Theme Speaker Summaries

Maintaining and Restoring Landscape Integrity: Upland Emphasis

Theme Speaker Summary

The Longleaf Alliance: A Regional Effort Promoting the Ecological and Economic Values of Longleaf Ecosystems

Dean Gjerstad

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For most of the past 5000 years longleaf pine was the dominant tree species on an estimated 90 million acres of uplands ranging from southeast Virginia down the Atlantic Coast and across the Gulf Coast to East Texas (Frost 1991). Today, less than 3 million acres is classified as longleaf forests (Landers et al 1995). Longleaf ecosystems are among the most biodiverse of all forest systems, supporting hundreds of plant and animal species. However, because of the decline of longleaf acreage, many associated animal and plant species are threatened, endangered, or languish in diminishing numbers due to changes in land use or forest practices. From a timber point of view, longleaf pine is superior to other southern pines in the production of high value wood products. Longleaf is also resistant to many diseases, insects, and other damaging agents common to other southern pines. It is seldom damaged by fusiform rust, a serious pathogen in slash and loblolly pine; resists attack by southern pine beetles, and is very tolerant of fire throughout most of its life cycle. With so many attributes, why then has the longleaf forest been systematically harvested and then regenerated to loblolly or slash pine? The reasons for its precipitous decline are many and are rooted in the history of the South.

Landscape-scale fires that swept across most sites every 3-5 years maintained the prehistoric longleaf forests. European explorers described these forests as open, park-like stands with grassy ground cover containing little or no hardwood (Bartram 1791). As most early settlers were farmers, the forest required clearing to encourage settlement of the interior of the South. However, until the development of the steam engine in the mid-nineteenth century, only longleaf timber adjacent to waterways was accessible for harvesting. Large tracts of longleaf remained on the uplands out of reach of loggers. Longleaf timber harvesting peaked in the early 20th century when railroad logging reached the remaining large tracts (Croker 1987). By 1930 railroad loggers had moved across the longleaf region with little consideration for regenerating a new forest. When the longleaf timber was depleted, mills were closed and most lumbermen moved to the Pacific Northwest to log its virgin stands. However, a few pioneering foresters remained in the South, believing that longleaf regeneration was possible, an indication that longleaf can be managed profitably over a long period of time.

Although longleaf pine is considered to be a pioneer species, it does not demonstrate the aggressive regeneration characteristics noted of most pioneer species (Landers et al 1995). In most years, mature longleaf trees produce few seed making natural regeneration difficult. Thus, as the virgin longleaf forests were harvested, few seed were available to regenerate the next forest. In addition, planting longleaf is more difficult because the “grass stage” seedling essentially has no stem. In addition, longleaf seedlings are inferior competitors. Weedy competition can retard growth, resulting in seedlings remaining in the grass stage for several years. However through current technology, the problems related to artificial regeneration have been, for the most part, overcome and landowners are able to successfully establish longleaf plantations. In addition, those landowners with existing longleaf stands can, through wise management, naturally regenerate most stands following harvest.

Another deterrent to the longleaf forest was the fire prevention effort instituted during the first half of this century (Croker 1987). Fire was considered evil and most thought at that time that it should be prevented at all costs. However, the longleaf forest is a fire dependent ecosystem and the tree is very tolerant of fire during most stages of its development. Fire is important in preparing a proper seedbed prior to seed fall and germination. Fire is also important in controlling hardwood competition that impacts the survival and growth of longleaf seedlings. Many plant and animal species associated with longleaf are dependent on fire maintaining a savanna-like ground cover (Means 1996).

Forest management was initiated primarily in response to the pulp and paper industry that moved into the South during the 1950's and '60's. This industry created jobs and markets for timber, and played a vital role in the South's post-Depression economy. Unfortunately for the longleaf ecosystem, the emphasis of this industry was —and is— on wood fiber production. Although longleaf growth rates are competitive with those of other southern pine species on most sites over periods of 30 years or more, the best return on forest investment for companies whose product requires only fiber comes from highly productive short rotation plantations, a kind of silviculture for which longleaf is not well suited. Tens of thousands of acres of abandoned cropland and cutover woodland were either deliberately reforested by planting slash or loblolly pine or naturally reseeded with these and other aggressive tree species, like sweetgum and water oak. The plant community associated with the fire-maintained longleaf ecosystem could not be sustained under these conditions and gradually disappeared, much like the prairies and savannas of the Midwest. Interestingly, a significant portion of the remaining longleaf has been conserved out of consideration for another natural resource of the longleaf ecosystem—bobwhite quail. Large quail-hunting reserves across the South began to use fire to manage the forest for that species in the late 1930s and continue that use today. As a result, some of the best remaining examples of the longleaf community exist on quail plantations.

