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A Compartive Analysis Of The Evolution Of Forest Management In The United States In General, With A Focus On Oregon, North Carolina

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A COMPARATIVE ANALYSIS OF THE EVOLUTION OF FOREST MANAGEMENT IN THE UNITED STATES IN GENERAL, WITH A FOCUS ON OREGON, NORTH CAROLINA AND FLORIDA

by

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ABSTRACT

The purpose of this paper is to evaluate and discuss the evolution of forest management practices in the United States. The paper discusses the trends in forest management that have occurred within the United States in general, and specifically within the western (Oregon) and southern (North Carolina and Florida) United States. The trends discussed include the three (3) to four (4) epochs of management and use that are generally accepted within the forest management literature, with the exception of North Carolina that is in the process of a fifth (5). The comparative analysis within the paper discusses the western model of management which tends to be distinctly different from the southern model in terms of regulatory approaches. The western model (i.e. Oregon) tends to be highly regulated, while the southern model is primarily voluntary, and quasi-regulatory in terms of using alternative mechanisms of regulation (i.e. Best Management Practices that regulate water quality). The paper also discusses the role of professionalism within the various forest services in each state, although the regulatory mechanism is the most important explanatory variable . In general, each state's forest services tend to be highly professional with licensing requirements, educational services and cooperative management. The two models are also distinctly different in terms of ownership, with Oregon being owned (nearly 50%) by the public, whereas the southern states are dominated by Nonindustrial Private Forest Owners (NIPF).

For my mother, whose sacrifice and support has served as an infinite source of inspiration.

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LIST OF ACRONYMS

BLM	Bureau of Land Management
BMP	Best Management Practice
CCC	Civilian Conservation Corps
CWA	Clean Water Act
EIS	Environmental Impact Statement
EM	Ecosystem Management
FDER	Florida Department of Environmental Regulation
FFA	Florida Forestry Association
FPG	Forest Practice Guideline
FWPCA	Federal Water Pollution Control Act
LDC	Least Developed Country
MUSY	Multiple Use Sustained Yield
NCAC	North Carolina Administrative Code
NCDFR	North Carolina Division of Forest Resources
NEPA	National Environmental Protection Act
NFMA	National Forest Management Act
NIPF	Non-Industrial Private Forest
NPS	National Park Service
ODF	Oregon Department of Forestry
OFIC	Oregon Forest Industry Council
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WMD	Water Management District

CHAPTER ONE: INTRODUCTION

This paper evaluates the trends and evolutions in forest management within the United States. The paper evaluates the trends generally, at the national level and then more specifically at the state level. The trends are important to understand at national level because of the influence these trends eventually have at the state level. Understanding these trends allows for a more complete and comprehensive understanding of the forest management evolution and process.

This study is important because of the role that forest resources and management has played in the economic, political and environmental history of the United States. All three of which are inextricably intertwined into our society. A more complete understanding of these aspects allows for forest management practices in the future to be constructed on the basis of historical reference that delineates between strategies that are purely political or economical, as opposed to more complete management techniques that incorporate the political and economic with the scientific. Furthermore, similar trends are emerging in Least Developed Countries (LDC's) where deforestation and subsequent ramifications continue to be environmental issues of extreme concern. Addressing these issues will continue to be of the utmost importance for the future of the planet.

The states chosen for the comparative analysis are: 1. Oregon, 2. Florida, 3. North Carolina. The reasoning behind the selection of theses states is relatively straightforward. Each has contributed substantially to the development and understanding of forest management practices. Oregon has been the dominant timber producing state since the turn of twentieth century. The historical implications of forests practices in Oregon, along

with subsequent political and economic developments, has been widely studied within academic literature, and as such allows for a basis of relevant study. This literature covers the early history of the timber industry through to the recent developments of the Oregon Forests Practices Act. This act has evolved as one the most comprehensive and restrictive in the country.

Florida was chosen for the opposite reason(s). Although Florida has played a significant role in the timber practices history of our country, the literature remains scant and incomplete. Also, as will be discussed, Florida has had a rather unique confluence between the timber industry, interests groups (Florida Forestry Association), and the legislative bodies responsible for timber practice oversight.

North Carolina's forest practice history has been one of the most diverse in the country, although the state has been one of the slowest to react legislatively. The vast forest resources of North Carolina were exploited for nearly a century, until at the very point of total collapse and exhaustion the birth of "scientific forestry" became the ultimate saving grace. This new advent in scientific forestry was spearheaded by Gifford Pinchot, the first Chief Forester of the United States Forest Service.

The paper focuses on three primary hypotheses: 1. Western states (i.e. Oregon) are more likely to have nonvoluntary, and more highly restrictive Best Management Practices. 2. Western states adopt state BMP guidelines prior to southern states, which are more likely to remain conservative in terms of any regulatory approach. 3. There will be little difference in the levels of professionalism within each states forestry agencies due to the high levels of participation that exist between the agencies and universities, and the

professional standards that apply through membership into various organizations of state foresters.

The second chapter is the literature review that discusses an overview of the general trends that have occurred in forest use and management within the United States. The chapter discusses the initial settlement and migration of settlers within the United States and the way in which forest resources were used as a means of expansion Westward through the doctrine of Manifest Destiny. During this period the timber resources were thought to be inexhaustible and necessary for capitalist expansion, including the utilitarian doctrine that was used as a justification of timber resource exploitation. The chapter then traces the beginning of forest policy at the federal level and the evolution of forest policy through the current day management technique(s), known as Ecosystem Management, adopted by the U.S. Forest Service.

The third chapter is the comparative analysis that focuses on the western model of Oregon, and the southern model(s) of North Carolina and Florida. While all three states share similar characteristics in terms of the historical timber resource exploitation, the states take very different approaches it terms regulations. Oregon has one of the most restrictive and involved pieces of forest practice regulations, that is nonvoluntary and highly restrictive in terms of negating the detrimental impacts that timber harvests have on the surrounding ecosystem and watershed. North Carolina and Florida initially both had quasi-regulatory regimes that were voluntary except were it is necessary to comply with water quality as outlined by the Federal Water Pollution Control Act (FWPCA) of 1972 (more commonly known as the Clean Water Act) and subsequent amendments. However, both states have recently developed state and local standards for controlling

and regulating siliviculture practices that affect water quality. North Carolina and Florida have accomplished this through the development of state and local Best Management Practices (BMPs). The impetus behind the development of Best Management Practices was the FWPCA; however both states have developed quasi-regulatory mechanisms that are the result of water quality regulations.

The comparative analysis also discusses the development of the state's forests services, and to a certain extent the level of professionalism in each. However it should be noted that the primary explanatory variable is the regulatory process. Furthermore, the analysis is not meant to discuss the compliance and monitoring problems that are associated with BMPs, but rather the analysis simply addresses each states development of such practices.

The final chapter highlights the differences between each state, with North Carolina and Florida being somewhat similar in their approaches to regulating silviculture practices. Both states approach forestry regulations by-way of the regulations focusing on voluntary mechanisms, except where water quality is a concern, while Oregon is distinctly unique in terms of being more restrictive and nonvoluntary. Also, Oregon (western model) adopted forest practices guidelines and BMPs far in advance of Florida and North Carolina.

CHAPTER TWO: LITERATURE REVIEW

The Gilpin Age

During the infancy of the American nation (late 18th and middle 19th century) forest resources in the West and natural resources in general, were viewed through a lens of infinite potential for consumption. The adoption of "Manifest Destiny" as a policy, and indeed as a personal "creed", was necessary in order to ensure that a youthful nation would attain the economic prosperity that so many of its citizens believed was their inherent right as Americans. This economic prosperity would be the reward of a country that followed an ideology dominated by devoutly religious individuals who believed in the "subjugation of wilderness" (Nash, 2001, 42). One of the most famous advocates of such policies, William Gilpin, viewed the West "through a blaze of mystical fervor… [With] his conceptions of its resources and its future as a home for millions was as grandiose as his rhetoric, as unlimited as his faith, as splendid as his capacity for inaccuracy (Stegner 1953, pg. 2)".

The government, through such policies as the Homestead Acts and the Desert Land Act, encouraged American citizens to migrate west to "take advantage of the country's resource abundance (Cortner and Moote 1999, pg. 12)". During this time period land management was purely a matter of dividing the land into parcels for resource exploitation by "yeoman farmers". The idea was to have individuals develop the land in order to avoid the "European model of wealthy landlords and poor tenants (Cortner and Moote 1999, pg. 12)". The reality of the situation was quite different when

the era of ruthless industrialists came to dominate the geographical and political landscape. These industrialists would begin to epitomize the wastefulness of a people whose leaders believed "that the nation had such quantities of land to waste as we please," because resources were so abundant that they would "last to the hundredth and thousandth generation (Cortner and Moote 1999, pg. 12)". This culture of consumption and exploitation would become the most dominate trait in land management for the better part of two centuries, and would set in motion the conflict between conservation and exploitation that continues to this day.

Late 19th and Early 20th Century

The realizations that the previous 200 years of resource exploitation had drastically affected the American landscape in a negative manner were still not a mainstream idea, but were beginning to take hold in a small but growing group of individuals that believed that resources should not be exploited to such a great extent. Resource exploitation would have to be slowed, halted and reversed in order to ensure long-term economic stability. These "Progressive Era" ideals would result in the "Utilitarian" ideology that first used the term "conservation", and recognized the need to ensure that the resources were available for human consumption over the "long-term". This movement was led by the "first Chief of the U.S. Forest Service, Gifford Pinchot (Nash 1989, pg. 9)". However, the "conservation" movement was not eliminating, or even halting the use of forest resources. Instead, the forest and its resources would be viewed as a depletable resource that must be replenished and renewed in order to ensure

that those resources would always be stable in terms of output. It is important to note that one of the benefits of this mode of policy formulation during the Progressive Era was the emergence professionals using science as a basis for decision making, however misguided their decisions might have been.

It is important to understand that "conservation" does not imply impeding development, quite the contrary. Pinchot clarified the distinction between conserving and "husbanding of resources for future generations. There could be no more serious mistake. Conservation does mean provision for the future, but it means also and first of all the recognition of the right of the present generation to the fullest use of all the resources with which this country is so abundantly blessed (Nash 1989, pg. 76)". This seemingly paradoxical argument implies that the future generations would have "plenty" because the previous generations used resources to the fullest to support the future of the country, therefore resource use and exploitation would not be considered wasteful. This reasoning would delineate the purpose of early land management policies in the United States.

The formulation and practice of land management policies based on resource extraction was not without its critics. John Muir, founder of the Sierra Club, would be one of the most vocal early critics of land management policies that were concerned primarily with economic output. Muir believed that certain areas of forest and wilderness "should be preserved for their own sake and used exclusively for recreational and educational purposes (Kraft 2001, pg. 83)". This would mark the beginning of the distinction between "preservation" and "conservation" as land management policies. Also, this period would influence the education and thinking of Aldo Leopold. Leopold

would eventually write on of the most influential environmental preservation pieces *A Land Ethic.*

This period of initial conflict during the Progressive Era would witness "the creation of national parks and forest reserves, national monuments such as the Grand Canyon (1908) and government agencies such as the Forest Service (1905), National Park Service (1916), and Bureau of Reclamation (1902) (Kraft 2001, pg. 85)". The Progressive Era would be the infancy stage of land management policies. The era was extremely important because of the precedent being set concerning citizen and governmental debate regarding land management policies on public lands. This debate remains of critical importance, especially within the confines of this paper, because the foundation was being laid for the future conflict between "prevailing values regarding the sanctity of private property, individual rights, and economic growth (Kraft 2001, pg. 84)".

