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Evaluating natural resource planning for longleaf pine ecosystems in the Southeast United States

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ABSTRACT

Natural resource plans play a critical role in guiding the sustainable management of forest ecosystems. However, little is known about the quality of management plans. In this study, we evaluated and compared the quality of 35 management plans from federal, state, and nongovernment groups managing longleaf pine ecosystems in the Southeast United States. We developed a plan evaluation tool consisted of five components: (1) Problem and Objective Statement, (2) Fact Base, (3) Actions and Implementation, (4) Integration with Other Plans, and (5) Stakeholder Participation, to examine to what extent plans incorporated planning best practices. We tested a hypothetical model for understanding the relationship among plan components, and our results suggested stakeholder participation predicted clear problem statements, better integration with other plans, and better actions and implementation protocols. The Fact Base component scored highest across most plans while the Actions and Implementation component scored lowest. Newer plans scored modestly higher than older plans, suggesting agencies may be learning to develop better plans over time and indicating older plans should be prioritized for revision. Plans from federal and state agencies scored higher than plans from nongovernmental organizations. Our findings suggest planners should consider incorporating more stakeholder participation, which was positively related to better actions and implementation and improved problem and objective statements.

1. Introduction

The management of forests, as well as natural resources in general, is inherently complex and unique in time and space, and high-quality management and planning is needed to support the sustainable stewardship of forests (Salwasser, 2004). Forest management is characterized by dynamic conditions, scientific complexity, and multiple stakeholders with diverse and at times conflicting values and goals. Forest managers must operate with limited resources, time, and information, leading forest management to fall within the policy domain termed "wicked problems" (Lachapelle et al., 2003). They must take in to account long planning horizons, various existing conditions and management problems, and multiple and competing uses for forest resources (Korjus, 2014). Management challenges are further complicated by a mix of legal mandates and regulations, pressure from interest groups, and decreasing budgets, which interact to constrain governmental and nongovernmental efforts.

The complex context of forest management makes planning especially important (Allen and Gould, 1986; Lachapelle et al., 2003). High-quality forest planning is important to ensure that management activities lead to desired future conditions and to prevent undesirable or unintended outcomes. Within the planning process, the management problem is defined and objectives are identified. A set of management actions and implementation protocols are developed based on the problem an agency aims to address and the objectives the agency hopes to achieve. Forest planning processes often include public and stakeholder involvement. Forest management problems affect many stakeholders, and engaging with them can provide agencies with a better understanding of the scope of the management problem, what values and objectives are important to stakeholder groups, and which opportunities are available to collaborate and coordinate with other groups (Blahna and Yonts-Shepard, 1989; Lachapelle et al., 2003; Roberts, 2000).

Natural resource agencies develop plans to guide management, to help identify and work towards desired future outcomes, and to optimize goal achievement based on limited resources (Davis et al., 2001).

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Management plans are policy-oriented documents that provide a vision for what agencies hope the future landscape will be, serve as guides for identifying and implementing management actions, and are valuable tools in shaping how natural resources are used under institutional, economic, and informational constraints (Baer, 1997; Berke et al., 2006; Davis et al., 2001; Lachapelle et al., 2003). They provide scientific information about the ecosystem, such as a description of the landscape or a resource inventory. They outline the management context and may include a list of relevant stakeholders and resources available for management.

Despite the importance of plans for guiding forest stewardship efforts, few studies have investigated the quality of management plans. Clark et al. (2018) evaluated the quality of natural resource management plans for longleaf pine ecosystems in the Southeast United States. In contrast to our study which examines the quality of plans based on planning best practices, Clark et al. (2018) evaluated plans based on how well they addressed climate change threats on longleaf pine ecosystems. They found that newer plans and plans from state agencies included greater consideration of climate change than those from federal agencies or NGOs or regional partnerships. In a meta-analysis of natural resource plan evaluation studies, Foster et al. (2016) found that many studies assessed quality based on established core planning components including goals, policies and implementation, and coordination, and most incorporated best practices for plan evaluation methodology. Stakeholder engagement was assessed in only one natural resource plan evaluation study we are aware of (Steelman and Hess, 2009), and this finding highlights a gap that should be addressed given the importance of stakeholder participation in natural resource planning and management. High-quality plans are important because, as research in the planning literature suggests, they are more likely to be used and may result in successfully achieving objectives (Berke and Godschalk, 2009). Therefore, producing high quality plans should be a priority for natural resource management agencies. However, plans have not been routinely evaluated against planning standards, thus little is known about which plans are best adapted to address forest management problems, which planning components are addressed best, and where improvement is needed.

In this paper, we address this research need with a case study evaluating the quality of management plans for longleaf pine (*Pinus palustris*) ecosystems. We identify plan components established as constituting high quality natural resource management plans and create a protocol for examining how well management plans incorporated those components. The evaluation tool measures five planning components: Problem and Objective Statement, Fact Base, Actions and Implementation, Integration with Other Plans, and Stakeholder Participation. We evaluate the quality of plan components from 35 management plans from federal, state, and nongovernment groups. We test a theoretical model for understanding the relationships among plan components, and we test whether various factors affect plan quality, including type of agency (federal, state, nongovernmental, or partnership) and age of the plan. We hypothesize government (federal and state) agencies would have higher scoring plans for longleaf pine ecosystem management than nongovernmental and partnership organizations since government agencies must comply with planning mandates, have longer planning histories, and have more staff to develop high quality plans (Meretsky et al., 2006; Cubbage et al., 2017). We also hypothesize that older plans will score lower than newer plans, reflecting learning over time and the incorporation of planning best practices (Berke et al., 2006; Baer, 1997; Brody, 2003a). In the next section of this paper, we provide a conceptual framework for understanding plan quality based on the components identified in the scholarly literature as key for successful planning. Section 3 discusses the planning context for longleaf pine ecosystems in the Southeast United States. The fourth section describes the sample selection, the plan evaluation tool, and data analysis methods. We then present and discuss results and implications of the findings for future planning efforts.

2. Conceptualizing plan quality

Plan evaluation studies use content analysis to assess whether and to what extent plans have incorporated established standards, such as involving stakeholders or including well-defined goals and objectives, for high quality planning (Berke and Godschalk, 2009; Lyles and Stevens, 2014). Indicators are developed that correspond to plan quality characteristics. Then, evaluators assess whether the indicators are present within plans. Using this method, qualitative information on plan quality is transferred into quantitative data. This facilitates comparisons among plans and the exploration of relationships between plan quality and other variables (e.g. planning resources (Brody et al., 2004; Conroy and Berke, 2004), mandates (Berke et al., 1999), or stakeholder participation (Brody, 2003b)). Plan evaluation studies have been completed on plans in a range of domains from hazard mitigation (Berke, 1994; Burby and Dalton, 1994; Tang, 2008), ecosystem management (Brody, 2003a,b; Brody et al., 2004; Norton, 2008), climate adaptation (Clark et al., 2018; Wheeler, 2008), and sustainability (Berke, 1994; Berke and Conroy, 2000). Plan evaluations can be used to identify the strengths and areas for improvement within the plan (Berke and Godschalk, 2009). Plan quality evaluations contribute to learning about the planning practice and can provide a baseline of data for future research to assess changes to the planning practice (Lyles and Stevens, 2014).