Although fast growing species like loblolly and slash pine are ideal for the pulp and paper industry, many nonindustrial private forest landowners prefer longleaf pine forests for their timber valuable and associated ecosystem that is aesthetically pleasing and is conducive to a diverse plant and animal community. However many of these landowners have not been able to readily obtain information and advice on longleaf management.

A relatively new organization, The Longleaf Alliance, was established in 1996 with the express purpose of coordinating efforts to restore longleaf and its accompanying ecosystem on lands where they are compatible with the objectives of the landowner. The vast majority of forestland acreage in the Southeast is privately owned (*e.g.*, nearly 95 percent in Alabama). Consequently, the Alliance directors felt that the greatest opportunity to significantly re-establish longleaf forests was on private lands. The restoration of a fully functioning longleaf ecosystem appeals to landowners in varying degrees. Recognizing that intact longleaf forest ecosystems are not likely to ever dominate the southeastern landscape again, the Alliance has adopted the philosophy that "better is better"; *i.e.*, longleaf in any form is better than a cotton field; that longleaf and wiregrass are better than longleaf alone, that longleaf, wiregrass, and gopher tortoises are better than longleaf and wiregrass alone, etc.

This initiative resulted from the recognition that interest in the longleaf ecosystem and the tree itself was growing rapidly. Ecologists, foresters, wildlife biologists, landowners and land managers were searching for information or for an outlet to distribute what they had learned. A growing body of anecdotal information, personal experience, and scientific data was being passed on fitfully and many publics were not being reached. The Longleaf Alliance was formed in an attempt to catalog and coordinate all of the initiatives currently underway and to serve as a clearinghouse for information on longleaf and longleaf forests for the general public.

The Longleaf Alliance is based at Auburn University's Solon Dixon Forestry Education Center in southern Alabama in the heart of the largest longleaf concentration left in the country. It is a nonprofit collaborative effort incorporating a broad community of similar interests in the longleaf forest system. Its structure is simple, its goals direct – the establishment of a functional longleaf forest ecosystem to the extent feasible in today's southern forest environment.

Recognizing and emphasizing the importance of both the economic and ecological value of the longleaf forest broadens the appeal of the Alliance and gives it credibility with both the scientific and private communities. Members include researchers, outreach providers, landowners and managers, tree nurseries, state and federal natural-resource agencies, forestry and wildlife consultants, forest industries, and forestry service providers. The effort and the organization are regional in scope, and the Alliance now has members from every state in the longleaf region. The Alliance maintains and constantly updates databases on current longleaf related research, longleaf seedling nurseries, forestry and wildlife consultants with longleaf expertise, and pertinent research and demonstration sites. The Alliance's first regional meeting was held in Mobile, Alabama in 1996 and was attended by over 250 longleaf enthusiasts from across the region representing virtually every southeastern natural resource perspective. A second regional meeting will be held in Charleston, S.C. in November of 1998. Publications produced by the Alliance to date have included proceedings from the first meeting, a landowner's guide to management of longleaf forests, several research notes, and newsletters.

The Longleaf Alliance is funded through donations, memberships, and grants. Further information on the Alliance is available by writing The Longleaf Alliance, Rt. 7, Box 131, Andalusia, Alabama 36420, telephone 334-222-7779, fax 334-222-7779, and e-mail addresses johnson@forestry.auburn.edu, gjerstad@forestry.auburn.edu, or hainds@forestry.auburn.edu. There is also a Longleaf Alliance home page at http://www.forestry.auburn.edu/coops/la/la.html and a longleaf list server accessed by leaving a message to listproc@alaweb.com. Leave the subject line blank and in the body of the message include the following line: subscribe longleaf Your Name. Interested readers are invited to participate in the Longleaf Alliance and share in the recovery of this once magnificent resource.

