

Effective Protection of Open Space: Does Planning Matter?

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Abstract High quality plans are considered a crucial part of good land use planning and often used as a proxy measure for success in plan implementation and goal attainment. We explored the relationship of open space plan quality to the implementation of open space plans and attainment of open space protection goals in Research Triangle, North Carolina, USA. To measure plan quality, we used a standard plan evaluation matrix that we modified to focus on open space plans. We evaluated all open space plans in the region that contained a natural resource protection element. To measure plan implementation and open space protection, we developed an online survey and administered it to open space planners charged with implementing the plans. The survey elicited each planner's perspective on aspects of open space protection in his or her organization. The empirical results (1) indicate that success in implementation and attaining goals are not related to plan quality, (2) highlight the importance of when and how stakeholders are involved in planning and implementation processes, and (3) raise questions about the relationship of planning to implementation. These results suggest that a technically excellent plan does not guarantee the long-term relationships among local landowners, political and appointed officials, and other organizations that are crucial to meeting land protection goals. A greater

balance of attention to the entire decision process and building relationships might lead to more success in protecting open space.

Keywords Land protection · Stakeholder involvement · Land use planning · Natural resource protection · Implementation · North Carolina

Introduction

Open space—land intentionally left as fields and forests while the surrounding land is developed into buildings and pavement (Ahern 1991)—provides numerous benefits that include protecting water quality, enhancing air quality, preserving scenic character, preventing flood damage, preserving natural heritage, and affording recreational opportunities for leading healthier lifestyles. Growing populations and increasingly land-consumptive development practices threaten the services provided by open space in many urban and suburbanizing settings. Consider for instance that from 1980 to 2000, the U.S. population grew nearly 25% while the amount of developed land increased by 34% (Alig and others 2004).

Protecting open space is one alternative for addressing some problems posed by growth, urbanization, and suburbanization. Regional and state government have played roles in encouraging or mandating growth management in some states, while the federal government has had much more limited responsibility (Wilson and Paterson 2002; Bengston and others 2004). Increasingly, nonprofit organizations play a part in open space protection, especially through land acquisition strategies. Despite the important functions of these entities, local governments have the largest effect on open space in places where rapid

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development is occurring, through the use of planning, zoning, regulation, and incentives (Porter 1997; Bengston and others 2004). Yet, little is known about what constitutes effective open space protection and what role planning plays in these complex processes.

To address this knowledge gap, we asked, “How does planning relate to the achievement of open space protection objectives?” In answering this question, we feel the main contributions of this article are threefold. First, we provide empirical data that connect plan quality with implementation and outcomes, a noted gap in the knowledge about planning (Brody and Highfield 2005). Second, we connect empirical data about stakeholder involvement in planning and implementation with success in implementation and attaining goals, another recognized gap in the literature (Brody 2003). Third, we investigate these relationships through the lens of open space planning, which has received little attention from the planning field at large. When open space is addressed in the literature, work tends to focus on describing programs and instruments rather than evaluating their effectiveness (Hollis and Fulton 2002). Our findings raise important questions about whether the emphasis on planning is misplaced given the importance of other steps in the open space protection process, such as building relationships, implementation, and evaluation.

Planning, Plan Quality, Implementation, and Open Space Protection

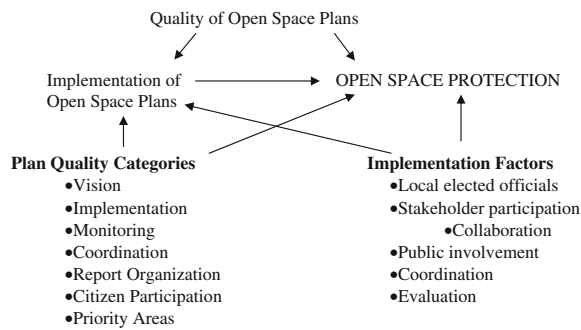
Planning has come under fire for creating products that sit on a shelf and have little relevance to achieving desired land use goals (Bryson 1991; Burby 2003). In the open space arena, this criticism is played out in the tension between the theory and practice of planning. In theory, a detailed plan identifies all the land that should be left undeveloped in an area and then that plan is implemented to protect open space. In practice, local governments develop plans that identify open space that should be protected—often in great detail—and then struggle to make progress during the implementation phase. In the planning literature, the congruity between plans and their implementation is often referred to as “plan conformity” (Talen 1997; Mastop and Faludi 1997).

Although conservation of biodiversity is often only one goal of open space protection in suburbanizing areas, the experience of conservation biologists is informative. Conservation biologists have developed reserve design procedures to identify land that should be protected to maximize the diversity of biota conserved (e.g., Noss and others 1999; Miller and Hobbs 2002). But Meir and others (2004) have questioned the feasibility of achieving conservation objectives using these procedures. They

suggested that these procedures are appropriate only when all properties are available and can be acquired immediately. In practice, land is acquired over a period of many years, during which budgets fluctuate and sites may lose their conservation value or simply be unavailable. If an organization adheres rigidly to a plan—especially one more than a few years old—it might forgo opportunities to protect otherwise acceptable land because it is not identified in the plan, or protect property that has become degraded because it is identified in the plan. Under these conditions, ad-hoc approaches might be more effective, such as using funds on hand to protect the *available* sites with the highest biodiversity value (Meir and others 2004; Turner and Wilcove 2006). Similar arguments could be made for the protection of open space in rapidly developing landscapes.

In spite of these practical challenges, researchers have identified high quality plans as important to fulfilling outcomes (Berke and French 1994; Burby and Dalton 1994; Burby and May 1998) and this notion has carried over to open space protection. Through the years, explicit evaluation criteria for assessing the quality of plans have been crafted and debated (Alexander and Faludi 1989, Baer 1997; Talen 1997) and these criteria have been extended to open space plans (McDonald and others 2006). Although plan quality is often used as a proxy for plan effectiveness, little is known about the correlation of plan quality with the implementation and ultimate effectiveness of a plan or how these relationships hold up in the realm of open space planning.