Plan quality is defined by the presence and form of key planning components within a plan. Early plan evaluation protocols conceptualize plan quality with three components: factual basis, goals, and policies (Baer, 1997; Berke, 1994; Berke and French, 1994; Lyles and Stevens, 2014). The factual basis describes the relevant context that the plan is addressing and includes an assessment of existing conditions and needs. The goals component describes the desired future conditions, while the policies component describes actions to be taken to achieve goals (Berke, 1994; Berke et al., 1999; Berke and French, 1994; Burby and Dalton, 1994; Kaiser et al., 1995). Subsequent works expand upon this and add implementation, interorganizational coordination, and participation as important components of plan quality (Berke et al., 2006; Berke and Godschalk, 2009; Brody, 2003a,b; Stevens, 2013). Implementation focuses on describing how actions should be managed and assesses whether agencies have adequate provisions for management actions. Monitoring involves assessing the implementation and outcomes of actions. Interorganizational coordination focuses on how management actions interact with other plans and agency efforts. The participation component assesses the process for public participation during the planning effort. Plan quality frameworks were further expanded to include components that assess the presentation and organization of the plan, given that plans that are comprehensible and useful to stakeholders are more likely to be used, monitoring and evaluation of planning efforts, and other elements deemed relevant to specific planning contexts (Berke et al., 1999; Berke et al., 2006; Stevens, 2013; Lyles and Stevens, 2014).

The plan evaluation protocol used in this study is informed by previous studies. Our protocol includes five components: Problem and Objective Statement, Fact Base, Actions and Implementation, Integration with Other Plans, and Stakeholder Participation. These core components of plan quality are established in seminal works on conservation and land use planning (Berke and Godschalk, 2009; Gregory et al., 2012) but modified to specifically address forest management planning. In the next sub-sections, we discuss each of the five planning components that compose our plan evaluation tool.

2.1. Problem and objective statement

The Problem and Objectives Statement component of a plan includes a discussion of existing issues or problems that management actions are aimed to address. This statement creates a specific vision for the management of the ecosystem. The list of objectives reflects the

values and priorities of the planning agency and the desired future conditions for the landscape. The objectives should address the issues outlined in the problem statement, be clearly defined and measurable, and reflect the mission of the management agency (Berke and Godschalk, 2009). The effectiveness of the plan will be measured against the objectives outlined in the plan.

2.2. Fact base

The Fact Base component provides an assessment of current conditions. It may include a description of the existing conditions within the ecosystem, species and resource assessments, projections of future conditions and needs, and other relevant information about the landscape (Berke, 1994; Berke and Godschalk, 2009). It provides a foundation on which objectives and policies are selected. Limited or incorrect information could result in ineffective actions and the failure to achieve goals.

2.3. Actions and implementation

The Actions and Implementation component guides what management actions should be taken to ensure that objectives are met. Management actions should be specific and tied to objectives (Berke and Godschalk, 2009). The implementation component should include aspects that support an agency's ability to translate policies into action such as providing timelines for actions, a budget, and designating responsibilities. This component should also outline a monitoring and evaluation process through which the agency can assess whether implementation is on track and occurring as intended (Berke and Godschalk, 2009; Stevens, 2013).

2.4. Integration with other plans

The Integration with Other Plans component discusses the management context of the ecosystem in relation to other jurisdictions and plans. It may specify whether and how the agency intends to coordinate with other groups (Berke and Godschalk, 2009). Agencies that are able to coordinate natural resource management with other agencies may potentially be more successful at broader goals such as restoring longleaf pine ecosystems because they are able to share and learn from each other, streamline efforts, and more efficiently use resources. This component recognizes the extent to which management efforts within their jurisdiction affect and are affected by actions carried out by other actors and identifies opportunities to coordinate or collaborate with other agencies (Berke et al., 2006).

2.5. Stakeholder participation

Stakeholder participation, defined here as the process by which individuals and groups engage in influencing decisions about issues that affect them, plays an important role in guiding the planning process (Reed, 2008). Stakeholder participation involves identifying and including relevant actors in the development of management plans. Stakeholders should be involved in establishing the goals and objectives and strategic actions for management (Brody, 2003b; Berke and Godschalk, 2009). Agencies have increasingly incorporated stakeholder participation into planning efforts with the expectation that engagement will lead to better decisions and outcomes, increased public understanding of the issue and support of the intervention, and new knowledge about the problem and potential solutions (Burby, 2003; Berke et al., 2006).

According to Berke and Godschalk (2009), plans that explain how multiple stakeholders and their interests are incorporated are more influential and more frequently used. Bernhardt (2010) found that plan quality for coastal management protected areas increased with greater levels of public participation in the planning process. Stakeholder input helps agencies define objectives and actions that meet the needs of both the agency and those who use the resource and are affected by its management. Engaging with stakeholders may also alert agencies to other plans and groups that should be considered during the planning process, which may influence what management actions are presented. Communication among agencies and the public is necessary to address challenging problems like longleaf pine restoration and may better align all agencies to meet overarching conservation goals, such as those presented in the America's Longleaf Range-wide Conservation Plan for Longleaf Pine (Armsworth et al., 2015; The Nature Conservancy, 2015).

Stakeholder participation cannot be thought of as a singular notion in which stakeholders are consulted or not, but instead varies in ways in which it is conceptualized, operationalized, and in the outcomes associated with it (Reed, 2008). Although stakeholder engagement often increases the quality of environmental decisions, scholars suggest the benefits depend on how stakeholders are engaged (Reed, 2008). Successful stakeholder participation must have sufficient depth, the extent to which stakeholders participate and influence the planning process, and breadth, the inclusion of a broad set of stakeholders (Berry et al., 1993; Conroy and Berke, 2004). If these criteria are not met, stakeholder engagement may exacerbate existing conflicts among stakeholders (Wondolleck and Yaffee, 2000). In this paper, our analysis of stakeholder participation is preliminary, assessing whether stakeholder participation was described in the plan but not the specific attributes (e.g., depth) of the stakeholder participation process, so further research is needed to assess the impacts of particular approaches to participation on plan quality and ecosystem outcomes.

2.6. Relationships among plan components

Many studies in the plan evaluation literature have focused on assessing the presence of the planning components described above as a way to understand what makes a good (Baer, 1997; Berke and Godschalk, 2009; Lyles and Stevens, 2014) plan. These studies have focused on identifying relevant components and assessing whether they have been incorporated into plans. However, these studies typically do not examine the relationships among planning components.

We propose a model for understanding how each of the five planning components we evaluated relate to each other (Fig. 1). We hypothesize that Stakeholder Participation positively influences the Problem and Objective Statement component by leading to well-defined management contexts and relevant objectives, and Stakeholder Participation positively influences how well a plan considers other planning directives. We hypothesize that the Fact Base influences the Problem and Objective Statement, and together the Fact Base, Problem and Objective Statement, and Integration with Other Plans components are related to the quality of the Actions and Implementation. In our model, we hypothesize that the plan components affect each other positively, or in other words, higher scores in one component (e.g. Problem and Objective Statement) lead to higher scores in the other (e.g. Actions and Implementation) component.