"Sustained Yield" would be the natural progression of the utilitarian ideology that guided public land management decisions during the early 1900's. From approximately 1920 through the early 1960's the primary theoretical goal of federal agencies charged with managing public land (i.e. Forest Service, Bureau of Land Management) was to take only the amount of resources that can be "replenished". However, the reality of how the "sustained yield" policies were implemented involved "taking the maximum supply a system can withstand (Cortner and Moote 1999, pg. 17)". During this period of land management policies concerned with maximum exploitation, the concept of "multiple-use" was interwoven into the "sustained yield" policy. This policy concept was the dominant "statutory mandate of both the Forest Service (the Multiple Use – Sustained-

Yield Act and the National Forest Management Act) and the Bureau of Land Management (the Federal Land Policy and Management Act)(Cortner and Moote 1999, pg. 17)". These policies would be at the center of the debate during the initial phases of the environmental movement during the late 1960's and early 1970's because of the evolution of environmental values within the citizenry were changing from strictly economic output to "demands for habitat protection, recreation, and pollution control (Cortner and Moote 1999, pg. 17)".

The Environmental Movement and the Beginning of Ecosystem Management

Although "sustained yield" and "multiple-use" were the dominant policies that directed land management during the late 1960's and early 1970's, opposition was beginning to make progress in various political venues. Interest groups concerned with "preservation" were taking advantage of the laws passed during this period in such a way that "began to break down the power the traditional interests exerted on resource policy (Cortner and Moote 1999, 18)". Forest policy, although not as important as pollution and pesticide issues during this period, witnessed a "notable increase in the environmental group presence (Davis et al. 2001, pg. 60)". Environmental interests groups mounted numerous legal challenges to "undermine the traditional policy regime" that dominated forest policy that was primarily concerned with the "liquidation" of timber resources, especially by means of "clear cutting" (Davis et al. 2001, pg. 60)". Public opinion during this time was beginning to assume a more environmentally friendly position. This change in public opinion, coupled with the environmentalist's legal challenges, "elevated

environmental protection as a policy objective and downgraded traditional timber interests (Davis et al. 2001, pg. 60)". Three extremely influential policies concerned with forest management would eventually emerge during this period of environmentally friendlier policy formulation.

The ideals behind sustained use and yield would form the basis for the Multiple Use Sustained Yield Act of 1960 (MUSY). The importance of MUSY as a policy for forest management cannot be overemphasized because it has been the dominate policy for decades, and the passage of MUSY "marked the beginning of a new and unsettled era of Forest Service Planning (Cubbage et al, 1993, pg. 331)". However, the reality and practice of the policy has tended to focus more on the "Yield" aspect more than anything else. Although the policy attempts to make considerations for other uses besides timber output, the reality has been quite different. The policy was constructed in such a way that non-timber resources were to be considered during forest management planning, however Bolle (1987) asserts that budgetary considerations for the policy were centered on timber output. This focus was of importance because MUSY relied on the old, and somewhat misguided, utilitarian philosophy that timber output was beneficial to all, including wildlife and water quality. This philosophy legalized and legitimized timber exploitation.

The National Forest Management Act of 1976 (NFMA) is a product of the relatively successful campaign by pro-preservation groups. The NFMA fundamentally changed the way in which forest policy was constructed within the halls of Congress. Up until this point, forest policy had been constructed under the jurisdiction of "appropriations committees, dominated by industry and regional interests (Davis et al. 2001, pg. 61)". The jurisdiction was "shifted to authorizing committees" that were "far

more sensitive to national environmental constituencies (Davis et al. 2001, pg. 61)". This shift in jurisdiction opened the process to include "the public in its decision making through meetings and hearings (Kraft 2001, pg. 161)". However, the most important aspect of NFMA that would form the foundation for the development of Ecosystem Management (EM) involved the formulation of "requirements for forest practice regulations and the creation of a new planning process (Davis et al. 2001, pg. 61)". This new process required the Forest Service to "promulgate regulations establishing standards and guidelines for timber management and the protection of other resources (Davis et al. 2001, pg. 61)".

The development of these regulatory standards would eventually extend in such a way that would force the Forest Service, byway of self-imposed "restrictions on their own discretion (Wilkinson and Anderson 1987 reprinted in Davis et al. pg. 61)", to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives (NFMA; 16 U.S.C. 1604[g][3][B] reprinted in Davis et al. pg. 61)". This seemingly broad set of guidelines, as Hoberg (2001) points out, would be implemented by way of "stringent action-forcing". This implementation would require: "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area (Wilkinson and Anderson 1987 reprinted in Davis et al. 2001, pg. 61)". The reality of these guidelines in practice would result in the Forest Service developing a completely "new policy framework (Davis et al. 2001, pg. 62)" concerned with a more holistic approach to forest management.

The procedural requirements under NFMA provided numerous opportunities for "administrative appeals" during the planning process. NFMA procedural requirements also mandated that the Forest Service construct "long-term, integrated plans for each national forest (Davis et al. 2001, pg. 62)". These NFMA mandates, along with the National Environmental Policy Act (NEPA) requirement that Environmental Impact Statements (EIS) be constructed during the planning phase, allowed for an unprecedented amount of public participation during the entire planning phase. This novel, multifaceted approach to forest management allowed for the consideration of environmental concerns during planning. This "open" process would lead to numerous legal challenges from environmental groups attempting to influence the planning process. While this intervention might be what is best for the protection of forest resources, it was an inevitable "procedural quagmire" for the Forest Service. The forest management of the late 1970's and the decade of the 1980's would entail an unprecedented rise in the amount of legal challenges, from environmentalists and "wise-use" advocates, brought forth against Forest Service plans. However, "by the late 1980's, the focus of resource management had begun to shift from sustained yield to sustainability (Cortner and Moote 1999, pg. 19)".

Ecosystem Management

The previous sections have been concerned with broadly describing how the policy roots of Ecosystem Management have evolved at the federal resource management level. Resource policy, especially forest policy, has evolved from an exclusive focus on

resource extraction and exploitation from the “Gilpin Age” through the mid 1970’s. A change in policy focus from sustained yield to sustainability was becoming more acceptable and visible during the late 1980’s. Ecosystem Management has become the dominant new structure that determines how resource policy is formulated at the national level. For forest policy this has meant moving away from focusing on timber resources to considering the long-term health of forests within the context of ecosystem health as a whole. This Section is concerned more specifically with certain fundamental changes concerning what principles and ideals are the “roots” of EM.

One of the most profound policy changes in Forest Service land management occurred in June of 1992 when “Chief Forester Dale Robertson announced that “ecosystem management” was the new concept guiding agency decision making (Davis et al. 2001, pg. 63)”. This approach would differ radically from previous management approaches because for the first time an emphasis would be placed on “using an ecological approach in the future management of national forests (quoted in Gerlach and Benston, 1994 and reprinted in Davis et al. 2001, pg. 63)”. This “ecological approach” was the result of a number of evolutions involving various aspects within forest management (i.e. growing scientific knowledge, evolving resource management expertise, and change in societal environmental values). Although forestry is the focus of this paper, Grumbine (1997, pg. 41) asserts, “Since the early to mid-1990’s, most federal agencies with resource responsibilities have officially adopted EM as a new framework within which to practice management”. In order to better understand EM as a management tool it is necessary to first discuss the previously mentioned aspects that contributed to the formulation of EM as a policy.

The growth of scientific knowledge and how it is applied to resource management is perhaps one of the most important "root[s] of ecosystem management (Cortner and Moote 1999, pg. 22)". This focus on ensuring that the science of EM is sound and integrated into the planning process is a result of the numerous procedural changes required by NFMA that eventually fostered "a change in the scientific knowledge base underlying forest policy (Davis et al. 2001, pg. 62)". EM can be broadly traced to the beginnings of ecology as a science, when one of its practitioners, Arthur G. Tansley, desired to move away from viewing nature as a "community" because of the "anthropomorphic connotations of the term. Nature was not a society or a neighborhood as those words were commonly understood. Instead Tansley used hard physical science, reduced nature to chemicals and energy, and described how these flowed through living things according to the laws of physics (Nash 1989, 57)". Tansley's new term "ecosystem" was meant to imply the interactions of the system as a whole, as opposed to a mass of unrelated variables. From this, "Tansley and other early ecosystem ecologists applied the physical concept of equilibrium to the organization and maintenance of ecosystems (Cortner and Moote 1999, pg. 23)". This study of nature as an integrated flow of energy within an entire system would be the cornerstone of ecosystem science for the next thirty (30) years.

The evolution of studying and understanding ecosystem science would experience one the most dramatic and influential progressions during the 1960's and 1970's. During these two decades Hubbard Brook scientists initiated experiments that "set several precedents in ecosystem research. Where previous ecosystem ecologists had focused on energy flow through the ecosystem, the multidisciplinary Hubbard Brook scientists

focused on flow of matter, particularly water and nutrients (Cortner and Moote 1999, pg. 23)". The series of studies conducted by the Hubbard Brook scientists were nothing short of seminal in terms of the advancements they produced in the science of ecosystem ecology. "Over 150 scientists took part in studies of the Hubbard Brook ecosystem in the 1960's and 1970's, producing over 450 research articles. The Hubbard Brook studies were the basis for future ecosystem research design and provided extensive empirical data for use in resource management (Cortner and Moote 1999, pg. 23)". These studies, besides producing such volumes of knowledge, also brought to the forefront the deficiencies of ecosystem science. Scientists soon began to realize that a multidisciplinary approach would be necessary if true progress were to be made in the field. This broad approach would have to encompass "disciplines like chemistry, geology, and hydrology… population dynamics, genetics and other sciences (i.e. social science) (Cortner and Moote 1999, pg. 23)".

Ecological economics and conservation biology would materialize during the 1980's and early 1990's and become two of the most influential fields within the developing paradigm of Ecosystem Management. The two new disciplines were fundamentally different from the classical biology and economics. "Both conservation biology and ecological economics are avowedly normative and committed to the goal of ecological sustainability (Cortner and Moote 1999, pg. 24)". A desire to understand and reduce the profound impact that human beings have had on the natural environment, especially on species extinction, lies at the normative core of conservation biology. "By the late 1980's and early 1990's, the new science of conservation biology became increasingly influential in the agency [Forest Service] (Davis et al. pg. 63)". This

influential new scientific foundation concerned with actual “preservation” of the natural environment fundamentally changed the way forests were managed because it requires a holistic approach to forest management, as opposed to simply focusing policy on maximizing timber yield. This differing approach also highlights the change of focus of within the new field of ecological economics. “Ecological economics, another synthesis discipline, seeks to bridge the disciplines of ecology and economics, based on a belief that traditional ecology has tended to overlook human dimensions and that traditional economics is built on the ideal and possibilities of unrestrained growth (Cortner and Moote 1999, pg. 24)”. Ecological economics operates under the assumption that economic systems operate within a finite sphere of natural resources.

