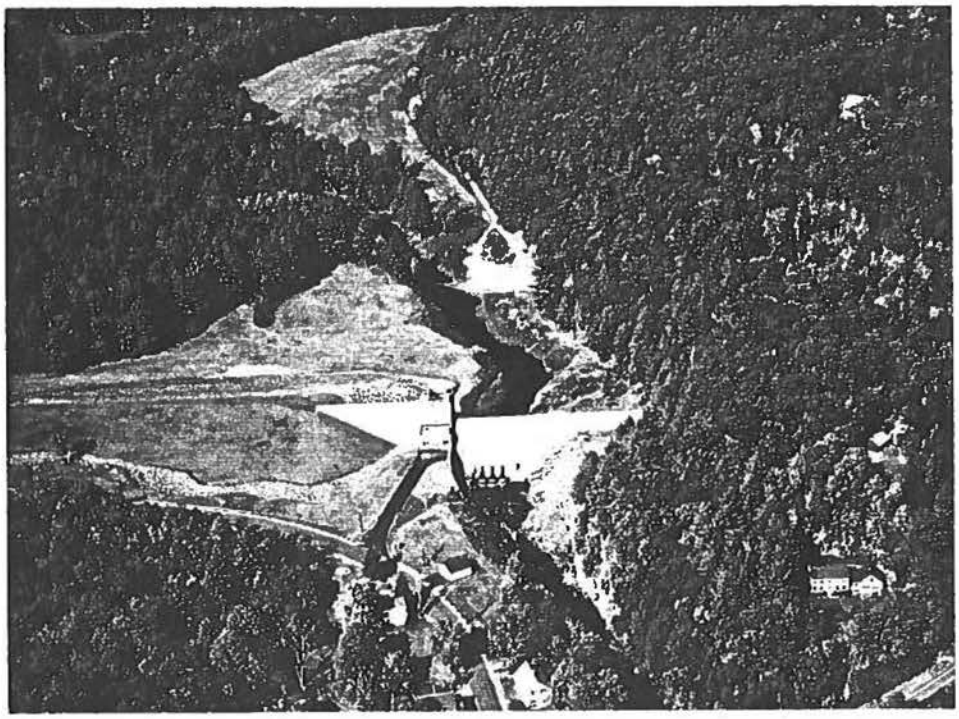
MASTER PLAN

BLACKWATER PROJECT

Salisbury, Webster, NEW HAMPSHIRE



November 1997

US Army Corps
of Engineers
New England District

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The Master Plan for the Blackwater Project covers approximately 3,580 acres of land and water resources within the limits of U.S. Government owned land over the ensuing five year horizon from 1 October 1997 to 30 September 2002. The Master Plan prescribes an overall land and water management plan, resource objectives, and associated design and management concepts that will provide the best possible combination of responses to regional needs, resource capabilities, and expressed public interest and desires consistent with the authorized project purpose. The Master Plan covers all of the resources, including but not limited to, fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial and outgranted lands, easements, and water. The planning process has identified opportunities for the establishment or enhancement of boat launching facilities, dayuse/picnic areas, universal access trails, visual access to selected exemplary natural communities, and a proposed forest management demonstration. It also includes the enhancement of the public assistance program to attract more visitors to the facilities at the Blackwater Project.

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CENAE-EP-PP (1105-2-10)

6 November 1997
Joyce/eml/78554

MEMORANDUM FOR Commander

SUBJECT: Submittal of Master Plan - Blackwater Project, New Hampshire, dated November 1997

1. In accordance with ER 1130-2-550 (15 November 1996), district commanders are responsible for approving master plans, supplements, and updates.

2. The subject Master Plan is enclosed for your review and approval. The previous Master Plan for Reservoir Development, Blackwater Reservoir, New Hampshire, dated February 1967, is rescinded.

3. The Master Plan prescribes an overall land and water management plan, resource objectives, and associated design and management concepts that will provide the best combination of responses to regional needs, resource capabilities, and expressed public interest and desires consistent with the authorized flood control function of the Blackwater Project.

4. The plan has been prepared in cooperation with the Construction/Operations Division which concurs with the Master Plan.

Encl

RICHARD D. REARDON, P.E.
Chief, Engineering/Planning Division

CF:
Mr. Joyce, 114S
Eng/Plng Files, 114S (master plans: mpbwdeap.wpd)

CENAE-EE 1st End

DATE:

FOR Chief, Engineering/Planning Division

APPROVED:_____ DISAPPROVED_____

MICHAEL W. PRATT
LTC, EN
Commanding

MASTER PLAN

BLACKWATER PROJECT
Salisbury, Webster, NEW HAMPSHIRE
(1 October 1997 - 30 September 2002)

NOVEMBER 1997
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

EXECUTIVE SUMMARY

The Master Plan for the Blackwater Project covers approximately 3,580 acres of land and water resources within the limits of U.S. Government owned land over the ensuing five year horizon from 1 October 1997 to 30 September 2002. The Master Plan prescribes an overall land and water management plan, resource objectives and associated design and management concepts that will provide the best possible combination of responses to regional needs, resource capabilities and expressed public interest and desires consistent with the authorized project purpose. The scope of the Master Plan covers all of the resources, including but not limited to, fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial and outgranted lands, easements, and water.

