An Ecological Assessment and Forest Management Framework for the Lower Worcester Plateau Ecoregion in Massachusetts

2nd
DRAFT

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
23 December 2003

Table of Contents

I. Introduction **6**
II. The Setting **9**
III. Conservation of Biological Diversity **13**
Protected Open Space and Land Conservation 13
Wildlife Resources in the Lower Worcester Plateau Ecoregion 15
Potential impacts on state-listed rare species by forest cutting operations. 17
Fisheries Resources in the Lower Worcester Plateau Ecoregion 19
The DFW Statewide Fisheries Monitoring and Assessment Program 19
A Forest Reserve System for Massachusetts and the LWP Ecoregion 22
Landuse Trends and Forest Fragmentation 25
Invasive Plants 27
IV. Forest Conditions, Health and Productivity **30**
Historical Trends in Forest Composition 30
Current Forest Conditions 32
Forest Disturbance Agents 35
Hemlock Woolly Adelgid 35
V. Soil and Water Conservation **39**
VI. Regional and Global Considerations **43**
VII. Socio-Economic Factors **44**
Demographics and Forestland Ownership 44
Outdoor Recreation 47
Forest-based Industry 47
Spiritual Values 54
Cultural Resource Protection 54
Prehistoric Archaeological Sites 54
Historic Archaeological sites 56
Historic Landscapes 56
National and State Register Resources 57
VIII. Issues, Goals and Recommendations **58**
Massachusetts' Land Management Agencies 58
Division of Water Supply Protection 58
Division of State Parks and Recreation 58
Division of Fisheries and Wildlife 59
Specific Issues, Goals and Recommendations for Action 59
Conservation of Biological Diversity 59
Forest Conditions, Health, and Productivity 62
Soil and Water Conservation 63
Regional and Global Considerations 64
Socio-Economic Factors 65
IX. Infrastructure and Resource Needs **68**
Glossary **69**
Literature Cited **77**
Appendix I. Summary of comments received on October 2003 draft of the LWP Ecoregion Document, and responses from the ecoregion planning team **81**
Appendix II. Listed species and natural communities known to occur in the Lower Worcester Plateau ecoregion. **97**
Appendix III. [list of forest conservation organizations for the LWP ecoregion]). **101**
Appendix IV. Information on invasive plants **102**
Appendix V. Cultural Resource Management Guidelines **104**

List of Figures

Figure 1. Proposed EOEA ecoregions for Massachusetts. 8
Figure 2. Location of the Lower Worcester Plateau ecoregion in central Massachusetts 10
Figure 3. Communities in the Lower Worcester Plateau ecoregion 10
Figure 4. Counties in the Lower Worcester Plateau ecoregion 11
Figure 5. Major river basins in the Lower Worcester Plateau ecoregion 11
Figure 6. Landuse in the Lower Worcester..... 12
Figure 7. Permanently (lighter color) and temporarily (darker color) protected open space in the Lower Worcester Plateau ecoregion. 13
Figure 8. BioMap core and supporting natural landscape areas in the Lower Worcester Plateau ecoregion 15
Figure 9. Estimated habitat occurrences of rare wetland wildlife species in the Lower Worcester Plateau ecoregion..... 16
Figure 10. Core Habitat and Critical Supporting Watershed areas in the LWP Ecoregion.... 16
Figure 11. Locations of fisheries assessments in the LWP ecoregion..... 21
Figure 12. Potential and certified (larger dots) vernal pools in the Lower Worcester Plateau ecoregion 22
Figure 13. Age class distribution of forestland in the Lower Worcester Plateau ecoregion and statewide, 1999 25
Figure 14. Top 20 towns in terms of acres per housing unit, and the "Sprawl" front in Massachusetts 26
Figure 15. Contiguous natural lands in the Lower Worcester Plateau ecoregion..... 26
Figure 16. Example of rare habitat survey results from the Quabbin Reservation..... 28
Figure 17. 1830 Forest within the Lower Worcester Plateau ecoregion..... 32
Figure 18. Growing stock volumes by diameter class for selected species in the LWP ecoregion..... 33
Figure 19. Hardwoods and softwoods as percentages of live trees in the Lower Worcester Plateau ecoregion and statewide..... 34
Figure 20. Comparisons of white pine and northern red oak volumes (as percent of total softwood or hardwood volumes) for the Lower Worcester Plateau ecoregion and statewide 34
Figure 21. Public water supplies in the Lower Worcester Plateau ecoregion 40
Figure 22. Outstanding Resource Water (ORW) areas in the Lower Worcester Plateau ecoregion..... 41
Figure 23. High (darker color) and medium-yield aquifers in the Lower Worcester Plateau ecoregion 41
Figure 24. Surficial geology of the Lower Worcester Plateau ecoregion..... 42
Figure 25. Hydrology of the Lower Worcester Plateau ecoregion 42
Figure 26. Population estimates for Lower Worcester Plateau communities..... 45
Figure 27. Population change in Lower Worcester Plateau communities, 1980-2000..... 46
Figure 28. Increases in developed land in Lower Worcester Plateau communities, 1971-1999 46
Figure 29. Potential population growth in LWP communities 47
Figure 30. Locations of Department of Fish & Game properties in the LWP ecoregion 50
Figure 31. Locations of Division of State Parks & Recreation properties in LWP ecoregion..... 50