The integrated scientific and social approach continues to evolve within the paradigm of Ecosystem Management. One of the ominous hurdles that EM faces arises from trying to incorporate solutions from scientific data into policy that will affect a broad range of individuals within society. Because EM practices are defined by “ecological boundaries”, “Management requires working across administrative/political boundaries (i.e. national forests, national parks) and defining ecological boundaries at appropriate scales (Grumbine 1994, pg. 30)”. These boundaries are inherently difficult to define, and as such “federal policy makers are confused about the government role in supporting EM efforts, especially when it is unclear, even by those directly involved in research, at what scales such support should be effected (Morrissey 1996, 718)”. This conflict is especially true at the state level because various agencies from different states must “coordinate their efforts with those of local governments, business, and private landowners (Brown and Marshall 1996, 721)”. However difficult this process of planning

and implementing EM practices over broad social boundaries will be is not so much an absolute negative when one considers that at least the process is taking place. This occurrence is indicative of another one of the "roots" of EM – a change of environmental values within society.

The "value" of the natural environment within society has undergone a major shift since the "Gilpin Age" when forests were considered only within the context of "material progress (Nash 2001, pg. 41)". Forests were to be conquered in order to provide the material means for the economic growth of a new industrializing country. The Westward migration was to be supported by the unrestrained exploitation of the natural environment. The dominant social conception that the American landscape was abundant in natural resources helped to form the foundation of "unfettered exploitation of the nation's resources (Corter and Moote 1999, pg. 11)" as a means of production. This 18th and 19th century conception of natural resources was ingrained into the mainstream American psyche that had yet to even consider the possibility of wasting resources. However, during the mid and later parts of the 19th century a small group of intellectuals and writers, George Catlin, James Fenimore Cooper, and George Perkins Marsh to name a few, began to recognize the profound ethical violations involving the exploitation of natural resources. George Catlin, in1832, "wrote of the overgrazing, overcutting, and general land misuse in the United States," however, "despite these early warnings, government policy did little to stand in the way of building a mighty industrial empire (Cortner and Moote 1999, pg. 13)".

The Progressive Era of the early 20th century would mark the beginning of "conservation" as an idea to guide natural resource management. This conception of

"conservation" did not include the principles of preserving natural resources. The idea instead focused on the utilitarian uses of forest resources to promote a sustained output that would benefit the country over the long-term. Gifford Pinchot, the leading supporter of the utilitarian idea during this period thought that the forest should be managed in such a way "as to obtain a steady and continuing supply of valuable products. In theory this was a compelling argument – the nation could have its forests and use them too (Nash 2001, pg. 134)". Pinchot viewed the forest like any other crop that should be managed, and as such would require professional foresters that used the "science of land management" to maximize the long-term output of forest resources. This mode of operation concerning the management of federal forests would become the dominant influence within the structure of federal land management policy formulation, and "continues to influence resource management policy today (Cortner and Moote 1999, pg. 11)". Also the Progressive Era idea that "professionals" would be needed to manage public land would form the foundation of the federal agencies concerned with land management. The theory and practice of utilitarian land management would also be the impetus for the schism concerning the ethical and proper use of natural resources that developed between Progressive Era "conservationists" and "preservationists".

"Preservationists" began to shift away from the anthropocentric (human-centered) idea of nature as utility for the furthering of human economic development. John Muir, founder of the Sierra Club and one of the first and most influential preservationists, began to view the natural environment as having an intrinsic right to exist, as opposed to the environment existing purely for human use. "The world, we are told, was made especially for man – a presumption not supported by all the facts…Why should man value himself

as more than a small part of the one great unit of creation (John Muir reprinted in Nash 1989, pg. 33)". However, the early preservationists' movement successes in having certain areas designated as national parks are inherently anthropocentric in their creation because the idea was to preserve wild areas for the recreational and aesthetic benefit of humans. Aldo Leopold would also consider and support such radical ideas about the preservation of nature. However, Leopold recognized the benefit of framing such ideas of preservation around human beings because the ultimate result would be the preservation of the natural environment. Leopold's *A Land Ethic*, widely considered to one of the most influential works concerning preservation, would be written at the end of the 1930's. However the work would not become influential until the environmental movement of the 1960's because the ideas put forth by Leopold were "truly radical" for their time because, "What he proposed would have necessitated a complete restructuring of basic American priorities and behavior (Nash 1989, pg. 73)".

The next discernable period concerning the changing environmental values of Americans would occur during the environmental movement of the 1960's and 1970's. Although the period did not have a profound impact on the practice of forestry because sustained-yield still dominated forest policy, it did set in motion the creation of policies like NFMA and NEPA that have been extremely influential in terms of how the forest are managed. These two decades are considered to be of importance to the eventual construction of the holistic concept of EM because of the fundamental questioning of "the values and attitudes that lay behind environmental problems (Nash 1990, pg. 206)". The questioning of the extensive use of pesticides, made popular by Rachel Carson's *Silent Spring*, coupled with the growing awareness of the detrimental effects of

unrestrained pollution served as an impetus for investigating the logic of forest policies that were based on corporate maximization of the efficient use of forest resources. The public awakening to the environmental problems that existed, as a result of humans, would help influence future forest policy in such a way that mandated the considerations of the public welfare, and not simply corporate economic interests. This general policy questioning would continue into the late 1970's and 1980's when environmental groups, acting on behalf of the public at large, became heavily involved in the policy construction process, and would eventually help influence the creation and refinement of EM during the 1990's through today.

The results of this era of value questioning can be witnessed within the workforce composition of federal agencies concerned with forest management because "management perspectives evolve in response to shifts in societal values and scientific knowledge (Cortner and Moote 1999, pg. 25)". This shift in workforce composition and management style can be observed within the Forest Service policy shift from sustained-yield to holistic approaches concerned with overall ecosystem health, and is another "root" of Ecosystem Management. The shift in workforce composition and management style can be linked to the broad ecological considerations required under NFMA. The Forest Service was no longer simply focused on timber production because a wide-range of values must be comprehensively considered during the policy planning process. These values would include the long-term health of the wildlife within the area being considered. And as such, it was necessary for the Forest Service to hire different professionals in biology, ecology and fisheries. "This restocking of personnel had profound effects on the agency as officials with environmental expertise and ideologies

increased in number and eventually made their way up the organization hierarchy (Davis et al. pg. 63)".

This level of integration within the Forest Service is nothing short of astounding when one considers the historical policy approach, since Pinchot was the first Chief Forester, within the agency was purely concerned with maximizing timber output. An example of the evolving values could be witnessed during the 1990's when the Clinton administration nominated two Chief Foresters, Jack Ward Thomas and Mike Dombeck, neither of which was trained as traditional foresters. The integration of numerous disciplines into the workforce and planning process would help to develop and refine the practice of EM because at the core of EM is the goal of holistically managing ecosystems. This can only be accomplished if the planning and implementation process is fluid and open to change based on the results of what has previously been learned. This fluidity is one of the central tenants of practicing EM.

Conclusion

Ecosystem Management as a practice is still in the infancy stages, and it is not without its critics. Although most agree with the central aim of protecting and maintaining "ecological sustainability, integrity, productivity, and biological diversity, there is no agreement on what this means exactly in terms of management outcomes (Cortner and Moote 1999, pg. 46-47)". The language that determines the practice of EM is still being debated among researchers and professionals, and as such it is proving difficult to get a broad range of individuals, each with their own agenda, to agree on a

policy. And even if the policy is agreed upon, it remains difficult to judge the relative success of such policies because of the differing opinions concerning the definition of success. Because of this, “ecosystem management may continue to be a niche management technique (Brown and Marshall, 1996, pg. 721)”.

This sort of debate is not necessarily a negative occurrence if progress is made. The most substantial problem that EM faces is not necessarily within the professional community, but rather society as a whole. America is a nation based on consumption of natural resources, if we do not consume domestic resources we consume foreign resources. We are a nation that is devoutly anthropocentric, even progress that is made within the realm of environmental protection is usually done with human benefits in mind. As many critics argue, “asking for a fundamental reframing of how humans work with nature is infeasible and defies common sense (Cortner and Moote 1999, pg. 47)”. This sort of mentality must be combated if any true and lasting change is to occur.

CHAPTER THREE: METHODOLOGY

The paper is comparative analysis that discusses the evolution of forest practices and management between the western and southern United States. The western model focuses on Oregon and describes how forest management evolved within the state beginning with industry domination that was without regulation and oversight. The section discusses the impetus behind the creation of Oregon Forestry Service and the subsequent regulatory mechanisms that emerged. The western model is uniquely different from the southern model that is predominantly voluntary and quasi-regulatory. The southern model is quasi-regulatory in so much as forestry practices are monitored and regulated by way of other pieces of legislation that control water quality.

CHAPTER FOUR: OREGON, NORTH CAROLINA AND FLORIDA

Oregon's Forests

The state of Oregon has an approximate total acreage of 61.5 million acres. Within this 61.5 million acres, less than half of that land (approximately 30 million acres) is classified as forestland. Of these 30 million acres, "39.6 percent (24.4 million) were capable of and available for growing timber for commercial harvest. Oregon [trails] only Alaska among the states in acreage of commercial forest (Davis et al, 1983, pg. 512)". Forestland ownership in Oregon is divided into three (3) specific categories of ownership. The federal government controls and manages approximately 18.1 million acres of forestland (including Native American lands), making it the largest proprietor of Oregon forests. This land is managed by four (4) federal agencies within the United States Department of Agriculture (Forest Service) and the United States Department of the Interior (Bureau of Land Management, National Parks Service, U.S. Fish and Wildlife Service). The United States Forest Service (USFS) controls approximately 15.1 million acres of public forestland, making it the largest proprietor of public land. The Bureau of Land Management (BLM) controls approximately 2.3 million acres of public forestland. The National Parks Service (NPS) and the United States Fish and Wildlife Service (USFWS) control 166,000 acres and 13,000 acres respectively.

State ownership comprises the second category of public ownership. The state of Oregon controls and manages approximately 1.02 million acres of forestland. The Oregon Department of Forestry (ODF) manages 645,000 acres of state controlled

forestland, making the agency the largest manager of state land. The third category of ownership is “non-public”, or private. Private ownership accounts for approximately 10.9 million acres of forestland, and of this, 5.6 million acres are classified as industrial forestland. Non-Industrial forestland accounts for 4.4 million acres of private land in Oregon. “From the standpoint of timber-production, private lands are inherently more productive than public lands. They generally are lower in elevation (with a longer growing season), have more productive soils and are dedicated solely to producing timber (Kerr, 2004, pg.6)”.

The commercial forests of Oregon “may be classified as two distinct zones: the Douglas-fir region of 13.9 million acres between the Pacific Ocean and the Cascade crest and the western pine region of 10.6 million acres east of the crest (Davis et al, 1983, pg. 512)”. Within these two regions, there are approximately twelve (12) species of trees that are of commercial value.

“The most prominent of these is the Douglas-fir, which grows from the western slope of the Cascades to the Pacific Ocean and on the Blue and Wallowa mountains of northeastern Oregon. Western hemlock of commercial quality is found almost exclusively on the western slopes of the Cascades and in the Coast Range. Ponderosa pine predominates in the drier eastern part of the state, grows widely in the Cascades, and occurs mixed with Douglas-fir in the Southwest (Davis et al, 1983, pg. 512)”.

With this vast amount of commercial quality timber as a resource base for Oregon’s forest industry, it is of little wonder why Oregon has historically led the nation in timber production since the late 1930’s.