Longleaf has a place in the southern forest for many compelling reasons. However due to the severe decline in longleaf acreage, it is important that we act now if we desire to insure its continued presence and reverse the decline of this important component of our southern forest.

References

Bartram, W. 1791 (1955). Travels through North and South Carolina, Georgia, East and West Florida. Dover Pubs. Reprint. NY 414p.

Croker, T.C. Jr. 1987. Longleaf Pine, A History of Man and a Forest. USDA Forest Service. Southern Forest Experiment Station, Forestry Report R8-FR7.37p.

Frost, C.C. 1991. Four Centuries of Changing Landscape Patterns in the Longleaf Pine Ecosystem. *In* Herman, S. (ed.) Proceedings, 18th Tall Timbers Fire Ecology Conference. The Longleaf Pine Ecosystems: Ecology, Restoration, and Management. May 30-June 2, 1991. Tallahassee, Florida. Tall Timbers Research, Inc. 418p.

Landers, J.L., D.H. Van Lear and E.D. Boyer. 1995. The Longleaf Pine Forest of the Southeast: Requiem or renaissance? 1995. Journal of Forestry 93:39-44.

Means, D.B. 1996. Longleaf Pine Forest: Importance to Biodiversity. *In* Kush, J. (ed.) Proceedings, First Longleaf Alliance Conference, Longleaf Pine: A Regional Perspective of Challenges and Opportunities. September 17-19, 1996. Mobile, Alabama. Longleaf Alliance Report No. 1. 178p.

Maintaining Landscape Integrity: Upland Emphasis

Theme Speaker Summary

Maintaining Landscape Integrity

Bob Bendick

Welcome to this session on maintaining landscape integrity — uplands. It is my role to frame the issues of upland conservation before we hear presentations on individual issues from out panelists. Last week, interesting news — there was a panther at our Tiger Creek- Preserve; it had been tracked as it moved from Big Cypress; illustrates the need for upland protection to sustain native species.

Of the three areas being discussed this morning, upland protection is the most difficult:

- Uplands are where most stuff gets built.
- Most uplands are privately owned.
- Uplands are less protected by law and regulation than wetlands or marine waters (except in the case of the uncertain protection of the Endangered Species Act).
- In Florida, uplands have few natural obstacles for development — water, perkable soils, easily graded and built on (in contrast to uplands in some other parts of the country); similarly uplands easily converted from wild state to agriculture.
- Because uplands not visually spectacular in much of Florida, there is not as strong a public perception of the need to protect them.
- And in Florida, even if purchased, require fire to maintain natural systems.
  - ▹ Fire
  - ▹ People management.

In fact, all of this has resulted in large-scale alteration of original upland habitat.

Here and elsewhere in the country we have created several conservation techniques to protect uplands:

• Definition needed: could mean protected in natural condition or, as we will discuss, could mean protection in some other conservation use such as ranching, farming or forest management.

• In evaluating conservation techniques it is useful to think about the concept of the public values, that is the value to the society as a whole of conserving open space uses of land. These values include for uplands:

- ▹ Sustaining plant and animal species.
- ▹ Resource-based outdoor recreation.
- ▹ Conservation of water resources — surface and underground
- ▹ Scenery/natural beauty.
- ▹ Sustaining economic uses based upon natural resources such as tourism, farming, ranching, and forestry.
- ▹ And maintaining a sense of place, of belonging and identity.

• While the operation of the market has been extremely successful in our country in providing us with goods and services, we learned more than 100 years ago, in a far more conservative America, that the market is not very successful in protecting the public values of land: this was realized during the early conservation movement — Yellowstone, Yosemite, Adirondack Park.

• Given the legal and political framework of our society, conservation of uplands must mobilize money to purchase the public values/management.

• And so since that time, we have developed strategies and techniques for conserving the public values of uplands:

▹ First, in the west, carne simply retaining land already in public ownership as national forests and parks; not really applicable in southeast.

▹ Then, public fee simple land acquisition.

▹ Conventional less-than-fee techniques like conservation easements, purchase of development rights.

▹ Support and assistance in making private natural resource uses more profitable so they would remain in conservation use — forestry assistance, cooperative extension and creating new conservation uses of land, like ecotourism, to supplement traditional incomes.