Stakeholder participation plays an important role in planning and management of natural resources, and insights gained during the engagement process may affect other areas of the planning process. We

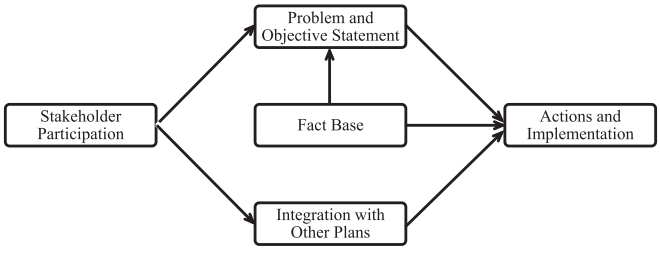

Fig. 1. Hypothesized path diagram model for plan evaluation components.

place Stakeholder Participation early in the causal chain; influencing the Problem and Objective Statement and Integration with Other Plans components. Previous research suggests stakeholder involvement helped organizations achieve goals by engaging diverse types of knowledge and values when defining problems and objectives and encouraging adaptation to changing conditions (Reed, 2008). We hypothesize that this same thoughtfulness and reflexivity may also occur in planning efforts where those developing plans do a better job articulating problems and objectives when they engage stakeholders in the planning effort.

Previous work by Lachapelle et al. (2003) found goals that were not specific and detailed enough to guide management actions were one of the main barriers to effective planning. Clear goals and objectives are necessary for planners to be able to identify the actions that need to be taken to reach goals, the resources needed to implement the actions, and to create indicators to measure the implementation of the plan (Brody, 2003a; Stevens, 2013; Tang, 2008). In our model, we suggest that there is a positive relationship between clearly defined objectives and clearly articulated actions and implementation protocols within plans.

Stakeholder participation may also increase agency capacity for coordination since public participation processes may increase awareness of management problems and parallel initiatives targeting those problems (Duram and Brown, 1999). Thus, we hypothesize that better stakeholder participation leads to better integration with other plans and management initiatives. Stakeholder participation processes provide opportunities for other agency stakeholders to consult with each other, often informally as each agency operates under different mandates, and stakeholder participation may lead to collaborative learning among stakeholders about each other's needs, priorities, and strategies (Lachapelle et al., 2003; McCool and Guthrie, 2001; Reed, 2008). We see Integration with Other Plans as a fitting intermediary component between Stakeholder Participation and Actions and Implementation because agencies may be better able to articulate relevant actions if they understand how their plan fits into the larger natural resource management context.

A strong Fact Base can play an important role in the planning processes of natural resource agencies (Davis et al., 2001). The Fact Base serves as a foundation to inform planning decisions. Natural resource management agencies use ecosystem and species assessments to set management objectives and actions (Lachapelle et al., 2003). As such, we hypothesize that the Fact Base component would be positively related to both Problem and Objective Statement and Actions and Implementation (Fig. 1).

3. Longleaf pine ecosystem planning as a case study

We conducted a case study on planning associated with the restoration of longleaf pine ecosystems in the Southeast United States. Longleaf pine historically dominated the landscape of the Southeast United States in colonial times, once covering up to 90 million acres throughout the Southeast. Agriculture conversion, overharvesting, conversion to other pines including loblolly, fire suppression, and urbanization have reduced the extent of longleaf pine forests to only 3.4 million acres across its nine state range (Frost, 1993; Oswalt et al., 2012; The Longleaf Alliance, 2015). These ecosystems typically exist in isolated fragments on public and private land throughout the Southeast, and many actors including federal and state governments, nongovernmental organizations (NGOs), and the private sector own and manage these ecosystems (Van Lear et al., 2005).

Interest in longleaf pine restoration has grown in recent decades, and federal, state, and nongovernmental organizations as well as private landowners have prioritized restoration of this rare North American ecosystem. Restoration has been motivated by several factors. Longleaf pine ecosystems protect biodiversity and provide habitat for a range of species including several threatened and endangered species such as the red-cockaded woodpecker (*Leuconotopicus borealis)* and gopher tortoise (*Gopherus polyphemus*) (Gibbons et al., 2000; Alavalapati et al., 2002). Longleaf pine ecosystems are resilient to climate change. They are naturally robust to climate extremes and are adapted to withstand severe storms and drought (Stanturf et al., 2007; Johnsen et al., 2009; Samuelson et al., 2012). Compared to other Southern pines, longleaf pine ecosystems are more tolerant of wildfire and more resistant to pests such as Southern pine beetle (*Dendroctonus frontalis*). Both forms of disturbances are expected to exacerbate under warmer, drier conditions (Costanza et al., 2015; Hodges et al., 1979; Martinson et al., 2007; Southeast Regional Partnership for Planning and Sustainability, 2009). Longleaf pine are also timber resources, and landowners may manage these ecosystems as profitable investments (Alavalapati et al., 2002; America's Longleaf, 2018).

Longleaf pine restoration is a complex natural resource challenge that provides a good context for examining forest planning and plan evaluation. Longleaf pine presents additional challenges given the long-time scales involved and management intervention needs (e.g. prescribed fire and complying with regulations regarding threatened and endangered species) that require planning and coordination among stakeholders (Kirkman and Jack, 2017). Second, longleaf pine ecosystems are managed by a range of actors and are guided by a range of management plans. Longleaf pine forests are found on federal lands such as national forests, military bases, and wildlife refuges, as well as in state forests and parks, and on privately owned land. Stakeholders working with longleaf pine systems have developed management plans for management by a single agency over an individual plot of land and cooperative plans for management of larger units of longleaf pine ecosystems by both public and private actors. Federal agencies including the United States (US) Forest Service, United States Department of the Interior (USDI) Fish and Wildlife Service, and the Department of Defense are responsible for managing forests on publicly owned land in accordance to their individual mandates. State resource agencies such as the Alabama Department of Conservation and Natural Resources and the Georgia Forestry Commission are charged with managing state lands and natural resources. Nongovernmental and partnership organizations such as The Nature Conservancy, America's Longleaf Restoration Initiative, and the Migratory Bird Joint Ventures own or manage land as well as set priorities for large units of land (e.g. The Nature Conservancy's ecoregion planning initiative). These plans incorporate the values and missions of the organization into restoration goals, which may result in a range of objectives and management actions (Conroy and Peterson, 2013). Agencies have unique institutional histories and operational contexts (e.g. number of acres, operational missions, resources available) that factor into the quality and effectiveness of their planning and management efforts.

Given this challenging management context, high-quality planning is required to guide successful restoration efforts of longleaf pine ecosystems (The Nature Conservancy, 2015; Van Lear et al., 2005). The longleaf pine management context gives us a sample of different types of plans with varying planning and resource contexts to examine the planning practice and to explore what makes a high-quality plan. An evaluation of management plans will help us to learning more about the needs of those engaged in longleaf pine restoration and will provide information about the quality of existing plans. The findings from this case study can be used by agencies supporting longleaf pine restoration to identify planning areas that need improvement and can guide future efforts to ensure that high quality plans are produced.

