SCIENTIFIC FOREST MANAGEMENT AREA

HUDSON POND

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BAXTER STATE PARK

SCIENTIFIC FOREST MANAGEMENT AREA UNIT MANAGEMENT PLAN

STATEMENT OF PURPOSE 1

PART I: MANAGEMENT POLICIES AND GUIDELINES

A. INTRODUCTION. 4

B. POLICIES AND CONCEPTS 6

C. RESOURCE MANAGEMENT GOALS 7

D. RESOURCE MANAGEMENT FRAMEWORK 7

PART II: FOREST MANAGEMENT PLAN

A. Site Description

1. Legal
2. Physiographic
3. Historical

B. Resource Management Plans

1. Timber
2. Fisheries and Wildlife
3. Recreation
4. Markets
5. Transportation
6. Visual
7. Critical Areas
8. Coordination, Cooperation, Research and Education

C. Appendix Data

1. Usefulness of an Experimental Forest for Research and Teaching
2. Timber Supply Anaylsis Utilizing the Formaine Model
3. SFMA Advisory Committee

STATEMENT OF PURPOSE

The Baxter Park Plan, Section I, Policies and Concepts (1978), describes and provides policy guidelines and a conceptual framework for management of the Park. This Unit Management Plan provides management policies, guidelines, standards and practices specific to the Scientific Forest Management Area of Baxter State Park.

The purpose of this Unit Plan is to define the long-term goals of the Scientific Forest Management Area as envisioned by Percival Proctor Baxter, and to provide specific management frameworks and guidelines for accomplishing these goals. The development of the goals of the SFMA are based solely on interpretation of the intentions of Governor Baxter as conveyed in communications to government officials and within the Trust Deeds giving the land to the State of Maine as follows:

Baxter Communications (1955) to Governor Muskie;
Senate and House of Representatives, 97th Legislature

"This 3,569 area will be available both for recreation and for scientific forestry management and can be made to produce a continuing crop of timber to be harvested and sold as are potatoes or any other product of the soil."

"It long has been my purpose to create in our forests a large area wherein the State may practice the most modern methods of forest control, reforestation and production....This new 3,569 acres is an excellent location for this purpose."

"In my travels in foreign lands I have seen beautiful great forests that for centuries have been producing a crop of wood without depletion. In Sweden, Norway, Finland, Germany, Chile, Russia and elsewhere what has been done by scientifically controlled forestry can be done in Maine. I now make it possible for the State to try a major experiment here at home, an experiment that can mean much for our future timber supply, which all admit is the chief natural resource of our State."

"The terms of this gift are identical with those of the three thousand five hundred sixty-nine (3,569) acre; Public Park, Public Forest, Public Recreational and Scientific Forestry Purposes and Reforestation. I want this township to become a show place for those interested in forestry, a place where a continuing timber crop can be cultivated, harvested and sold; where reforestation and scientific cutting will be employed; an example and an inspiration to others. What is done

in our forests today will help or harm the generations who follow us."

"This township six (6) range ten (10) is what is termed by woodsmen 'good growing land'. an area with an abundance of wildlife, especially moose. Fishing and hunting will be allowed under the general Fish and Game Laws of the State."

Private and Special Laws 1955, Chapter 61

"All harvesting of said products shall be done according to the most approved practices of Scientific Forestry and all revenue derived from the sale of said products shall be used by said State for the care, management and protection of Baxter State Park as now or hereafter defined:"

Private and Special Laws 1955, Chapter 171

"The trees harvested may be cut and yarded on the premises but no manufacturing operations shall be carried on within said township. All revenue derived from the sale of timber shall be used by the State IN TRUST for the care, management and protection of Baxter State Park as now and hereafter defined, and the said twenty-five thousand twenty-five (25,025) acres forever shall be held by said State as Trustee in Trust..."

Private and Special Laws 1955, Chapter 2

"The State of Maine is authorized to clean, protect and restore areas of forest growth damaged by Acts of Nature such as blowdowns, fire, floods, slides, infestation of insects and disease or other damage caused by Acts of Nature in order that the forest growth of the Park may be protected, encouraged and restored."

PART I:

MANAGEMENT POLICIES AND GUIDELINES

A. INTRODUCTION

Baxter State Park is unique; there is none other like it. The Scientific Forest Management Area is also truly unique because it is a part of the Park and because of the intentions Governor Baxter set out for its management.

Management within the Scientific Forest Management Area (herein referred to as SFMA) will be very different than that in the remainder of the Park where the forever wild concept expresses the management philosophy. The forever wild concept does not prevail in the SFMA, where rather than allowing natural processes to occur uninterrupted, practices may be implemented to manipulate the successional stages of the forest. The SFMA must also be exemplary in comparison to forests managed for commercial purposes. SFMA management practices must, however, be practical and economically feasible to meet Governor Baxter's desires for the area to be a "showplace" and "an example and an inspiration to others".

Growing and harvesting high quality trees in concert with reforestation on a continuous basis under the best known methods of scientific forest management is the primary consideration within the SFMA.

Herein, scientific forest management is considered to be the practical application of knowledge provided by the biological, physical and social sciences in an endeavor to attain specified objectives of ownership in the management of a forest property.

When properly applied, scientific forest management results in a sustained yield of forest products and/or services of better quality and in greater quantity than would have been produced on a forest property in the same period of time by natural processes alone. Scientific forestry incorporates the following:

1. Recognition of the fact that a forest is a dynamic biological entity. At various stages in its development, it has different characteristics. To accomplish scientific forest management, the forest must be conceived as a dynamic biological entity. Cultural practices performed to benefit human interests must be considered an intervention in naturally occurring processes. However, to be truly effective, these practices must be similar to the naturally occurring processes.

2. Recognition of the forest stand (a community of trees occupying a specific area and sufficiently uniform in composition, construction, density, and site quality to be distinquishable from adjacent communities) as being the basic unit of silvicultural management.

3. Harvest of mature forest stands with prompt replacement by young stands established either naturally or artificially and composed of a single species or mixture of species deemed to be most suited biologically and economically to the site.

4. Intermediate cuttings (treatments) in immature forest stands, when justified from an economic standpoint, for the purpose of augmenting the total yield; controlling the species composition; and improving the vigor, growth rate, seed production, and wood quality of the residual trees.

5. Maintenance of inherent site quality by locating roads and conducting harvesting operations with such equipment and in such manner as to minimize soil erosion and soil compaction and resource degradation.

6. Adoption of merchantability standards for material re-removed during cultural operations which are realistic in accordance with markets. Markets are affected primarily by technologies and forces outside the realm of forest management.

7. Use of equipment for cultural activities that will best accomplish objectives. Equipment is a means to an end, not an end in itself. Restricting operational procedures to methods of yesteryear or tomorrow does not guarantee that scientific forest management will be pursued.

8. Prevention and control of damage to forest crops by wildfires, insects, diseases, and other injurious agencies, within the realm of understanding and application of forest ecology and the place of all factors which play a natural part in forest development.

9. Enhancement of the yield and/or quality of wood products produced per unit area through amelioration (fertilization, drainage, irrigation) of the site, use of genetically improved growing stock, and/or applications of stand treatments(weeding, cleaning, spacing etc.).

10. Enhancement of wildlife populations by increasing the diversity and quality of habitat.

11. Preservation and enhancement of special areas, such as habitat, for rare and endangered flora and fauna, deer yards, stands of old growth trees of special significance, especially valuable geological formations and other areas or sites having unusual ecological value.

12. Development of appropriate recreational opportunities to enhance enjoyment of the natural resources and provision of interpretive facilities and opportunities designed to educate the user regarding the scientific forestry principles practiced in the SFMA.

The balance that forest management on the SFMA must achieve between social and economic needs and the long-term biological values and framework of the forest ecosystem is a major challenge. The concept of this balance from the European perspective is described by Hans Leibundgut, Director, Institute of Silviculture, Swiss Federal Institute of Technology, Zurich, Switzerland in the paper "Usefulness of An Experimental Forest for Research and Teaching". (See Appendix.)

B. POLICIES AND CONCEPTS

The "Scientific Forest Management Area" is specifically provided for in the Deeds of Trust, with scientific forest management being the employment of the best forest practices known to achieve the goals established for the area. Practices shall be reviewed frequently with knowledgeable members of the professional and scientific community.

The Baxter Papers present this area as a zone within Baxter Park in which the forest is to be managed for purposes which go beyond the usual need of a commercial forest. It is the long-term goal of the Baxter Park Authority to demonstrate the highest levels of practice available in management of all the various renewable surface resources to serve as an example and inspiration.

The actual practice of forestry in this area will consist of establishment and growth of trees and associated vegetation, cultural operations to protect and enhance growth, and harvest and transportation of forest products. Forestry practice will strive to be harmoniously coordinated with the management of other resources, including fisheries and wildlife, recreation, unique natural characteristics and watershed values with a view toward effecting a proper balance among all uses. All approved practices will be the responsibility of the Resource Manager under the supervision of the Park Director.

The quality of forest management practiced will work toward the highest order currently in practice or documented by research of authorities recognized in the forestry profession. Operations will strive for economic feasibility as stated in the Deeds of Trust which provide for use of "revenues derived from sale of timber". Such revenues shall not be sought after solely as short-term economic gain, but will be used primarily for long-term exemplary management with professionally sophisticated consideration showing an overall economic balance of income over

expenditures. Appropriate records will be maintained to identify the practicality of operations and thereby demonstrate the variety of values of forest land to the public.

All practices will be carried out in a manner that will:

a. Maintain a substantial yield of products and services. Products include sawlogs, pulpwood, fish, wildlife, and similar items that can be managed and produced. Services include clean water, recreational opportunities, aesthetics, wildlife viewing, unique habitat protection, educational opportunities and similar items that are a part of the total environment that can be maintained and improved by scientific forest management.

b. Incorporate other uses provided for in the Deeds of Trust, which do not deny accomplishment of the scientific forest management objectives. Productivity of the land shall not be impaired nor one natural resource sacrificed for the benefit of another.

c. Enhance the quality of the more productive sites and habitats. Effort expended shall be proportional to the productive potential, i.e., the most effort put into the best sites as an investment in a future return of greater value.

d. Maintain or enhance sites and habitats when ever possisible.

C. RESOURCE MANAGEMENT GOALS

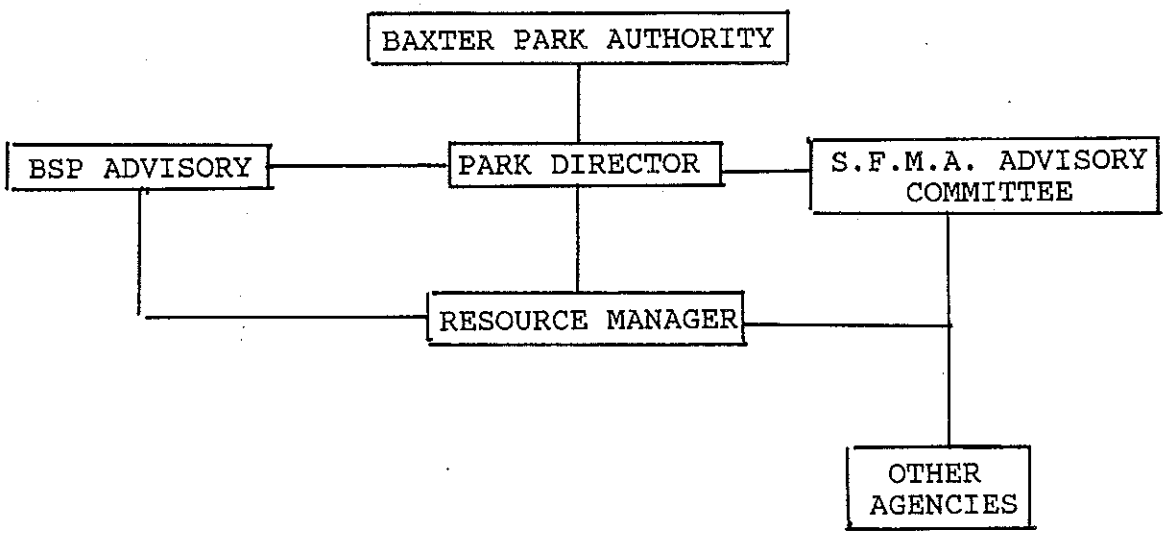
It is the goal of the Baxter State Park Authority to manage the SFMA in compliance with Governor Baxter's Communications and Special and Private Laws as expressed in the Deeds of Trust for the area, by the implementation of sensitive, scientifically-approved intervention, to develop a forest which will produce high value forest products while maintaining or enhancing the other primary products and social values of the SFMA.

D. RESOURCE MANAGEMENT FRAMEWORK

1. The Management Process

The SFMA exists solely as a result of Percival Baxter's efforts, ideals and dream. The purpose and direction regarding use and development of the SFMA is provided for in the Deeds of Trust. In light of continually evolving social values and

perceptions of proper resource use, the translation of Governor Baxter's intentions into specific management guidelines and procedures can lend itself to a variety of interpretations. The Baxter Park Authority's interpretation of Governor Baxter's intent regarding the management of the SFMA will use a system that employs a wide range of professional expertise and abilities in the natural resource field, and draw from the spectrum of philosophies regarding land use and development. The basic organizational management framework for the SFMA is as follows:



An important body responsible for review and interpretation will be the Scientific Forest Management Area Advisory Committee. The SFMA Advisory Committee, a standing committee presently composed of twelve (12) members, serves at the pleasure of the Baxter Park Authority. First established in March, 1986, the Committee has worked with the Park Director and the Resource Manager in an advisory capacity to the Authority, offering a variety of skills and expertise in problem solving, management direction and implementation. This Committee, working under the Baxter Park Authority and with the Park Director and Resource Manager, shall provide a continuing and primary source of interpretation, review, advice, and counsel concerning the development and evolution of management guidelines, plans and operations on the SFMA.

