

Map A. Local Site Scale   **Map B.** Community Scale   **Map C.** County-wide Scale   **Map D.** Regional Scale

2. Which scale would be best for showing information about population growth?
____ Map A
____ Map B
____ Map C
____ Map D
____ Don't know

3. Which scale would be best for showing where future development is likely to occur?
____ Map A
____ Map B
____ Map C
____ Map D
____ Don't know

4. Which scale would be best for deciding whether policies to manage growth are needed or not?
____ Map A
____ Map B
____ Map C
____ Map D
____ Don't know

5. In general, do you think maps or photographs are a better way to illustrate changes in how land is used in Macon County?
____ Maps
____ Photographs
____ Depends on situation
____ Don't know

PLEASE CONTINUE TO THE NEXT COLUMN ⤴

8. Both series of maps on the previous page show changes in development in Macon County between 1953 and 2003. Which series most clearly illustrates these changes to you?

_____ Series A
_____ Series B

9. In the maps from Series B, what color represents places that are developed, such as buildings and parking lots?

_____ Green
_____ Red
_____ Yellow
_____ Blue
_____ Don't know

10. Thinking about maps that show changes in how land is used over time, such as those on the previous page, which period of time between maps would be of most interest you? PLEASE CHOOSE ONE.

_____ One year (for example: 1990, 1991, 1992, 1993)
_____ 5 years (for example: 1990, 1995, 2000, 2005)
_____ 10 years (for exampe: 1980, 1990, 2000)
_____ 20 years (for example: 1980, 2000)
_____ Other (

PLEASE CONTINUE TO THE NEXT COLUMN ⬆

11. The full-time population in Macon County grew nearly 27% from 1990 to 2000. Population projections from the US Census Bureau estimate how many people will be living in Macon County in the future.

For which period in the future would you be most interested in knowing the expected population of Macon County—5, 10, 20, or 50 years from now?

_____ 5 years from now
_____ 10 years from now
_____ 20 years from now
_____ 50 years from now
_____ other (

The two maps below show a property subdivision in Macon County that occurred between May 2005 and March 2006. The yellow lines are property lines, shown on an aerial photograph of the land.

12. Looking at the maps below, please rate your agreement with the following statements.

	Strongly Disagree ▶	Somewhat Disagree ▶	Neutral ▶	Somewhat Agree ▶	Strongly Agree ▶
These maps are clear.	☐	☐	☐	☐	☐
These maps illustrate changes in Macon County that are important to me.	☐	☐	☐	☐	☐
These maps would be useful to me if I was thinking about whether or not to support land use planning in Macon County.	☐	☐	☐	☐	☐
I find this information surprising.	☐	☐	☐	☐	☐

May 2005

March 2006

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14. Please look at the images below and answer the following questions about them.

Actual Photograph   _Potential Future Development_

These images show a hillside in Macon County that has been subdivided for development.

This is a photograph of a hillside in Macon County as it appeared in winter 2004–05.

This image shows how the same hillside _might_ look once houses are built on each of the already subdivided lots.

	Strongly Disagree ▶	Somewhat Disagree ▶	Neutral ▶	Somewhat Agree ▶	Strongly Agree ▶
These images are clear.	☐	☐	☐	☐	☐
These images illustrate changes in Macon County that are important to me.	☐	☐	☐	☐	☐
These images would be useful to me if I was thinking about whether or not to support land use planning in Macon County.	☐	☐	☐	☐	☐
I find this information surprising.	☐	☐	☐	☐	☐

15. Are there places that are particularly special to you in Macon County? PLEASE DESCRIBE UP TO THREE PLACES IN MACON COUNTY THAT ARE IMPORTANT TO YOU, using the space provided below. These can include any kind of place—a place of importance to your family history, somewhere you like to go, etc. If there are none, please write 'none' in the first box.

Example:
_1._ _The West Mill area is important to me because I used to walk to the post office there with my family._

1.

2.

3.

16. Do you have any comments about the maps and information you saw in this section?

_____

_____

_____

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