▹ Tax policy.

▹ Agricultural set asides, leases and payments like conservation reserve program.

▹ Transfer of development rights.

▹ Cluster zoning of various kinds,

▹ Habitat conservation plans.

▹ Landowner education/public pressure.

• These techniques have worked in varying degrees in different situations, but the successful use of such approaches requires similar overall strategies:

▹ Identify in some systematic way the priorities for land conservation; everything cannot be conserved; attempts to do so always fail. Identification of priorities requires both a scientific understanding of the land and an understanding of the values and beliefs of the community in which such conservation is taking place.

▹ Respect for linkages/connections to create framework/critical mass.

▹ Understand the landscape, the landowners and the public sufficiently to choose the right conservation tools for the right land**.**

▹ Raise enough money to employ those tools in enough places to permanently protect the public values the community wishes to protect.

▹ Raise enough money to provide sufficient incentives such that the land managed properly over the long run to retain values for which it was conserved.

▹ Coordination/integration among agencies.

How is Florida doing?

• Identification - Game Fish - closing gaps/FNAI/Greenways/UF => way ahead/CARL.

• Giant step forward with Preservation 2000 and county programs in providing funds.

• Beginning to use less-than-fee techniques - but suspicion remains in some quarters.

• Beginning to sort out the relationship of agriculture and commercial forestry to conservation for other purposes – protecting matrix within which critical habitats exist.

• Beginning to understand effective management => Governor's summit on land management => agencies/WMDs.

• But explosive growth; collapse of growth management and other regulatory techniques has caused fragmentation; Uncertain public understanding.

In my view the future depends upon:

• (Vision of future) Continuing to set priorities; making the greenway idea real connections/consolidation of lists — some political risk — We can define those lands shown on maps as land that "should be conserved," whether by public or private action.

- Broadening the use of new techniques — conservation easements.
- Overcoming the differences between agriculture/forestry and environmental groups to develop incentives for sustainable natural resource use.
- Strengthening the ties between upland conservation and water resources protection.
- Authorizing a successor to Preservation 2000 that will provide the funding to work fairly with property owners to carry out the plans.
    1. CRC Amendment on the ballot
    2. Next year's legislature
- Having this same program inspire and encourage local efforts – ALL CITIZENS.
- Enough money for restoration management and the will to limit use - sustainable
    - ▹ Management
    - ▹ Coalitions
    - ▹ Eglin partnership an example of how to do it
- Monitoring/adaptive management -> FNAI/others

Can we do it? Absolutely!

- We can afford it.
- The will to do it? => Public understanding/contact - a conservation ethic - lessons from Florida's land.

Maintaining and Restoring Landscape Integrity: Coastal and Marine Emphasis
Theme Speaker Summary

Maintaining and Restoring Landscape Integrity: Coastal and Marine Emphasis

R. Grant Gilmore, Jr., Ph.D.

What is landscape integrity? What were original landscapes before human modification? How did they change? What did indigenous landscapes do? How did they function? These are all very basic questions which must be answered if any landscape maintenance or restoration attempt is to be successful. Landscape/ecosystem integrity has to be examined with an understanding of natural environmental change such as community succession and geological/hydrological dynamics over short and long periods. This is particularly true of the extremely volatile land-sea margin, the coastal marine and estuarine environment.

Coastal and marine landscapes, ecosystems and biotic communities offer a special challenge to humans that are making an effort to manage anthropogenic impacts on natural resources. Their extremely dynamic nature requires a new perspective by the land manager. In contrast to terrestrial oak and cypress trees that may live for millennia, algae and seagrass may survive for only days and weeks. Water is constantly moving with great mass and inertia and the capacity to change coastal margins within hours. Inter-glacial sea level rise has reduced the size of the Florida by one half since humans have occupied the peninsula, rising 300 feet within 12,000 years. This was accompanied by an invasion of tropical species as climates became more moderate. This invasion is still occurring. While terrestrial ecosystems remained primarily warm temperate, the aquatic biota is decidedly tropical in origin for most of the lower Florida peninsula. This great aquatic biodiversity, the richest within the United States, has only recently been considered worthy of conservation and protection. Legal protection of mangroves, wetlands, endangered species and many fishery resources has only been granted during the last 20 to 40 years. During this period we have significantly expanded our knowledge of unique Florida coastal ecosystems. Yet we are still just beginning to understand the functional role these geographic areas play in indigenous organism life histories and ecosystem operation. This understanding is difficult to obtain, but must be gained before successful protection, maintenance and restoration of any coastal landscape can take place.