Some researchers have found that evaluation of open space plan implementation suffers from a lack of systematic empirical work (Brody and Highfield 2005; Hollis and Fulton 2002). Although planners as a profession are acutely aware of the importance and value of monitoring and evaluation, matters perceived as more urgent often preclude them from following through (Seasons 2003). A study conducted in Ontario, Canada found that organizational culture and competing demands for limited resources including staff time, money, and training were the factors that affected the potential for monitoring and evaluation (Seasons 2003). In their literature review, Bengston and others (2004) posited several reasons for the lack of evaluation in open space planning. These included difficulty identifying what would have happened in the absence of the plan; length of time to complete implementation, because open space policies take many years to be realized and short term-evaluations may not identify complete results; competing spatial scales and jurisdictions often overlap, making the effects of specific policies or plans difficult to discern; and lack of explicit, measurable goals or targets for many open space plans or programs, which makes evaluation difficult.



- Hypothesis 1: Plan quality correlates positively with implementation of open space plans
 Hypothesis 2: Plan quality correlates positively with open space protection
 Hypothesis 3: Implementation of open space plans correlates positively with open space protection
 Hypothesis 4: Plan quality categories correlate positively with implementation of open space plans
 Hypothesis 5: Plan quality categories correlate positively with open space protection
 Hypothesis 6: Implementation factors correlate positively with implementation of open space plans
 Hypothesis 7: Implementation factors correlate positively with open space protection

Fig. 1 Conceptual framework for hypothesis development. We tested several hypotheses relating open space planning and implementation to open space protection, the ultimate goal of these activities. The quality of an open space plan is the sum of the quality of plan components (see Appendix A), and a number of factors are hypothesized to affect plan implementation and open space protection. Arrows show hypothesized positive correlations we tested

These challenges are not unique to open space planning, but have plagued planning as a whole (Baer 1997; Brody and Highfield 2005). Consequently, proxy measures such as plan quality have been used as indicators of the effectiveness of plans. This raises important questions about the degree to which the quality of adopted plans actually correlate with their intended outcomes. In the limited empirical work that exists in correlating plan quality with plan implementation, Brody and Highfield (2005) found no statistically significant relationships between plan quality and conformance with the plan. This literature suggested two hypotheses for testing: plan quality is correlated positively with the implementation of open space plans, and plan quality is correlated positively with open space protection (Fig. 1).

Factors that Influence Implementation and Open Space Protection

The actual protection of open space rests on implementation. Several researchers have noted the lack of effective policy implementation in the field of open space protection (Bengston and others 2004; Brody and Highfield 2005). As a result of varied success in implementation, similar plans can yield different outcomes (Porter 1997). Specific factors influence plan implementation and these include commitment from local elected officials (Burby and May 1998; Webler and others 2003), stakeholder participation (Burby

2003; Bengston and others 2004), collaboration (Bengston and others 2004; Koontz 2005), public involvement (Bengston and others 2004), coordination by various jurisdictions (Bengston and others 2004), and commitment to evaluation (Brody and Highfield 2005).

The involvement of *local officials* in planning is recognized as an important factor in policy outcomes, and the lack of local officials' commitment to a plan can lessen its effectiveness (Burby and May 1998; Webler and others 2003). Burby and May (1998) described complex relationships among plans, local elected officials, and stakeholder support. They posited that effective environmental planning entails a high quality plan that enables the building of support from political constituencies that are important to local officials. Burby and May surveyed perceptions of local government officials in Florida, USA and New South Wales, Australia and found that government officials were less likely to commit to a plan if it was perceived to be of low quality, when it lacked support from the public, and when risks were not imminent. Consequently, Burby and May (1998) recommend that better quality plans and supportive local constituencies could help overcome the reluctance of local officials to commit to plans.

Stakeholder participation and *collaboration* have been identified as an important factor influencing plan implementation by some (Burby 2003), but not by others (Koontz 2005). Stakeholder participation is important because it can incorporate knowledge that otherwise might be missed, defray potential opposition, and is deemed important in a democratic society. Burby (2003) studied the link between stakeholder participation in planning and the implementation of those plans in natural hazards policy. Implementation was measured using the ratio of proposed mitigation actions to those actually executed. Results from his study of 60 comprehensive plans in Florida and Washington, USA, revealed that plans were stronger and more likely to be implemented when there was greater stakeholder involvement (Burby 2003). In a study of the effects of collaborative planning on farmland preservation in Ohio, Koontz (2005) conducted interviews with key informants and found that implementation had more to do with perceived local contextual factors (e.g., political feasibility, levels of development pressure, and the strategic use of zoning rules) than internal group factors (e.g., the decision making process, membership diversity, and resources). While citizen input and collaboration were important, Koontz (2005) concluded that they must occur in a context that is amenable to policy change. In a meta-analysis of the literature, Bengston and others (2004) broadened the discussion of stakeholders and collaboration to encompass "*public involvement*," concluding that participation of grassroots supporters throughout the process

from planning through implementation is vital to realizing plan goals. Bengston and others (2004) also suggested that open space protection is less effective when there is poor *coordination among jurisdictions* and among different agencies within jurisdictions.

Finally, when implementation matched plan intent, Brody and Highfield (2005) identified specific factors that facilitated conformity. These included policies that supported implementation measures, sanctions for failure to comply with implementation, and tracking implementation through a *monitoring* program.

Altogether, this literature review helped identify additional independent variables for testing (Fig. 1). Hypotheses derived from these variables included expectations that there would be positive correlations between *plan implementation* and (1) stakeholder participation in planning; (2) stakeholder participation in implementation; (3) public support for open space protection; (4) support of elected officials; (5) collaboration with other conservation organizations; and (6) commitment to evaluation. Likewise we were interested in whether actual *open space protection* was correlated positively with the same set of variables.