Table 1:
Forestland Ownership in Oregon

Land Owner	Acreage (millions)	Percentage of total land
Federal	18,157,000	29.6%
State	1,022,000	.017%
Non-Public	10,872,000	17.%
Total Oregon Forest Land	30,051,000	48.9%
Total Oregon Land	61,441,280	100%

Table 2
Table 2: Federal Land Ownership

Federal Land Owner	Acreage	Percentage of Federal land
Forest Service	15,135,000	83.3%
Bureau of Land Management	2,368,000	13%
National Park Service	166,000	.01%
Fish and Wildlife Service	13,000	.0007%
Total Federal Land	18,157,000	100%

Table 3
State Ownership

State Land Owner	Acreage	Percentage of State Land
Department of Forestry	645,000	63.1%
Common School Fund	133,000	13.0%
Parks and Recreation Dept.	60,000	5.8%
Dept. of Fish and Wildlife	39,000	3.8%
Dept. of Transportation	7,000	0.6%
Board of Higher Education	15,000	1.5%
County and Municipal	123,000	12.0%
Total State Land	1,022,000	100%

Table 4
Non-Public Ownership

Non-Public Land Owner	Acreage	Percentage of Non-Public Land
Native American Land	480,000	4.4%
Non-Industrial	4,438,000	40.8%
Industrial	5,954,000	54.8%
Total	10,872,000	100%

Forest Practices History of Oregon

Oregon's logging trends could generally be divided into three epochs that roughly correspond or shadow the general trends within the United States. The first epoch began in the mid to early 1840s and continued to the early 1900s. This epoch would contain the influx of vast numbers of settlers who would form the employment base for the developing, and soon to be dominant, timber industry. The second epoch would approximately begin during the early 1920s and continue until the early 1970s. This period would witness the growth of the timber industry, making the industry the primary employer in the state, although the numbers of individuals being employed by the industry would begin to shrink, a trend that would continue into the proceeding epoch. This epoch would also contain the adoption and enactment of the first legislation concerning forest practices, mainly reforestation, in 1941. The third and final epoch began during the early 1970s, coinciding with the beginning of the environmental movement, and continues until present day. This epoch contains the adoption of Best Management Practices (BMPs) that have been essential with regards to maintaining soil and water quality protections. This epoch has been an era marked by the contentious legal and political confrontations between environmental organizations and the timber industry.

Oregon's forests remained relatively undisturbed in terms of resource extraction until the mid 1800's. Before this period, Oregon was inhabited by a meager population of Native Americans. The Native Americans "regarded the forests less as a source of raw materials than as a home of spirits and animals significant to their culture. For the most

part, Indians did little to alter or manage the vast tracts of timber on whose margins they lived (Davis et al, 1983, pg. 512)". For the most part, this pre-settlement period would be the last time that a relative equilibrium existed between Oregon forests and its inhabitants. The arrival of settlers (i.e. British, French Canadians, and Americans) during the mid 1800's would mark the beginning of new period in Oregon's forests because "it was not long before the forests and their wood resources were exploited (Davis et al, 1983, pg. 512)".

For all intents and purposes, the timber industry began in Oregon when "John McLaughlin (the "Father of Oregon)… built a sawmill during the winter of 1842-43 at Oregon City that employed thirty Hawaiians to produce 3,000 board feet per day – about half of a modern flat bed trailer – for export (Kerr, 2004, pg. 35)". Seven years later in 1849, "thirty sawmills were operating there, mostly along the lower Columbia and Willamette rivers (Davis et al, 1983, pg. 512)". The growth of Oregon's economy during this period depended largely upon the use and exploitation of the states timber resources. This resource base would be invaluable during the mid 1800's when "the California gold rush and explosive growth of San Francisco made lumbering Oregon's leading industry (Davis et al, 1983, pg. 512)". This extensive use of Oregon's timber resources would lay the foundation for exploitative practices well into the twentieth century because during this period "forests were logged and left behind because loggers always believed there were more trees over the next hill (Kerr, 2004, pg. 35)".

During the first epoch of the late 1800's and early 1900's Oregon's forests would be opened considerably due to several factors. The first factor in opening Oregon's forests occurred during the early part of the nineteenth century when railroad construction

began to make its way across the continental United States. Before this period, loggers were constrained by navigable bodies of water. However, this constraint would be lifted due the instrumental role railroads played in "opening up some of the remote forests to the loggers (Davis et al, 1983, pg. 512)". The railroads also played another role in the transport of lumber, and by 1906 "as much lumber would be exported from the Pacific Northwest by rail as by sea (Davis et al, 1983, pg. 512)". During this period of railroad encroachment into the once untouched Oregon wilderness, "52% of all [wage earners] were employed in the lumber industry (Teal, Boyle, and Veagh, 1916, pg. 10-11, reprinted in Dumont, 1996, pg. 279)".

The second factor of opening Oregon's forest during the first epoch occurred when: "the depletion of timber stands of the Lake States and the East brought more lumbermen and timberland investor into the Pacific Northwest, where the Homestead Act and the Timber Stone Act both proved more useful in transferring lands to loggers than to farmers. Over 3 million acres in Oregon were purchased as Timber and Stone claims between 1900 and 1909 (Davis et al, 1983, pg. 513)". This transfer of land would coincide with the third factor responsible for large amounts of acreage transfer from public to private ownership, and would leave Oregon's forests "concentrated in the hands of a relatively few owners (Davis et al, 1983, pg. 513)". This occurred when the federal government began issuing railroad and wagon grants. The issuing of these grants would eventually result in "22.7 percent of the timber land in Oregon" being controlled by the "holdings of the state's two larges private landowners – Weyerhaeuser and the Southern Pacific (which had absorbed the Oregon and California [railroads] and its large land grant) (Davis et al, 1983, pg. 513)".

The first epoch would also contain the subsequent creations of the Oregon Department of Forestry (ODF) and the School of Forestry at Oregon State University in

Corvallis. The devastating fires of 1902 and 1910 would be the impetus for the eventual creation of the Oregon Department of Forestry in 1911. Before continuing to the second epoch in Oregon, it is important to discuss the Oregon Department of Forestry in order to develop a better understanding of how forest management evolved within the state.

The Oregon Department of Forestry was given forest management authority in 1929 "when Oregon consolidated a state forest of 70,000 acres by exchanging scattered land which had been obtained from the federal government (Davis et al, 1983, pg. 515)". The department assumed additional regulatory authority in 1941 when Oregon passed the Oregon Forest Conservation Act of 1941, and again in the early 1970's (third epoch) when the Oregon Forest Practices Act was adopted. The department of forestry is considered to be a highly professional department that requires foresters to be licensed before they are given the authority the develop forest management plans. Today the Oregon Department of Forestry is responsible for managing 780,000 acres of state-owned forestlands. The department employs 700 full time foresters and approximately 700 seasonal employees, and has an annual budge of [insert budget numbers]. The department is delegated numerous authorities and responsibilities concerning forest management (i.e. fire management, operating a seedling nursery growing 15 million trees annually, and controlling insects and disease on 12 million acres of public and private lands). The Oregon Department of Forestry is given vast amounts of regulatory and enforcement authority, making it one of the most powerful forestry agencies in the nation.

During the second epoch, beginning around 1920 and continuing until the early 1970's, logging activities in Oregon increased steadily, with a slight decrease during the Great Depression era. By 1920, "Oregon's reported annual lumber production passed 3

billion board feet… when the state passed Louisiana to rank second, behind only Washington (Davis et al, 1983, pg. 513)". Oregon would eventually succeed in passing Washington in timber output in 1938, making Oregon the number one timber producing state. The increase in timber output was the result of an increase in automation, this along with an increase in corporate mergers, would be the cause behind the reduction of individual loggers from rural communities employed by the timber industry. Despite the shrinkage of the workforce during this epoch, timber output in terms of billion(s) of board feet, increased nearly five fold from approximately two (2) billion board feet to nearly ten (10) billion board feet. Timber output would remain at this arguably unsustainable level until the mid 1970s.

During this period there was very little, if any, legislation or regulation concerning forests practices. However, the beginnings of regulating timber practices were beginning to take hold with the adoption of the Oregon Forest Conservation Act of 1941, which "required landowners in the state to leave seed trees to ensure regeneration (Cubbage et al, 1993, pg. 426)". This new regulatory action was enacted at the state level, and was unique because the legislation "was the first law in the nation requiring that private logged-over lands be reforested, either by leaving a seed source or by artificial restocking (Davis et al, 1983, pg. 515)". Also, this epoch would contain a noteworthy occurrence of the Progressive era when nearly three (3) million acres of valuable Oregon forestland was returned to the federal government in 1916. This occurred "when the Southern Pacific failed to comply with the provisions it inherited from the Oregon and California Railroad (O&C) land grant (Davis et al, 1983, pg. 514)".

The adoption of the Oregon Forest Conservation Act of 1941 was an attempt to "preempt federal legislation by enacting [state] forest practices laws (Cubbage et al, 1993, pg. 422)". This new statute was "a response to the perceived threat of timber shortages" and mainly focused on "ensuing adequate regeneration after harvest (Cubbage et al, 1993, pg. 422)". The focus of the legislation on sustaining timber output was consistent with Progressive utilitarian ideals of the moral necessity of resource use and extraction as a means for developing the economic future of the United States. The 1941 Oregon Forest Conservation Act would remain the predominate regulatory mechanism for nearly three (3) decades, and "was reasonably well enforced throughout the 1950s and 1960s (Cubbage et al, 1993, pg. 426)".

The early 1970s would mark the beginning of the third epoch of forest practices in the state of Oregon. Oregon's citizens, like many in the United States, were becoming increasingly more concerned "about the environment and forestry (Cubbage et al, 1993, pg. 426)". During this period of growing public concern, Oregon forests were producing approximately ten (10) billion board feet of lumber. The public's growing reservations concerning the unsustainable and detrimental aspects of logging and forest practices in general, along with an industry that was beginning to recognize the need to protect it's resource base through utilizing more effective scientific management techniques, would lead to "the establishment of a special forest practices study committee, which proposed a new forest practices law in 1970 (Anderson 1977, reprinted in Cubbage et al, 1993, pg. 426)". The legislation submitted by the committee "was given wide review by interest groups in the state and formed the basis for the [final] legislation (Cubbage et al, 1993, pg. 426)". The final legislation was "enacted as the Oregon Forest Practices Act of 1971

and became effective on July 1, 1972 (Cubbage et al, 1993, pg. 426)". The Oregon Forest Practices Act of 1971 "became a model for other states. This act emphasized educational programs for landowners and forest operators. Close cooperation by the forest industry and natural resource agencies contributed to the act's success (Davis et al, 1983, pg. 516)".

The Oregon Forest Practices Act of 1971 initiated a legal requirement on the State Board of Forestry compelling it to "establish at least three regions and a nine-member forest practices committee for each region (Cubbage et al, 1993, pg. 426)". The establishment of the committees allowed for recommendations concerning forest practices to be constructed on a regional basis. The enactment of the new legislation "set minimum standards for reforestation, road construction and maintenance, timber harvesting, chemical application and slash disposal (Oregon Department of Forestry, *The Evolution of Oregon's Forest Practice Rules 1971-2003*)". The law specifically addresses the rules concerning harvesting practices that "cover the quality of the residual stand, soil protection, location of landings, skid trails, fire trails, drainage systems, treatment of waste materials, stream protection (Cubbage et al, 1993, pg. 427)". These regulations generally contain the extensive BMP regulations that are responsible for the maintenance of soil and water quality. These BMPs are required under the federal Clean Water Act of 1977 (CWA), however Oregon has strengthened and surpassed the requirements of the CWA.