List of Tables

Table 1. Information on Masachusetts ecoregions 9
Table 2. Landuse in the Lower Worcester Plateau ecoregion, 1985 and 1999..... 12
Table 3. Protected open space[1] in the Lower Worcester Plateau ecoregion..... 14
Table 4. Currently documented occurrences of invasive plant species in the Lower Worcester Plateau ecoregion counties 29
Table 5. Timberland area by forest-type group and size class, Lower Worcester Plateau ecoregion..... 33
Table 6. Average annual growth and removal of sawtimber volume (in board feet) from the Lower Worcester Plateau ecoregion and statewide, 1984-1998 38
Table 7. Forest damage agents in the Lower Worcester Plateau ecoregion, 1990-1997..... 39
Table 9. Surficial geology in the Lower Worcester Plateau ecoregion 40
Table 9. Imperviousness estimates in the LWP ecoregion 44
Table 10. Population data for communities in the Lower Worcester Plateau Ecoregion..... 48
Table 11. Percent change in developed land in Lower Worcester Plateau communities, 1971-1999 49
Table 12. Licensed timber harvesters in LWP communities 52
Table 13. Number of licensed private consulting foresters in LWP communities 53
Table 14. Maple sugar producers in LWP communities..... 53
Table 15. Christmas tree growers in LWP communities 54

Acronyms used in this document

BF – Board Feet
BMP – Best Management Practices
BOF – Bureau of Forestry
CR – Conservation Restriction
CRI – Cultural Resource Inventory
CRM – Cultural Resource Management
CSW – Critical Supporting Watershed
DCR – Department of Conservation & Recreation
DEM – Department of Environmental Management
DEP – Department of Environmental Protection
DFW – Division of Fisheries & Wildlife
DSPR – Division of State Parks & Recreation
DWSP – Division of Water Supply Protection
EOEA – Executive Office of Environmental Affairs
EPA – United States Environmental Protection Agency
ER - Ecoregion
FCPA - Forest Cutting Practices Act
FIA – Forest Inventory & Analysis
FSC – Forest Stewardship Council
ft^3 – cubic feet
GIS – Geographic Information Systems
HWA – Hemlock Woolly Adelgid
IPANE - Invasive Plant Atlas of New England
LWP – Lower Worcester Plateau
MassGIS – Massachusetts office of Geographic Information Systems
MDC - Metropolitan District Commission
MGL – Massachusetts General Law
MHC - Massachusetts Historical Commission
MWRA - Massachusetts Water Resources Authority
NHESP – Natural Heritage & Endangered Species Program
ORV/ATV – Off-Road Vehicles/All Terrain Vehicles
ORW – Outstanding Resource Water
PILOT - Payment In Lieu Of Taxes
PMOA - Programmatic Memorandum of Agreement
SCS – Scientific Certification Systems
SFI – Sustainable Forestry Initiative
SLCP – Statewide Land Conservation Plan
TNC - The Nature Conservancy
USFS – United States Forest Service

An Ecological Assessment and Forest Management Framework for the Lower Worcester Plateau Ecoregion in Massachusetts

I. Introduction

Forests are much more than just trees. People rely on forests to provide building materials, heat for their homes, pure water and clean air, food and recreation, and other purposes vital to the health and economies of both individuals and societies. Further, they provide essential habitat for plant and animal species, retain genetic banks, protect rare/endangered species, and protect exemplary forest habitats. All of these values require a long-term perspective and stewardship of our forest ecosystems, yet relatively few people have been giving the issue of forest "sustainability" the degree of attention that it deserves.

This document is the beginning of a unique statewide effort to complete ecological assessments and provide regional guidance for the sustainable management of forests within the ecological regions ("ecoregions") of Massachusetts. Ecoregions are portions of extensive landscapes with similar geology, physiography, vegetation, climate, and land use history.