Several major examples of recent discoveries in ecological theory and ecosystem function are presented illustrating the rapidity at which our knowledge has been increasing on Florida coastal landscape integrity, function and importance to major biotic resources. Many agencies and institutions governing Florida landscape conservation or mitigation have not kept up with this new information nor used it in managing coastal terrains resulting in a net loss of productive coastal landscape throughout the Florida peninsula. Florida coastal biotic diversity and aquatic resource productivity has been declining due to human impact with no apparent stabilization or increase predicted. Slowing and reversing this destructive human activity is the true challenge for those involved in restoring and maintaining Florida's landscape integrity. This session will not only present new discoveries on coastal biotic resources, but also ways in which multiple organizations may pool resources to restore and manage coastal ecosystems.

Maintaining and Restoring Landscape Integrity: Invasive and Exotic Species Emphasis

Theme Speaker Summary

Displacement of Native Ecosystems by Invasive Alien Plants: The Florida Experience [How to Destroy an Ecosystem].

Daniel F. Austin, Florida Atlantic University

Humans have been introducing plants into Florida since at least the 1500s. Those imports increased dramatically with the rise of agriculture and horticultural business growth. To date there are records of over 1000 plant species known to occur in the wild within the state. Several of those naturalized alien species are physically outcompeting natives and threaten to completely displace and disrupt Florida ecosystems. This talk provides an overview of the problem, and concentrates on the biogeographic factors that allowed the biotic pollution and led to this displacement. Among the problems are: (1) the numbers of plant species that have been introduced; (2) the long historical period they have been brought here (ca 500 years); (3) similarity of climatic and ecological parameters in their homelands to Florida; (4) the "insular effect" of Florida biogeography; (5) and habitat alteration in the state. In effect, humans and their introduced plants have altered and destroyed the Florida ecosystems.

Maintaining Landscape Integrity: Wetland Emphasis

Theme Speaker Summary

Florida's Ecosystem Management Approach

Ernie Barnett, Director, Office of Ecosystem Planning, FL DEP

The Department of Environmental Protection (DEP) began developing its Ecosystem Management Initiative in 1993. The department had three goals: provide better protection for the state's ecosystems; establish an agency culture that supports a systems approach to environmental protection; and encourage a conservation ethic and sustainable lifestyle in Florida's citizens. Ecosystem Management is now at work in Florida. Highlights include:

• The development of a team permitting approach has saved private sector participants hundreds of thousands of dollars and resulted in clear and substantial environmental benefits that could not have been achieved through traditional permitting.

• A Partnership for Ecosystem Protection Program that is reducing waste and pollution in Florida through voluntary, incentive-based partnerships with Florida businesses. As of May 1997, four Florida businesses (a power plant, a chemical manufacturer, a dry cleaner, and a major manufacturer of paging systems) have taken up the challenge and become Partners in Ecosystem Protection.

• Greater protection for Florida seafood consumers and less red tape for the seafood industry through a state/federal partnership to improve the inspection of blue crab processing facilities. In 1997 the partnership received the Vice President's Heroes of Reinvention Hammer Award which recognizes excellence in government programs.

• A Private Lands Initiative for Florida farmers, foresters and ranchers which recognizes the value of these industries to Florida's economy and to its ecosystems. The initiative seeks to protect these land uses through permit streamlining, acquisition of development rights, technical assistance, and advocacy for tax reform and other measures to help ensure that farms, ranches and forests remain a viable part of Florida's landscape.

• A return of government to the people through the department's landmark Ecosystem Management Area Teams. The department has divided the state into 24 major ecosystems and has established at least one team in each ecosystem. The teams are open to all citizens and governments of jurisdiction. Their task is to reach consensus on a future vision, identify important environmental issues, and develop and implement an action plan to protect ecological functions on a regional scale.