It is important to note and highlight the cooperative and powerful position the School of Forest Resources holds on the board. The School of Forest Resources at Oregon State University cooperates with the board in terms of giving policy advice that is

the result of years of academic and applied research that is developed on the 133,000 acres of Common School Fund forestland. Also, the dean of the school is a one (1) of thirteen (13) voting members on the Oregon Board of Forestry. The forestry program at Oregon State University was also the primary architect behind the development of the forest management plan responsible for protecting the Spotted Owl habitat. Furthermore, the university is one of the major contributors, along with the Pacific Northwest Research Station, in the development of "New Forestry" techniques and experimentation.

The Oregon Forest Practices act was widely regarded as one of the most progressive and manageable pieces of legislation, due in part to the simplicity of the act. Also, "interagency cooperation and problem prevention, not confrontation, were stressed (Cubbage et al, 1993, pg.427)". However, the act was not without its critics, and this criticism would eventually lead to substantial amendments to the original legislation. "Environmental groups criticized many perceived weaknesses of the law. Many viewed the Board of Forestry as being dominated by timber interests and having excessive discretion in writing forest practice standards (Cubbage et al, 1993, pg. 427)". The environmental groups were also concerned about the funding allocated for violation enforcement. Also, the groups asserted that a more cooperative relationship should exist between the state Board of Forestry, and the various state agencies responsible for management of other natural resources. Furthermore, "by the 1980s, environmental groups believed that the forest practices themselves were too lenient. On the other hand, industry believed that new county land use laws were restricting forestry too much (Cubbage et al, 1993, pg. 428)". This contentious dispute would eventually lead to amendments of the original act in 1987.

The various interest groups entered into a dispute resolution process, which is arguably one the main tenants of the current Ecosystem Management paradigm. This dispute resolution process would eventually lead to amendments that were supported by environmental and timber industry groups. The new amendments "imposed stricter requirements for riparian zone protection, including wider buffer strips and a greater percentage of trees being left in the zones (Cubbage et al, 1993, pg. 428)". The new law was more explicatory in terms of delineating the authority of the State Board of forestry because the law "clarified that the Board of Forestry did have exclusive authority over forestry regulation (forestry would not fall under the county zoning laws and commissions), except in urban growth areas (Cubbage et al, 1993, pg. 428)". Furthermore, the amendments addressed the growing concerns of endangered species protection. However, these amendments did not satisfy the interest groups (mainly within the forest industry), and debate would continue until new amendments were added in the 1991.

In 1991 the timber industry would depart from the previous mode of cooperation and seek legislation that it considered more favorable to its interests. This would lead to timber industry groups drafting legislation without the consultation and consent of the environmental groups, who were viewed by the timber industry as unwilling to accept any amendments submitted by the timber industry. This new tactic of directly lobbying the legislature would eventually be successful, and elevated the standing of the timber industry within the Oregon state legislature.

The primary timber interest group participating in the construction of the new amendments to the original legislation was the Oregon Forest Industries Council (OFIC).

This group is comprised of over fifty-five (55) companies and organizations responsible for timber harvests and use. The organization is the largest and most powerful timber industry lobby in the state of Oregon since its inception in 1975. However, timber industry lobbies have been in place in Oregon since 1900 when Frederick Weyerhaeuser "put together a consortium that… purchased 900,000 acres of land-grant forests from the Northern Pacific Railroad for six dollars per acre Davis et al, 1983, pg. 379)". The Oregon Forest Industries Council did participate in lobbying the original legislation of 1971; however the various organizations within OFIC were under a different conglomerate known as the Association of Oregon Industries. The OFIC, along with foresters, "were able to take the initiative away from environmental groups in the Oregon legislature. As a rule, industry's standing with legislators in the public policy arena increased substantially (Armstrong, 1991, reprinted in Cubbage et al, 1993, pg. 429)".

The new laws were considered extensive in terms of new regulations added governing forest practices. "The 1991 Oregon Forest Practice Law amendments set new clear-cut limits of 120 acres, with the possibility of extension to 240 acres if no environmental harm were likely. They also tightened the requirements for reforestation and "green-up" after a clear-cut. The areas must be reforested within two years and have established seedlings at least four feet tall and free from overtopping competition after 4 years. The law also requires that any clear-cut greater than 10 acres, at least two live trees and two downed trees per acre must be left for wildlife habitat. These requirements reflected the belief that more residual material should be left, as espoused by the advocates of "new forestry" (Cubbage et al, 1993, pg. 428)".

The new amendments also addressed the need to develop corridors that would allow for animal migration along twenty-nine (29) state scenic highways. The new law went even further into addressing the necessity of designating streams into classes based on the location and importance of the stream to the surrounding ecosystem. The new

amendments were considered to be stricter in terms of regulatory protection. However because the timber industry demonstrated its willingness to implement more stringent, yet manageable regulations, the new amendments were successfully passed through the state legislature. The lumber industries were willing to develop and implement these new amendments in order to "reduce the risk from antiforest management initiatives such as those in California (Cubbage et al, 1993, pg. 429".

It is important to understand the relationship between the timber industry and Oregon forest policy because the timber industry was responsible for several arguably progressive forms of forest management in Oregon, and the Pacific Coast (Oregon, Washington and California) in general. "The lumber industry has played an important part in the shift to sustained-yield forestry in the Pacific Coast states. George S. Long, of the Weyerhaeuser Timber Company; William B. Greely, of the West Coast Lumbermens Association; and David T. Mason, a private consulting forester, were key advocates in the struggle to win acceptance for modern scientific forestry in the region. The Western Pine Association and Industrial Forestry Association, both made up of lumbermen, successfully pushed for tree farms on private holdings (Davis et al, 1983, pg. 381)". This participation is relatively unique within the forestry community, and is one of the main reasons why Oregon has remained the most productive lumber producing state. However, there is a continuing conflict between the timber industry and environmentally aligned organizations. The conflict is largely centered on the remaining old growth forests in the state, and what is the proper role of the forests. The environmental groups continue to push for restricting the logging of old growth forests on Federal land, while the timber industry would prefer to be granted access to the valuable old growth stands.

The third epoch would also witness one of the most important transformations in forest management with the beginning of "New Forestry" programs. New forestry began

to be developed as a management tool during the 1980's when it became readily apparent the previous methods of logging were not conducive with the long term health of the entire ecosystem. New forestry is considered within the same framework of Ecosystem Management, in fact the two terms are often interchanged because the goals of both are essentially the same – ecological integrity. This approach uses the same scale of landscapes for management that are consistent with Ecosystem Management tenants (i.e. the system in its entirety, not simply the tree stands intended for harvest). The approach attempts to maintain and promote ecological integrity by leaving the logged sections in such a condition that more accurately mimics the natural old growth forests of the region. "Such an approach would allow for the retention at harvest of standing live trees, both in riparian zones and elsewhere; increase reliance on natural regeneration; and provide for the management of dead wood (Cubbage et al, 1993, pg. 318)". This new paradigm in forest management is one of the most important developments in Oregon's forest practice history because for the first time a serious effort is being made to retain and protect timber stands and ecosystems that were once simply viewed as "products".

The timber industry has used the New Forestry initiative as an outlet for advocating the need for opening Federal land that has been prohibited from the timber industry. The timber industry's argument is predicated on the assertion that, "under new forestry, less wood fibers is harvested per unit area than in intensively managed systems (Gillis, 1990, 558-562)". Because of the reduction in the amount of wood product per given acreage, the production of timber would decrease. The industry argues that this loss of production should be offset by the expansion of acreage available for timber harvest, especially the old growth areas of Federal land. This contentious argument concerning

the proper use of old growth forests has, and will, continue to be at the forefront of discussions and debates in Oregon.

Conclusion

Oregon has developed some of the most comprehensive and restrictive rules concerning the harvest and management of timber. The Oregon Forest Practices Act is arguably one the comprehensive in the country. The requirements of the act have been revised on a continuous basis, and most importantly, compliance is not voluntary. Furthermore, the act contains clearly defined legislative duties that are divided between the various agencies responsible for natural resource management activities. For example, the rules were amended in 1987 to address concerns about riparian zone protection. The amendments place statutory requirements on the communication and planning between the Board of Forestry and the Fish and Wildlife Commission. Also, amendments were added in 1987 that "reduced Board of Forestry membership from twelve to seven with no more than three members holding financial interests in forestry (Oregon Department of Forestry, *The Evolution of Oregon's Forest Practice Rules 1971-2003*)". This reduction in commercial timber interests on the board was a victory for the environmental organizations that have always been critical of legislation deemed too friendly to commercial interests.

Oregon has arguably one of the most comprehensive set of Best Management Practices in the country. The BMPs surpass the federal requirements under section 208 of the Federal Water Pollution Control Act of 1972 (FWPCA) that "mandated state planning in order to control nonpoint source pollution from mining, agricultural, development, and

silvicultural activities (Cubbage, 1993, pg. 364)". Oregon has revised the regulatory statutes numerous times (1974, 1978, 1987, and 1991). Furthermore, the regulations are mandatory and enforceable through the Oregon Department of Forestry. This places the ODF in the unique position of having enforcement authority, as opposed to the voluntary regulatory mechanisms that exists in much of the Southeast. The importance of BMPs within forestry cannot be underestimated because of the soil and water protections that are encompassed within the statutes. Although monitoring and compliance issues do exist within the BMP debate, Oregon has the highest compliance rate in the West (98%). This compliance rate also speaks volumes about the level of professionalism in the ODF because of the responsibility each forester has in drafting and administering logging plans and activities. In comparison, "California has a compliance rate of 92.3% based on 2003 data of 502 violations per 6488 forest practice inspections. Washington has a compliance rate of approximately 96.6% based on 2002 and 2003 date of 370 primary violations per approximately 11,000 applications (ODF, Annual Performance Progress Report 2003-2004)". After a generation of exploiting Oregon's timber resources, it appears as if progress is finally being made in terms of protecting the surrounding ecosystem and natural resources.

North Carolina Forests

The state of North Carolina can generally be divided into four (4) distinct regions: 1. the southern coastal plain, 2. the northern coastal plain, 3. the piedmont region in central North Carolina, 4. the mountain region in western North Carolina. Within these four (4) regions of the State there is an approximate total acreage of 31.2 million. Within

this total there is approximately 18.3 million (59%) acres classified as forestland. This forestland contains approximately 17.7 million acres (97%) of land that is classified as timberland (land capable of producing 20 cubic feet of industrial wood per acre). The North Carolina forests are some of the most biologically diverse on the planet with approximately 196 different species of trees, which is more species diversity than the total of European forests. This diverse landscape is comprised of nearly 12.7 million acres of hardwood forests and 5.0 million acres of softwood forests. The hardwood forests are comprised of approximately five (5) different types: 1. oak-hickory/7.3 million acres, 2. oak-pine/3.0 million acres, 3. oak-gum-cypress/2.0 million acres, 4. elm-ash-cottonwood/167,000 acres, 5. maple-beech-birch/116,000 acres. The North Carolina softwoods are comprised of approximately six (6) different types of pine(s): 1. loblolly pine/3.5 million acres, 2. Virginia pine/479,000 acres, 3. pond pine/307,000 acres, 4. white pine/196,000 acres, 5. longleaf pine/177,000 acres, 6. shortleaf pine/155,000 acres.