Our changing world and the social evolution that drives the forces of change is reflected in our struggle to develop a suitable long-term land use ethic. Development of this ethic will demand further interpretation of the best application of Governor Baxter's intent regarding land use and management on the

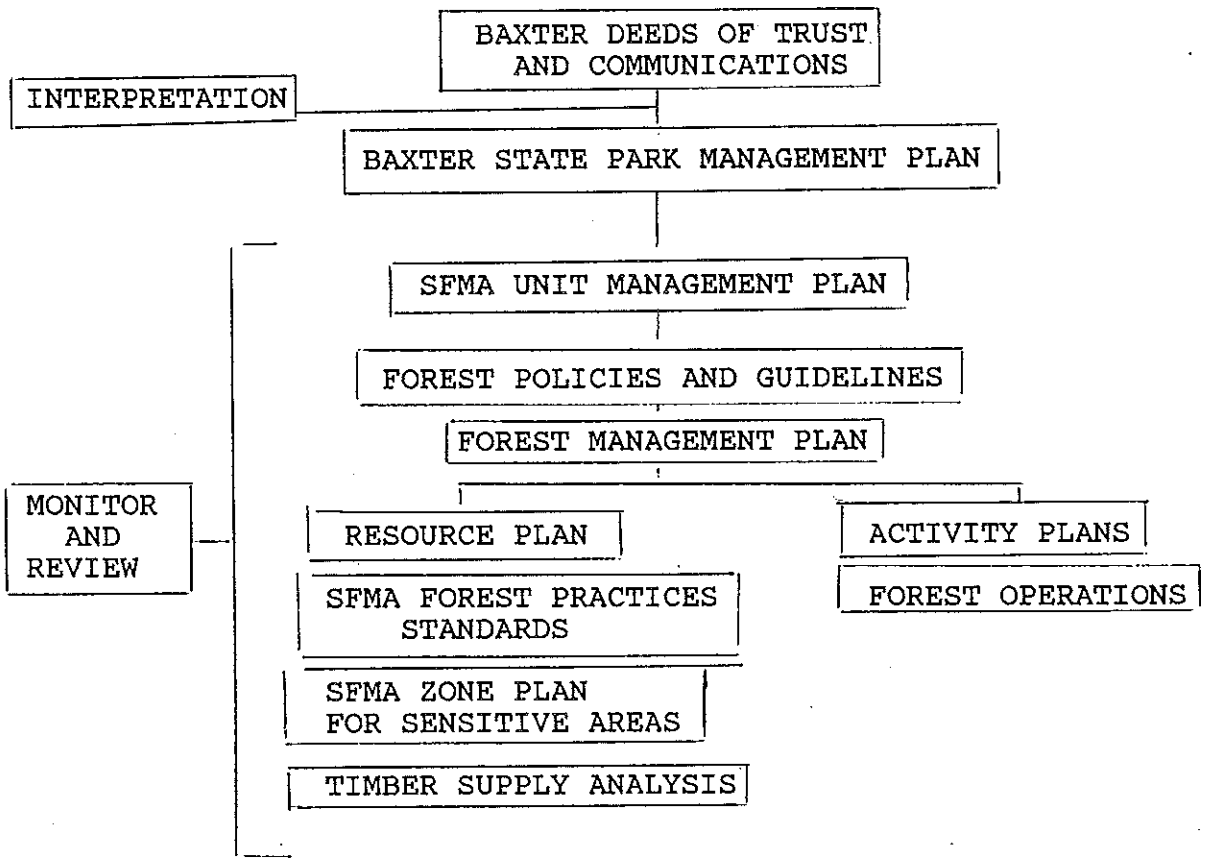
SFMA. The SFMA Advisory Committee is a valuable tool in providing long-term continuity and involved expertise in the evolution and development of resource management on the SFMA.

The management guidelines and planning and operation systems must be flexible enough to react to a changing environment and adaptable enough to improve as experience and knowledge are accumulated. The interpretation of Governor Baxter's intent as reflected in the Management Policy and Guidelines and the implementation of that intent as expressed through the Management Plan, must provide a strong framework for the direction of management efforts into the future while being open to review and adaptable to revision. The SFMA Advisory Committee will be expected to play a major and continuing role in this process of review and revision.

When appropriate, other public agencies such as the Department of Conservation-Bureau of Public Lands, Maine Forest Service, Department of Inland Fisheries and Wildlife and private organizations will be offered the opportunity for review and comment.

2. Management System:

Forest Management on the SFMA will employ the management framework described above in conjunction with the following system of management:



SFMA Policies and Guidelines: description of the conception, realization and history to date of the SFMA, with principles and policies guiding the long-term development and management of the SFMA, with an overview of the management/planning system.

Forest Management Plan: the Plan will include information pertinent to the landbase including historical operations, forest operations, resource management guidelines, statistics, forest inventory, and resource maps. The Forest Management Plan will also address key resource issues and the associated management decisions within the following components.

a. Resource Management Plans:

Resource Plans include descriptions of the existing resource and associated management guidelines.

b. SFMA Forest Practices Standards:

The SFMA Forest Practices Standards provide specific guidelines and directives for implementation of integrated management of resources, protection of resource values, and administrative procedures.

c. SFMA Zone Plan for Sensitive Areas:

The SFMA Zone Plan for Sensitive Areas provides specific guidelines for forest management activities within or near to sensitive areas of the SFMA including, but not limited to, riparian and recreation areas.

d. Activity Plan:

The Activity Plan serves as the principal means of resource evaluation and development of specific operational plans consistent with the SFMA Management Policies and Guidelines. The development of the Activity Plan embodies the assimilation and evaluation of all resource information and the consideration of management guidelines and individual resource requirements in the development of an operational proposal. The area of operations may relate to one compartment, or several compartments, and span a variety of resource concerns consistent with the procedures and direction of the Management Plan. The Activity Plan comprises the major avenue for regular and frequent professional review of operations on the SFMA. Professional review of Activity Plans, including review by the Baxter Park Authority, SFMA Advisory Committee, Baxter Park Staff, and other resource professionals, will strive to create operational

proposals that best exemplify the forest management ideals of the SFMA.

e. Forest Operations:

As the implementation of all levels of management planning, the operations phase is recognized as the most important step in achieving the management goals of the SFMA. In the end, forest management succeeds or fails as a result of the efforts of individual people working on the land in an attempt to make a living and sustain themselves physically and spiritually. The success of any management plan is a result, not only of how the plan evaluates and coordinates the existing resources to be managed (planning), but just as importantly, how well the plan motivates and enhances the human resource required to carry out each and every operation on the ground (implementation). The continued motivation and development of human resources is vital to the success of this plan in regards to any component of management of the SFMA from Baxter Park Staff to private contractors and woods labor.

Implementation and administration of the SFMA operations and Activity Plans must be carried out with a level of supervision that will minimize mistakes or abuses. At all times, operations on the SFMA should employ procedures that attract the best labor available and motivate that labor toward producing a product of the highest quality possible. In the spirit of the "showplace" forest, the human resource developed to plan and implement the management of the SFMA should receive the same effort toward improvement and enhancement as any other resource on the SFMA. Investments toward development of a knowledgeable, capable and motivated labor force on the SFMA will be returned several-fold in the quality of management on the area.

The operations which dictate the pace of development of the SFMA must be consistent with the development of all forest resources and in accordance with all changing factors that affect those resources, such as markets, social values and access options.

f. Monitor and Review

This essential segment of the management process occurs at every phase of planning and operations. Through the input of the Baxter Park Authority, the SFMA and B.S.P. Advisory committees and outside agencies and organizations the Park Director and Resource Manager will constantly strive to improve the planning and implementation of resource management on the SFMA.

3. Economic Considerations:

Although economic viability must be a long-term objective of the management of the SFMA, at no time should economics, market or forest conditions result in the degrading of the forest or diverting the forest from the management goal of the highest possible sustained yield of the highest quality forest products, or infringe upon or degrade the other primary products and social values of the SFMA. Management within the SFMA should constantly strive to balance sound silvicultural operations, suitable markets and the generation of sufficient revenue to continue development within the principles of the management policy, including economic viability. The size, duration and intensity of planned activities should be consistent with the development of management on the SFMA and within the framework of the available budget.

PART II: FOREST MANAGEMENT PLAN

A. SITE DESCRIPTION

1. Legal

Lying in the northwest corner of Baxter State Park, 55 miles northwest of Millinocket via the Great Northern Paper Company's Golden Road, the Scientific Forest Management Area (hereinafter "SFMA") is comprised of all Township 6 Range 10 W.E.L.S. (TOWN GEOCODE 21826). This was conveyed to the State of Maine by former Governor Percival P. Baxter in two separate deeds in 1955 to ".....forever be kept for and as a State Forest, Public Park, and Public Recreational Purposes and for the practice of Scientific Forestry, reforestation, and the production of forestry wood products". These deeds conveyed all interest except a 25-acre dam lot on Webster Stream at the outlet of Webster Lake owned by the East Branch Improvement Co., and certain easements of rights-of-way. The dam lot and associated easements were subsequently conveyed to Baxter State Park in 1982. The area determined by planimetry of maps prepared from aerial photographs is 29,537 acres, of which 27,761 acres were classified as forest.

2. Physiographic

The terrain of the SFMA is generally flat to rolling, with low ridges interspersed with streams and bogs. The highest point, Wadleigh Mountain, in the southeastern portion (T6,R9), is 1,203 feet above mean sea level; the lowest areas, in the north and eastern sections of Township 6, Range 10, where the land begins to slope toward the East Branch of the Penobscot River, are approximately 760 feet above mean sea level. Most of the area lies between 800 and 1000 feet above mean sea level. (U. S. Geological Survey 1955).

Most of the 29,537 acres of the SFMA are underlain with bedrock of sedimentary origin from the older Devonian period, with a generally thin cover of glacial tills. Wadleigh Mountain bedrock is Traveller Rhyolite, covered with outwash soils. Bedrock between Wadleigh Mountain and Trout Brook is sedimentary, but from a younger Devonian age. Till deposits are the characteristic soils of the area.

The major drainage system for the Scientific Forest Management Area is the Webster Lake - Webster Stream watershed, flowing to the northeast, and fed by Thissell Brook from the southwest; Murphy Brook, from the west; and Hudson Brook, flowing from Hudson Pond to the south; before reaching the East Branch of the Penobscot River in Township 6, Range 9, north of Grand Lake Matagamon.

The second important watershed is that formed by the effluence of Lost and Blunder Ponds, joining in Wadleigh Bog, then flowing southeasterly to Trout Brook, serving as the southern perimeter of the SFMA in Township 6, Range 9.

Further drainage is provided by Boody and Hinckley Brooks flowing east to Grand Lake Matagamon, and the South Branch of Braley Brook flowing northeast to Township 7, Range 10. A breakdown of the land base classification on the SFMA is as follows:

LAND BASE ACREAGE SUMMARY

Acres in forest types		27,761
Acres in swamps & bogs		1,043
Acres in field, ledge & campsites		60
Acres in water:		
Webster Lake (portion in T6 R10 only)	331	
Hudson Pond	122	
Frost Pond	41	
Blunder Pond	20	
Lost Pond	13	
	527	
Webster Stream	114	
Other streams/brooks	32	
Total water acres		673
Total land base acres		29,537

Additional information on acreage classifications can be found in the Base Inventory Report.

The Scientific Forest Management Area lies within the Northern Forest Region of the American continent, and experiences the cool, moist climate typical of this region. The following climatic data are based on observations at Caribou, Maine, 70 air miles to the northeast:

Annual Mean Temperature: 38.6 F

Average Annual High Temp: 64.9 F

Average Annual Low Temp: 10.7 F

Record High Temperature: 96. F

Record Low Temperature: -41 F

Average Annual Precipitation: 36.45"

Average Annual Snowfall: 113.3"

Annual Precipitation of Snow:* 37%

Average Annual Frost-free Period: 125 days

9-year Average Seasonal Growing Degree Days:** 1833

* (Approximation based on the 1978-79 season)
** (Base 50 F)

3. History

Townships in this area of north central Maine were first delineated in 1833 by surveyors for the State Land Agent. This was during the Pine Era in the State of Maine. The survey notes make frequent reference to "scattered timber pine, long and handsome", spruce, fir and hardwood growth, and describe streams "suitable for driving logs". At this time, water from Telos Lake fed the Allagash watershed. In 1841, the construction of the Eagle Lake "Lock Dam" caused the flow to change direction into Webster Lake and become part of the Penobscot drainage. Later that year, this flowage was improved by deepening the natural cut between Telos and Webster Lakes. This came to be known as the Telos Canal, and was the cause and site of the famous bloodless Telos War, a dispute over tolls charged for driving logs through the canal.

In 1903, sections of the SFMA, primarily in the southeastern quarter, were burned in an extensive fire which covered a great portion of Township 5, Range 9.

The area has been cut various times for differing products, first for pine sawlogs, then spruce logs, and most recently for pulpwood. Although no records of actual operations have been located, the Eastern Corporation reportedly had planned a large operation in the southwest corner of Township 6, Range 10 in the late 1940's, but due to a slump in the pulpwood market, this area was not cut. Roads cleared in anticipation of the proposed operation are visible on recent aerial photographs of the area.

The Eastern Corporation acquired majority interest in Township 6, Range 10 in 1911, and by 1944 owned in both townships the interest which was sold to Percival P. Baxter in 1955, and subsequently deeded to the State of Maine to become the Scientific Forest Management Area of Baxter State Park

Little attention was given to the forest management directive of this area until 1972, when the Great Northern Paper Company and the Baxter State Park Authority agreed to exchange stumpage rights held by the Great Northern Paper Company on the southern end of the Park for timber of equal consideration from the SFMA. The proposed operation was questioned as to its approximation of "scientific forestry" in light of the absence of a definition of the term, and an overall management plan for the area. After approximately one-half mile of right-of-way has been cleared, the operation was terminated with a cash settlement to the Great Northern Paper Company.

In 1969-70, the boundary lines of Baxter State Park were surveyed and marked by the Maine Forest Service. In 1987 the south line of the SFMA was marked by Baxter State Park Staff. Overall, the lines of the SFMA are still in good condition. A regular program of line maintenance ensures the integrity of property lines on the SFMA.

The Great Northern Paper Company`s Telos Camp, located 11 miles from the SFMA in Township 5, Range 11, is the base for their mechanical harvesting operations in the area. Shortly after Township 6, Range 11 was deeded to the Maine Bureau of Public Lands, the Great Northern Paper Company relocated its Coffelos Camp outside of the township.

The major forest industry of the area is pulp and paper, followed by sawmills, a limited veneer and plywood industry, and several small, specialty mills. Other industry includes agriculture, food processing, recreation/tourism, allied support trades.

B. RESOURCE MANAGEMENT PLANS

TIMBER MANAGEMENT

Forest Description

The forests of the SFMA have been harvested several times since the mid-1800's, with earlier cuttings concentrating on pine and subsequent harvest moving to spruce and general softwood pulp. Heavy harvests circa 1890, followed by a significant forest fire south of Webster Stream in 1903, a severe spruce budworm outbreak in the 19-teens, and scattered pulpwood cutting up to the mid-1900's have combined to shape the character of the present-day stands of the SFMA.

The recent spruce budworm epidemic of the early 1980's resulted in loss of softwood over the area, particularly balsam fir. Through the Greenwoods Program, protection measures(aerial application of BT) were applied to portions of the SFMA. Estimates indicate that 25% to 50% of the fir component on the SFMA was lost to the budworm, but this estimate is confounded by the loss of fir to age-related mortality.

Harvesting during the 1982 - 1985 period, primarily partial cutting, removed approximately 30,000 cords of softwood over 3000 acres.

The SFMA today (29,537 planimetric acres) is made up of softwood types - 68% (20,160 acres), mixedwood types - 22% (6,369 acres), a small component of hardwood types - 4% (1,232 acres), and inoperable area in lakes, ponds, streams and bogs - 6% (1776 acres). All the forest types on the SFMA consist of generally older-aged, mature forest stands with a distinct and pronounced lack of acreage occupied by young age classes. Management implications are strong in this regard, since growth rates in these older stands have either leveled off or are declining and mortality can be expected to increase, especially in existing fir and intolerant hardwood components. The overall uniform mature forest canopy also denotes the lack of diversity essential to wildlife and aesthetic needs.

Management Objectives

Within the forest management community in particular, and society in general, debate over the relative merits of different systems of forest management, silviculture and harvest, has continued for decades. The complexity and endless variation within the forest community, aggravated by the vagaries of the biological and geological environments and the changing demands of society, ensure that the debate will go on into the future. There is a great challenge in the execution of a management system that extends over eight decades or more within the framework of a society capable of significant change within the span of a generation.

From the standpoint of long-term forest management, the SFMA is at the seedling stage. Development of basic access alone, implemented at a pace in harmony with general forest development on the SFMA, will require more than a decade to approach completion. At present, management has yet to organize and effect on-the-ground forest treatment and harvest operations that can satisfactorily proceed with the direction afforded by management guidelines. Also lacking are important prerequisites to successful operations, such as on-site lodging and adequate labor access.