Open Space Conservation and Consumption in the Research Triangle, North Carolina

Regionally, the largest increases in developed areas from 1980 to 2000 in the U.S. were in the South, which accounts for 7 of 10 states with the largest average annual increase in developed land (Alig and others 2004). Projections indicate that population in the U.S. South will grow by 49% through 2025. Because of changing demographic patterns that lead to a higher number of homes per capita (Liu and others 2003), this population growth will likely be accompanied by a 75% increase in land area developed (Alig and others 2004). North Carolina is one of three states with the most developed land per person and has developed more than 10% of its land area, in contrast to a 5.2% average for the United States.

The setting for our study was the Research Triangle, North Carolina (Fig. 2). The Research Triangle comprises approximately 8,550 square kilometers (3,300 square miles) divided among six counties (Chatham, Durham, Johnston, Lee, Orange, Wake) and 31 municipalities, each with planning control within its jurisdiction. Population has more than doubled in this region since 1970 from nearly 500,000 to 1.2 million people and is estimated to double again to more than two million by 2030 (TJCOG and others 2005). Nearly 775 square kilometers (300 square miles) of land were developed between 1987 and 1997, most of which was forested (68%) and agricultural (29%) (Hess and others 2001). Additional pressures are placed on the land because development patterns have become

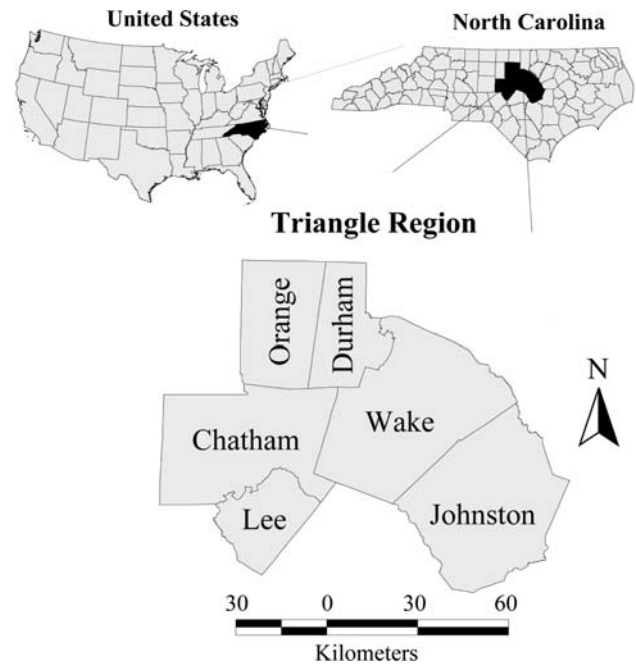


Fig. 2 Research Triangle, North Carolina, USA

increasingly land-consumptive. In 1950, approximately 50 hectares (122 acres) of land were developed for every 1,000 people living in the region, rising to 143 hectares (353 acres) per 1,000 people in 1990 (Hess and others 2001). Finally, the cost of preserving land is increasing, more than tripling in NC between 1996 and 2006 from US \$280 to US \$1,076 per hectare (US \$699 to US \$2,691 an acre) (Land for Tomorrow 2007).

In response to these trends, many government and nongovernment organizations in the region are taking action to conserve open space. A regional GreenPrint was created in 2001 (N.C. DENR and others 2002), four of the six counties in the Triangle Region have open space plans, four river corridor plans cover multiple jurisdictions, and all twelve of the municipalities in Wake County—the most populous in the region—have created a consolidated open space plan (Wake County 2003). Land conservation activity has increased, with more than 2,800 hectares (7,000 acres) protected in the Triangle during the 2.5 years ending in December, 2004 (TJCOG and others 2005).

Research Methods and Data Analysis

To evaluate how planning, implementation and open space protection are related, we used a two-phase research design in spring, 2006. The design included a plan evaluation to determine the quality of each open space plan and a web-based survey of open space planners to gauge perceived success in implementation and open space protection, and

whether factors expected to correlate with implementation were valid.

Plan Quality Evaluation

We evaluated all 20 open space plans in the Triangle's six-county region. These included 5 regional or county plans, 11 municipal plans, and 4 river corridor plans. We evaluated only plans that included a natural resources protection element; we excluded plans with a purely parks and recreation management focus. We modified a standard plan evaluation matrix (Berke and others 2006) to focus on open space plans. To build our scores for plan quality, we organized criteria into seven categories, each with a number of yes/no questions: (1) overview and organizing principles, (2) breadth and strength of implementation recommendations, (3) measurable objectives and monitoring, (4) coordination with other plans and jurisdictions, (5) report organization; (6) degree of citizen and stakeholder participation, and (7) identification of priority areas (Fig. 1).

Using these seven categories we created an evaluation rubric and applied it to each open space plan (Appendix A). A team of five people evaluated the plans after agreeing on a common interpretation of the evaluation questions and possible responses. Two people evaluated each of the 20 plans and met to reconcile any differences. All differences between evaluators were brought to the larger group of five evaluators for final reconciliation and coding. We did not use an inter-rater or inter-coder reliability score due to the diverse nature of the plans. Instead, we engaged in a dialog about why different people found different outcomes and sought to resolve those differences among the larger group of five participants. This allowed us to maintain internal consistency among all plans that were categorized. We did not proceed until we agreed unanimously on the categorization.

Scoring was performed as follows: (1) within each category, the number of "yes" responses was divided by the number of questions, resulting in a score from 0 to 1 for each category and (2) the scores for the categories were summed, resulting in a total score from 0 to 7.