North Carolina forests, in terms of ownership, are dominated by Nonindustrial Private Forest (NIPF) landowners. NIPF ownership is divided into two categories of individual and corporate timberland owners. “In 2002, NIPF owners accounted for 78%, or 13.8 million acres, of the timber land in the State (Brown, 2004, pg. 1)”. Within the individual ownership category, 11.4 million acres are controlled by individual proprietors. The corporate ownership category comprises 2.4 million acres of North Carolina timberland. Public ownership of North Carolina forests comprises approximately 2.4 million acres of timberland. Nearly half, 1.1 million acres (47%) of the public land, is controlled by the Federal government within the National forest system. “Miscellaneous Federal timberland, primarily on military bases, accounted for 586,000

acres or one-fourth of the public timberland (Brown, 2004, pg. 2)". State and local government(s) control approximately 560,000 acres of North Carolina timberland (about one-fifth), respectively. The timber industry in North Carolina owns 1.5 million acres of timberland.

Table 5
North Carolina Forestland

Forestland in North Carolina	18.3 million acres	59%
Total acreage of North Carolina	31.2 million acres	100%

Table 6
Timberland Ownership

NIPF	13.8 million acres	78%
Public (including National Forests)	2.2 million acres	13%
Forest Industry holdings	1.5 million acres	9%
Totals	17.7 million acres	100%

Forests Practices History of North Carolina

The history of North Carolina's forests practices are unique in the sense that it can generally be divided into approximately four, and arguably five epochs. The first three epochs correspond to the general trends throughout the United States, while the fourth

and fifth are unique to North Carolina and the southern United States. The first epoch began during the pre-settlement period, when the forests were inhabited by Native American tribes. It is difficult to approximate the beginning of this period because of the lack of written history before European explorers and settlers began their movement farther west into the North Carolina forests. However, it is readily accepted that these Native American tribes lived for centuries in the forests of North Carolina. Furthermore, one can approximate the length of the period because the corresponding end of the period is well documented.

The first epoch lasted roughly eight-hundred to a thousand years, ending in the late 1840s and early 1850s. This epoch was marked by relatively little timber use due to the sustenance role the forests played for the various Native American tribes in the state. The second epoch began during the 1850s and lasted until the early 1900s. During this epoch, the birth of scientific forestry would begin at the Biltmore Estate near Asheville, North Carolina. Also, the Naval Stores industry and the timber industry in general would begin to expand and dominate the economic landscape. The third epoch would last from the early 1920's until approximate mid 1950's. This epoch would contain the further advancement of scientific forest management and the planting of millions of seedlings in the North Carolina reforestation effort which was necessary to counter the previous exploitation of virgin timber resources. The fourth epoch began during the mid to late 1950s and continued until the mid to late 1980s. Within this epoch, the timber industry was revitalized due to improved harvesting methods and the availability of second growth forests that were developed through advanced scientific methods including genetic engineering of pine stocks. The final epoch began in the mid to late 1980s and continues

until the present day, with no end in site. During this epoch the first Best Management Practices Manual was published in 1989 by the North Carolina Division of Forest Resources. However, the present epoch has been marred by urbanization and forest fragmentation that has contributed to the disappearances of North Carolina's diverse forests, not to the timber industry, but to the housing industry. This forestland has been forever lost to the insatiable appetite of American "development".

During the first epoch or "pre-settlement" period, longleaf pine was the most predominant tree type found along the coastal plain(s) of North Carolina. The longleaf was "supplemented by loblolly pine, particularly above the Roanoke, and by pond pine, cypress, cedar, gum, and oak (Davis et al, 1983, pg. 494)". The bordering piedmont region of central North Carolina contained various types of hardwoods, "with chestnut [being] the most prominent, followed by yellow-poplar, oak, maple, black cherry, and black walnut; as well as conifers such as Virginia pine, hemlock, and white pine (Davis et al, 1983, pg. 494". In the western mountain region, especially within the higher elevations, Red spruce and Frasier firs alpine forests remained relatively untouched by man. During this period, various Native American tribes relied on the vast and bountiful North Carolina forests for sustenance. However, the Native Americans "did use fire to create agricultural clearings and improve wildlife habitats (Davis et al, 1983, pg. 494)". The use of fire has been one of the most consistent traits shared by North American forests.

The first Europeans were awed by the size and variety of the North Carolina forests. "Verrazano, in 1520, reported a "mightie great woods... with divers sorts of trees," and in 1854, Raleigh's scout, Arthur Barlowe, spoke excitedly of oaks and cedars

that far surpassed anything in Europe (Davis et al, 1983, pg. 494)". The European settlers differed significantly from the Native Americans in terms of how they utilized the vast forests. The Europeans viewed the North Carolina forests through a lens of commerce and development, and the forests possessed, in their view, unlimited amounts of resources to achieve both. The settlers would also be responsible for the unfortunate introduction of "free-ranging scrub cattle and long-snouted woods hogs (Clark, 1984, pg. 41)". This introduction of foreign animal species caused tremendous damage to the juvenile trees and hampered the natural re-growth of tree seedlings. This exploitation of North Carolina forests would last for centuries, and "by 1770 the colony ranked seventh in the export of boards, shingles, and staves, and produced about 20 percent of the 100,000 barrels of tar and pitch shipped annually from the American colonies (Davis et al, 1983, pg. 494)". This use of North Carolina forests would lead to the dominant Naval Stores industry within the state, and would eventually lead to the adoption of "The Tar Heel State" as the state's nickname. The vast Naval Stores industry produced "Resins and gums from this state's forest [and] supplied both domestic and foreign ship builders, rope winders, and paint manufacturers… [And] following the War of 1812 the naval stores industry was centered largely in North Carolina (Clark, 1984, pg. 20)". The timber industry itself was undergoing a radical transformation in terms of existence because the era of the yeoman farmer was coming to an end, and being replaced with a timber based resource economy.

The nineteenth century, and the beginning of the second epoch, would be one of continuing exploitation of the North Carolina forests for the primary purpose of providing the naval stores industry with the necessary materials. The naval stores industry would be

the primary driving force behind the encroachment into all of the forest regions of North Carolina. And, “In succession, the magnificent longleaf and loblolly pine gave way to the ax, and what the avid timber cutter missed, the farmer removed seeking new ground to replace exhausted fields (Davis et al, 1983, pg. 494)”. The methods of retrieving forest products and materials from the North Carolina forests were some of the most inefficient and wasteful methods ever to be utilized by the timber and turpentine industries. As A.H. Van Bokelen of Wilmington, North Carolina noted, “The production of naval stores is carried on in a wasteful, extravagant manner, and the net profits derived from the business are entirely out of proportion to the damage which it inflicts upon the forests of the country; the injury is enormous (Bokelen, reprinted in Clark, 1984, pg. 21)”.

Toward the end of the nineteenth century the lumber and forest products industry would began a radical boom of exploitation. The exploitative boom was aided by the infusion of “Northern capital [and] post-Civil War industrialization… Splash dams, log flumes, and railroads extended logging operations into more remote mountains, and steam engines, circular saws, and later band saws accelerated the processing of felled timber (Davis et al, l983, pg. 494)”. These technological advancements, along with the utilization of portable lumber mills, would place North Carolina at the center of the southern lumber industry.

During the second epoch, from about 1889 to 1911, the North Carolina timber industry explosion was well under way. This explosion was aided by the beginning of the thriving pulpwood and furniture industries, and during this period, “annual lumber production increased from 554 million board feet to a record 2.25 billion board feet (Davis et al, 1983, pg. 494)”. The timber industry was experiencing another important

evolution in its existence because historically the turpentine industry had been a very large and powerful competitor in terms of the amount of timber resources that were exploited. However, “the two industries were incompatible. In the long run the turpentiner was unable to compete successfully with the lumberman… After 1910 the lumbering industry greatly outstripped all other exploiters of the [North Carolina] woodlands (Clark, 1984, pg. 23)”.

The Progressive Era of the second epoch would also contain what was arguably the saving grace of North Carolina forestry – the establishment of the Biltmore Estate and the beginning of scientific forestry. In the late 1880s George W. Vanderbilt “acquired more than 100,000 acres of rugged mountainous lands about the headwaters of the French Broad River in the western North Carolina counties of Buncombe, Henderson, Transylvania, and Haywood (Clark, 1984, pg. 41)”. Vanderbilt would employee Gifford Pinchot, who would later become the first Chief Forester of the United States Forest Service, as the lead forester for the estate. Pinchot had been trained in the forestry profession at the French National Forestry School because during this period Europe was far more advanced in the scientific management of forests than that of their American counterparts. This knowledge and training would lead Pinchot to supervise “the first major reforestation program in the United States (Davis et al, 1983, pg. 495)”.

After encouraging Vanderbilt to purchase more land that included the Pisgah Forest, and exposing the Biltmore forests practices to vast amounts of publicity at the 1893 Columbian Exposition in Chicago, Pinchot resigned and subsequently encouraged Vanderbilt to hire Carl A. Schenck as his replacement. The German born Schenck would start the one year academy known as the Biltmore Forestry School in 1898. The school

was the first of its kind in the United States. The vastness of the Biltmore Estate allowed Schenck to practice and implement his philosophy of attempting to make forestry profitable. In this he was successful, and although Schenck would eventually end his relationship with Vanderbilt in 1909, and the school in 1913, “his impact upon American forestry has been incalculable; the Biltmore Forest is still a mecca for foresters from all over the world (Davis et al, 1983, pg. 496)”. The Pisgah Forest would eventually be sold in 1916 by Vanderbilt’s widow to the Federal government, which in turn created the Pisgah National Forest. Another important occurrence during this time was the adoption of the Federal Weeks Act of 1911 which “facilitated development of national forests in the East. Appropriately, the first purchase under the Weeks Act was a tract on Curtis Creek, near Old Fort, North Carolina (Davis et al, 1983, pg. 496)”. The these two occurrences would help foster the creation of three other national forests during the future epochs – “the Nantahala, in 1920; the Croatan, in 1936; and the Uwharrie, in 1961 – bringing the total national forest lands to more than a million acres (Davis et al, 1983, pg. 496)”.

The second epoch, and the beginning of the third epoch, was an extremely busy time in the advancement of scientific forestry in the southern United States. Forest management of Federal land was already taking place, and this management would be furthered by the development of a state forestry department. The North Carolina Geological Survey was commissioned in 1891 in order to “conduct forestry investigations and prepare timber inventories for the state (Davis et al, 1983, pg. 496)”. This would lead to the creation of the first forestry division within the state in 1908. The forestry division, “under the renamed Geological and Economic Survey”, would be

placed “under the direction of graduate forester John Simcox Holmes (Davis et al, 1983, pg. 496)”. The Division of Forest Resources (NCDFR), located within the North Carolina Department of Environment and Natural resources is the modern day equivalent of North Carolina Geological Survey. The creation of the North Carolina Department of Forestry would be implemental in the reclamation and reforestation that would take place in the third epoch. These reforestation efforts would be crucial to the future of North Carolina forests because this epoch would witness the continued exploitation of North Carolina forests by the timber industry because the “years of World War I… may well be considered a watershed in the history of the forest industry in [North Carolina]. The shocking and wanton harvest during these years was a sobering experience, the memory of which lingers in any historical consideration of the South’s forest resource (Clark, 1984, pg. 25)”. The next World War would not exact such a toll on North Carolina’s forests due to the advent of steel production and construction.