In consideration of the stage of management on the SFMA and the disproportionately mature age of the forest, planning objectives will place a priority on:

a. determining operational levels that are well within acceptable ranges for sustainable long-range management.

b. recognition of the age-class distribution of the forest and the need and capacity for operations that begin generation of younger age classes.

c. recognition of the need for:

    1. implementing successful and continuable on-the-ground forest operations to allow realistic management and planning.

    2. improvement of work conditions on the SFMA including better access to labor markets and suitable lodging for work crews.

Through reasonable implementation of forest operations and with continuous commitment to monitoring, evaluation, review and improvement of ongoing operations, it is the objective of management to establish the credibility of the SFMA as a working forest; to establish a workable mechanism by which to accomplish management objectives, and to productively begin realistic development of the SFMA toward the ideals expressed in the Deeds of Trust.

Management Guidelines

1. Sustainable harvest and regulation - utilizing state of the art forest modeling systems, in combination with 1980 forest inventory data, long-term sustainable harvest estimates will be determined in relation to current and expected forest growth. Forest models will be updated continuously to reflect additional or improved information, changing product markets and alterations in management strategies.

2. Silvicultural Objectives - in consideration of the condition of forest stands on the SFMA as a whole, primary silvicultural objectives will be to:

a. Manipulate and regenerate mature softwood stands by the application of silvicultural management systems to improve the overall quality, growth and vigor of the forest.

b. Accent harvest on stems of low vigor or high susceptibility to mortality.

c. Define operability limits in major stands on the SFMA based on silvicultural prescriptions, stand volumes, and existing wood products markets.

d. Identify stems of strong vigor and potential value for retention.

To achieve these objectives, harvests should concentrate as much as possible on removal of presently over-mature fir, intolerant hardwoods and individual stems exhibiting poor potential. Recognizing that a portion of the present older age class can and should be maintained for a long period, some species, particularly spruce, that have the potential for increased growth and value over the long term should be retained.

Existing markets prevent acceptable application of these priorities in stands where species designated for removal are mixed with a substantial component of unmerchantable hardwoods. It should be recognized that in stands of this nature, removal of the limited softwood component will eliminate reasonable options for productive regeneration and future management. Operations on these stands will be avoided until better market conditions develop or operations can be implemented on a stand improvement basis.

3. Silvicultural Systems - both even-aged and uneven-aged silvicultural systems will be applied as dictated by stand and area exams. Specific silvicultural guidelines and harvest standards will be applied to forest stands within the Activity Plan process. Where applicable, forest modeling techniques will be applied to evaluate specific management options on a given stand.

a. Even-aged: Even-aged management will generally rely on systems of shelterwood harvest to regenerate even-aged forest stands. Stand entries will consist of two to three entries with the first cuts generally removing between 25 and 70 percent of the parent stand. When adequate regeneration is well established the removal of the overstory will be completed.
Clearcutting will also be considered as a harvest system in stands designated for even-aged management. Clearcutting will be applied in areas of salvage, established advance regeneration or where unusual conditions apply. Clearcuts will be under 20 acres unless documented special conditions require a larger area.
b. Uneven-aged: Uneven-aged management will utilize either single tree or group selection cuts. Objectives will be to ensure that residual stand composition is characterized by species of commercial value and capable of sustaining re-entry at 10 to 30 year intervals.

4. Harvest Systems - harvest systems will be developed as a part of the Activity Plan process. There shall be no limits on the types of harvest systems and equipment utilized to implement the system as long as impacts and results are consistent with silvicultural objectives and the SFMA Forest Practices Standards. Experimentation with a variety of harvest methods and systems from traditional to newly developed, will be encouraged on the SFMA.

5. Timber Stand Improvements - the following concepts should be recognized concerning stand improvement treatments (weeding, cleaning, spacing, pre-commercial, commercial thinnings etc.):

1. Given the present component of unmarketable or low value species in many stands on the SFMA, and the formidable regenerative capacity of this component, effective stand treatment will be a necessity in forest management on the SFMA.

2. Stand improvement practices are cost intensive, and the development of continuous revenue producing operations on the SFMA is critical to provide funds to implement necessary stand treatments.

In consideration of the above, stand treatment operations will be evaluated in all pre, post and general stand exams and management will strive toward establishing operations at a level that provides adequate funds for necessary stand improvements.

6. Stand History -the development and maintenance of a continuous, consistent record of stand history can be an important aid in providing the information needed for insight and sound judgement in forest management. Standard procedures for stand exams and treatments for the SFMA and uniform consistent procedures for maintaining this data in a useful, accessible form will be developed and implemented.

7. Forest Protection - within general management activities, forest protection will be guided by the following:

1. Insects and Disease: an integrated approach to insect and disease will be applied with the greatest accent placed upon the use of stand manipulation to reduce the susceptibility of the forest to insect and disease attack by stand manipulation. In the event of a large-scale, serious insect or disease outbreak, management will cooperate with other State agencies and evaluate the use of biological controls such as BT.

2. Fire: the SFMA, as part of Baxter State Park, will follow follow the Baxter State Park Fire Plan. Although natural catastrophes such as insect attack, disease, or blowdown may elevate fire hazard unexpectedly anywhere within the Park, sustained forest operations on the SFMA will continuously create identifiable areas of elevated fire danger. The relatively remote nature of these areas, combined with the possibility of uncontrolled public access dictates the need for close communication and cooperation with the Maine Forest Service Fire Control Division (Island Falls). In addition, the following needs should be addressed in management planning for the near term:

1. The need for access control at entry points to the SFMA in times of extreme fire danger.

2. The need for improved access to the SFMA for fire patrol and suppression equipment and personnel.

8. Economic Analysis - the management of the SFMA must be self-supporting and sustaining over the long term in its operation. A primary management objective over the period of this plan will be

to establish, within long-term sustainable limits, acceptable operational levels and revenues in economic balance with adequate staff, administrative and operational costs. An important component of this objective will be to determine accurately all costs of forest operations and to closely monitor revenues. A high priority will be placed on achieving the highest utilization of forest products, while striving to develop and capitalize on available markets for low quality material. As a means of supporting Maine's economy, in-state markets will be favored wherever they provide outlets for equivalent products. Shipment of forest products out-of-state will be limited to markets enabling higher utilization of those situations where in-state markets are either non-existent or dramatically uncompetitive.

9. Forest Operations - management will strive to maintain maximum control over all operations. To this end, all avenues and combinations of forest operations arrangements, from private contractors to in-house operations by Baxter Park-employed personnel will be examined and tested.

FISHERIES AND WILDLIFE MANAGEMENT

The objective of wildlife management on the SFMA is to provide a forest setting enriched by a wide variety of species and habitat conditions. Wildlife management will be implemented through the development and enhancement of habitat and diversity within the generally uniform, older-aged forest stands of the SFMA. The guidelines for wildlife management and methods for developing habitat and diversity on the SFMA will correspond to the classification of the area into zones of different significance to wildlife. Together, these zones reflect the diversity essential to a healthy environment for wildlife. These zones, and associated management guidelines, are as follows:

1. Riparian: Of extreme significance to wildlife, riparian areas encompass the forest edge around lakes, ponds, rivers and streams. This forest edge provides a majority of the necessary habitat for some species and acts as a important corridor for species to access and traverse waterways. Riparian habitats have a direct influence on the health of the aquatic habitat for fisheries by providing shade for streams and acting as a natural buffer and sediment filter for run-off entering watercourses.

Management guidelines for riparian areas:

a. Riparian areas will be identified on the SFMA base map system. Management guidelines and preservation standards for riparian areas around the major watercourses of the SFMA (Webster Lake/Stream, Frost, Lost, Blunder and Hudson Ponds) are addressed in the SFMA Zone Plan for Sensitive Areas.

b. Smaller, permanent streams designated PSL-2 by Land Use and Regulation Commission Standards, (i.e. Murphy, Brayley, Hudson Brooks) will be provided 200 feet (100 feet each side of the stream) of riparian area designation.

c. Harvest planning in riparian areas will be develop in cooperation with wildlife expertise from the Dept. of Inland Fisheries and Wildlife and SFMA Advisory Committee, and in accordance with the SFMA Zone Plan for Sensitive Areas, and SFMA Forest Practices Standards.

2. Wetlands: Wetlands are freshwater bogs and marshes characterized by the presence of sufficient water/moisture to sustain a diverse growth of aquatic vegetation. They are important for a variety of game and non-game species of wildlife, including aquatic furbearers, waterfowl, fish and song-birds. Wetlands also serve as natural sponges which store groundwater,

stabilize surface water, curb erosion and act as firebreaks. Guidelines for the management of wetlands are as follows:

a. Maintain water levels through the use of artificial impoundments and a variety of beaver management techniques.

b. Maintain habitat balance for brood cover (rearing habihabitat consisting of a combination of shrubs, water, trees and emergent plants), nest cover (dry shrub/grass islands) and open water. Sites which possess these characteristics naturally should be selected as candidates for specific improvement projects.

c. Maintain all snags, consistent with operator safety, and modify harvesting to favor timber species of value to wetland wildlife.

d. In road layout, place heavy emphasis on avoiding wetlands to prevent fragmentation.

e. Develop and maintain a waterfowl nestbox program.

3. Upland Forest: Upland Forest provides the dominant habitat type on the SFMA, and consists of the rolling, forest-covered uplands. It is within this zone that many species find both cover and food. Presently, the generally older, uniform stands of the SFMA provide the greatest opportunity to develop and enhance wildlife habitat, primarily through increasing diversity and modifying vegetative cover by the considerate integration of wildlife concerns and harvest planning. The harvest of mature forest stands within the SFMA will move toward creating a more uniform distribution and variety of forest age classes within the SFMA, with a corresponding increase in diversity of wildlife habitat. Short and long term harvest planning will be developed in close cooperation with the Dept. of Inland Fisheries and Wildlife, SFMA Advisory Committee, and other available expertise in wildlife management to integrate with maximum effectiveness wildlife concerns with wood products harvest and other forest activities. All forest management activities will be in accordance with the SFMA Forest Practices standards which include guidelines specific to wildlife management in the Upland Forest

4. Featured Habitats: Featured habitats are areas of unique characteristics by virtue of landform (alpine areas, glacial features, small watersheds, etc.), the occurrence of particular vegetation (mast-producers, conifer areas in which deer seek winter cover, perch or nesting trees, etc.) or some other specialized habitat feature related to a particular species (wetland for beaver). Also included in the category would be habitat for species listed as rare and endangered and portions of the forest in which timber should be retained as old-growth or extended rotation to meet specialized habitat requirements. Each

of these situations will require special considerations on a case-by case basis and development of management directives through the Activity Plan review process. The documentation of sensitive, threatened or endangered species through site examinations, visitor reports, or any other means will prompt coordination through the Baxter Park Naturalist with the Critical Areas Program of the State Planning Office and the Dept. of Inland Fisheries and Wildlife for the development of detailed management guidelines.

RECREATION MANAGEMENT

General directives for recreation management on the SFMA will be consistent with the overall recreation plan for Baxter Park (see Recreation section, Baxter Park Unit Management Plan). However, the objectives of forest management on the SFMA do provide the need for some additional considerations unique to the SMFA.

A. Forest management on the SFMA shall consider the use of the area for recreational purposes in all activity plans and shall strive toward maintaining or enhancing the aesthetic and recreational value of the forest setting in all areas.

B. Planning of forest operations shall consider location and timing of operations relative to areas of recreational use, peak periods of use, and the effects of noise generated by forest operations on recreational use.

C. Forest management operations in regard to recreation features (ponds, lakes, streams, campsites etc.), will be in accordance with the SFMA Zone Plan for Sensitive Areas.

D. Expansion of the existing trail system, if and when considered necessary, will be from the existing trail system and not from present or future forest management roads. Access development shall be such that any additional trails located on the SFMA will not originate from roads or cross roads on the SFMA.

E. The Webster Lake Camp shall continue in use as an administrative facility for control and monitoring of recreational use of Webster Lake and Stream during the summer months. The remote and inaccessible character of this facility will be maintained.

TRANSPORTATION

Transportation development is recognized as an extremely important phase of forest management. Decisions regarding access routes, agreements and road locations can have long-term effects on the utilization of forest products, patterns of recreational use and the value of the forest as a whole. Development of the in-forest transportation systems, specifically road construction, can have more effect on forest resources as a whole than any other management activity. Forest road construction also represents a high per acre cost in the framework of forest management. The high cost, combined with the relatively permanent effect roads have on the forest environment, provide ample reason for careful consideration of this phase of forest management.

The location, rate and specifications of roads on the SFMA will be designated by a Forest Transportation Plan. The Transportation Plan shall serve as a general outline for road location, planning, and rates of construction and shall be guided by the following considerations:

1. Road construction, while recognized as necessary to effective forest management, should be carefully considered in respect to loss of productive land and impact on other resources. A primary objective in transportation planning shall be to minimize road construction of any type while achieving adequate levels of management access and economic returns.

2. Road construction shall be considered in light of all forest resources with the objective of utilizing road design and placement to enhance the enjoyment and production of forest resources whenever possible.

3. Road construction shall employ the best methods and equipment available, consistent with budget constraints, to ensure the quality of the finished product. To maintain maximum control over construction activities, forest road construction should be accomplished separately from, and prior to, timber harvest operations.

4. The rate of development of roads within the SFMA, should be consistent with management levels, current sustainable harvest yields, and budget constraints.

5. To facilitate in-forest transportation and improve access options, construction of a crossing over Webster Stream was considered. This option was rejected due to the detrimental impact the crossing would have on the recreational resource and natural characteristics of the stream.

6. Planning and construction of roads within the SFMA shall be in accordance with the SFMA Zone Plan for Sensitive Areas.

7. In all transportation planning, alternatives to stand-transportation systems will be considered.

8. In order to protect and maintain wildland resource quality in the manner envisioned by Governor Baxter, Baxter State Park maintains control of vehicular and pedestrian access and limits such access when Park resources are threatened by overuse, misuse or extreme environmental conditions. Access control on the SFMA will be consistent with the overall policies of Baxter State Park concerning access and registration procedures. Uncontrolled access poses a concern in regard to fire danger in areas of elevated fire hazard resulting from forest operations or insect attack. In addition, uncontrolled access poses a problem in maintenance of roads during mud season and personal safety during natural catastrophes such as blowdown, fire or storms.
In order to protect the forest resources from the problems associated with unlimited vehicle access, management will take the following actions:

   a. Access development into the SFMA will be expanded from discreet points of entry at which vehicular access can be controlled.

   b. Forest management roads, when not in use for forest management operations, shall be blocked or otherwise restricted to vehicular access as needed.

   c. Access to the SFMA by any individual or group to view or inspect forest management activities may be achieved through coordination with the Park Director and Resource Manager.

   d. Entry to the SFMA on roads open to public access will require on-site self registration at established registration facilities.

9. Management shall address the access issue based on Governor Baxter's intent as indicated in the Deeds of Trust and related communications, and in relation to the goals and objectives stated in this plan, to formulate and implement an access policy for the SFMA.