Inputs to the planning process were: surveys, management plans for natural, wetlands and cultural resources, as well as, analyses of recreational capacities and projected needs for project lands. Natural and man-made resources were located, identified and analyzed, including wetlands, exemplary natural communities, and cultural resources that require particular management practices for their protection. These were integrated into a series of project-wide and compartmental objectives to protect and enhance all of the resources in the project area and promote and develop, as appropriate, those resources of interest for public use, education, and visual access.

Recreational opportunities have also been identified through an analysis of regional needs and a public participation process. The planning process has identified opportunities in the project area for the development of canoe launching facilities, day use/picnic areas, a forest management demonstration area, universal access trails, visual access to selected exemplary natural communities, and a proposed forest management demonstration area. In addition, the Master Plan includes the enhancement of the visitor assistance program to attract more visitors to use the facilities at the Blackwater Project.

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ABBREVIATIONS

ATV	All Terrain Vehicle
BW	Blackwater Project
CENAE	Corps of Engineers, New England District
cfs	cubic feet per second
DRED	New Hampshire Department of Resources and Economic Development
FF	Franklin Falls Project
GOES	Geostationary Operational Environment Satellite
L&WCF	Land and Water Conservation Fund
MSL	Mean Sea Level 1929 datum (also referred to as NGVD)
NHDFL	New Hampshire Division of Forests and Lands
NHFG	New Hampshire Fish and Game Department
NH NHIP	New Hampshire Natural Heritage Inventory Program
NH SHPO	New Hampshire State Historic Preservation Officer
OMP	Operational Management Plan
OSP	New Hampshire Office of State Planning
PSNH	Public Service Company of New Hampshire
RCC	Reservoir Control Center
RVFMP	Recommended Voluntary Forest Management Practices
SPNHF	Society for Protection of New Hampshire Forests

TBD	To be determined
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VERS	Visitor Estimating and Reporting Service

I. INTRODUCTION

1.1 Project Authorization and Purpose

The Blackwater Project was authorized by Congress on 22 June 1936 through the Flood Control Act of 1936 (PL 74-738) as amended by the Flood Control Act of 1938 on 28 June 1938 (PL 75-761) as a unit of a coordinated system of reservoirs including Franklin Falls, Hopkinton-Everett, and Edward Mac Dowell Lakes for controlling flooding in the Merrimack River Basin. The Merrimack River and its tributaries flow through New Hampshire and Massachusetts. Construction of the dam was started in May 1940 and completed in November 1941 at a cost of $1,319,746. The dam and reservoir include approximately 3,580 acres of land and water, which are divided into eight compartments for planning, administrative and management purposes. See Figure 1.

Authorization for development and use of the reservoir area for public recreation and other purposes is contained in section 4 of the Flood Control Act of December 22, 1944 (Public Law 534, 78th Congress), as amended.