Survey of Open Space Planners

We developed an online survey and administered it to open space planners charged with implementing each of the 20 open space plans. The survey elicited each planner's perspective on aspects of open space protection in his or her department or organization. The survey consisted of 27 open and closed-ended questions that characterized open-space protection. To enhance face validity and construct validity, a team of nine people outside our sample

evaluated the survey before it was administered. This team included planning and design specialists, ecologists, non-profit land protection specialists, open space advocates, local government open space planning assistants, and planning consultants. Because human subjects were involved, the research was approved by North Carolina State University's Institutional Review Board. The questions reported on in this article are replicated in Table 1. An electronic invitation to complete the survey, including an informed consent agreement, was sent to 24 planners (some plans span multiple jurisdictions, in which case each jurisdiction's planner was polled); 23 planners returned the completed survey for a response rate of 96%. The planners responding to our survey had been in their positions from 2 to 25 years (mean 8.5 years, median 6 years).

Analysis

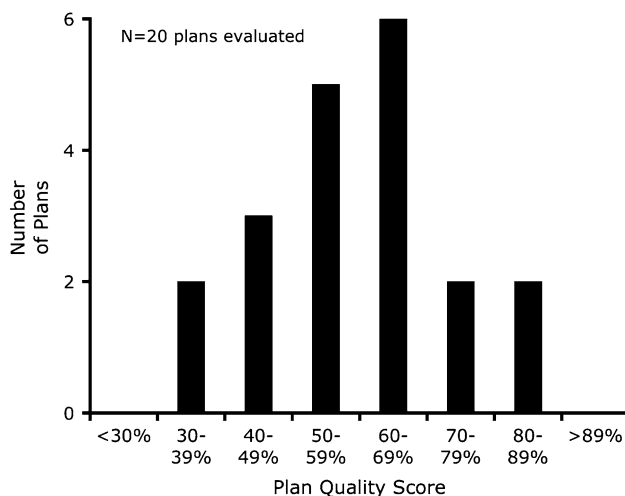
The distribution of plan quality scores was mixed. The minimum possible score was 0% and the maximum was 100%; scores ranged from 31% to 85% with half the plans scoring 61% or better (Fig. 3).

We combined the plan quality and survey data and examined correlations (Table 2) to test relationships between our dependent and independent variables (Fig. 1). When more than one jurisdiction participated in implementing a plan, we combined each jurisdiction's survey response with the corresponding plan quality data (this occurred three times, so that $n = 23$ even though there were only 20 plans). We used the Kendall's Tau correlation, a nonparametric measure of concordance, because our data were ordinal (Agresti 2002). If the response for one of the pair of variables being correlated was "Don't know," we removed that record from the analysis; thus, sample size varied among correlations.

Our dependent variables were subjective measures of plan implementation and open space protection; based on self-reported responses of open space planners to questions we developed (Table 1). We originally expected to obtain objective measures of open space protection but were unable to do so for several reasons. First, half of the open space plans we evaluated did not identify measurable, quantitative land protection objectives. Thus, we did not have a clear metric against which to evaluate progress systematically across all plans. This is a shortcoming in open space planning that makes evaluating implementation and goal achievement challenging (Bengston and others 2004). Second, we found that open space data collection and mapping efforts were sound in some planning departments but incomplete in others. Third, we discovered that protecting open space at the local level is a moving target. The goals change from year-to-year depending on the opportunities available to open space planning staff, money

Table 1 Variables used in our analysis and the questions used to quantify the value of each. The plan quality score was derived from our evaluation of each plan (Appendix A). All other variables were derived from the perception survey of open space planners

Variable	Question(s) used to quantify
Plan quality	A score from 0 (lowest quality) to 7 (highest quality) based on seven sets of criteria for plan quality (described in text)
Plan implementation	Scores summed from two questions and used as a single score How effective do you think your department or organization has been in implementing your open space plan? (not effective = 0, somewhat effective = 1, effective = 2, very effective = 3, don't know)
Open space protection	How closely have you followed your open space plan when protecting open space in your jurisdiction or area of operation? (rigidly = 3, closely = 2, somewhat = 1, not at all = 0, don't know)
Stakeholder participation in planning	How effective do you think your department or organization has been in protecting open space? (not effective = 0, somewhat effective = 1, effective = 2, very effective = 3, don't know)
Stakeholder participation in implementation	Two questions tested separately How would you characterize stakeholder participation in the creation of your open space plan? Number of people participating (low = 0, medium = 1, high = 2, don't know) Breadth of stakeholder representation (e.g., landowners, community, interest groups) (low = 0, medium = 1, high = 2, don't know)
Public support for open space protection	Two questions tested separately How would you characterize continued involvement by these stakeholders in the implementation of your open space plan? Number of people participating (low = 0, medium = 1, high = 2, don't know) Breadth of stakeholder representation (e.g., landowners, community, interest groups) (low = 0, medium = 1, high = 2, don't know)
Support of elected officials	Please evaluate public support for open space protection within your jurisdiction or area of operation: (low = 0, medium = 1, high = 2, don't know)
Collaboration with other conservation organizations	Please evaluate support elected officials for open space protection within your jurisdiction or area of operation: (low = 0, medium = 1, high = 2, don't know)
Commitment to evaluating the implementation process	Please evaluate the level of collaboration with other conservation organizations in open space protection within your jurisdiction or area of operation: (low = 0, medium = 1, high = 2, don't know)
	Please evaluate the commitment to evaluating implementation progress open space protection within your jurisdiction or area of operation: (low = 0, medium = 1, high = 2, don't know)

**Fig. 3** Distribution of the quality scores for the open space plans we evaluated**Table 2** Kendall's Tau correlation between plan quality categories and (1) plan implementation and (2) open space protection