4. Methods

4.1. Data collection

We gathered publicly available natural resource management plans from federal and state agencies and nongovernmental and partnership organizations. We identified organizations active in longleaf pine

Table 1
Number of plans in sample and population by type.

Plan type	No. in sample	No. in population
Federal		
Department of Defense	3	3
US Forest Service	6	10
US Fish and Wildlife Service	12	28
State		
Forest Action	4	9
Wildlife Action	4	8
NGO and regional partnerships		
America's Longleaf	1	1
The Migratory Bird Joint Venture	2	3
The Nature Conservancy	3	9
Total	35	71

ecosystem management through internet searches and expert consultation. The population for this study included all plans that provided explicit direction for the management of longleaf pine ecosystems from the following organizations: US Forest Service ($n = 10$), USDI Fish and Wildlife Service ($n = 28$), Department of Defense ($n = 3$), America's Longleaf ($n = 1$), the Nature Conservancy ($n = 9$), the Migratory Bird Joint Ventures ($n = 3$), and state natural resource agencies in the nine Southeast states within the longleaf pine range (Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia) ($n = 17$).

We evaluated 35 plans from the total population of 71 plans. A stratified sample ($n = 35$) was taken to ensure proportional representation of federal, state, NGO, and partnership plans. The sample included the 1 plan from America's Longleaf, 2 plans from the Migratory Bird Joint Ventures, 3 plans from the Department of Defense, 3 plans from the Nature Conservancy, 4 state Forest Action plans, 4 state Wildlife Action plans, 6 plans from the Forest Service, and 12 plans from the Fish and Wildlife Service (Table 1, Appendix A). The small sample size is a limitation of this study. Small sample size reduces the power of statistical tests to detect effects. If statistical power is lower, the probability of making a type II error, or concluding that there is no effect when one exists, is higher. However, this does not pose problems regarding significant relationships that are detected (Moore et al., 2016).

4.2. Plan evaluation tool

We developed a plan evaluation tool (Appendix B) based on approaches developed by Berke (1994); Berke et al. (1999); Berke et al. (2006); Brody (2003a,b), and Tang (2008), which provided a blended qualitative and quantitative approach to assess the quality of management plans. The tool allowed us to assess the presence and strength of specific plan elements using a rating system and facilitated statistical analysis of the quality ratings. We developed the management plan evaluation protocol to be specific to plans guiding the management of longleaf pine ecosystems, although not specific to management plans of a certain type or from any particular agency.

Our protocol contained 38 indicators grouped into five categories of plan quality. We used the plan evaluation protocol developed by Berke and Godschalk (2009) as a starting point for our plan evaluation tool. We evaluated the Problem and Objective Statement component using five criteria: whether plans clearly define the management problems, describe major threats and trends related to the longleaf pine ecosystem, specify objectives to guide restoration actions, analyze alternatives, and list challenges and assets that managers have. We combined indicators from Berke et al.'s (2006) Issues and Vision Statement component with indicators related to goal achievement from the Goal and Policy framework component into our Problem and Objective Statements category. There were only two indicators associated with goals and objectives in the Berke et al. (2006) protocol, and given the importance of goal and objective setting for planning, we added indicators to our protocol that were derived from Conroy and Peterson's (2013) work on decision making in natural resource management. These indicators were used to assess the type of objectives (fundamental or means), whether they were measurable (an aspect of good quality objectives), and how objectives were prioritized (Appendix B).

The Fact Base component was analyzed using three criteria: whether plans assess the current state of the management area and factors influencing its current and future state, articulate information in a clear and easy to understand manner, and cite data from credible, peer-reviewed sources. Our indicators, paralleling those in Berke et al. (2006), assessed whether descriptions of the planning area and evaluation of current state of the landscape were identified and presented, but our indicators were slightly modified to reflect the planning contexts associated with longleaf pine systems. Berke et al.'s (2006) protocol focused on urban land use planning, but indicators in our protocol focused on the state of the landscape rather than human population and infrastructure. In addition, we included indicators about whether tables, figures, and information were clearly articulated from Berke et al.'s Create Clear Views and Understanding of Plans section in this category.

The Actions and Implementation component was evaluated using four criteria: whether plans identify management actions, allocate funding and assign responsibility for implementation, describe evaluation protocol, and include a protocol for plan revision. The Actions and Implementation component of our protocol followed the Implementation and Monitoring sub-sections of the Plan Proposal section in the Berke et al. (2006) protocol. We did not include the Spatial Design sub-section as those indicators were related to future infrastructure growth that does not typically occur in longleaf pine ecosystems where most development is restricted.

Planners and managers must be aware of how a particular plan and the objectives and actions presented in the plan fit in the larger context for landscape scale conservation, and we evaluated this Integration with Other Plans by determining whether plans identify other plans and agencies to consider or coordinate with during planning and implementation. We used indicators from Berke et al.'s (2006) Account for Interdependent Actions in Plan Scope component in our Integration with Other Plans component.

We evaluated the Stakeholder Participation component using three criteria: whether plans incorporate stakeholders in plan preparation or implementation, include relevant stakeholders, and describe the engagement process. According to Berke and Godschalk (2009), plans that explain how multiple stakeholders and their interests are incorporated are more influential and frequently used. Collaboration between agencies and the public is necessary to address challenging problems like longleaf pine restoration (The Nature Conservancy, 2015). We included all indicators from the Berke et al. (2006) protocol except one indicator that examined the effect of the planning process on stakeholders and another that assessed how stakeholders were incorporated in previous planning efforts; both of which are important for understanding the planning process, but not indicators of a plan's quality.

4.3. Scoring plan quality

We calculated the total plan evaluation score using a series of questions that measured indicators for each of the five components. The possible coding responses were scores of 0, 1, or 2. These responses were categorized as 0 = not identified; 1 = identified, vague; and 2 = identified, detailed, relevant, clear (Berke et al., 2006; Brody et al., 2004).

The raw score for each component was calculated by summing the scores from all indicators. Because each component varied in the number of indicators, we standardized the scores by summing the raw score, dividing by the total possible score, and multiplying by 100. Scores ranged from 0 to 100 for each category. We calculated total

evaluation score, similarly, by summing the raw category scores and standardizing.

We pretested the protocol to ensure reliability in the plan evaluation. First, two coders independently evaluated the same plan and compared results. We revised the evaluation tool after discussing unclear questions and coding disagreements. The pretesting process was repeated on a subset of 15 plans from the sample, and we used the results to calculate percentage agreement and intercoder reliability (Cohen's kappa). The percentage agreement score was 86%, and the Cohen's kappa reliability score was 0.72. Scores at or above 80% for percentage agreement are generally considered acceptable, and scores between 0.40 and 0.75 represent agreement beyond chance for Cohen's kappa (Banerjee et al., 1999; Miles and Huberman, 1994). After testing the tool and ensuring acceptable intercoder reliability, one coder evaluated the remaining 20 plans.