The third epoch would begin in the mid to late 1920s, and would contain some of the most drastic improvements to the exploited North Carolina forests. This era would also contain the creation of the two dominant forestry schools at North Carolina State University at Raleigh in 1929, and ten years later Duke University would found a prominent graduate school for forestry. And by the 1980s “the respective schools [managed] 82,000 acres and 7,000 acres of experimental forests (Davis et al, 1983, pg. 496)”. The 1930s were an extremely progressive time in the scientific management and reforestation of North Carolina. The Tennessee Valley Authority partnered with the North Carolina Department of Forestry to explore methods of fire prevention and control on 2.71 million acres of forests. “The North Carolina experiment… resulted in a

phenomenal reduction in the number and scope of areas burned over by individual fires and in total acreage destroyed annually (Clark, 1984, pg. 90)". Also, "during the 1930s, the Civilian Conservation Corps (CCC) worked with state foresters planting trees, checking erosion, building fire roads and towers, and providing numerous recreational sites throughout the state (Davis et al, 1983, pg. 496)".

The reforestation of North Carolina's forest lands that took place during the fourth epoch would have the direct effect of revitalizing the timber industry. Although the industry had never left North Carolina, it had begun to move farther south in order to find more abundant sources of virgin timber. Furthermore, there was a need to modify logging practices during this time because of the inherent destructive nature of the practices (i.e. log skidders destroying new seedlings). The timber industry realized, by way of cooperation with the Southern Forest Experiment Station, that new and better methods must be developed in order to protect the longevity of the timber industry's resource base. The development of more benign logging methods such as, "selective cutting practices, and utilization of wastage of inferior logs… and the [introduction] of the logging truck (Clark, 1984, pg. 71)", along with the emergence of the second growth forests that were planted during the beginning of the third epoch, would act in concert as a means for the timber industry's revitalization. This revitalization in North Carolina and the South in general, would lead to the timber industry's acquirement of large new tracts of timberland, and "[building] enormously expensive processing plants, [employing] highly sophisticated forest management techniques, and gave close heed to those golden terms of wood-using industrial survival, "regrowth" and "continuous operation" (Clark,

1984, pg. 72)". This industrial revitalization would last until the mid 1980s and early 1990s when the fifth epoch of North Carolina's forest lands would begin.

The fifth epoch in North Carolina's forest lands is quite unique in the history of North Carolina and the United States. The epoch has witnessed the shrinkage of forest industry land, although the forest industries remain the second largest employment sector within the state, employing more than 144,000 individuals in 2004 (source: United States Department of Agriculture; Cooperative Forestry Statistics). The acreage owned by the timber industry "declined 33 percent, from less than 2.3 million acres in 1990 to 1.5 million acres in 2002 (Brown, 2002, pg. 1)".

During the fifth epoch the forest industry would be placed within a quasi-regulatory scheme that regulates forestry through the implementation of BMPs. These BMPs are contained within the North Carolina Forest Practice Guidelines (FPGs). FPGs are primarily concerned with water quality, and as such the FPG guidelines constitute a quasi-regulatory mechanism that controls forestry activities. Also, the forestry regulations are quasi-regulatory in so much that harvest regulations are voluntary except when the activities will directly and adversely effect water quality (i.e. the distance of the harvest activities in relation to various water sources). BMPs are defined under North Carolina Administrative Code (NCAC) as: "a practice, or combination of practices, that is determined to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (NCAC 01l.0102)".

These regulations were first published in September of 1989 by the Division of Forest Resources. This relatively late occurrence, as compared with Oregon and other Pacific Northwest states, is widely considered typical in terms of southern states being

reluctant to adopt regulatory policies that are considered outside of the conservative policy mainstream. Harvest activities in North Carolina must also comply, like all states, with the FWPCA, the Coastal Zone Protection Act, and the Endangered Species Act. However, the primary means for regulating harvest activities at the state and local level within North Carolina are the BMPs within the Forest Practices Guidelines.

The current epoch contains the most dramatic occurrence affecting North Carolina's forests – urbanization and the subsequent forest fragmentation that occurs when more owners control smaller tracts of forests. According the United States Department of Agriculture (USDA) 2002 statistics on urbanization, North Carolina is urbanizing faster than any state in the country (USDA, *State and Private Forestry Fact Sheet*). This unprecedented urbanization "results in increased pressure on communities in the wildland-urban-interface to enhance education, regulatory and related ordinances and other activities associated with smart growth development and natural resource conservation (USDA, *State and Private Forestry Fact Sheet*)". This urbanization has been made possible through the shrinkage of the timber industry whose timberland holdings "declined 33 percent, from less than 2.3 million acres in 1990 to 1.5 million acres in 2002 (Brown, 2004, pg.1)".

Conclusion

North Carolina has traditionally been conservative in terms of the regulatory approaches the state has used to control forestry activities. The state still has a quasi-regulatory approach in so much as many of the regulations are voluntary, except when water quality concerns are present. When water quality concerns are present, the

landowner must comply with the BMPs listed under the NCAC Forest Practice Guidelines. These regulations are developed and applied at the state and local level by the North Carolina Division of Forest Resources. The NCDR is a highly professional organization that employs nearly one thousand employees, of which, over 600 technician and forestry professionals that cooperatively manage over six million acres of land (National Association of State Foresters, *2002 State Forestry Statistics*). However, the main threat to North Carolina Forests is no longer the timber industry, it is the housing industry. Urbanization trends in North Carolina are the highest in the country and are showing absolutely no signs of slowing. This will continue to be of importance as encroachment continues into North Carolina's forests. This encroachment is decidedly different from what has taken place during North Carolina's forest practices history in so much as the land will not be reforested, and is forever lost to "development".

Florida's Forestland

Florida's forestland "originally covered 27 million acres, almost 80 percent of the state's land area (Davis et al, 1983, pg. 185)". This original forestland acreage has decreased substantially, and in 2002 forestland acreage was approximately 14.7 million acres, 42 percent of the state's land area (2002 State Forestry Statistics; National Association of State Foresters). The original forestland that covered most of the state was comprised of several types of oaks, slash and longleaf pine, "while juniper and cypress were predominant in the swamps and mangrove clung to the southern costal areas (Davis et al, 1983, pg. 185)". Remnants of this forestland diversity still exist in the state with an approximate forestland cover of fifty percent hardwoods and fifty percent softwoods. However, the forestland of the state is currently dominated by pine plantations, which cover 31 percent of Florida's forestland. These pine plantations are owned by the timber industry and are primarily located in the state's northern "Panhandle".

Florida's forestland, in terms of ownership, is comprised of approximately four (4) categories. Nonindustrial Private Forests (NIPF) owners control 7.2 million acres (49%) of forestland, making NIPF's the largest proprietor of Florida's forests. The forest industry is the second largest proprietor with approximately 4.6 million acres (31%). This forestland is predominantly pine plantations located in the northern "Panhandle". The third category of ownership, approximately 1.8 million acres (12%), is controlled by state and local governments. This amount of acreage being controlled by state and local governments makes Florida relatively unique in terms of ownership. Within this acreage there are thirty-six (36) State Parks with an approximate acreage of 800,000 acres (42%

of state owned land). The final category of ownership is the Federal government, which controls 1.03 million acres (7%) within the National Forests system.

National Forests	1.030 million acres	7.0%
State and Local	1.802 million acres	12.3%
Forest Industry	4.016 million acres	27.4%
Forest Industry Leased Holdings	.586 million acres	4.0%
NIPF	7.217 million acres	49.3%
Totals	14.651 million acres	100 %

Forests Practices History of Florida

Forests practices in the state of Florida can generally be divided into four epochs that correspond to the general trends in the Southern United States. The first epoch began in the mid 1700s and lasted until the 1920s. This epoch was defined by the exploitation and clearing of mature natural forests. The forests were exploited by the growth of the timber and Naval Stores industries, and cleared to make way for agriculture. The second epoch began in the 1920s and lasted until the 1940s. This epoch was defined by a drastic reduction in timber output that was the result of exploitation in the first epoch. Also, within this epoch, the timber industry would begin to attempt its first reforestation efforts that coincided with the return of pine stocks on land that was abandoned by farmers. The 1940s through the 1960s would be the third epoch. This epoch contained some of the most drastic and intensive efforts by the timber industry to re-grow its depleted resource

base. It would be an era of cooperative programs between the timber industry and local owners, including the introduction and dispersion of seedlings grown in industry nurseries. The fourth and final epoch began in the 1960s and continues until the present day. This era has witnessed the planting of genetically engineered pine seedlings through the cooperative relationships that were begun during the preceding epoch.

Florida's forests began to be exploited "on a limited scale in 1760s with the production of planks, shingles, staves and tar. During the American Revolution, Florida supplied England with lumber and Naval Stores (Davis et al, 1983, pg. 185)". This exploitation would decline slightly when Florida was returned to the control of Spain. However, in 1819, when Florida was granted statehood, forests resource use would begin to increase. And by "1834 there were twenty-five mills in the vicinity of Pensacola manufacturing lumber, Lath, shingles, and staves for markets in the United States and the West Indies (Davis et al, 1983, pg. 185)".

Lumbering operations during this early period were limited by navigable rivers that were able to be used to move the logs downstream to lumber mills. This impediment would change after the Civil War when the railroads would begin to encroach on the interior of the state, opening the once secluded areas to lumbering operations. Furthermore, the railroads also connected the Florida peninsula to the rest of the United States thereby making markets more readily accessible. Railroad construction would play an instrumental role in the development of the timber industry because "the state sold its lands at bargain prices and gave millions of acres to the railroads as construction subsidies. These corporations in turn sold their lands to the lumber industry (Davis et al, 1983, pg. 185)". These land transactions would foster the explosion of the timber

industry, and between 1870 and 1909 “lumber production rose sixfold from 200 million board feet a year to a peak of over 1.2 billion [board feet] (Davis et al, 1983, pg. 185)”. The 1870s would also witness the detrimental creation of the turpentine industry in the Northern Florida pinelands, and by 1908 the turpentine and Naval Stores industries in Florida “yielded over 17 million gallons of turpentine and over 1 million barrels of rosin, almost half the rosin produced in the United States (Davis et al, 1983, pg. 185)”.

During the second epoch, beginning in the 1920s and lasting until the 1940s, the timber industry production would begin to decline do to several interrelated factors. The first factor was the rapid advancement in specialized equipment and logging techniques that “made it possible to harvest the magnificent cypress that flourished in the swamplands. Production of cypress peaked at about 200 million board feet in 1930, when it provided 22 percent of the state’s lumber output (Davis et al, 1983, pg. 186)”. The timber industry relied on technological advancements and the railroads to continue their trek south in search of mature forests to exploit. This encroachment into the swamplands of Florida was the result of a severe lack of conservation and reforestation efforts on behalf of the timber industry. This second factor, lack of conservation and reforestation, would have a direct impact on the future of the timber industry in Florida because by the late 1920s “destructive cut-out-and-get-out practices and rampant wildfires had reduced Florida’s once bountiful forests to just 6 million acres of virgin timber stands (Davis et al, 1983, pg. 186)”. These destructive practices would help spur the creation of the Florida Forestry Association (FFA) in 1923, which is arguably one of the most significant developments in the history of the Florida timber industry.