Plan quality categories	Subjective measures			
	Plan implementation		Open space protection	
	Kendall's Tau (<i>n</i>)	<i>P</i>	Kendall's Tau (<i>n</i>)	<i>P</i>
Overview	0.16 (21)	0.37	0.07 (23)	0.69
Implementation	0.15 (21)	0.43	0.23 (23)	0.22
Monitoring	0.14 (21)	0.45	0.14 (23)	0.44
Coordination	−0.26 (21)	0.18	0.05 (23)	0.80
Report organization	−0.32 (21)	0.09*	−0.17 (23)	0.35
Citizen participation	0.31 (21)	0.07*	0.08 (23)	0.63
Priority areas	0.91 (21)	0.62	0.21 (23)	0.25

Plan quality criteria scores were derived from a content analysis of plans. Plan implementation and open space protection were derived from a survey of the perceptions of open space planners (Table 2). Significance values are rated as * $P < 0.1$, marginally significant; ** $P < 0.05$, significant; and *** $P < 0.01$, highly significant

available, and the willingness of land owners to sell their property. For all these reasons, we decided that the best way to assess open space protection systematically across all jurisdictions was to ask those most closely associated with the process of open space protection. Consequently, we relied on the perspectives of the experts most familiar with implementation and open space protection—the planners charged with overseeing open space programs in their municipality or organization.

Studies that use objective measures are arguably more precise than those using subjective measures. For instance, Brody and Highfield (2005) compare the original land use design of comprehensive plans with subsequent development activity through an analysis of the spatial pattern of wetland development permits in Florida. Burby (2003) measured implementation using the ratio of proposed mitigation actions to those actually executed. Nonetheless, several studies in the natural resources field rely on perceptual data (Butler and Koontz 2005; Koontz and Bodine 2008). Self-reported perceptions, such as those we collected, can suffer from a bias on behalf of respondents to give socially desirable answers. Consequently, we might expect open space planners to overstate the achievement of their objectives. To see if there was uniform bias in our responses, we looked at the distribution of responses for our dependent variables (Fig. 4). The responses for implementation approximate a normal distribution and do not indicate clustering at one of the scale or the other. The responses for open space protection cluster in the middle of the response categories. This means that in response to the question, “How effective do you think your department or organization has been in protecting open space,” respondents were more likely to mark “somewhat effective” and “effective” rather than “not effective” and “very effective.”

While the survey data have weaknesses, the perceptual measures of the planners were the best available data for this project. Given the paucity of empirical work on open space planning, we provide these data as a reasonable starting point for inquiry and further investigation.

Results and Discussion

We failed to support Hypotheses 1 and 2 (Fig. 1). Plan quality was not significantly, positively correlated with perceptions of plan implementation or open space protection (Table 3). Plan implementation, however, was highly, positively correlated with planners’ perception of open space protection, suggesting that open space is protected when a plan is implemented, regardless of the quality of the plan.

These findings raise questions about the relative importance of plan quality in achieving overall objectives in open space protection. There are at least five possible

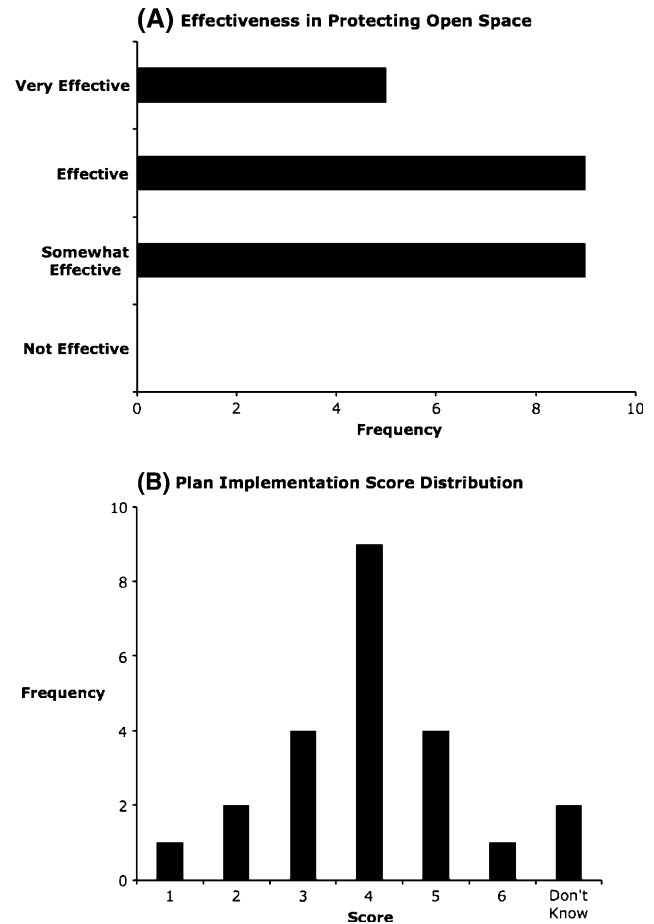


Fig. 4 Response distribution for **a** open space protection and **b** plan implementation score ($n = 23$). The exact questions asked and the scoring mechanism for plan implementation are described in Table 1 under “open space protection” and “plan implementation.”

explanations for the lack of statistically significant relationships between plan quality and implementation, and plan quality and open space protection. First, plan quality may not be important to implementation or open space protection. Second, the criteria we used to evaluate plan quality may not be relevant to plan implementation and open space protection. Third, not enough time has elapsed since plan completion to implement a plan or protect open space. Fourth, planners’ perceptions of implementation and open space protection are incorrect or biased. Fifth, the small sample size may have led to statistically insignificant relationships.