4.4. Data analysis

We used analysis of variance (ANOVA) with Tukey's post hoc analysis ($\alpha < 0.05$) to test for differences in plan quality scores among agencies. Quality scores were grouped by agency type: federal, state, and other (NGOs and regional partnerships). We performed an ANOVA to test our hypothesis that federal agencies produced higher scoring plans than state and nongovernmental agencies.

We conducted regression analyses on total evaluation score as a function of plan implementation year to test whether overall plan quality improves over time. In this model, total plan evaluation score was the dependent variable, and implementation year was the independent variable. We also conducted regression analyses for each category score as a function of plan implementation year, using separate models for each category.

We evaluated relationships between plan components using structural equation modeling (SEM). We developed the model in STATA SE version 12. SEM approaches, including path analysis, test the likelihood that category scores, or observations in general, fit a causal model by allowing several multiple linear regression equations to be analyzed simultaneously (Garson, 2008; Stevenson et al., 2014). We measured goodness of fit for the model using standardized root mean square residual (SRMR), and R^2 measures, and compared the two models using Akaike's Information Criterion (AIC).

5. Results

We evaluated management plans from federal and state agencies and nongovernmental and partnership organizations managing longleaf pine ecosystems in the Southeast United States and compared plan quality scores. There was considerable range in total evaluation scores, from 41.9 (Nature Conservancy's South Atlantic Coastal Plain Ecoregional Assessment) to 86.5 (Carolina Sandhills National Wildlife Refuge Comprehensive Conservation Plan). The mean total evaluation score was 68.9 (Table 2). The Actions and Implementation component was the lowest scoring category with a mean of 45.1, while the Problem and Objective Statement, Integration with Other Plans, and Stakeholder Participation components had mean scores of 70.2, 80, and 76.6, respectively. The Fact Base category had the highest mean score of 88.4.

Our results indicate there was some variability in plan quality by plan type. Plans from the USDI Fish and Wildlife Service scored higher (mean = 79.4; $p = 0.05$) than state forest action plans (mean = 68.2), Forest Service plans (mean = 61.7), Joint Venture plans (mean = 55.4), and NGO plans (mean = 49.1). Department of Defense plans (mean = 74.3) and state wildlife action plans (mean = 69.9) scored higher than Joint Venture and NGO plans (Fig. 2).

Total plan evaluation scores were statistically different by agency level (federal, state, other; Table 2). Management plans from federal agencies ($n = 21$) scored highest with a mean of 73.6 (Fig. 3). Evaluation scores for federal plans ranged from 45.9 to 86.5 with a standard deviation of 10.5. Scores for plans from state agencies ($n = 8$) had a similar range (43.2 to 83.8, SD = 12.3) and averaged 69.1. The remaining plans which included plans from nongovernmental organizations and from Joint Ventures ($n = 6$) scored the lowest with a mean of 52.3. There was less variability in the scores from these plans, and scores ranged from 41.9 to 62.2 and had a standard deviation of 7.6. Plans from nongovernmental agencies and Joint Ventures had significantly lower scores than federal ($p < 0.001$) and state agency ($p = 0.006$) plan evaluation scores (Fig. 3).

Year of plan implementation was a positive predictor of total evaluation score ($p = 0.018$, $R^2 = 0.158$) (Fig. 4). The regression analysis resulted in the following regression equation: $Y = -2576.486 + 1.318x + \epsilon$. The positive implementation year coefficient (1.318) indicates plans published more recently tended to score higher than older plans. Implementation year was also a positive predictor of plan quality scores for the Problem and Objective Statement, Fact Base, Integration with Other Plans, and Stakeholder Participation components (Table 3).

We proposed and tested a model for understanding how plan components affect each other, and our results support the theoretical model predicting structural relationships among plan evaluation components (Fig. 5). Higher stakeholder participation scores were positively related to plans having well-defined management problem statement and objectives targeting the problem and to plans being better integrated with other plans. A high Problem and Objective Statement component score, in turn, predicted plans having clear action and implementation protocols. Since Fact Base did not significantly influence either Problem and Objective Statement or Actions and Implementation, we excluded this category from the final model (Fig. 6). Although Stakeholder Participation was positively related to Integration with Other Plans, that integration did not influence Actions and Implementation (Fig. 6).

6. Discussion

The evaluation of longleaf pine management plans provided useful insights about the quality of plan components and which agencies produce better plans. Our results indicate that the scores for the plans were generally high on a 0 to 100 scale, however, given the lack of similar studies it is difficult to contextualize these scores in the broader natural resource planning context.

Plan quality scores varied by agency type which may be explained by differences in agency missions and resources. Plans produced by wildlife-focused management agencies may have scored higher than

Table 2
Plan evaluation scores by agency type.

Agency type	Problem & objective statement	Fact base	Actions & implementation	Integration w/ other plans	Stakeholder participation	Total
Federal	76.9	88.4	52.6	83.3	77.6	73.6
State	61.6	96.4	42.5	100	87.5	69.1
Other	58.3	77.4	22.2	41.7	58.3	52.3
Mean	70.2	88.4	45.1	80.0	76.6	68.9
Std. deviation	14.2	14.5	18.2	34.2	36.0	12.9
N = 35						

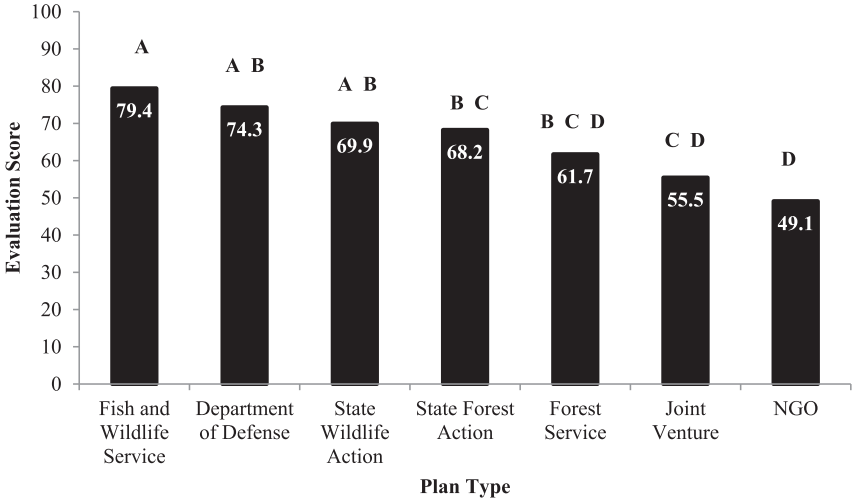

Fig. 2. Mean total evaluation scores by plan type. Plan types with different letters had statistically significant differences in plan evaluation scores based on Tukey's post hoc test.