Increasingly, resource management agencies make use of ecological classification systems for land management planning. Such an approach has the benefits of both allowing for the development of landscape-level goals and objectives, and providing a logical framework for coordinating management activities among various agencies, organizations and other landowners.

This effort is being led by the Executive Office of Environmental Affairs (EOEA), with active participation by the three principle state land management divisions: the Division of State Parks and Recreation (DSPR), the Division of Fisheries and Wildlife (DFW), and the Division of Water Supply Protection (DWSP)[1]. Section VIII provides further detail on the missions and mandates of these agencies.

The goals of this new statewide effort include:

- Identify current land management issues for each ecoregion;
- Improve the management of state-owned forests by more closely linking actions to the unique ecological and social issues in the landscape and ecosystem of which they are a part;
- Coordinate the management of state lands under the care and control of the three principal environmental land management agencies;
- Provide consistent opportunities for public input into the management of state-owned forests across a region with similar ecological attributes;
- Incorporate actions into specific forest management plans and programs for state-owned forestlands that offer incentives and technical assistance to private forest landowners in the ecoregion;
- Offer guidance to large non-state landowners (non-profit conservation organizations, forest industry, etc.) as to how their management practices can help address priority conservation issues in the ecoregion.

The concept of coordinating the management of state and other forests across ecological regions was recommended during the independent audit of the 500,000 acres of state-owned forest

[1] The "Ecoregion Team" and primary authors of this document included: Robert O'Connor (EOEA), Paul Lyons (DWSP), John Scanlon (DFW), Thom Kyker-Snowman (DWSP), James DiMaio (DSPR), Mike Barry (DSPR), Mike Fleming (DSPR), Peter Church (DWSP), and Bruce Spencer (DWSP).

lands by Scientific Certification Systems (SCS) as part of the Forest Stewardship Council's (FSC) Forest ("Green") Certification for these lands. Massachusetts is the first state to put all its state management lands up for certification. The audit, which took place in 2002 and early 2003, was launched with the following goals:

- Improve forest management on state lands based on state-of-the-art sustainable forest management principles;
- Improve coordination of forest management among the three land-holding EOEA divisions;
- Improve the confidence and understanding of the public about the management of the state's 500,000 acres of forests;
- Take advantage of potential value-added markets for "Green Certified" forest products sold on state lands;
- Educate the public about the role of sustainable forest management in providing local wood products and making Massachusetts more self-sufficient in the use of wood products;
- Encourage other landowners within Massachusetts to complete FSC Forest Certification on their lands to improve forest management across the state.

The FSC (www.fscoax.org) is recognized as the most credible provider of third-party certification of the sustainability of forest management practices. FSC does not conduct audits directly, but accredits other organizations to conduct audits. In North America, the two FSC-accredited auditors are SmartWood, based in Vermont (www.smartwood.org) and Scientific Certification Systems in California (www.scscertified.com). SCS was chosen to conduct the Massachusetts audit through a competitive bid process. SCS is required to assess practices against FSC principles and criteria. FSC provides a set of 10 Principles and associated Criteria (available on FSC website) by which all certified properties must be judged. In addition, FSC establishes regional guidelines in the form of Indicators. The current draft (7.7, June 2002) of the FSC Certification Standard for the Northeast Region of the United States is the FSC standard for Massachusetts.

As auditor for Massachusetts state forests, SCS also developed its own Standard for State Forestlands in Massachusetts, modifying the SCS Generic Interim Standard to reflect state forest management in the region and incorporating relevant components of the FSC Northeast regional standard. SCS also used its own Forest Conservation Program (FCP) criteria for the MA evaluation. The FCP was designed to directly reflect the FSC Principles and Criteria. All MA public forest operations were evaluated and scored on 18 SCS criteria within three program elements. These ratings were then translated into scores for each of the 10 FSC Principles.

The audit report, completed by a diverse team of nationally-known forest experts, is still pending FSC's final approval. This audit included field visits to over 70 sites where forest management practices had occurred or were planned on the land of the three land-holding divisions within the EOEA. EOEA and its land management divisions are moving forward with the completion of the first ecological region forest document which will guide forest management plans for the state properties within this ecoregion over the next few years. It is the intent of this process to create ecological guidance documents for the entire state over the next few years to guide the drafting of property management plans for all state-owned forests.

In delineating ecological regions for the state, staff from the three land-managing divisions reviewed formats established by the Environmental Protection Agency (EPA) and the U.S.D.A. Forest Service (USFS). Both systems are based on assessment of the physical, chemical and biological features of Massachusetts landscapes. The Forest Service system is part of a nested classification system that covers the entire United States. The EPA system only includes Massachusetts. The Nature Conservancy has adapted the Forest Service ecological regions in its "forest matrix" analysis of the Northeastern United States.