Only two categories of plan quality were statistically significant (at the .07 and .09 levels, respectively) in our correlation analysis with respondents’ impression of implementation of open space plans and open space protection (Table 2). These findings indicate that citizen participation as part of a quality planning process is associated with planners’ perception of better implementation of open space plans. Conversely, better report organization

Table 3 Kendall's Tau correlation between factors and (1) plan implementation and (2) open space protection

Factors	Subjective measures			
	Plan implementation		Open space protection	
	Kendall's Tau (n)	P	Kendall's Tau (n)	P
Plan quality	0.08 (21)	0.66	0.20 (23)	0.23
Plan implementation	–	–	0.73 (21)	0.0001***
Open space protection	0.73 (21)	0.0001***	–	–
Stakeholder participation in planning (total #)	0.33 (21)	0.08*	0.48 (21)	0.01**
Stakeholder participation in planning (breadth)	0.33 (21)	0.06*	0.31 (21)	0.12
Stakeholder participation in implementation (total #)	0.45 (21)	0.03**	0.40 (21)	0.05*
Stakeholder participation in implementation (breadth)	0.28 (21)	0.16	0.12 (21)	0.59
Public support for open space protection	0.01 (21)	0.97	0.21 (23)	0.29
Support of elected officials	0.42 (21)	0.03**	0.18 (23)	0.34
Collaboration with other conservation organizations	–0.11 (21)	0.58	0.08 (23)	0.69
Commitment to evaluating implementation progress	0.38 (20)	0.06*	0.22 (21)	0.27

Plan quality was measured using an evaluation rubric (Appendix A). All other factors, as well as plan implementation and open space protection, were derived from a survey of the perceptions of open space planners (questions I Table 2). Significance values are rated as * $P < 0.1$, marginally significant; ** $P < 0.05$, significant; and *** $P < 0.01$, highly significant

in a high quality plan was associated with a perception of less effective implementation (Table 2).

The number of stakeholders involved during planning and implementation was consistently, positively correlated with planner impressions of plan implementation and open space protection (Table 3). Although none of the correlations were very strong, their consistency supports other empirical research demonstrating the importance of stakeholder involvement during the planning process (Burby 2003). Interestingly, our findings suggest that keeping stakeholders involved during the implementation stage of the open space protection process might also be important. We found only one statistically significant correlation involving breadth of stakeholder involvement, which was positively correlated with perceived plan implementation.

Support of elected officials was positively correlated with planners' impression of plan implementation, but not with open space protection (Table 3). Other studies do not separate the practice of implementation from the desired outcome. Thus, on one level our findings corroborate the importance of elected official support to program effectiveness that has been identified by others (Webler and others 2003; Burby and May 1998). On the other hand, our findings muddy the waters because it is not clear why elected official support should be important to implementation but not the achievement of the desired outcome—open space protection.

Our preliminary findings provide an empirical basis for and enrich those of Burby and May (1998) who suggested

complex relationships among plan quality and the support of local elected officials and stakeholders. The relationships among stakeholder support, elected official support, and plan quality are not clear from our statistical results, but combined with Burby and May's (1998) work, we believe our findings indicate that implementation might be more important than plan quality to successful open space protection. This supposition is supported by the lack of a high, positive correlation between planners impressions of plan quality and implementation and open space protection; and the existence of positive correlations between plan implementation and stakeholder involvement, elected official support, and perceived effectiveness in open space protection (Table 3). Additionally, we believe our results support Koontz's (2005) findings about the importance of contextual factors, such as political feasibility.

Commitment to evaluating implementation progress was also positively correlated with planners perceptions of plan implementation (Table 3). Although the correlation was not very strong, this finding provides empirical support to those who have speculated or provided anecdotal evidence about the importance of evaluation to achieving policy or planning goals (Seasons 2003; Bengston and others 2004; Brody and Highfield 2005).

Equally interesting are the positive correlations that we did not see. Perceived collaboration with other organizations was not significantly and positively correlated with reported outcomes, contrary to the findings and conclusions from Bengston and others' (2004) meta-analysis. We also saw no significant, positive correlation between public

support and respondents' perceptions of outcomes. This suggests that perhaps success depends more on a segment of the public—those interested enough to join stakeholder groups—than on the public at large. These findings may provide additional evidence in support of Koontz's (2005) work that concluded citizen input and collaboration were important, but need to be practiced in a context that is amenable to policy change.

Implications

In many urbanizing and suburbanizing environments growth and the consequent loss of open space threaten the provision of ecosystem services and amenities, including maintenance of high quality air and water, wildlife habitat, scenery, and recreational areas. Open space protection is one alternative for sustaining some of these values. This prompted us to ask, "How does planning relate to the achievement of open space protection objectives?"

Because we conducted our study in one region of the United States—the Research Triangle, NC—our ability to generalize is limited. The limitations of the research include our small sample size and lack of controls on our statistical procedures. Nonetheless, we believe our study suggests direction to those investigating relationships between open space plan quality, implementation, and open space protection on a larger scale. Future studies might be enhanced by larger sample sizes, the use of regression analysis, comparisons across multiple states, and the use of actual outcome measures. We identify three themes to build upon.

First, the entire open space protection process is important, not just planning. Our data indicate that a strong focus on implementation—actually protecting open space—may be more critical than creating a high quality plan. Commitment to evaluating implementation progress also appears to be important. The absence of precise, quantifiable goals with established target dates in many open space plans makes measuring progress challenging, and this is one area ripe for improvement in open space planning. Together these findings suggest the need to examine closely the entire open space protection process, from implementation through evaluation.

Second, some relationships may be more important than others. Stakeholder involvement in planning and implementation in the Research Triangle was correlated positively with open space protection, as was elected official support. Likewise citizen participation, including stakeholder involvement and the identification of specific interest groups, as a component of high quality plans, was correlated positively with open space implementation. Public support, which was not significantly, positively

correlated, might be too general to translate into concrete action. Additionally, collaboration with other conservation organizations, also not correlated with open space protection, may be appropriate in some instances but too idiosyncratic for statistical generalizations. Relationships developed among stakeholders during the planning process and throughout implementation, along with elected official support, might be more important than the collaboration among organizations and general public support, at least in the Research Triangle region.