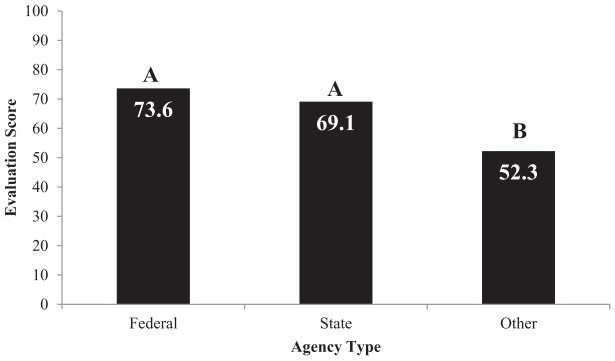

Fig. 3. Mean total evaluation scores by agency type. Agency types with different letters had statistically significant differences in plan evaluation scores based on Tukey's post hoc test.

their forestry counterparts because they are more likely to focus on single use objectives (e.g., wildlife conservation) than forest management agencies which face "multiple use" mandates (Cubbage and McGinley, 2015). This possibility is reflected in higher scores for the Problem and Objective Statement and Actions and Implementation components among wildlife agencies. Government agencies may produce higher scoring plans than NGOs because they have greater resources for planning (e.g. information, funding). NGOs may face greater constraints on budget or planning resources that affect the quality of plans. They also balance fundraising and land acquisition with their other efforts, which may draw resources away from planning efforts (Ryan et al., 2006).

Table 3
Regression models of plan evaluation scores versus date of plan.

Planning scores	Intercept	β	P	R^2
Problem & objective statement	−2387.100	1.225	0.049	0.113
Fact base	−3696.674	1.997	0.002	0.257
Actions & implementation	2779.381	−0.063	0.088	0.086
Integration w/other plans	−8756.387	4.404	0.002	0.252
Stakeholder participation	−8707.102	4.378	0.004	0.225
Total	−2576.486	1.318	0.018	0.158
N = 35				

Government agencies may also produce higher scoring plans because they have more guidance requiring some planning components including stakeholder engagement and a statement of goals and objectives. Plan quality has been shown to be positively related to the presence of mandates in hazard mitigation planning, and our findings may lend support to this argument (Berke and French, 1994; Berke

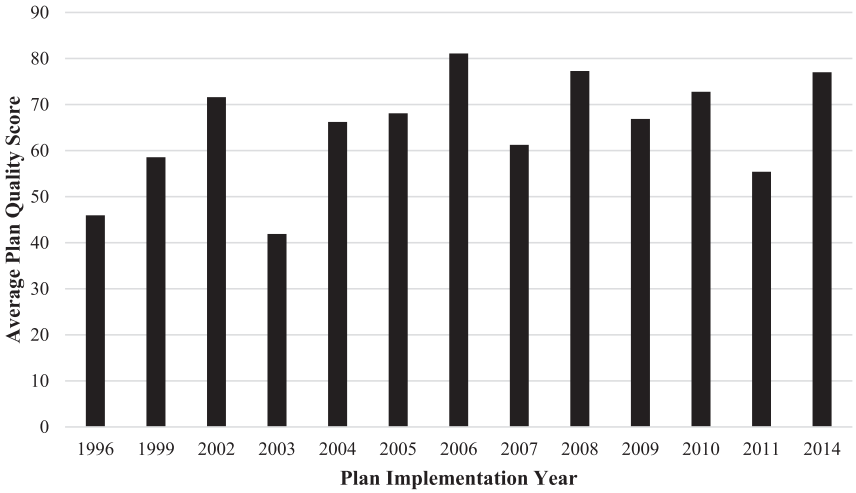

Fig. 4. Mean total evaluation score by plan implementation year.

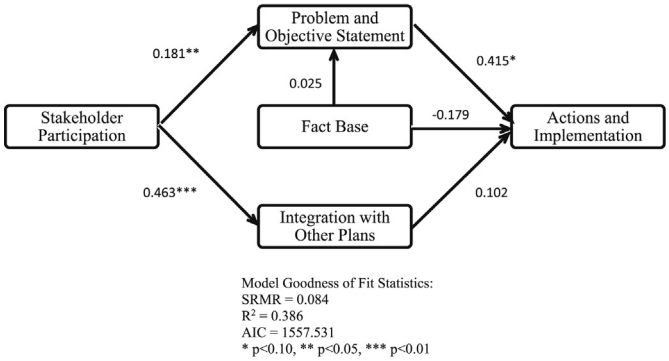

Fig. 5. Relationships in path diagram model for plan evaluation components.

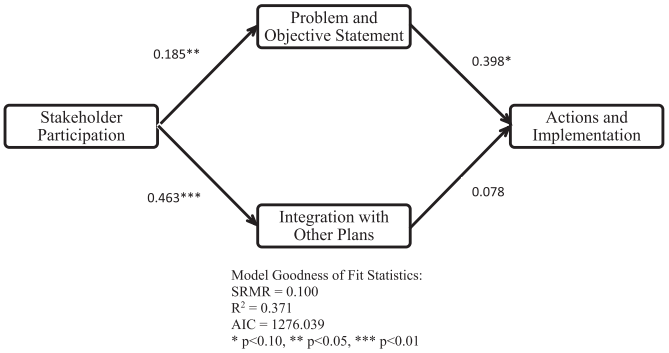

Fig. 6. Final path diagram model for plan evaluation components.

et al., 1996; Burby and May, 1997; and Conroy and Berke, 2004). In the longleaf pine management context, federal grant programs mandating state forest action and state wildlife action plans have specific planning requirements which when met would lead to higher plan evaluation scores. State agencies received technical assistance from the USDI Fish and Wildlife Service, US Forest Service, and other partners. Both programs require inclusion of several elements, which are similar to the five elements we evaluated management plans for, including a description of habitat, species, threats, and priorities; a proposal of management actions; a list of monitoring and evaluation protocols; plans for coordination with other agencies; and public participation (Association of Fish and Wildlife Agencies, 2014; National Association of State Foresters, 2015). NGOs, on the other hand, may not have institutionalized planning best practices to the extent in which they have in federal and state agencies through mandates.

Management plans from federal, state, and nongovernmental agencies tended to score high on the Fact Base component, and characteristics of forest planning may explain this finding. Forest planning often involves conducting resources assessments and inventories, which are key for assessing the current conditions of the ecosystem and serve as the basis for setting objectives and management actions. The focus on developing elements within the Fact Base may be a result of mandates (Burby and May, 1997) and long histories of data collection. Federal mandates such as the National Forest Management Act (NFMA) of 1976 and the National Wildlife Refuge System Improvement Act (NWRSIA) of 1997 require ecological assessments of the landscape, and this information base is used to develop and is included in plans (Loomis, 2002; Meretsky et al., 2006). Similarly, most state level wildlife management agencies are required to conduct science-based management, and many staff within those agencies believe decisions can and should be based purely on data (Peterson et al., 2007; Organ et al., 2012).

The path analysis indicates that the Fact Base component has relatively little impact on the other planning categories, and the AIC results suggest the model without the Fact Base variable was of higher quality than the model with the variable. This could suggest that agencies may be focusing on the area of planning in which they do best but need the least. Statistically, the variable was not important because all plans scored similarly high and variance was very low. Pragmatically, however, this suggests efforts to improve plans may be most effective focusing on areas (e.g. Actions and Implementation) where there is more room for improvement.