MARKETS

A. Labor

In view of the existing communities in the area and the tradition of forest work that has developed over time, the labor force is present to supply the operational force on the SFMA. Regardless of the quality of management plan guidelines, all management is actually accomplished by the individuals who make up the on-the-ground labor force. Although often overlooked, the quality and motivation of these individuals has a profound effect on the effectiveness and quality of the final product. Maintenance of a high level of quality in operations on the SFMA can be accomplished only by attracting and securing a high-quality labor force. The SFMA offers substantial room for improvement regarding the attractiveness of the area to labor, including the areas of housing, access, contracting procedures and a sustained, established level of operations. Development of the labor resource of the SFMA shall work towards the following objectives:

1. Avoid contract procedures implementing high/low bid, transient procedures which accent low cost or high revenues and not high quality of services rendered.

2. Implement screening procedures to locate and interest skilled labor of good reputation and ability.

3. Provide a working environment more attractive to local labor by:
   a. Development of attractive, suitable facilities on the SFMA that offer working crews and administrative personnel secure, comfortable housing with facilities for materials storage and equipment maintenance and servicing.
   b. Improvement of access to the SFMA by local labor.
   c. Establish consistent, sustained operations on the SFMA to provide security to the labor force.

4. Educate to and integrate the contractor/crew in the guidelines, plans and procedures of forest management on the SFMA and provide regular opportunities for input.

5. Provide the opportunity to integrate Baxter Park personnel with year-round operations on the SFMA, and develop a Park-employed forest operations labor force.

B. Wood Products

A variety of mills within reasonable transport distances from the SFMA provide markets for most of the wood products growing on the area. Some species provide only marginal and/or unstable utility and their marketability is greatly dependent on transport distances, quality and current market conditions. Marketablility

for some species will be a persistent problem and will conflict with ideal silvicultural practice. The ability of management operations to strike the best possible balance between what is ideal silviculturally and what is realistic economically will be one of the primary objectives of forest management on the SFMA. The management guidelines which seek to achieve this optimum balance are:

1. Administration of forest operations shall strive toward achieving the highest level of utilization (and a high rate of economic return) of harvested wood consistent with other forest needs and uses.

2. Economic costs and revenues in forest operations will be realistically evaluated. Maintaining high aesthetic levels or implementing harvest operations based solely on silvicultural guidelines can often result in lowered overall production. Hidden costs such as these should be evaluated to develop as accurate a picture as possible of the economics of forest operations on the SFMA.

3. Management shall strive to develop stable, long-term operations levels to enable local markets to feel secure in purchase agreements of materials from the SFMA and to allow the SFMA to develop favorable market relationships with area wood products markets.

VISUAL

The visual resource is one resource which will interact, in one way or another, with every individual who travels within the SFMA. Forest management activities often present both challenges in the mitigation of effects on the visual resource and opportunities to develop and enhance the visual resource. Management on the SFMA will strive to improve or maintain the existing visual resource and present the visitor (or worker, researcher etc.) to the SFMA with a high level of aesthetics in conjunction with forest management activities.

CRITICAL AREAS

Critical areas are those areas which fulfill a particularly important habitat need for wildlife (see Featured habitats, Wildlife Management), or plants, possess an especially scenic or aesthetic quality, or are of outstanding natural or historical interest. Different State agencies maintain inventories of areas within the State that are significant for various reasons. Baxter State Park, including the SFMA, has been the subject of several of these inventories.
The State Planning Office, through their Critical Areas Program, has conducted inventories of alpine vegetation, vascular plant fossil localities, waterfalls, eskers, old growth forest stands, unusual forest stands (species) and unusual fish life. To date, none of the areas suitable for registration have been located within the SFMA. Management of critical areas within the SFMA shall adhere to the following guidelines:

1. Maintain communication with the State Planning Office Critical Areas Program, for continuation of proper management of critical area(s).

2. Coordinate with Park Naturalist to integrate survey concerns for Critical Areas into Activity Plan site examination procedure.

3. Apply SFMA Zoning Plan for Sensitive Areas classifications and directives to Critical Areas as applicable.

COORDINATION, COOPERATION, RESEARCH AND EDUCATION

The SFMA, as part of Baxter State Park, will coordinate its program efforts, as approved by the Baxter Park Authority and as appropriate and consistent with the Deeds of Trust, with agencies of government, educational institutions, surrounding private landowners, and public and private conservation organizations. The SFMA will participate in such cooperative programs and research and will contribute to improved standards of forest management throughout Maine.

Cooperative programs and research must utilize the Baxter State Park Research Project Application format offering opportunity for multi-disciplinary review of project outline, goals and means.

Consistent with the Deeds of Trust, the SFMA shall integrate forest management activities with the development of both casual and formal educational opportunities. Educational efforts shall include:

1. Informational signing at sites of forest operations along roads, trails, and near campsites.

2. Posting or verbal information relay at registration points(office or field), particularly to parties scheduled for sites within the SFMA, of forest activities in progress on the SFMA.

3. Group tours (formal) of the SFMA by prior arrangement.

4. Individual (informal) tours of the SFMA as possible within work schedules.

5. Presentations of SFMA topics, progress as requested.

6. Work-study, job training and research activities will be invited and encouraged by maintaining communication on forest activities with educational institutions and social and private agencies and groups interested in forestry and resource management.

ZONE PLAN FOR SENSITIVE AREAS

SCIENTIFIC FOREST MANAGEMENT AREA

BAXTER STATE PARK

INTRODUCTION

The purpose of this plan is to guide forest management activities in unique or sensitive areas. Where the zones overlap the more restrictive zone is to be followed. The final determination for these zones shall be with the B.S.P.A.

ZONE DESCRIPTION

1. Preservation Zone - Only ecological changes are allowed. No timber harvesting or other man-made activities are allowed other than normal campsite development and maintenance. Where a trail enters this zone, normal clearing and trail marking activities are permitted.
2. Retention Zone - Management activities are permitted but are not visually evident. The visual quality of the area is the primary consideration; forest management programs are secondary and not readily apparent.

   Partial Retention Zone - Management activities still remain secondary to the visual quality of the area, but can be partially observed.

APPLICATION OF ZONES TO RECREATION AND RIPARIAN AREAS

FEATURED AREA: Webster Trail and The Freeze Out Trails

AREA CLASSIFICATION: Recreation

ZONE APPLICATION: Partial Retention
Zone Requirements: 200' on either side of trail. All trees to be harvested must be marked. The objective is to provide a forestry educational opportunity to travelers along the trail. The identification of natural features (fire, budworm, blowdown, tree species, wildlife sites) and objectives of forest harvesting methods will be described by the use of numbered sites and a brochure. Winter and summer roads will be limited.

FEATURED AREA: Camp Sites

AREA CLASSIFICATION: Recreation

ZONE APPLICATION: Preservation
Zone Requirements: 200' around the exterior use area of the camp site

ZONE APPLICATION: Partial Retention
Zone Requirements: 200' beyond the Preservation Zone around the camp site. Harvesting in the vicinity of the camp sites is to be restricted during seasonal peak use of the sites.

FEATURED AREA: Webster Stream

AREA CLASSIFICATION: Recreation, Riparian

ZONE APPLICATION: Preservation
Zone Requirements: 300' on each side of the stream.

ZONE APPLICATION: Retention
Zone Requirements: to height of land visible from the stream.

ZONE APPLICATION: Partial Retention
Zone Requirements: for areas not readily observed, to be established the visual height of land.

FEATURED AREA: Frost, Lost, Blunder and Hudson Ponds

AREA CLASSIFICATION: Recreation, Riparian

ZONE APPLICATION: Preservation
Zone Requirements: 300' around the ponds.

ZONE APPLICATION: Retention
Zone Requirements: to the visual height of land around the Ponds. A Partial Retention

ZONE APPLICATION: Partial Retention
Zone Requirements: for areas not readily observed, to be established the visual height of land.

FEATURED AREA: Webster Lake

AREA CLASSIFICATION: Recreation, Riparian

ZONE APPLICATION: Preservation
Zone Requirements: 400' Preservation Zone to be provided around the B.S.P.A. ownership of the lake shore.

ZONE APPLICATION: Retention
Zone Requirements: established to the visual height of land to the extent of ownership.

ZONE APPLICATION: Partial Retention
Zone Requirements: for areas not readily observed, to be established the visual height of land.

SFMA FOREST PRACTICES STANDARDS

A. General Objectives:

Forest management activities, timber harvesting operations and the construction of roads shall be conducted in a manner to prevent the introduction of soil sediments, slash and other waste material, and toxic chemicals into surface waters, and to preserve the aesthetic qualities of the shorelines. Standards that will improve, maintain and protect the forest soil and water resources will also conserve aquatic habitat and the fishery resources. Standards that will improve, maintain and protect the visual qualities of forested shoreland areas will preserve the aesthetics associated with and important to waterbased recreational experiences.

B. Forest Administration:

1. The Scientific Forest Management Advisory Committee shall aid in the management of the SFMA by providing review and input on forest administration, operations and management guidelines as well as offering expertise on the management of specific resources. The Baxter Park Resource Manager (and other Park staff as appropriate) shall meet with the SFMA Advisory Committee a minimum of four times annually.

2. The Management Plan for the Scientific Forest Management Area of Baxter State Park will be reviewed annually by the Baxter Park Staff and the SFMA Advisory Committee. Modifications or amendments to the Plan, if needed, will be presented to the Baxter Park Authority for review and approval.

3. Baxter State Park will cooperate with the Maine Department of Inland Fisheries and Wildlife and other State agencies in the identification, management and protection of waters of scientific, educational or special recreation significance in order to assure water quality and habitat conditions critical to the perpetuation of aquatic communities and to maintain recreational opportunities of high aesthetic value.

4. Inspections on forest operations will be at least weekly. Forest operations of any type will not progress over more than 40 acres between inspections.

5. Standard stand examination procedures will be implemented on all stands prior to forest operations as part of the Activity Plan process. Post-operations stand

examinations will be implemented within two years after harvest to evaluate operational success and/or the need for additional treatment.

C. Road Construction:

1. Stabilization, mulching and revegetation of exposed soil abutting streams shall be carried out as soon as possible during and after construction of stream crossings.

2. Clearing trees and brush for water crossings shall be limited to minimum width necessary consistent with safety (primarily approach visibility) and required construction standards.

3. In order to maintain natural streambeds preference will be to use bridges rather than culverts, wherever possible.

4. Bridge construction shall not be undertaken during periods of spring run-off or other periods of excessively high water.

5. Bridges shall completely span the stream with no encroachments (or narrowing) on the banks.

6. Culverts shall be placed at or slightly below streambed elevation; no "hanging" downstream ends which would prohibit fish movement upstream.

7. Fill used for culvert installation and bridge abutments shall not to be excavated streambed material. All fill shall be removed and streambed rehabilitated when culverts or abutments are removed.

8. Temporary bridges and culverts shall have a cross-section at least equal to the cross section of the stream at the site, or have the capability of handling a "normal" spring run-off flow.

9. Permanent road, bridge or culvert crossings shall be designed to handle at least a 50-year frequency flood stage.

10. Surface run-off diversions on approaches to bridges or culverts shall be tailored to match the length and degree of slope, contours, and existing vegetation which can act as a filter, etc. Methods specific to each site will vary but the basic purpose is to divert ditch run-off before it dumps directly into the stream. Culverts, thank-you-ma'ams, catchment/settlement basins, or simple cuts in ditches leading water off into the woods shall be considered. Maintenance of

these structures is of prime importance and shall be continued after road construction is completed.

Forest Harvest and Treatment Operations:

1. With the exception of clear-cut areas, all stems will be designated for cutting and removal with a paint mark above and/or below stump height. Boundaries of clear-cut areas will be clearly designated.

2. A buffer strip of vegetation shall be maintained along all perennial streams. This strip shall include all vegetation that helps to stabilize stream banks and provide shade and, thus, maintain lost stream water temperatures. Timber stands involved may be maintained in a healthy condition by partial cuts as consistent with the SFMA Zone Plan for Sensitive Areas.

3. Skid trails approaching a stream (including small channels which may be dry at the time of operation) shall have sufficient water diversions incorporated to prevent direct channeling into a stream.

4. During cutting operations along streams, maintenance of shade cover to prevent warming of the water must be considered.

5. Slash shall be removed to at least 50 feet back from streams. Harvest equipment operations within 50 feet of a stream shall not be permitted. Trees shall be cut and winched 50 feet from stream before being limbed and bucked.

6. Harvest equipment crossings of "live" stream channels (flowing water) shall have temporary bridges or culverts installed.

7. Skidding operations shall not be conducted in areas especially susceptible to erosion, such as areas with steep slopes and fragile soils. Alternative methods that will not disturb the forest soil shall be utilized.

8. The location of all primary skid roads and log landings in an operated area will be designated by Baxter Park staff prior to the initiation of operations in the area.

9. Log landings and wood yards will be located back from primary roads. Methods for managing any resulting accumulations of slash will by determined before operations are initiated. At the conclusion of operations, all log landings, where there has been major

soil disturbance, will be seeded to herbaceous growth to stabilize soil, provide wildlife benefits and retain sites for future management needs.

10. Skid trails shall be rehabilitated by grass-seeding, mulching with brush, or other surface run-off protection when logging operations cease on sites where erosion is likely to occur.

11. Consistent with existing conditions and operator safety, snags exhibiting value for wildlife purposes will be retained.

12. Consistent with existing conditions, at least one active and one potential den tree per acre of operated forestland will be retained for wildlife.

SCIENTIFIC FOREST MANAGEMENT AREA

ACTIVITY PLAN

Date:

Proposed Activity:

____Road Construction
____Tree Harvest
____Stand Treatments
____Site Examinations
Resource examined:_____
____Other

General description, planning concerns and objectives:

Activity: **TREE HARVEST**

Description of Planning Area:

Location:(township, compartment, subdivision, map reference)

General Description: (resources description, history etc.)

Specific resource description: (timber)

a. Stand exam data description: number plots, location, technique etc.

b. General forest types, stands, species.

c. Stand data: basal area, ave diameter, diameter distribu-distributions, species %, stocking, volumes, operability, etc.

d. Stand condition descriptions:
stand history and development, disease/vigor estimates, soils, species compositions, regeneration,

Management Objectives: (consideration of all resources)

Silvicultural Prescription:

Implementation:

a. Harvest System: (machinery, #'s, sizes)

b. Scheduling: (time, duration of activity)

c. Layout and special requirements: block size, shape (CC, selection)

d. Removal designations: (indiv. tree marking, flagged/ painted boundaries, dia. limit)

e. Yarding: (skid trail layout, temp crossings, log landing/yard locations limbing requirements, length requirements, slash disposal, regen protection, site prep. etc.)

f. Rehabilitation: (waterbars, seeding, mulching etc. skid roads, landings, log yards)

g. Transportation needs: (haul road rehab, blocking,

grading, drainage etc.)

h. Administration: (inspection requirements, labor needs, personnel needs

i. Post-activity plans: (regeneration exam, residual stand response check, next activity plan)

j. Production estimates: (product, quantity, value, totals)

Attached Maps:

Activity: **ROAD CONSTRUCTION**

Description of Planning Area:

Location:(township, compartment, subdivision, map reference)

General Description: (resources description, history etc.)

Specific resource description:(transportation)

a. Existing access description, conditions, restrictions

b. Forest transportation plan guidelines

c. Topo features, soil types etc.

Management Objectives: (consideration of all resources)

Transportation Plan: (road type, length, width, surface, include spec sheet)

Implementation:

a. Layout considerations, methods

b. Construction:
-scheduling
-materials requirements (culverts, crossing lmbr, gates, etc.)

-equipment requirements (bulldozer, ripper, backhoe etc.)