Third, less emphasis on plan quality and more emphasis on implementation and building relationships might result in more open space protection. The data from our region indicate that plan quality might be less important than involving stakeholders and implementing the plan. Likewise, as a component of plan quality, "report organization" was negatively correlated with open space plan implementation. It is important, however, not to misinterpret these findings. Lack of statistical significance of the correlations between plan quality and implementation and open space protection does not mean that planning is not important. The findings do suggest, however, that focusing on a technically perfect plan might divert time, money, and labor resources that could be more effectively expended on implementation or building relationships. Investigating whether these relationships hold in a broader study could be helpful to planners and other open space actors alike.

Conclusion

We conclude that planning is necessary but not sufficient for protecting open space. Planning is important because a plan can provide credibility, establish priorities for potential courses of action, foster stakeholder involvement, and provide a basis for leveraging funding from political allies. Unfortunately, the theory of comprehensive planning runs head on into the political and economic practicalities that make up the day-to-day constraints faced by local planners. Under these circumstances, planners may need to be more adaptable, working to protect lands that are both ecologically significant and available at a given time. A technically excellent plan does not guarantee the long-term relationships among local landowners, political and appointed officials, and other organizations that are crucial to meeting land protection goals. Building these relationships should become an explicit—and perhaps paramount—focus of the open space planning process. Planning is a means, not an end. A greater balance of attention to the entire process and the relationships essential to protecting land might lead to more success in protecting open space. We encourage further work measuring outcomes from open space plans, using larger

sample sizes and comparisons across multiple states to confirm or refute the preliminary findings reported here.

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Appendix A: Plan Evaluation Criteria

Plan Evaluation Form

Plan title:

Jurisdiction (town, city, or county):
 County (if town or city):
 Prepared by (e.g., consultant, town):
 Date of adoption:
 Date of last revision:
 Reviewed by:
 Coding categories: 0 = no; 1 = yes

1. Overview and Organizing Principles

1.1 Are key issues identified? _____

<input type="checkbox"/>	Population growth
<input type="checkbox"/>	Land use change
<input type="checkbox"/>	Sprawl
<input type="checkbox"/>	Water quality
<input type="checkbox"/>	Air quality
<input type="checkbox"/>	Quality of life
<input type="checkbox"/>	Other _____

1.2. Which aspects of open space are address in the plan (check below)?

<input type="checkbox"/>	Water quality
<input type="checkbox"/>	Riparian corridors / buffers
<input type="checkbox"/>	Habitat protection
<input type="checkbox"/>	Greenways
<input type="checkbox"/>	Parks and recreation
<input type="checkbox"/>	Viewsheds
<input type="checkbox"/>	Working lands
<input type="checkbox"/>	Forest
<input type="checkbox"/>	Historic / cultural values
<input type="checkbox"/>	Wildlife connectors / corridors
<input type="checkbox"/>	Other _____

1.3. Are key issues identified (ref 1.1.) substantiated by evidence (e.g., citations, tables, charts, and numbers supporting blanket statements)?

1.4. Are sources of information and data referenced?

1.5. Is there a vision statement?

1.6. Is there an explanation of how the plan can affect outcomes?

1.7. Is it clear that the plan was formally adopted?

1.8. Is there evidence of commitment from elected officials?

Specify: _____

2. Implementation

2.1 Are there any recommendations to implement the plan?

2.2. Are recommendations mandatory/strongly worded (shall/require) as opposed to suggestive/weakly worded (should/may)?

2.3. Are the actions/recommendations comprehensive enough to accommodate issues raised in the plan?

2.4. Does the plan recommend SPECIFIC actions?

2.5. Are timelines for implementation identified?

2.6. Are organizations with responsibility to implement policies clearly identified?

2.7. Are SPECIFIC sources of funding identified to implement the plan?

3. Montioring

3.1. Are goals quantified based on measurable objectives?

3.2. Is there a plan for evaluating progress in open space protection?

3.3. Are agencies or departments identified that are responsible for monitoring PROGRESS in open space protection?

3.4. Is a method for updating the plan indicated?

3.5. Is there a timetable for updating the plan?

4. Coordination with other plans

4.1. Are connections with other local (from the same jurisdiction) plans and programs explained?

4.2. Does the plan reference/address the Triangle GreenPrint?

4.3. Does the plan reference/address plans of overlapping or adjacent jurisdictions?

5. Organization and presentation

5.1. Is there a glossary?

5.2. Are key terms defined?

5.3. Is there an executive summary?

5.4. Is the plan in plain English (avoids poor grammar, jargon-free)?

5.5. Are clear illustrations used (e.g., photos, diagrams, graphs)?

5.6. Are there maps of open space?

5.7. Is spatial information clearly illustrated on maps?

5.8. Are supporting documents included with the plan (e.g., appendixes, videos, CD, and websites)?

6. Citizen participation

6.1. Was there stakeholder involvement in the creation of the plan?

6.2. Are organizations and individuals that were involved in plan preparation identified?

- ☐ Public officials
- ☐ Conservation organizations
- ☐ Land owners
- ☐ Public health
- ☐ Economic development
- ☐ Agriculture
- ☐ Affordable housing
- ☐ Other _____

6.3. Is there an explanation of why the organizations and individuals identified in the plan were involved?

6.4. Is there an explanation of the participation techniques that were used?

- ☐ Charette
- ☐ Community meetings (two-way communication)
- ☐ Information forums (one-way communication)
- ☐ Committee / advisory board of stakeholders
- ☐ Survey instrument
- ☐ Cannot be determined
- ☐ Other _____

6.5. Does the plan describe the history of stakeholder involvement that occurred PRIOR to the planning process?

7. Identification of priority areas

7.1. Are there priority areas?

7.2. If yes, are the criteria for selecting priority areas clear?

7.3. If included, are habitat areas selected based on conservation science (e.g., endangered species, patch size, and critical habitat)?