The creation of the FFA in the early 1920s was the direct result of the growing concern about the sustainability of timber resource extraction. In 1923, "lumbermen, landowners, and other concerned individuals established the Florida Forestry Association (Davis et al, 1983, pg. 186)". This organization was formed on the basis of cooperation between industry and citizens, and by 1926 the FFA had published *Common Forests Trees of Florida*. This publication would be the FFA's first educational booklet. By 1927, one year after the incorporation of the organization, the FFA "took the leading role in securing legislation that created the Florida Board of Forestry. The Board proceeded to organize the Florida Forest Service 'to gather and disseminate information on forests, their care and management, to prevent and extinguish forest fires, and to enforce all laws pertaining to forests and woodlands.' In 1928, the Association worked with the Florida Forest Service to organize replanting efforts with a state program to subsidize the cost of growing and supplying tree seedlings to the public (Florida Forestry Association website, *Florida Forest History*)".

The creation of the FFA had a profound impact on the forest industry in Florida because "within five years of its first meeting, [the FFA] had put into place a self-regulatory system where the Florida Forest Service serves as a public educational bureaucracy rather than a regulatory one (Conference Paper; Kiel, Dwight)". The uniqueness of this educational versus non-regulatory approach, coupled with the recognition that the lumber industry "could not afford to exhaust their timberlands as their predecessors had done (Davis et al, 1983, pg. 186-187)", had a profound impact on the structure of the forest industry. This cooperative method would be the impetus behind the timber industries leading "the way in sustained-yield management and reforestation on their own lands and set precedents for forestry elsewhere (Davis et al, 1983, pg. 187)".

The creation of the Florida Forest Service in 1928 was the direct result of the FFA's participation and influence. The FFA furthered the advancement of Florida forestry in 1936 when the organization was the lead proponent for the "establishment of the School of Forestry at the University of Florida (Florida Forestry Association website, *Florida Forest History*)". The support, and subsequent creation of the school by the FFA, would be instrumental in providing Florida with "professionals for the Florida Forest Service and the forest industry (Conference Paper; Kiel, Dwight)".

During the third epoch, which began during the 1940s and lasted until the 1960s, the FFA would continue to play an instrumental role in the recovery and development of Florida's timber industry. The FFA would continue to support Florida educational institutions, and in 1947 the Columbia Forestry School, which would later become the Forest Ranger School at Lake City Community College, was founded with FFA support and influence. It is important to note that, "the FFA not only helped in establishing these schools they continue to this day to use their publications to promote the hiring of the graduates of these two publicly funded schools (Conference paper; Kiel, Dwight)". Furthermore, in 1957, the FFA would support the University of Florida in the creation of a "research and educational unit in tree genetics… which was funded by the public and ten of the largest pulp and paper companies in Florida (Conference paper; Kiel, Dwight)". The creation of this research institution would be instrumental in the development of genetically engineered pine seedlings that would become the stable of replanting efforts, and "by the 1960s, the state led the nation in tree planting five years in a row, with more than 100 million seedlings planted annually (Davis et al, 1983, pg. 187)".

The third epoch, and the beginning of the fourth in the early 1970s, would contain two developments that would threaten to undermine the influence of the FFA and timber industry in Florida politics. The first instance occurred during the reapportionment of the Florida state legislature in 1962. The state legislature was reapportioned in such a way that the influence of the forest industry in northern panhandle was shifted toward the rapidly developing urban areas in southern Florida. The FFA shifted legislative strategies in order to compensate for the reapportionment. “The FFA argued that increased lobbying and vigilance was necessary because, ‘tragically, pine trees no longer voted’ (Conference paper; Kiel, Dwight)”.

The second occurrence that threatened to undermine the influence of the FFA occurred during the end of the third epoch and the beginning of the fourth. During this period there was an increasing concern surrounding the detrimental impact that human activities were having on the environment. This increased concern was taking place across the nation, and Florida was certainly no exception. The increase in concern and awareness would lead to the creation of the Florida Department of Environmental Regulation (FDER) in 1975. The FFA was concerned about the possibility of regulations hampering harvests, and in response to this perceived threat the FFA began to establish a cooperative working relationship with the department. This cooperative relationship is indicative of how the FFA has historically operated and would lead to the creation of Best Management Practices (BMPs) “that would protect water quality. The BMPs were voluntary guidelines except where they were necessary to reach compliance with Federal Water Pollution standards (Conference paper; Kiel, Dwight)”. During this period, “Florida’s forests supplied about 3 million cords a year to 9 pulpmills in the state, while

more than 125 sawmills, veneer mills, and other primary wood-using plants utilized about 400 million board feet of timber annually (Davis et al, 1983, pg. 187)".

The FFA would continue cooperating with Florida's natural resource agencies, and in 1984 when the Wetland Protection Act (WPA) was passed, the FFA began working with the five (5) regional Water Management Districts (WMDs) that were created under the WPA. These WMDs were given regulatory authority over forest practices on land that was not classified under public ownership. The Florida Division of Forestry began a formal review of BMPs in 1992. The review involved the participation of state agencies responsible for natural resource management, conservation groups and the FFA. The FFA played an instrumental role on the "Technical Advisory Committee… that revised the forestry BMPs in Florida (Conference paper; Kiel, Dwight)".

During the 1990s the FFA continued to participate in programs that are arguably considered to be within the conservation paradigm. This participation is particularly evident with the FFA support of the Preservation 2000 program and the Florida Forever land acquisition program. Furthermore, the "FFA and the Division of Forestry have combined forces to create Florida Forests Forever, an informational and educational program that touts the advantages of forestland acquisition (Conference paper; Kiel Dwight)". This cooperative effort between industry and natural resource agencies is unique and has presented the FFA with a continuing "source of timber without industry maintenance costs (Conference paper; Kiel Dwight)".

Conclusion

Florida's forests practices history has shared a common thread with that of North Carolina, especially in terms of regulatory mechanisms used to regulate silviculture practices. Florida's silviculture guidelines remain voluntary, except were it is necessary to comply with legislation concerning water quality, thereby making the regulatory structure quasi-regulatory in its composition. The development of the Water Management Districts and subsequent Best Management Practices has had an influential impact on silviculture activities in Florida. Also, the involvement and influence of the Florida Forestry Association has been noteworthy because of the close cooperation that has existed between the FFA, the timber industry and Florida legislature. This association is unique, as Kiel highlights, because of the uniqueness of the stability of the policy triangle.

CHAPTER FIVE: CONCLUSION

Forest use and practices within the United States has evolved from periods of unconstrained exploitation, through the utilitarian and Progressive periods, Multiple-Use (which was little more than the continuation of exploitation) to the beginnings of scientific management, and the current paradigm of Ecosystem Management. The view of the early settlers that saw timber resources through a lens of utility and exploitation has long passed, what remains is timber resource management that is increasingly relying on science and an understanding of the necessity of preserving and maintaining timber resources. This evolution has taken decades of experience and trial and error. The current technique of Ecosystem Management is still in its infancy and much debate remains about how to properly pursue such management techniques.

Oregon, and the Pacific Northwest in general, have the most comprehensive and restrictive forest practice acts in the country. The Oregon Forest Practices Act covers a wide array of harvesting activities including stream buffer zones to protect water quality, standards for slash disposal, and requirements that Oregon Department of Forestry foresters make site preparation plans prior to harvesting. The act does allow for "enforcement authority [that] ranges from personal conferences with violators to corrective action taken by the state agency [ODF] that can include placing a lien on the landowner's or timber operator's property… Violation of the law in [Oregon] usually is a misdemeanor punishable by fines of up to $1000 or jail sentences of up to one year, or both… Some loggers and landowners have been jailed for violations of the state forest practice acts in Oregon (Cubbage, 1993, pg. 425)". Furthermore, logging contracts that take place on "Oregon state forests require high levels of soil and watershed protection", which is consistent with the restrictive Best Management Practices that the forest practice

act contains. “For example, loggers must maintain roads to safeguard soil, water, and drainage structures and ensure that exposed soil will not erode (Koontz, 2002, pg. 73)”.

The ODF is considered a highly professional organization that requires foresters to complete licensing programs to ensure and enhance competence. The ODF has regulatory authority and the ability to enforce and levy penalties under Forest Practices Act. The ODF foresters also complete site specific plans for harvesting operations prior to the beginning of harvesting activities. These requirements are common throughout the Pacific Northwest and not as common in the South.

Florida and the southern model in general, differ from Oregon in so much as “Florida has a non-regulatory BMP program, but State permits are required for forest roads, stream and wetland crossings, ditching and borrow pits (Vowell 2000, reprinted in Prud’homme and Greis 2002, pg. 530)”. However, the Florida Department of Environmental Protection’s Forestry Division can assess “noncompliance with specific BMPs. When it is determined that a BMP has not been implemented properly, an assessment of “significant risk” is made. Significant risk exists when a situation presents imminent and substantial danger to designated beneficial uses of State waters (Prud’homme and Greis, 2002, pg. 531)”.

The Forestry Division of Florida is considered to be a highly professional organization that requires foresters to complete programs such as a Master’s Logger program, which is a three day program, intended to enhance proficiency and competency. The foresters within the division have completed the various technical and licensing programs that exist within the State universities that were previously mentioned. The

Florida model is unique due to the cooperative and beneficial relationship that exists between the Florida Forestry Association and the Division of Forestry.

North Carolina, “the cradle of forestry”, has a rich history concerning forestry and forest practices. The diverse forests of North Carolina were, at one time, on the verge of extinction. The forests have rebounded due to the unprecedented reforestation efforts that have taken place in the State. However, the forests are once again under assault from urbanization and forest fragmentation trends that show no signs of slowing. North Carolina has lost approximately one (1) million acres of timberland since 1990, with over 70% being lost to urbanization.

North Carolina’s quasi-regulatory mechanism controls harvesting activities through a “mandatory set of Forest Practice Guidelines (FPGs), which are performance standards specified for various forest management categories, but has a voluntary forestry BMPs designed to ensure attainment of FPGs (White 1992, reprinted in Prud’homme and Greis 2002, pg. 531)”. The State has also passed the Sediment Pollution Control Act which initially exempted forestry activities; however the act was amended in 1989 to include harvesting practices to ensure that harvesting complied with the FPGs.

The State primarily relies on citizen complaints to bring attention to possible violations. After a complaint is submitted, a representative from the North Carolina Division of Forest Resources inspects the sight to determine whether or not the logger is in violation (if the logger is unable to be reached, then the landowner is held responsible), and makes subsequent recommendations for FPG compliance. “If recommendations are not implemented and water quality problem(s) continues, the incident is referred to the department of land resources, the division of water quality, or the division of forest resources law enforcement staff for action. Activity can be stopped and a fine of $1,000 levied, a sediment plan required within 30 days of disturbance,

specific cleanup measures required, and $500 per day fine levied if cleanup is not accomplished. The site is monitored until cleanup is finished (Prud'homme and Greis, 2002, pg. 531)". The state does have a compliance rate, according the DFCR, of approximately 93%.

The North Carolina Division of Forest Resources is considered to be highly professional organization, employing licensed foresters and technicians. The technicians are responsible for the scientific justifications and study, while the foresters are responsible for site planning and inspection. Also, North Carolina is one of the few states in the South that requires foresters that are not with the NCDFR to be licensed.

As previously stated, the primary differences between the Western model and the Southern model pertains the regulatory mechanisms utilized. Oregon has one of the most comprehensive and restrictive pieces of legislation in the country, while Florida and North Carolina have quasi or semi-regulatory mechanisms. Compliance in Oregon is nonvoluntary, while Florida along with North Carolina relies on voluntary mechanisms to for BMPs. However, North Carolina's statutes have become more restrictive since the late 1980's. The common trait shared by all is the professionalism of the forestry division. All three go to great lengths to ensure that the foresters and technicians that are employed by each division are highly trained and qualified.

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