-special concerns requirements

c. Rehabilitation: (seeding, mulching, blocking etc.)

d. Administration: (inspection requirements, labor needs, personnel needs)

e. Post-activity plans: (drainage, rehab, surfacing checks)

Cost estimates:

-clearing, excavation, drainage, surfacing, grading

Attached Maps:

Activity: **STAND TREATMENTS**

Description of Planning Area:

Location:(township, compartment, subdivision, map reference)

General Description: (resources description, history etc.)

Specific resource description:(timber, wildlife etc.)

Management Objectives:

Treatment Prescriptions:

Implementation:

a. Layout considerations
b. Equipment considerations
c. Materials requirements
d. Scheduling
e. Special requirements
f. Rehabilitation
g. Administration
h. Cost estimates

Attached Maps:

Activity: **SITE EXAMINATION**

Resources Examined:

Timber
Wildlife
Recreation
Visual
Critical Areas
Transportation
Coordination/Education
Other

Examination Description and Objectives:

Examination Data:

Attached Maps:

Activity: **OTHER**

Activity Description and Objectives:

Implementation Plan:

SCIENTIFIC FOREST MANAGEMENT PLAN

APPENDIX

Sound, long-range scientific forest management must resist pressures from the ever present extremes. The best management lies somwhere in between but still taking advantage of good practices on a continuing basis from whatever position on the spectrum they may occur. The basis of this concept from the European perspective was given by Hans Leibundgut, Director, Institute of Silviculture, Swiss Federal Institute of Technology, Zurich, Switzerland, at a June, 1975, symposium held at Loval University, Quebec in his keynote address "Usefulness of An Experimental Forest for Research and Teaching".

"The advent of the multiuse concept of the forest based on the ecosystem is not the only representative aspect of this period [the transition from regarding the forest as essentially similar to other agricultural crops to viewing the forest in a biological context]; a characteristic representation of the forest during this period is that of a harmonious stable structure. We find, however, that this idea of a static structure was exaggerated by a group that considered the forest as 'permanent' and who saw the forest as some sort of 'superior organism'.

"Thus, over the period of a century in central Europe, the conception of the nature of the forest passed from one extreme to the other: to some the forest represented nothing but a productive resource, a point of view still seen today; for others (who have often been labeled as 'nature freaks') the forest represents a kind of immortal 'permanent organism'. Silvicultural research must be credited more than anything else in succeeded [sic] in replacing these extremes with a more normal outlook.

"Today in Switzerland silviculture is affiliated with both economics and ecology. During the past quarter of a century, silviculture has been affected by several factors of an economic nature. Since World War Two there has been a staggering increase in the population. New materials competitive to wood enter the market place almost daily. However, large quantities of energy are required to produce most of these new materials, at great cost to our environment. This environmental or energy input aspect of manufacturing hardly enters into consideration, the only determining factor being the production costs. But what of tomorrow? In countries that have a developed and sustained forest economy, logging is becoming more and more onerous and less and less profitable due to rising costs, particularly those paid out as salary and fringe benefits. For these reasons, the wood placed on the international market by countries who cut a surplus or who do not carry out their logging on a sustained yield basis, competes fiercely with forest products produced from forests carefully managed under

the sustained yield system. Productive mountain regions, particularly, feel the serious effects of this competition on their forest economy, and silviculture inevitably will suffer the repercussions of the present crisis in the forest economy.

"People desirous of managing our forest on the short economic term are expressing their point of view more and more vociferously. However, the impossibility of augmenting on the short term both the quantity and quality of wood produced results in a rationalization by which the logging costs are reduced, often at the expense of the biological principles of silviculture. The community now demands that the forest be used to produce many benefits, such as the following:

-protection from avalanches and rock slides,
 regulation of runoff,
 protection against soil erosion,
 protection of ground water;
-to assure recreation space;
-to produce beneficial influence on the environment.

"These demands are forever increasing, and it has become quite evident that our forests must be managed so that, as far as possible, they fill many different functions. If we are to approach this goal it is essential that economics and ecology work in harmony in the forestry context.

"So as to satisfy these requirements, the forest should be formed in such a way that the vital processes associated with them proceed with a certain automatism in the direction of our objectives. In this respect, we speak of a desired natural 'automization' of fibre production and of other benefits supplied by the forest.

.....

"...the forest is now pictured as an aggregate of its members, organisms and the abiotic environment, making up a homogenous and functional whole. In other words, the forest is not simply composed of trees, which lend the external and internal appearance, but also the forest climate, the soil, the flora and fauna all go with the

forest stand to form an individual whole. In this regard it is doubtful that we should consider an insect epidemic as being an isolated incident, when in fact it is a symptom of the weakness of the ecosystem in its entirety. With the exception of the solar energy which animates every ecosystem, the ecologically healthy forest, close to its natural state, constitutes to a great extent an independent (autonomous) and self-sufficient system, able to nourish and conserve itself. We must underline here the fundamental differences between the forest and most agricultural crops: with the exception of natural prairieland, most agricultural crops possess no self-regulating capacities, nor the abilities of self-regeneration and fertilization. Consequently, it is necessary to fertilize and mechanically till the soil in order for it to retain its fertility. These artificial crops must be protected from the competition of other naturally occuring [sic] plants and parasites, and as a result are often detrimental to the environment.

"The forest in a near natural state, on the other hand, is made up in great part by naturally occuring [sic] species capable of regenerating and maintaining themselves if the environmental conditions remain constant. The potential for widespread devastation (forever present in agriculture) is not present in the natural forest. This forest then, is capable of healing itself and thus of playing a regulating and stabilizing role on the landscape.

.....

"The course of life of a forest follows no fixed plan; to the contrary, we note the marked individuality of every forest. Silviculture based on maximum yield must be practiced with this in mind. Silvicultural techniques that follow a certain schema and that are carried out over large areas always entail losses. We continually try to locate the economic optimum between the simplest schema and the broadest outlook on the one hand and the best ecological intervention on the other. Nevertheless, it is a certainty that creating and artificially conserving unnatural ecological imbalances is never economical on the long term.

.....

"Today silviculture is the application of forest ecology. It has the responsibility of directing or orienting the natural phenomena that take place in the forest ecosystem so as to assure the maximized sustained production of benefits. The expression 'sustained yield' is no longer restricted to its traditional meaning related to age class structures, standing volume per hectare, growth, and financial return. Today our society demands that many benefits be accrued from the forest on a sustained basis; we ask the forest to satisfy economic and socio-cultural imperatives as best it can. Silvicultural intervention is meant to do more than adapt the forest to some desirous state of 'normality'; it is now represented by the synthesis of many considerations: ecological, economic, and social, in addition to forest production. For this reason the silvicultural decision is not an abstract, intellectual process to attain a desired goal. The kind and intensity of the intervention, the volume of standing timber and when it matures, the form of the treatments and their duration are all the result of previous knowledge and principles, and logical deductions.

"A desire to rationalize, that is, to obtain a maximum effect by a minimum of effort or intervention, leads us to work as much as possible towards the automation of all the biological processes. The ideal silvicultural technique employed uses this dynamic automation of the forest as long as it is moving in the direction of our economic objective. But each time the forest veers from the path we would like it to follow to attain our final objective, we must intervene with preventative and corrective measures. These interventions, adequately taken at the right time, permit us to restart the natural processes at any given moment in time and to do so economically."

Scientific Forest Management Area

Timber Supply Analysis Utilizing the FORMAINE Model.

Introduction:

The Scientific Forest Management Area (SFMA) is located in the northwestern corner of Baxter State Park. Percival Baxter, in deeding the area to the State of Maine, specified its use for scientific forestry. In-depth descriptions and policies for the area can be found in the SFMA Unit Management Plan as included in the Baxter State Park Management Plan.

The initial management plan for the area, completed in 1980 and preceded by a detailed forest inventory (see SFMA Base Inventory Report), included a forest harvest and regulation plan strongly influenced by a perceived need to pre-salvage balsam fir threatened by an in-progress spruce budworm outbreak. Harvest levels were developed from plans to completely remove all merchantable fir from the area in the first operating period of ten years. Additional harvest was included based on a mean annual increment developed by dividing average stand absolute age (increment core plus 15) into the average cubic foot volume for the stand (as measured in the 1980 inventory). This method made no attempt to separate softwood volume from hardwood volume. At the time the regulation plan was developed, calling for 23,000 cds/yr harvest levels, no access existed on the SFMA and there was no estab;ished woods operation on the area.

Since 1980, the SFMA has experienced inital access development and some harvesting activity in softwood stands along the western edge of the area, althcugh the limits of the 1980 planned harvest levels were never approached. Perhaps more importantly, the budworm epidemic that provided the driving force for so much of the harvest and regulation plans of 1980 has ended. Damage to stands on the SFMA was not as severe as anticipated, probably due to protection efforts that involved the aerial application of BT over at least 2 seasons. At present, observation indicates some scattered but continous loss of fir, especially in the smaller size classes, and renewed vigor on surviving stems of both spruce and fir.

The passing of the budworm and the present observed state of the SFMA, in conjunction with the revision of the 1980 Management Plan, provide an excellent opportunity for application of forest growth and supply models such as FORMAINE to re-develop long term harvest and regulation strategies for the SFMA

Objectives: to develop the necessary data files to apply and calibrate the SMFA to the FORMAINE model.

Goal: to project primary product inventory on the SFMA through a management period with different harvest levels and management intensities to determine:

1. Sustainable harvest levels under the extremes of:
   a. no management activities other than harvest (minimum levels)
   b. intensive managment activities (maximum levels)

2. Sustainable harvest levels under planned management stategies.

Set-Up Procedure:

Information for applying the SFMA to the FORMAINE model was obtained largely from the 1980 SFMA Base Inventory. This inventory measured 300 prism plots on the SFMA and produced specific stand data to generate volume and structure estimates for the 67 stand types mapped on the SFMA (photo interpretation) by the Sewall Co. in 1978. Basic yield file information was obtained from curves developed from USFS Inventory plot data for the USFS Forest Survey of 1980 (Powell & Dixon Report).

A. Class File Development:

The first step in this process was to determine the acreage in each forest type in the SFMA. To reduce complexity in this initial application, the types were grouped in the broad forms of Softwood - S4, S3, S2, and Mixedwood - M4, M3, M2 (illustration no.1). Hardwood represents only 4% of the operable acreage on the SFMA and 2% of the operable volume and was not included in the model application at this time.

Acreage in each forest type was determined from the original mapping and typing data. The next step was to further delineate the acreage not only by type but by site quality as well. The SCS had performed a soil survey of the SFMA in 1976 as part of the general survey of unorganized towns in Maine. This survey delineated soils in the SFMA by site quality into good, medium (average) and poor classes, (illustration no. 2) and acreage was determined for each class, but no effort was made to assign existing timber types to a soil class. This was accomplished by planimeter mapping of the existing type map over the soils map, with the acreage in each timber type being assigned a site productivity based on the underlying soils rating. Final figures were balanced to adjust for errors in planimeter work (illustration no. 3). This was tedious and time-consuming work, with limited accuracy, and presents a strong case for consideration of digitizing existing forest and type maps.