7.4. Does the plan recognize stewardship and management as a need?

7.5. Are there specific recommendations for stewardship and management?

7.6. Does the plan call for monitoring the natural resources in question to determine effects of plan implementation?

References

- Agresti A (2002) Categorical data analysis. Wiley–Interscience, New York, 710 p
- Ahern J (1991) Planning for an extensive open space system: linking landscape structure and function. *Landscape and Urban Planning* 21:131–145
- Alexander ER, Faludi A (1989) Planning and plan implementation: notes on evaluation criteria. *Environment and Planning B: Planning and Design* 16:127–140
- Alig RJ, Kline JD, Lichtenstein M (2004) Urbanization in the U.S. landscape: looking ahead in the 21st century. *Landscape and Urban Planning* 69:219–234
- Baer WC (1997) General plan evaluation criteria. *Journal of the American Planning Association* 63:329
- Bengston DN, Fletcher JO, Nelson KC (2004) Public policies for managing urban growth and protecting open space: policy instruments and lessons learned in the United States. *Landscape and Urban Planning* 69:271–286
- Berke PR, French (1994) The influence of state planning mandates on local plan quality. *Journal Planning Education and Research* 13:237–250
- Berke PR, Godschalk DR, Kaiser EJ, Rodriguez D (2006) Urban land use planning. University of Illinois Press, Urbana, 490 p
- Brody SD (2003) Measuring the effects of stakeholder participation on the quality of local plans based on the principles of collaborative ecosystem management. *Journal of Planning Education and Research* 22:407–419
- Brody SD, Highfield WE (2005) Does planning work: testing the implementation of local environmental planning in Florida. *Journal of the American Planning Association* 71:159–175
- Bryson JM (1991) There is no substitute for an empirical defense of planning and planners. *Journal of Planning Education and Research* 10:164–165
- Burby RJ (2003) Making plans that matter: citizen involvement and government action. *Journal of the American Planning Association* 69:33–39
- Burby RJ, Dalton LC (1994) Plans can matter! The role of land use plans and state planning mandates in limiting the development of hazardous areas. *Public Administration Review*. 54:229–238
- Burby RJ, May PJ (1998) Intergovernmental environmental planning: addressing the commitment conundrum. *Journal of Environmental Planning and Management* 41:95–110
- Butler KF, Koontz TM (2005) Theory into practice: implementing ecosystem management objectives in the USDA Forest Service. *Environmental Management* 35:138–150
- Hess GR, Dixon K, Woltz M (2001) State of open space 2000. Triangle Land Conservancy, Raleigh, NC, 24 p
- Hollis LE, Fulton W (2002) Open space protection: conservation meets growth management. Washington. <http://www.brookings.edu/es/urban/publications/hollisfultonopenspace.pdf>. Accessed 17 Dec 2008
- Koontz TM (2005) We finished the plan, so now what? Impacts of collaborative stakeholder participation on land use policy. *Policy Studies Journal* 33:459–480
- Koontz TM, Bodine J (2008) Implementing ecosystem management in public agencies: lessons from the U.S. Bureau of Land Management and the Forest Service. *Conservation Biology* 22:60–69
- Land for Tomorrow (2007) The price of conserving land in North Carolina. <http://www.landfortomorrow.org/page401.html>. Accessed 17 Dec 2008
- Liu J, Daily GC, Ehrlich PR, Luck GW (2003) Effects of household dynamics on resource consumption and biodiversity. *Nature* 421:530–533

- Mastop H, Faludi A (1997) Evaluation of strategic plans: the performance principle. *Environment and Planning B: Planning and Design* 24:815–832
- McDonald L, Allen W, Benedict M, O'Connor K (2006) Green infrastructure plan evaluation frameworks. *Journal of Conservation Planning* 1:12–43
- Meir E, Andelman S, Possingham HP (2004) Does conservation planning matter in a dynamic and uncertain world? *Ecological Letters* 7:615–622
- Miller JR, Hobbs RJ (2002) Conservation where people live and work. *Conservation Biology* 16:330–337
- North Carolina Department of Environment, Natural Resources Division of Parks, Recreation, Triangle J Council of Governments, Triangle Land Conservancy (2002) Triangle GreenPrint regional open space assessment. Triangle J Council of Governments, Research Triangle Park, NC, 56 p
- Noss RF, Dinerstein E, Gilbert B, Gilpin M, Miller BJ, Terborgh J, Trombulak S (1999) Core areas: where nature reigns. In: Soule ME, Terborgh J (eds) *Continental conservation: scientific foundations of regional reserve networks*. Island Press, Washington, pp 99–128
- Porter DR (1997) *Managing growth in America's communities*. Island Press, Washington, 311 p
- Seasons M (2003) Monitoring and evaluation in municipal planning: considering the realities. *Journal of the American Planning Association* 69:430–440
- Talen E (1997) Success, failure, and conformance: an alternative approach to planning evaluation. *Environment and Planning B: Planning and Design* 24:573–587
- Triangle J Council of Governments, Triangle Land Conservancy, NC Department of Environment, Natural Resources (2005) Triangle GreenPrint progress: tracking progress toward creating a Regional Green Space Network in the Triangle. Triangle J Council of Governments, Research Triangle Park, NC, 17 p
- Turner WR, Wilcove DS (2006) Adaptive decision rules for the acquisition of nature reserves. *Conservation Biology* 20:527–537
- Wake County (2003) Wake County consolidated open space plan (full report). Wake County Department of Parks, Recreation and Open Space, Raleigh, NC, 216 p
- Webler T, Tuler S, Shockey I, Stern P, Beattie R (2003) Participation by local government officials in watershed management planning. *Society and Natural Resources* 16:105–121
- Wilson RH, Paterson R (2002) State growth management and open space preservation policies, policy research project report number 143. The University of Texas at Austin Lyndon B. Johnson School of Public Affairs, Austin, TX, 143 p