Across all agencies, the Actions and Implementation component tended to score the lowest. Efforts to maintain flexibility and perhaps lack of funds and personnel may have resulted in low scores in actions and implementation planning. The dynamic nature of ecosystems may lead agencies to desire flexibility to reallocate resources, shift goals, and to adapt to changing conditions over different spatial and temporal scales, and agencies have incorporated adaptive management strategies to achieve this end (Armsworth et al., 2015; Cortner et al., 1996; Williams and Brown, 2012). Because adaptive management forces actions to be open-ended and subject to change, agencies may be hesitant to identify proposed actions, and action and implementation planning may be poor in these plans precisely because planners want to maintain flexibility required for adaptive management. The increase in flexibility, however, may come at the cost of goal achievement and may result in missed opportunities for coordinating actions within and between agencies if agencies lack specific action plans for achieving their objectives.

Findings from this study should motivate agencies to increase focus on improving actions and implementation protocols, and to do so by exploring its relationships with problem defining, objective setting, and stakeholder participation. Poorly articulated actions and implementation protocols are problematic because it may result in failure to achieve objectives. Brody and Highfield (2005) found the inclusion of an implementation component within plans was associated with greater degree of actual implementation of planned actions, suggesting that improving the quality of Actions and Implementation component in plans may lead to better outcomes for stakeholders. Establishing objectives is crucial because they specify what agencies hope to achieve through management actions and are used to calculate trade-offs between actions. Government agencies in many nations weigh these trade-offs to determine which action strategy is best (Gregory et al., 2012). Without clear and specific objectives, managers may be addressing the wrong problems, may have difficulty tracking whether actions are addressing the management problem and leading to desired outcomes, and may be unable to defend their actions against critics (Gregory et al., 2012; Meretsky et al., 2006).

Previous research by Steelman and Hess (2009) found stakeholder participation was a positive indicator of plan quality score, and our results support and expand this finding by identifying a potential pathway by which engaging with stakeholders positively impacts other aspects of the planning process. While engaging stakeholders does not ensure that clearly articulated sets of actions are developed, stakeholder engagement may improve action planning indirectly through better definition of the management problem and objectives. Stakeholder participation processes may be used by the public and interest groups to direct the management agenda of the agency by providing additional knowledge, expressing values, and discussing concerns that agencies may not have considered only using a science-driven approach (Germain et al., 2001). Stakeholder participation during the planning process may lead to increased awareness of issues and may help agencies and stakeholders develop a common understanding of both what the desired management outcomes are and how they will be achieved (Khadka et al., 2013). Engaging stakeholders early in the planning process may lead to more clearly defined problem and objective statements and may result in the development of better actions and implementation strategies since clear objectives provide a framework for specific actions to be developed. Natural resource agencies have long standing practice of engaging the public during the planning process, and our findings suggest agencies should continue to strive to use best practices and better stakeholder participation techniques

during the planning process to produce high quality plans (Fontaine, 2011). It is important to note, however, that barriers (e.g. lack of resources, insufficient active participant involvement, incomplete information transmission, or lack of trust among stakeholders) to successful stakeholder participation must be overcome in order to realize the aforementioned benefits associated with stakeholder participation (Wondolleck and Yaffee, 2000).

Evaluation scores tended to be higher for newer plans, suggesting agencies are getting better at planning to address complex challenges. Two trends associated with natural resource management may explain the modest shift detected in this study. First, agencies are increasingly required to plan and to include a set of common elements in all plans of the same type (e.g. set of eight elements included in all state wildlife action plans), which may raise the quality of plans if they are aligned with best practices (Fontaine, 2011; Kilgore et al., 2006). Land use plans in general have rapidly proliferated along with establishment of best practices over the last two decades (Berke and Godschalk, 2009; Lyles and Stevens, 2014). These developments mean planners have a growing pool of best practices which were not readily accessible prior to the early 2000s (Baer, 1997; Berke, 1994; Berke and Godschalk, 2009; Lyles and Stevens, 2014). Our regression models have low R^2 values and small effect sizes, suggesting other factors in addition to age of the plan influence plan quality score. Nevertheless, natural resource planners and managers should consider updating plans and incorporating best practices to improve plan quality.

Our findings serve as a starting point for future research on forest management plan quality and evaluation. We found that plan quality varied by agency type, and future research is needed to identify what factors (such as the role of mandates, size of staff, and budget) explain this variation. Future research could further identify what factors influence scores for each plan component and could further untangle the relationships among planning components. Many plans included poorly established goals, objectives, and actions, which may present challenges during implementation. Future research could examine how quality of plans translates to implementation and success in achieving goals and objectives. This could be helpful in ensuring that plans contribute to achieving desired outcomes.

7. Conclusions

Our longleaf pine management plan evaluation results suggest efforts to improve longleaf pine planning should focus on state agencies and nongovernmental and partnership organizations, who scored lowest in the evaluation and may have fewer resources to produce high quality plans. The tendency for newer plans to score higher than older plans highlights the value of regular review and revision of natural resource management plans. Structural equation modeling of relationships between plan components suggests stakeholder participation during a planning process may increase the quality of management problem and objectives statements and promote integration with other planning and management efforts. A good problem and objective statement, in turn, may promote clear action and implementation protocols. Fact Base may be the least important plan component to invest additional effort in, largely because longleaf pine management plans already perform very well in that domain, and additional efforts have little room to improve.

This study contributed to the planning literature by developing a protocol specific to natural resource management as few plan evaluation studies have examined the quality of plans devoted to natural resource management and even fewer focus on forest ecosystems. The plan evaluation tool described in this study provides a framework for evaluating natural resource plans quantitatively and facilitates comparison across jurisdictions and agencies. The plan evaluation tool had acceptable intercoder reliability and may provide a useful tool in other forestry and natural resource planning contexts in the region and abroad. This study is also relevant to natural resource planners and practitioners. It provided a baseline of data about the quality of management plans associated with longleaf pine ecosystems. We identified the strengths and weaknesses of existing plans and provided insights that can be used to improve longleaf pine planning and management. Additional insights may be gained by examining how the results of this evaluation compare to evaluations of plans for other ecosystems. Natural resource governance is tremendously complicated and influenced by many factors, so developing high quality plans is an essential tool for ensuring that agencies address natural resource problems, engage with stakeholders and other agencies, and implement actions that work towards achieving objectives.