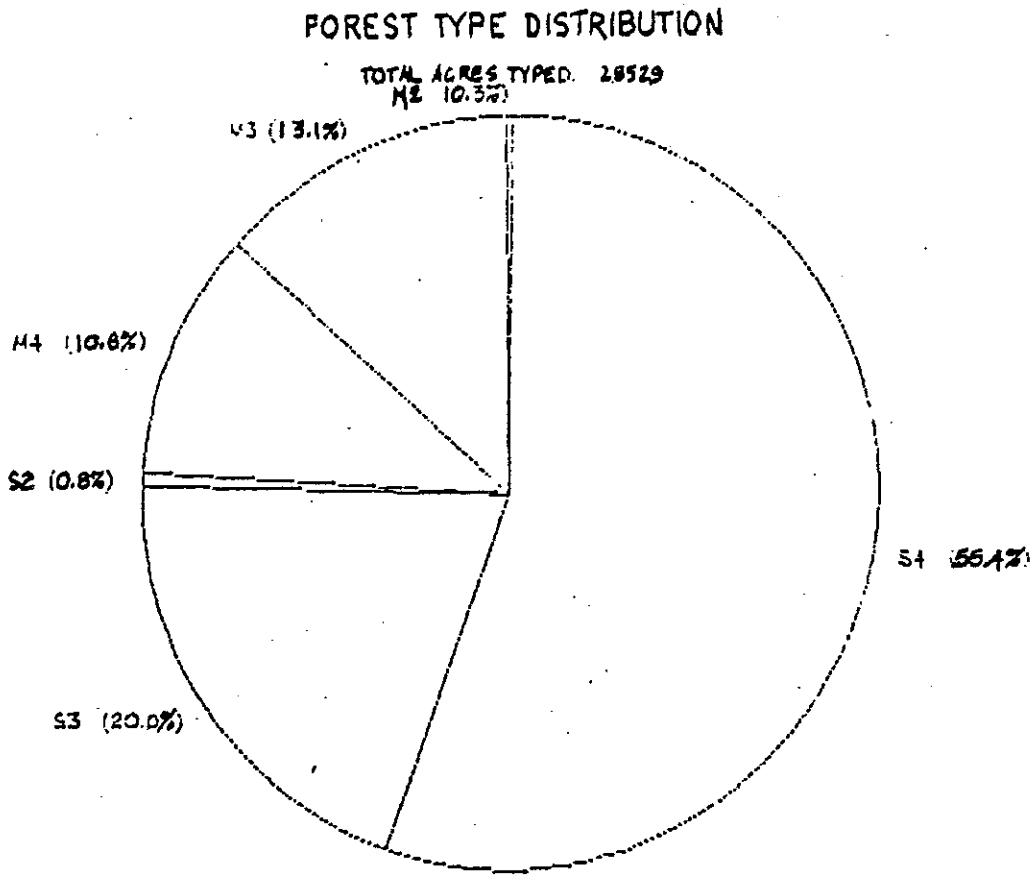


Illustration no. 1

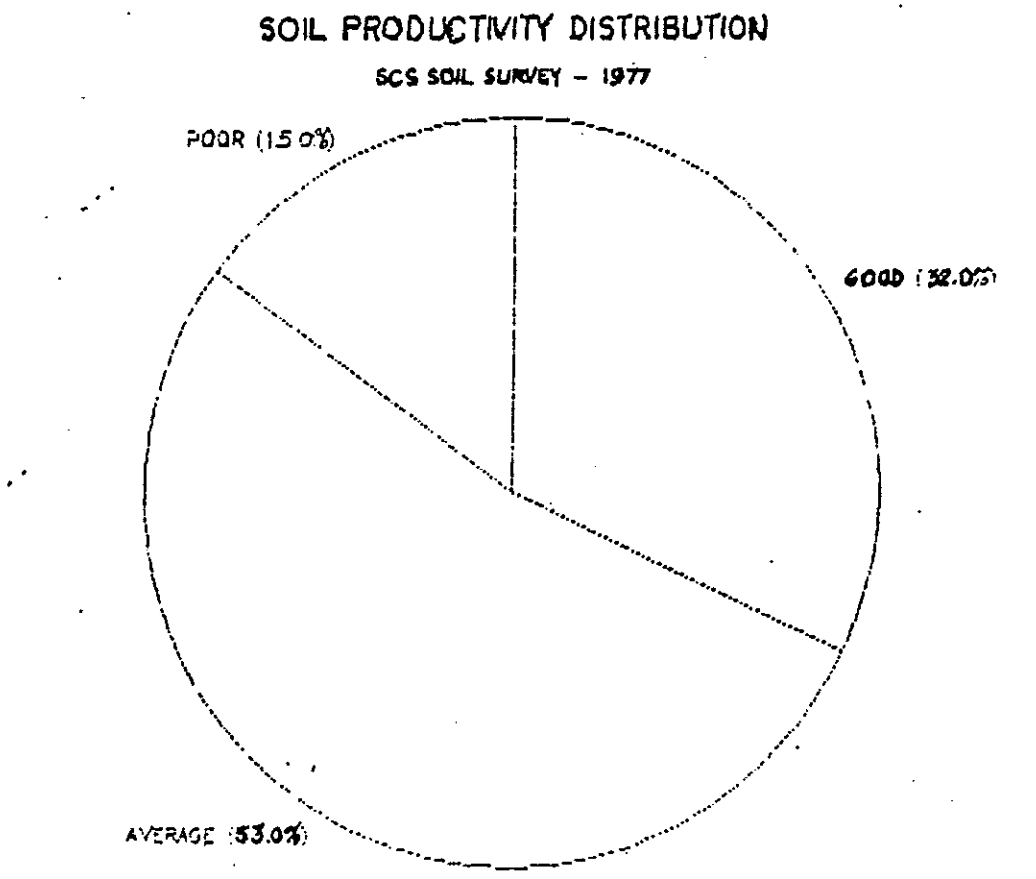


Illustration no. 2

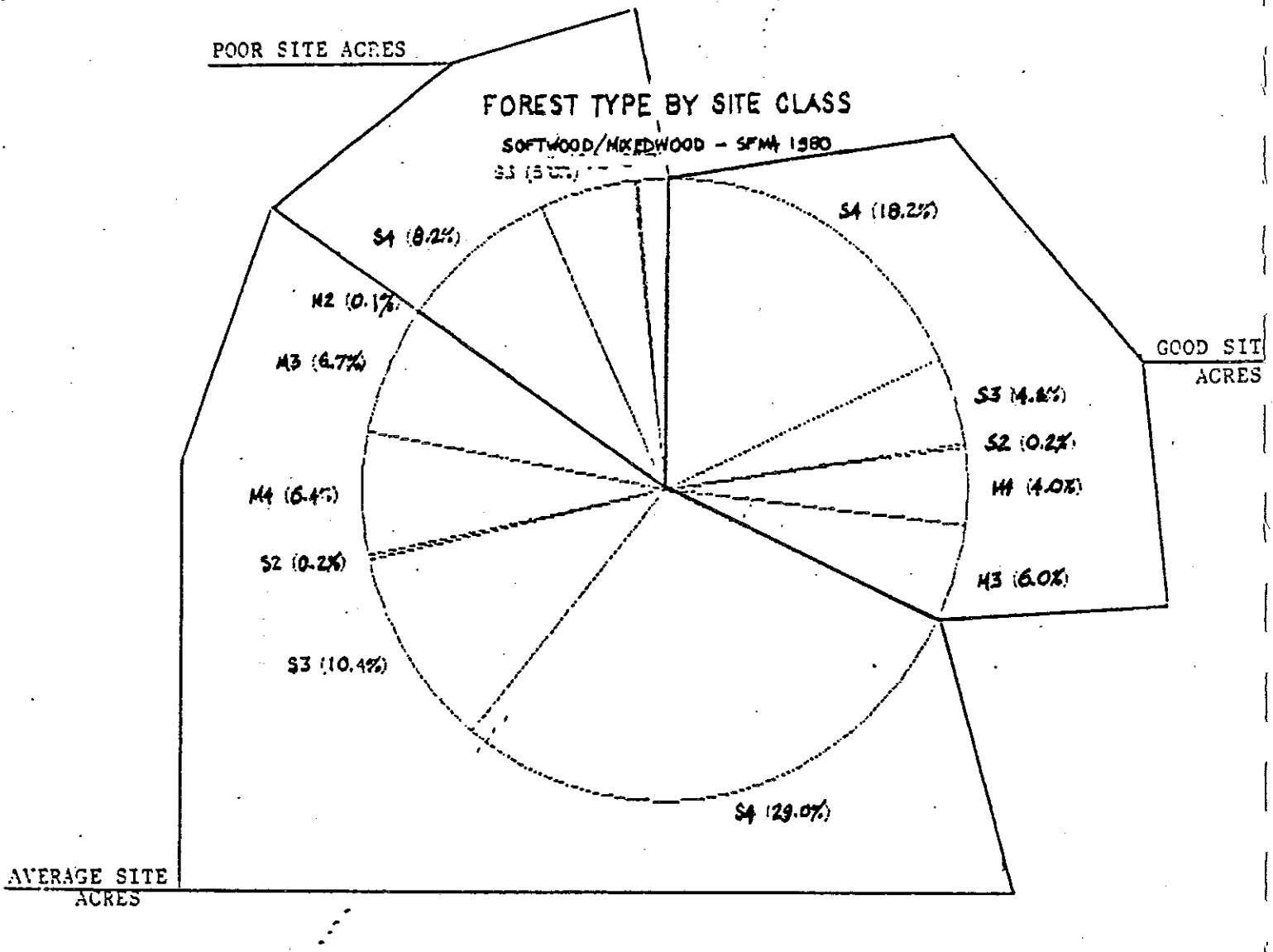


Illustration no. 3

The final step in the development of the class file was to determine the age class distribution for the different forest types and site classes. Base inventory data on the SFMA offered some age data per type. This data consisted of ages as measured (absolute) on the plots and presented problems in realistic application to FORMAINE model using viable yield curves. The largely older-aged character of the SFMA resulted in the absolute ages often exhibiting a significant amount of suppression in individual tree growth. Disregarding this suppression would tend to misrepresent the SFMA as a forest that is older than it really is in terms of growth. This would result in greater neccessary downward calibration to bring the curves in line with the established inventory totals and lower overall growth on the forest through the projection period. Fortunately, derived ages for major types had been determined by R. Seymour in 1979 in association with inventory information examination. The derived ages are much more applicable to the existing inventory totals and resulted in fairly low calibration requirements. Derived ages were then applied to the forest types (illustrations no.s 4 & 5).

B. Yield File Development:

The yield curves utilized for the SFMA application of FORMAINE were yield curves developed from the USFS Maine Forest Survey data (Powell & Dixon Report 1980). The yield curves for softwood (spruce-fir) were taken as is and applied to the SFMA class file and then calibrated to bring generated inventory in line with measured inventory. Illustration no. 6 displays the calibrated curves, including the yield curve generated by spaced stands. Secondary products (hardwoods) were determined by adding corresponding portions of the intolerant and tolerant hardwood yield curves to develop a general hardwood yield curve for the SFMA. Existing hardwood volume in softwood and mixedwood stands on the SFMA was determined by totaling up the hardwood component of the stand types, expanding the volume by type acreages, and calibrating the FORMAINE output to the calculated total hardwood volume.

Calibration adjustments were minor (95% of yield curves) for spruce-fir which indicates a good match between SFMA inventory plot data, forest type and soil type data and the empirical yield curves. Calibration adjustments for mixedwood were more significant (55% of yield curves), indicating a lower than "normal" softwood component in the mixedwwod type. Reasons for this are unclear. It is possible that many of the mixedwood sites hold that typing as a result of past operations (40's and 50's) that removed the viable softwood component and the remaining softwoods that are now present have lost ground to competing hardwoods. The effects of the budworm in unprotected mixedwood stands may be a factor.

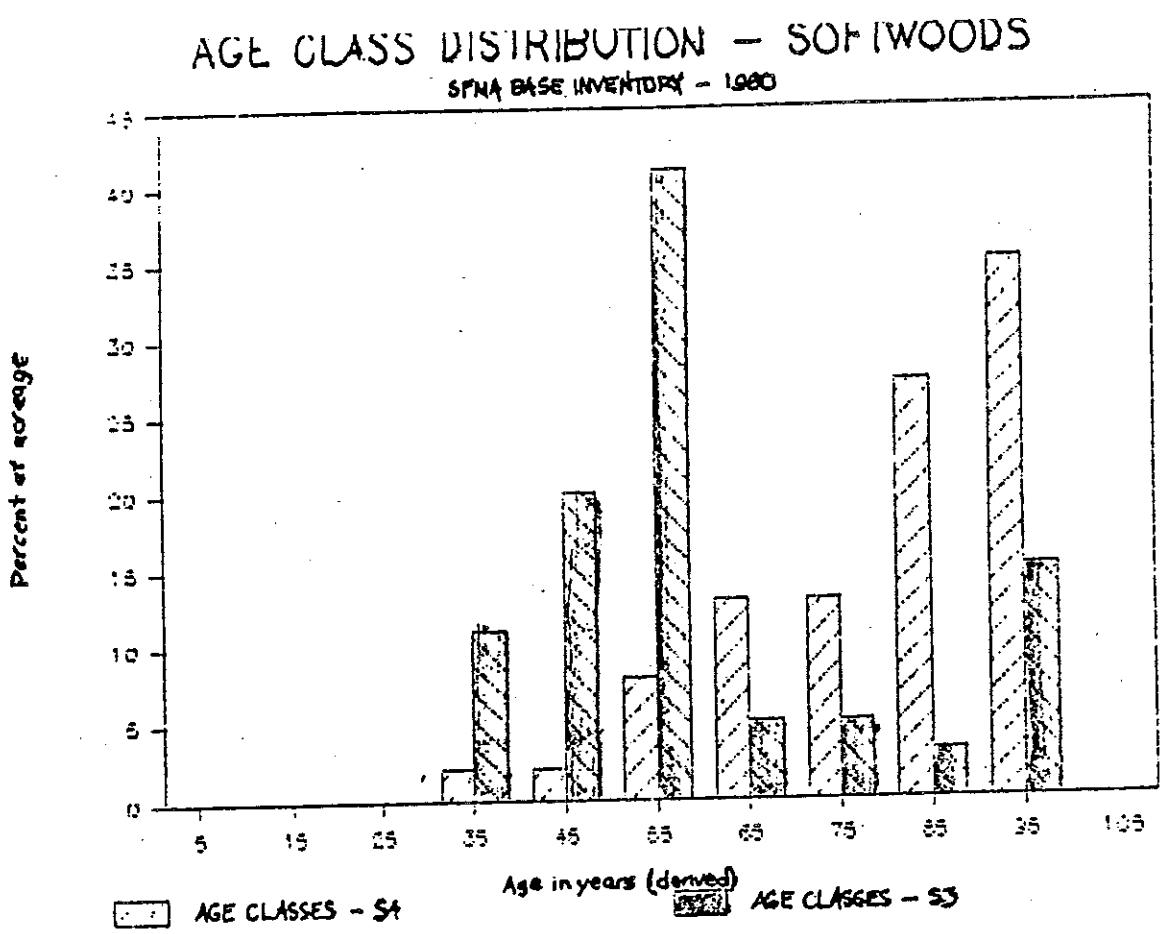
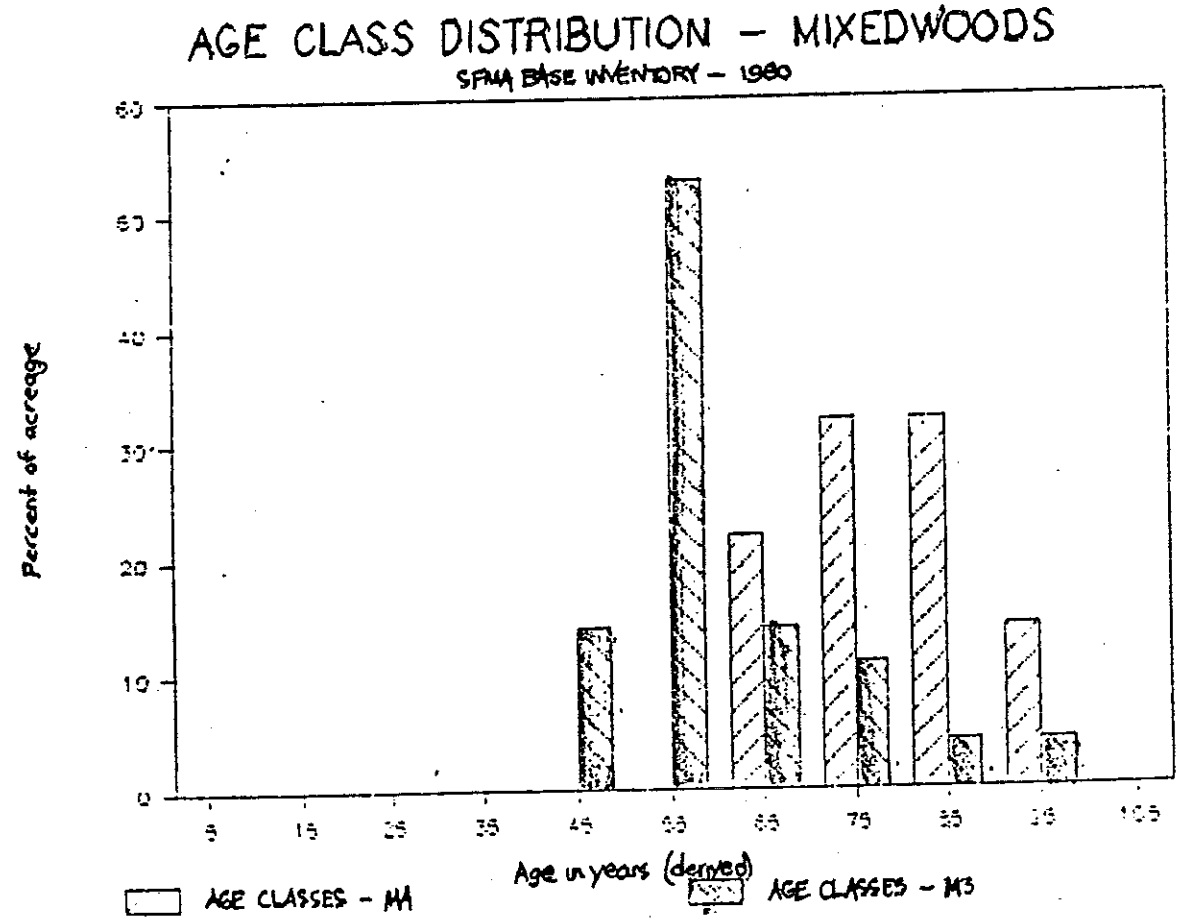


Illustration no. 4



C. Harvest History File:

The forest as generated by FORMAINE, now closely resembles the SFMA as inventoried in 1980. Prior to approaching projection work, the forest model should reflect the activities of the past 8 years. Records indicate a harvest from 1980 through 1985 of approximately 2550 Mcf, primarily in S3 and S4 types. No effort was made to determine acreage in either type because the area was partial cut and since the S3 and S4 type together comprise about 75% of the SFMA, scheduled harvesting in the model will access those types. Harvesting for 80-85 was entered as 2550/5 = 510 Mcf/yr. In the 1985-1990 period, harvesting was estimated to total 850 Mcf total or 170 Mcf/yr. Harvesting on all runs was scheduled at a minimum of 680 Mcf/yr for 90-95. This is the only economic limitation considered in any projection, but these levels are considered necessary and reasonable to provide sufficient income for start-up and establishment of woods operations.