The staff of the EOEA agencies considered the benefits of these two systems and also considered the overall location of the 500,000 acres of state-owned forest land relative to the two formats. After careful consideration, EOEA agency staff adopted a hybrid of the two systems (Figure 1). For areas from the main stem of the Connecticut River and its valley eastward to the coast, we feel the Forest Service system provides the most detailed information and best serves the needs of this process. For areas to the west, the EPA system has the finer delineations that are necessary for this management planning process. It should also be noted that ecoregional planning is an adaptive process, and as new information becomes available, management guidelines and plans will change accordingly.

For the most part, the issues raised in this document will be specific to the conditions of the Lower Worcester Plateau (LWP) ecoregion. However, some issues may be fairly consistent across several ecoregions. For example, improving the conservation of the more two million acres of private, non-industrial forest land in the state is an issue that crosses ecoregional boundaries. The need for an improved "current use" forest legislation to broaden the enrollment of the current Chapter 61 legislation is one way to address this important issue. This legislation, in combination with other educational and technical assistance tools, is perhaps the most important statewide issue for the protection and sustainable management of the state's forestland.

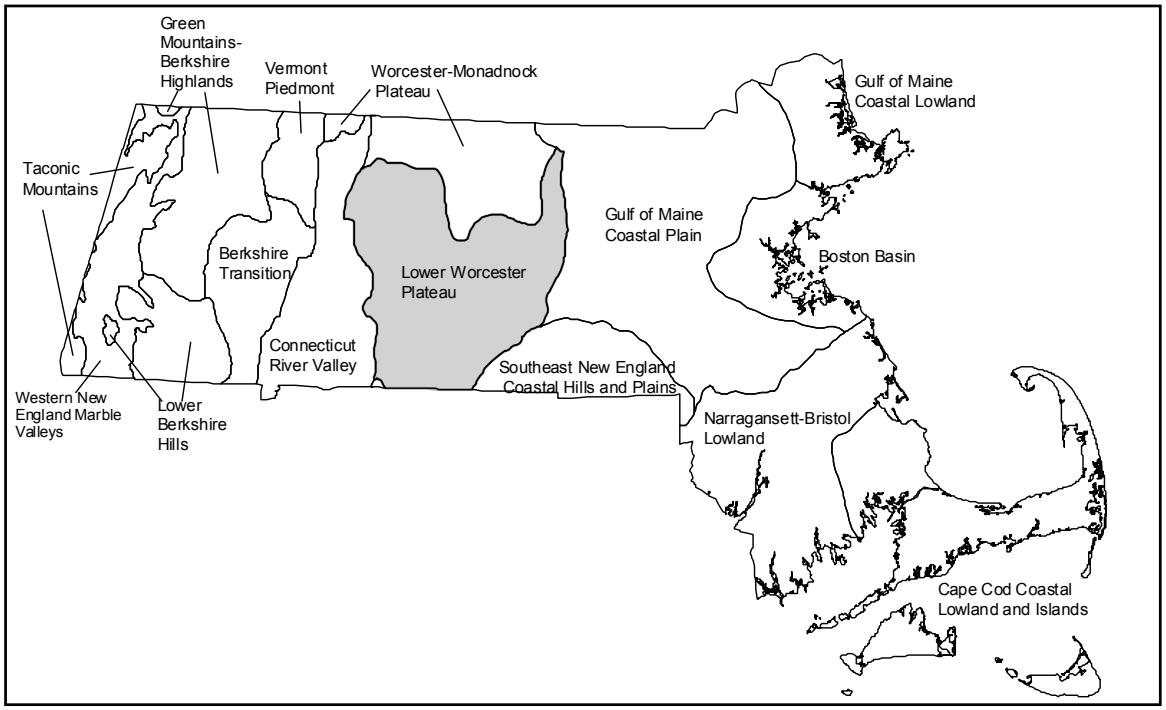

Figure 1. Proposed EOEA ecoregions for Massachusetts.

Another important issue that crosses regional boundaries is the continued improvement of forest management on private forest lands, and especially the use of the state's Forest Cutting Practices Act as a tool to assist in this improvement. Recent policy changes by the DSPR (formerly DEM) are extremely positive and will address many of these issues, but careful monitoring and future adjustments are also important. However, the principal focus of this document is the coordination and improved management of the state lands within the Lower Worcester Plateau Ecoregion.