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Appendix A. Table of management plans in sample

Plan name	Year of publication	Agency	Agency level
A Comprehensive Wildlife Conservation Strategy for Georgia	2005	Georgia Department of Natural Resources	State
Bond Swamp National Wildlife Refuge Comprehensive Conservation Plan	2009	US Fish and Wildlife Service	Federal
Camp Lejeune Integrated Natural Resources Management Plan	2006	Department of Defense	Federal
Carolina Sandhills National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment	2009	US Fish and Wildlife Service	Federal
Cedar Island National Wildlife Refuge Comprehensive Conservation Plan	2006	US Fish and Wildlife Service	Federal
Conserving Alabama's Wildlife: A Comprehensive Strategy	2005	Alabama Department of Conservation and Natural Resources	State
Croatan National Forest Land and Resource Management Plan: National Forests In North Carolina	2002	US Forest Service	Federal
Eglin Integrated Natural Resources Management Plan	2010	Department of Defense	Federal
Eufaula National Wildlife Refuge Comprehensive Conservation Plan	2008	US Fish and Wildlife Service	Federal
Fort Benning Integrated Natural Resource Management Plan	2014	Department of Defense	Federal
Francis Marion National Forest Land and Resource Management Plan	1996	US Forest Service	Federal
Georgia Statewide Assessment of Forest Resources: A Comprehensive Analysis of Forest-Related Conditions, Trends, Threats and Opportunities.	2010	Georgia Forestry Commission	State
Grand Bay National Wildlife Refuge Comprehensive Conservation Plan	2008	US Fish and Wildlife Service	Federal
Lake Wales Ridge National Wildlife Refuge Comprehensive Conservation Plan	2010	US Fish and Wildlife Service	Federal
Land and Resource Management Plan: National Forests in Alabama	2004	US Forest Service	Federal

Mississippi Sandhills Crane National Wildlife Refuge Comprehensive Conservation Plan	2007	US Fish and Wildlife Service	Federal
Mississippi's Assessment of Forest Resources and Forest Resource Strategy	2010	Mississippi Forestry Commission	State
Mountain Longleaf National Wildlife Refuge Habitat Management Plan	2005	US Fish and Wildlife Service	Federal
National Forests in Florida Land and Resource Management Plan	1999	US Forest Service	Federal
North C arolina Wildlife Action Plan	2005	North Carolina Wildlife Resources Commission	State
North Carolina's Forest Resources Assessment: A Statewide Analysis of The Past, Current, And Future Conditions Of North Carolina's Forest Resources	2005	North Carolina Division of Forest Resources	State
Okefenokee National Wildlife Refuge Comprehensive Conservation Plan	2006	US Fish and Wildlife Service	Federal
Open Pine Landbird West Gulf Coastal Plain/Ouachitas	2011	Lower Mississippi Valley Joint Venture	Other
Panhandle Longleaf Pine Large-Scale Conservation Area and Gulf Coastal Plain Ecosystem Partnership Conservation Action Plan.	2007	The Nature Conservancy	Other
Range-Wide Conservation Plan for Longleaf Pine	2009	America's Longleaf Restoration Initiative	Other
Revised Land and Resource Management Plan: Kisatchie National Forest	1999	US Forest Service	Federal
Santee National Wildlife Refuge Comprehensive Conservation Plan	2008	US Fish and Wildlife Service	Federal
South Atlantic Coastal Plain Ecoregional Assessment	2002	The Nature Conservancy	Other
South Carolina Comprehensive Wildlife Conservation Strategy	2005	South Carolina Department of Natural Resources	State
South Carolina's Statewide Forest Resource Assessment and Strategy: Conditions, Trends, Threats, Benefits, And Issues	2010	South Carolina Forestry Commission	State
St. Marks National Wildlife Refuge Comprehensive Conservation Plan	2006	US Fish and Wildlife Service	Federal
The South Atlantic Migratory Bird Initiative Implementation Plan: An Integrated Approach to Conservation of All Birds Across All Habitats	2008	Atlantic Coastal Joint Venture	Other
The Upper East Gulf Coastal Plain: An Ecoregional Assessment	2003	The Nature Conservancy	Other
Uwharrie National Forest Land and Resource Management Plan: National Forests In North Carolina	2012	US Forest Service	Federal
Waccamaw National Wildlife Refuge Comprehensive Conservation Plan	2008	US Fish and Wildlife Service	Federal

Appendix B. Plan evaluation tool

Name of Organization _____

Name of Plan _____

Unique ID# _____

Coding Categories:

2= Identified, detailed, relevant

1=Identified, vague, incomplete

0=Not identified

1. Problem and objectives statement

		Score	Page #
1.01	Is the primary driver requiring this plan explained?	0 1 2	
1.02	Is the decision maker/administrative authority for the planning effort indicated?	0 1 2	
1.03	Is there a preliminary assessment of major trends related to the open pine ecosystem?	0 1 2	
1.04	Is there a description of major threats to the open pine ecosystems?	0 1 2	
1.05	Is there an overall objective of what the plan is working towards?	0 1 2	
1.06	Are objectives clearly stated?	0 1 2	
1.07	Are objectives measurable?	0 1 2	
1.08	Are objectives prioritized?	0 2	
1.09	Are fundamental objectives considered?	0 1 2	
1.10	Are means objectives considered?	0 1 2	
1.11	Are alternatives considered?	0 1 2	
1.12	How many alternatives are considered?	_____	
1.13	Is there a process for changing objectives based on changing conditions?	0 1 2	
1.14	Is there a review of the challenges managers must overcome to achieve the objectives?	0 1 2	
1.15	Is there a description of assets available to managers relating to open pine ecosystem management?	0 1 2	

SCORE: /28

2. Fact base

		Score	Page #
2.01	Contains analysis of current and future conditions impacting the open pine ecosystem.	0 1 2	
2.02	Gives an assessment of the current state of the landscape.	0 1 2	
2.03	Are clear maps included which display information that support reasoning and enhance relevance and comprehensibility?	0 2	
2.04	Are tables clear, relevant, and comprehensible?	0 2	
2.05	Is language used clear and understandable to reader?	0 2	
2.06	Are data sources cited?	0 2	
2.07	Are data sources peer-reviewed?	0 2	

SCORE: /14

3. Actions and implementation

		Score	Page #
3.01	Are actions for implementing plans clearly identified?	0 1 2	
3.02	Are actions for implementing plans prioritized?	0 2	
3.03	Are timelines for implementation identified?	0 1 2	
3.04	Are specific individuals within the organization assigned responsibilities for implementation?	0 2	
3.05	Is funding allocation identified to implement the plan?	0 1 2	
3.06	Are evaluation criteria identified?	0 1 2	
3.07	Are evaluation criteria tied to objectives?	0 1 2	
3.08	Is there a timeline for updating the plan?	0 1 2	
3.09	Is there a process for updating the plan based on changing conditions or the result of new monitoring data?	0 1 2	

SCORE: /18

4. Integration with other plans

		Score	Page #
4.01	Are horizontal connections with other plans or organizations explained?	0 1 2	
4.02	Are vertical connections with national, regional, and local plans and organizations explained?	0 1 2	

SCORE: /4

5. Stakeholder participation

		Score	Page #
5.01	Are organizations and individuals involved in the plan preparation and implementation identified?	0 1 2	
5.02	Is there an explanation of why the organizations and individuals were involved in the plan preparation or implementation?	0 1 2	
5.03	Does the plan incorporate input from non-agency stakeholders?	0 2	
5.04	Are the stakeholders involved representative of those groups that will likely be impacted by the plan?	0 1 2	
5.05	Is there an explanation of participation techniques that were used?	0 1 2	

Score: /10

Total score: ____/74.

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