D. Treatment/Cost Curves:

Although of value academically, development and modeling of these curves has limited application on the SFMA at this time. Not enough information specific to the SFMA exists to produce meaningful curves for these files, and the SFMA is at a stage of management where application of the model data would not be possible. In the future, as operations on the SFMA produce accurate data to build cost and treatment curves and the model is revised and updated, use of these additional curves will be considered.

E. Projection Period:

The SFMA, from the standpoint of age class distribution, is severely out of balance. Single rotation or 100-year projections don't offer enough time to observe the forest at a regulated, sustainable level because it takes a rotation to get the SFMA even roughly regulated. For this reason, and in full recognition of the fragile value of overly long projections, the SFMA FORMAINE runs were set at 40 iterations (200 years). this offers enough time for inventory stabilization and observation of sustained harvest/inventory levels over time.

F. Management Strategies:

Based on the management guidelines for the SFMA, particularly the weight of cost relative to othermanagement considerations such as full utilization of forest products, non-timber recurces and investment in forest development, the harvest rules were set at:

50% Rule 1 (maximize unharvested loss)
50% Rule 2 (maximize harvested volume)
Years 1 - 5 (previous harvest activities)

80% Rule 1

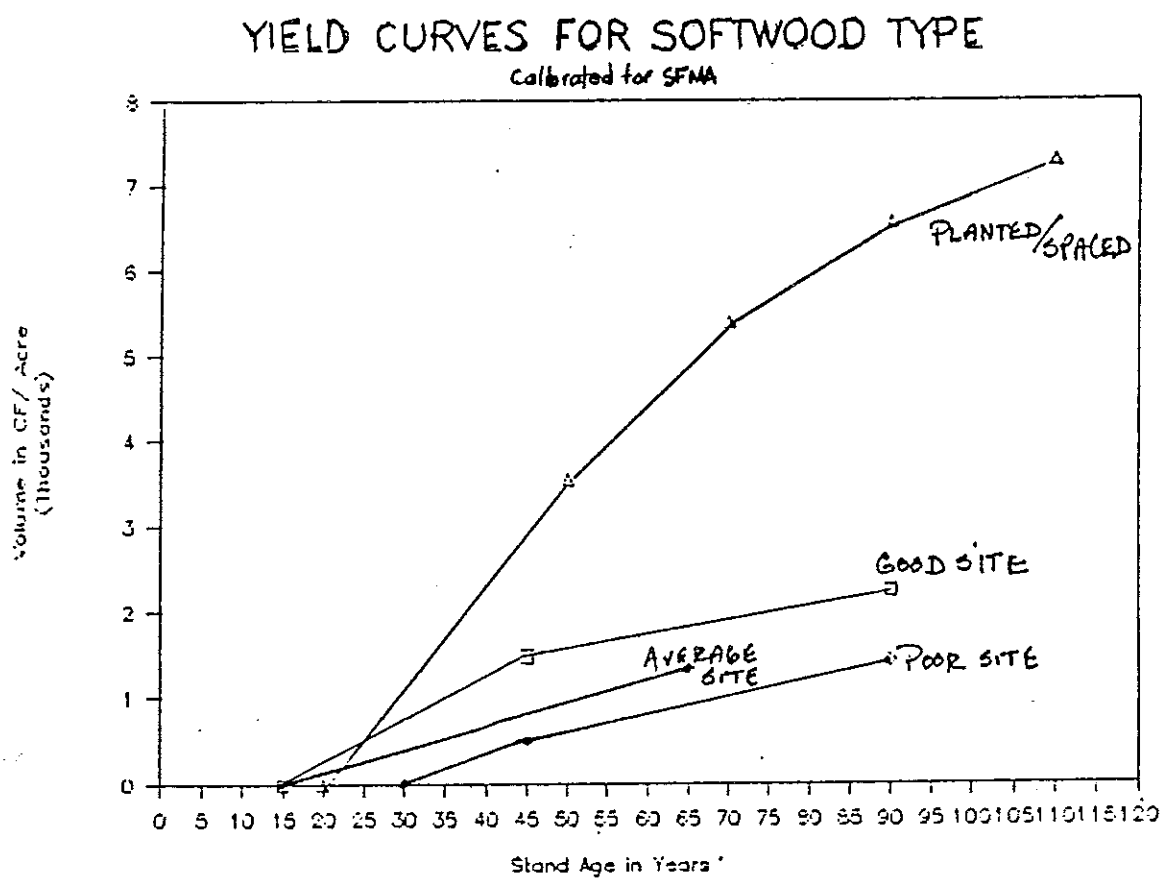


Illustration no. 6

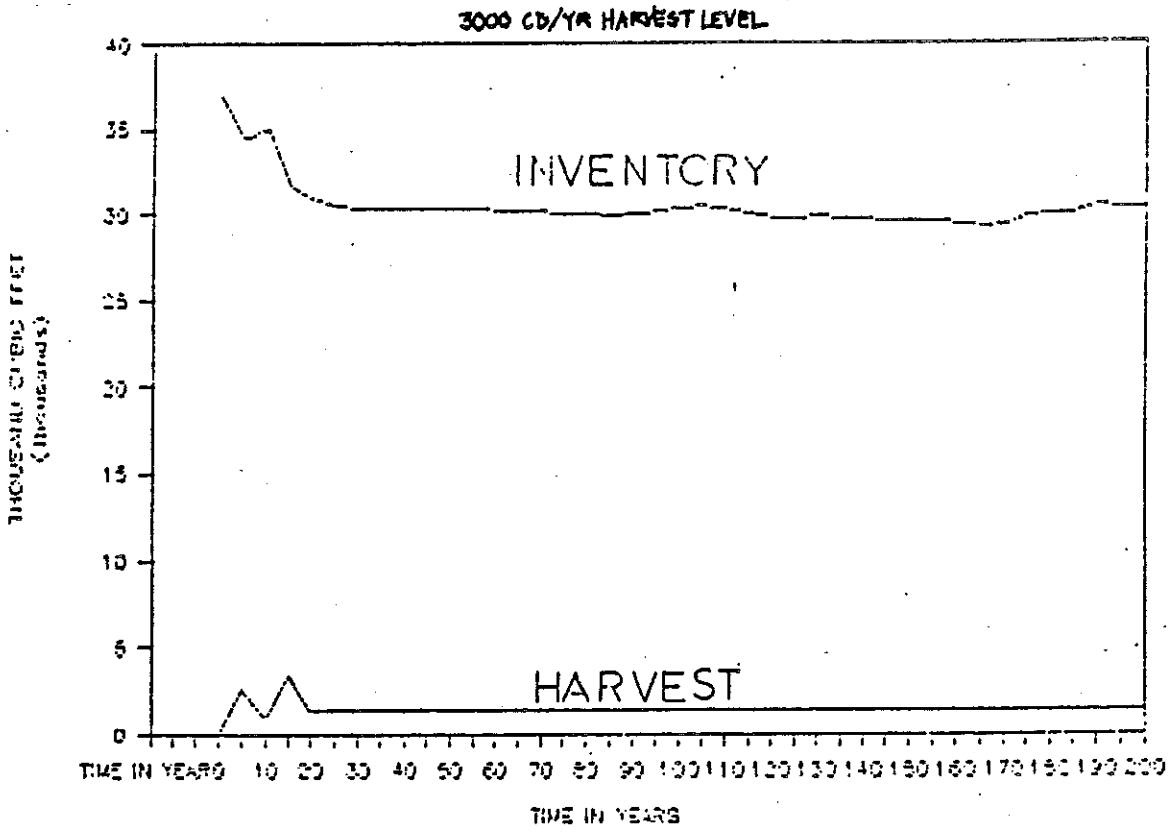
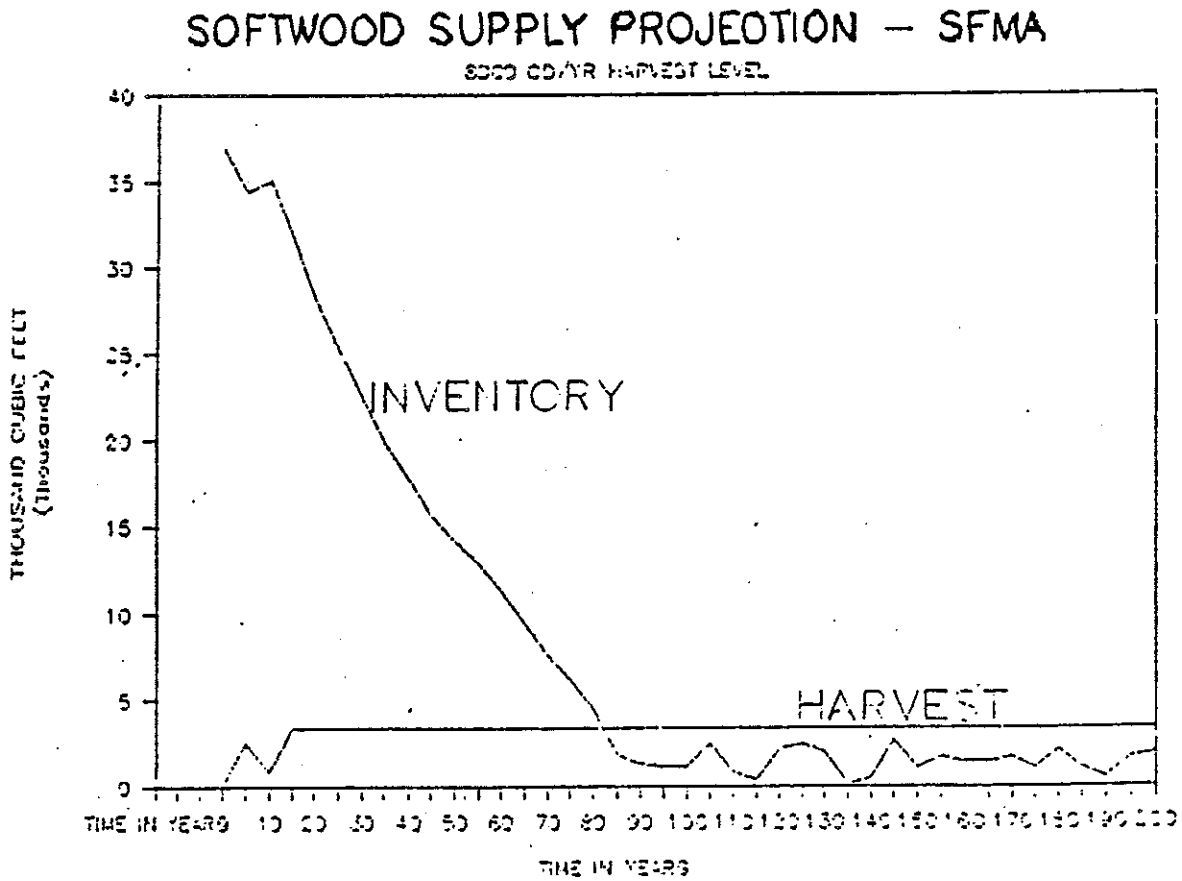


Illustration no. 7



20% Rule 2
Years 6 - 200

Supply Projection Procedure:

With harvest rules, projection period and harvest history all determined, a number of projections were generated to determine the harvest levels described under "Goals" above. The runs can be grouped into 3 catagories:

1) No management
2) Moderate management
3) Intensive management

A variety of harvest levels were run under each catagory, with the objective of establishing upper and lower limits of harvest, i.e., a low harvest limit that does not fully utilize inventory growth, an upper limit at which harvest levels deplete inventory levels to the point where harvest is not sustainable, and the desired range where both harvest and inventory are stable over a long period

1) No management - these runs specified no planting or spacing and assumed harvest only. Based on previous management plan calculations of M.A.I. (see Introduction) of 18.7 cf/ac (x 27761 ac = 519 Mcf/yr) runs were tried at 85 Mcf intervals from 255 to 680 Mcf/yr levels. Products were entered in proportions of 65% pulpwood and 35% sawlogs.
2) Moderate management - runs were generated at 170 Mcf intervals from 680 to 1020 Mcf/yr harvest levels. Management included spacing operations at 150 acres/yr - about 40% of the operated acres. Spacing was scheduled to begin at year 30 (allowing for lack of existing young stands and lag in shelterwood regeneration systems) and continues to the end of the projection. The spacing window was set at 15-25 years to match yield curve growth.
3) Intensive management - runs in this category entailed spacing all available acres. Planting was not considered due to realistic problems with labor and economic issues. It is realized that spacing 700 acres/yr on the SFMA is unrealistic, but the runs do serve to illustrate theoretical possibilities. Harvest levels were run from 1020 to 1360 Mcf/yr. Spacing was set at 1000 acres/yr to cover all available acres.

Discussion:

No management:

Illustrations no. 7, 8 and 9 are graphed output from runs of 255, 680 and 510 Mcf/yr harvest levels. At 255 Mcf/yr (illustration no. 7) inventory is stable but only because the non-spaced yield curves level out in mature stands. The level inventory reflects

this flat portion of the yield curves and the 355 Mcf/yr is not enough harvest to cover available yearly growth in younger stands. This harvest level would be below the sustainable level available for harvest.

At 680 Mcf/yr (illustration no. 8) harvest levels are beyond sustainable levels and inventory plunges to a shortfall at year 82. Stands are then harvested early in the yield curve and the forest never generates enough accumulated growth before harvest to rebuild inventory levels. With no management other than harvest, 680 Mcf/yr is above the sustainable harvest levels.

At 510 Mcf/yr (illustration no. 9) inventory stabilizes after regulation is reached in 80 years. This corresponds will with anticipated softwood rotations, and allows stable harvest levels over time. Inventory decreases from 36 MMcf to 20 MMcf (44%) as acreage accumulates in young age classes below merchantable parameters. Harvest levels are 2.5% of sustained inventory. Without any management toward forest and/or stand improvement, 510 Mcf/yr appears to be a reasonable sustained harvest level.

Moderate management:

Although spacing of 40% of operated acreage would be considered intensive management by most, it is classed as moderate in this examination relative to the extreme of spacing all available acres. Illustrations no. 10, 11 and 12 represent harvest levels of 680, 1020 and 850 Mcf/yr harvest levels.

At 680 Mcf/yr (illustration no. 10) the strength of the spaced stands yield curve is demonstrated as inventory climbs out of sight after year 50, when stands spaced at year 30 begin producing merchantable volume. Harvest levels have little effect on inventory growth after this point as the inventory goes through the roof. Under 150 ac/yr spacing guidelines, 680 Mcf/yr is well short of sustainable yields.

1020 Mcf/yr (illustration no. 11) produces the opposite effect as inventory is rapidly depleted and a shortfall is reached (year 57) before spaced stands have a chance to boost volumes. As with 680 Mcf/yr harvest levels under no management, the inventory is harvested before it can generate enough growth to overcome harvest levels.