• More efficient management of Florida's public lands through a variety of interagency and citizen partnerships. Interagency partnerships have reduced costs and improved efficiency through sharing of equipment, resources and expertise. Citizen partners have accomplished many resource management tasks, particularly in the area of ecological restoration, that would go undone at current funding levels. Among their many activities, they have grown and planted sea oats, mangroves and seagrasses, removed invasive exotic species, cleaned up shorelines, and provided surveillance for the Florida Marine Patrol through the CoastWatch program. In fiscal year 1996-97, the Florida Park Service alone logged volunteer hours equivalent to 30 percent of its full time work force.

• More and better environmental information is being put into the hands of government staff, elected officials and citizens than ever before in history through an increased emphasis on science and technology. Decision-makers can now integrate such things as satellite habitat imagery, air, water and biological

data, demographic information, and transportation and land use maps. This has proven essential to the protection of irreplaceable resources such as Wakulla and Ichetucknee Springs, the Indian River Lagoon, and the Everglades/Florida Bay ecosystem.

- Educating Florida citizens on the many ways individuals can save money and resources while improving the home or workplace environment is a goal of the department's Environmental Citizenship Campaign. The campaign encourages Florida citizens to become active participants in resolving environmental problems by providing them with information on the causes of environmental problems and challenging them to "do their part" to keep our state clean and healthy.

These examples, and the others show that Ecosystem Management is working for Florida—for the environment, for citizens, and for the businesses that support our economy. Ecosystem Management is not any one project or program. It is a philosophy that recognizes and seeks to preserve and restore the intricate connections between all parts of the environment, including our human communities. It is a pathway to a sustainable future for Florida.

Maintaining and Restoring Landscape Integrity: Wetland Emphasis

Theme Speaker Summary

General Principles for Large-scale Wetland Restoration

Ed Lowe

Restoration will be a necessary adjunct to environmental preservation efforts because only restoration can increase the size of habitats. By enlarging habitats, restoration projects can increase the number of species which can be sustained. Some of the largest, most ambitious wetland restoration projects are in Florida. These projects are of sufficient scale that many of the intensive, direct techniques for habitat management used in small-scale projects will be infeasible. For this reason, large-scale restoration projects must rely on more subtle management techniques which utilize ecological principles. Most restoration projects are directed at management of the vegetation, based on the principle that vegetation creates the habitat and the assumption that faunistic goals will be achieved if vegetational goals are achieved. For large-scale projects this management chain must be extended an additional step: that is, abiotic factors control the vegetation and vegetational and faunistic goals can be achieved through manipulation of abiotic factors. Management of abiotic factors can be guided by theoretical models which link the factors to vegetation processes (e.g. Grimes, 1979; van der Valk, 1981; Lowe and Keenan, 1997). Strict control of abiotic factors should not attempted: it is often unachievable in large-scale projects and, more importantly, it is often deleterious. Consequently, management should strive towards maintaining, and minimally constraining, the range of variation for each factor rather than meeting a point target. These ranges, taken together, form a multi-dimensional management space which defines the acceptable variation in abiotic factors. Thus, both the vegetation and the controlling factors will vary through time in a successful project and this variation will largely be governed by natural processes.

The desirability of constrained variation dictates several general principles for large-scale restoration. First, manage for long-term effects and avoid temporally parochial management. This is necessary to allow prediction of temporally-cumulative effects, to enhance acceptance of necessary environmental extremes and population fluctuations, and to inhibit implementation of politically-driven, short-term decisions. Second, manage on the basis of broad-scale considerations; the apparent value of any given habitat changes with the scale of reference. For conservation of biodiversity, often the most appropriate scale is global. Third, manage towards self-maintaining systems. This reduces costs and increases the likelihood of long-term viability by decreasing reliance on human support mechanisms. Last, practice minimalism to reduce costs, to promote variation, and to reduce the likelihood of unintended, deleterious effects.

Literature Cited

Grime, J. P., 1979. Plant strategies and vegetation processes. John Wiley and Sons, New York, 222 pp.

Lowe, E. F. and L. W. Keenan, 1997. Managing phosphorus-based, cultural eutrophication in wetlands: a conceptual approach. Ecological Engineering, 9: 109-118.

van der Valk, A. G., 1981. Succession in wetlands: A Gleasonian approach. Ecology, 62: 688-696.