At 850 Mcf/yr (illustration no. 12) sustained harvest levels are reached at 45 years with a stable inventory around 15MMcf; a decrease of 58% from year zero inventory of 36MMcf. This reflects the greater acreage held in age classes too young to reflect merchantable volume. The stable inventory with relatively high harvest levels reflects the potential of those younger stands if spaced. Determining the specific harvest levels needed to produce a stable inventory were more difficult to ascertain through iterative methods as the system is more sensitive to change as more and more acreage is grown on the

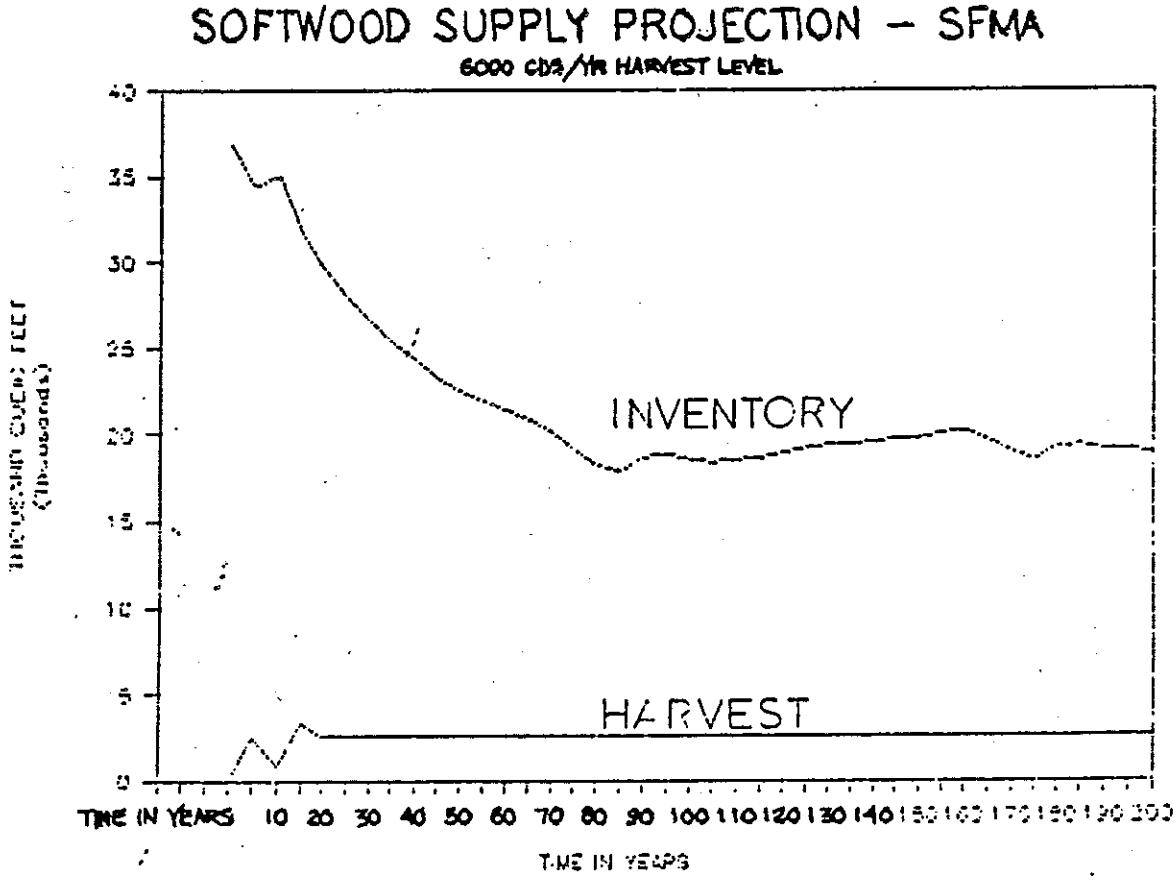


Illustration no.9

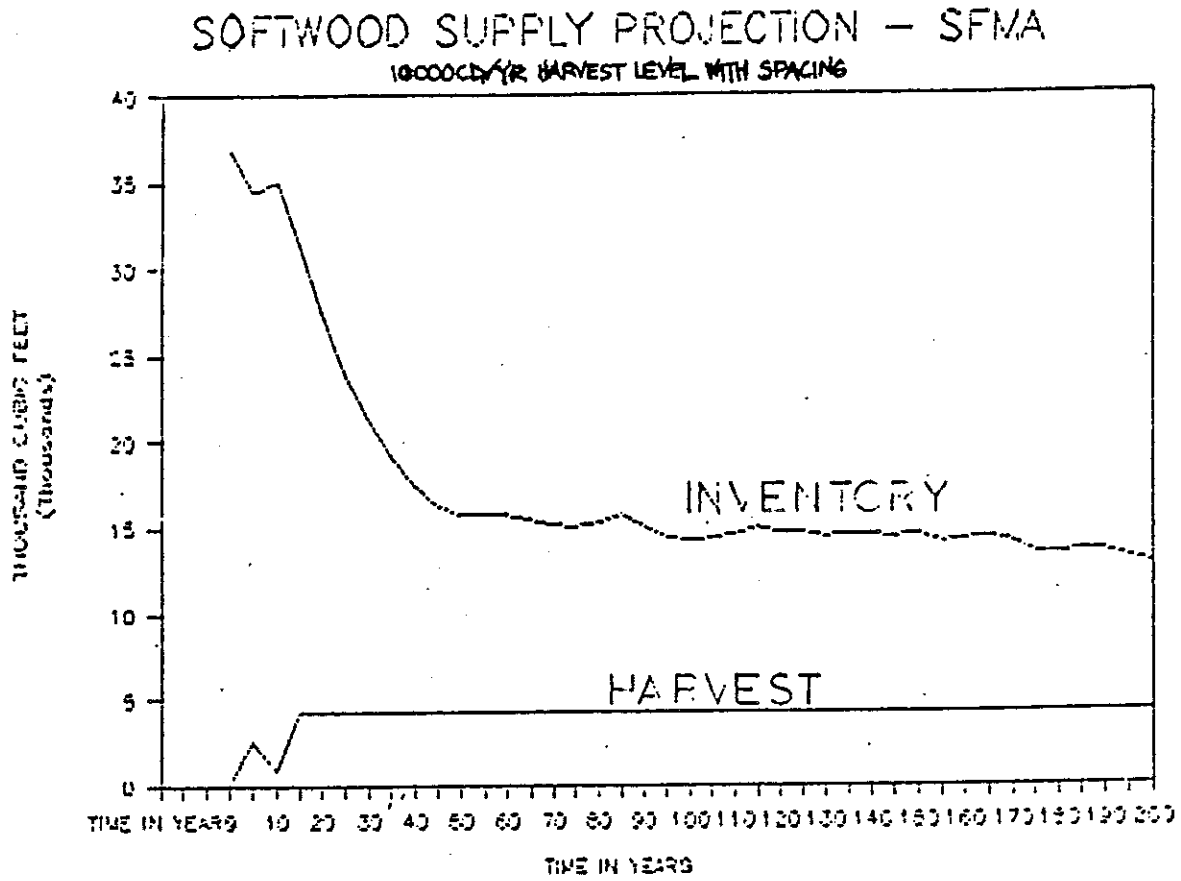


Illustration no. 12

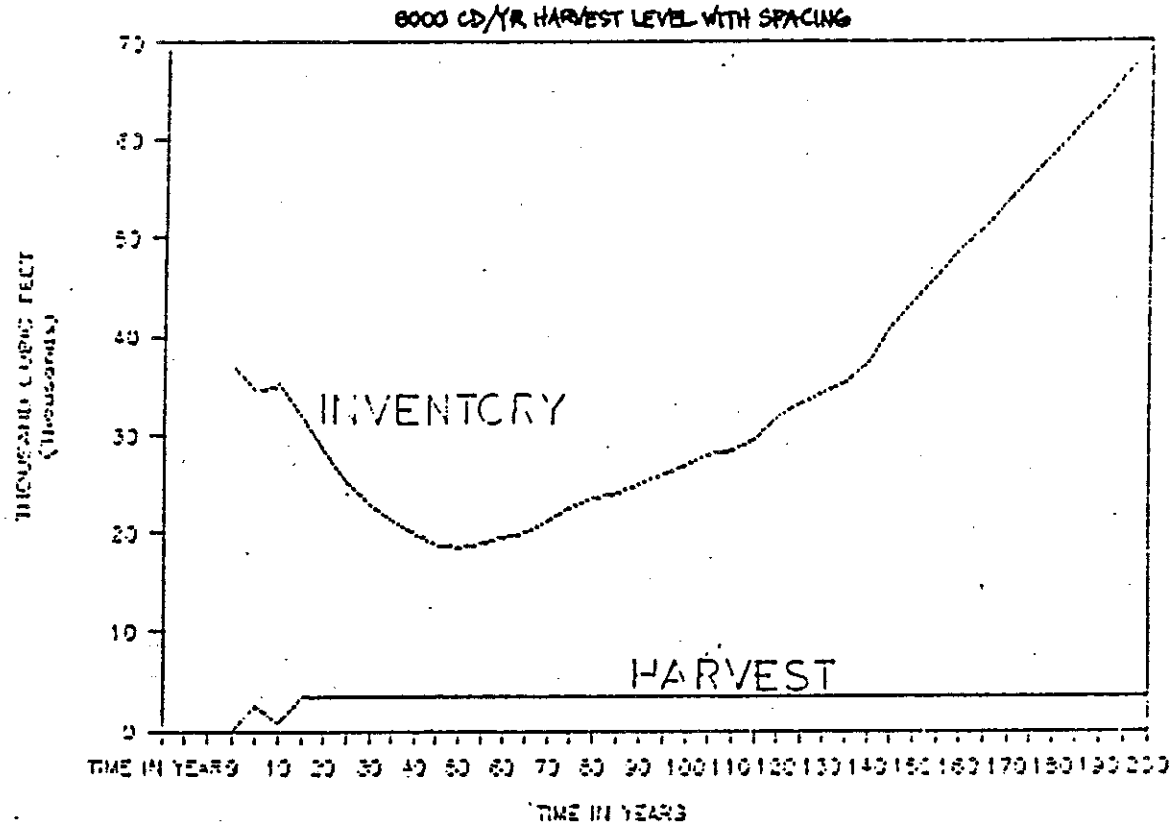


Illustration no. 10

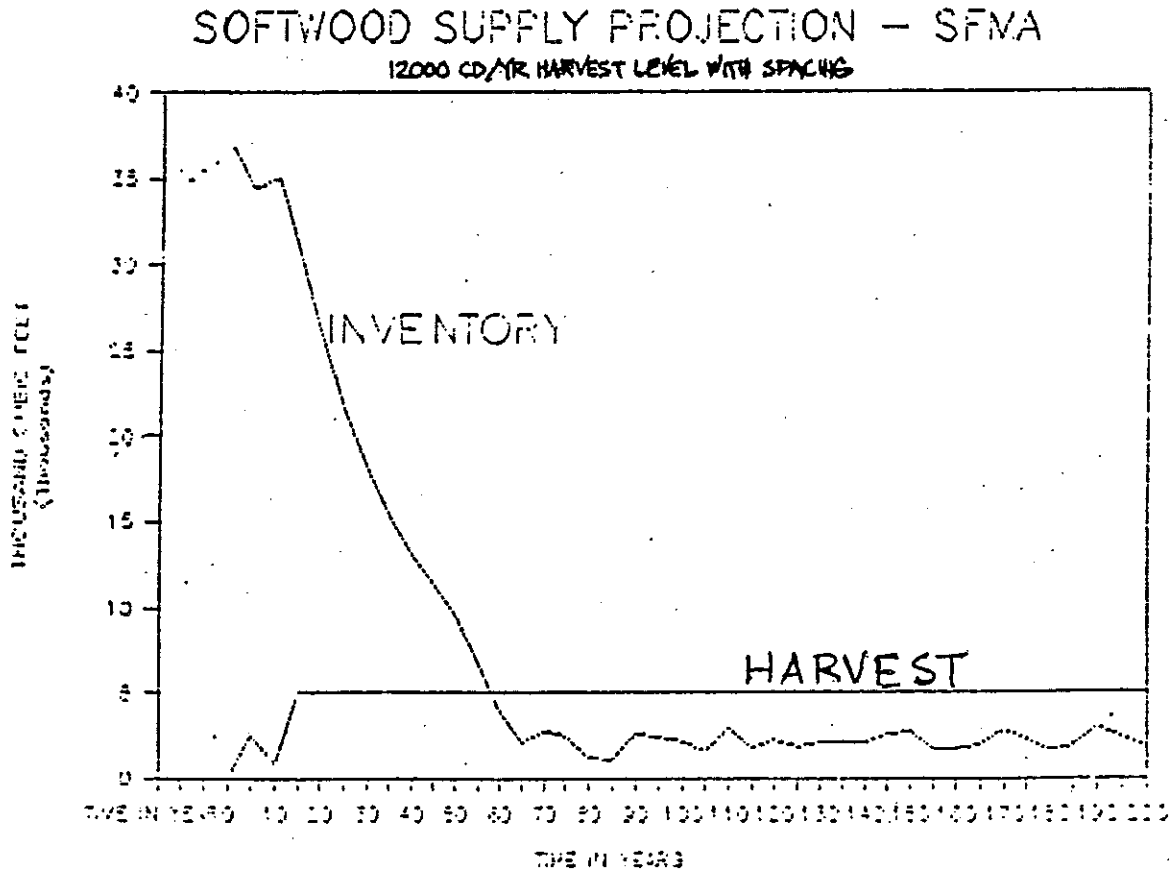


Illustration no. 11

relatively steep spaced-stand yield curve.

Intensive management:

A variety of levels were tried with all available acres receiving spacing. A high level of sensitivity was realized with the high growth levels applied on a forest-wide basis. Despite trying a variety of harvest levels, a sustained, stable inventory could not be modeled. The best attempt is shown in illustration no. 13, harvesting 1173 Mcf/yr. A stable inventory is achieved at year 33 and held until year 110 when all acres on the forest reached spaced status (30 years lag to space + 80 years to regulate) and inventory again cutdistances harvest. Increasing sustained harvest levels depletes the existing inventory below a recoverable level before enough acres ore spaced to hold inventory above harvest. Even if the sustained inventory achieved between year 38 and 110 could be maintained, it would be worrisome from a management perspective since the harvest level of 1173 Mcf is fully 11% of the total inventory of approx. 10MMcf. Harvesting 11% if the existing inventory every year would eliminate any room for error or natural catastrophe.

Summary:

Based on FORMAINE model projections, a reasonable level to begin harvest on the SFMA is at least 510 Mcf/yr. As management systems are established and forest development activities are initiated, harvest levels could be raised to the 680 to 850 Mcf/yr range, depending on management activities. Long-term levels in the 680 Mcf range should be avoided without active management to ensure increased growth rates. Above all, the extremely long projection periods, and the problems associated with applying FORMAINE or any other model, should accent the need for continous review and revision of model and projection data and methods. Consideration of the FORMAINE projections should also recognize areas in which more specific field work could improve the data that forms the FORMAINE files and the inconsistencies associated with the model in reference to specific forest management on the SFMA. A brief summary of some of the concerns regarding application of FORMAINE to the SFMA are as follows:

a. The FORMAINE model does not anticipate changes in stand types over time as a result of management activities. The class file does not change over the projection period - an unlikely scenario given the silvicultural characteristics of Maine forest types in general and SFMA forest types in particular.

b. FORMAINE, as utilized for SFMA projections, assumes total access to all forest types, which is far from the actual situation. A harvest sequence file could be developed to mitigate this problem somewhat, but it would be difficult to effectively prepare.

c. FORMAINE assumes a clear cut regeneration system, and does not apply well to aspects of selection, shelterwood or other partial cut systems, particularly in the areas of operated acreage, lages in regeneration establishment and realization of actual harvest volumes, and growth on residual stems after intermediate harvest operations.

These concerns should be addressed over time as models such as FORMAINE are improved to reflect different regeneration systems and the SFMA application is updated and revised.

BAXTER STATE PARK
SCIENTIFIC FOREST MANAGEMENT AREA
ADVISORY COMMITTEE
(Effective 9/7/88

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