1.1 Master Plan

1.2.1 Goal

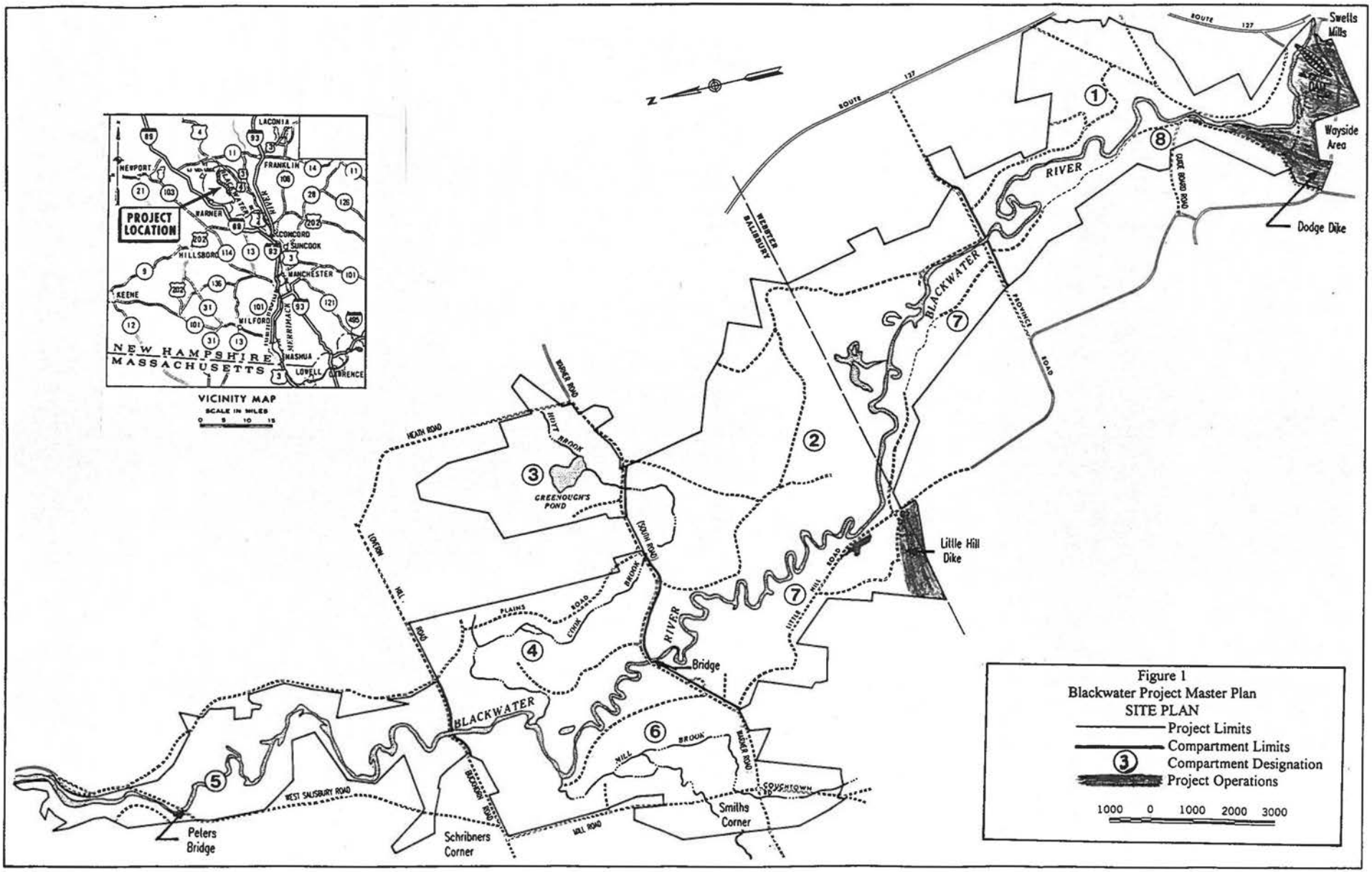
In accordance with EP 1130-2-550 (15 November 1996), the primary goals of the Blackwater Project Master Plan are to provide a concept document to prescribe an overall natural, cultural and manmade resources management plan, resource objectives, and associated design and management concepts consistent with the authorized project purpose, which:

(a) Provide the best combination of responses to regional and ecosystem needs, project resource capabilities and suitabilities, and expressed public interests and desires;

(b) Contribute towards providing a high degree of recreation diversity within the region;

(c) Emphasize the particular quantities, characteristics, and potentials of the project;

(d) Exhibit consistency and compatibility with national objectives and other state and regional goals and programs.


PROJECT LOCATION
NEWPORT
WARNER
CONCORD
SUNCOOK
HILLSBORO
MANCHESTER
KEENE
MILFORD
NASHUA
LOWELL
LAWRENCE
NEW HAMPSHIRE
MASSACHUSETTS
VICINITY MAP
SCALE IN MILES
0 5 10 15
N
ROUTE 127
Swetts Mills
Wayside Area
Dodge Dike
RIVER
WEBSTER
BALLISBURY
BLACKWATER
PROVINCE ROAD
DUKE BOARD ROAD
BUNKER ROAD
HEATH ROAD
HUTT BROOK
GREENOUGH'S POND
LOVEIN HILL ROAD
FOGUN ROAD
PLAINS ROAD
CLINK BROOK
Little Hill Dike
LITTLE HILL ROAD
Bridge
WEST SALISBURY ROAD
BLOODEN ROAD
Peters Bridge
Schribners Corner
MILL BROOK
COVENTOWN RD
Smiths Corner
1
2
3
4
5
6
7
8
Figure 1
Blackwater Project Master Plan
SITE PLAN
Project Limits
Compartment Limits
Compartment Designation
Project Operations
1000 0 1000 2000 3000

1.2.2 Project Purpose

ER 1130-2-540 establishes policy for the administration and management of the natural resources activities at US Army Corps of Engineers (USACE) civil works water resources projects and establishes the following program objectives:

(a) To manage natural resources on USACE administered land and water in accordance with ecosystem management principles, to ensure their continued availability.

(b) To provide a healthful environment for project visitors.

ER 1130-2-550 establishes the policy for the administration and management of USACE recreation programs and facilities at civil works water resources projects and establishes the following program objectives:

(a) To provide a quality outdoor recreation experience which includes an accessible, safe and healthful environment for a diverse population,

(b) To increase the level of self sufficiency for the Corps recreation program,

(c) To provide outdoor recreation opportunities on Corps administered land and water on a sustained basis, and

(d) To optimize the use of leveraged resources to maintain and provide quality public experiences at Corps water resources projects.

1.2.3 Master Plan Scope

The Master Plan will prescribe an overall land and water management plan, resource objectives and associated design and management concepts that will provide the best possible combination of responses to regional needs, resource capabilities and expressed public interest and desires consistent with the authorized project purpose. The scope of the Master Plan covers all of the resources, including but not limited to, fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial and outgranted lands, easements, and water.

The Master Plan covers approximately 3,580 acres of land and water resources within the limits of U.S. Government owned land over the ensuing five year horizon from

1 October 1997 to 30 September 2002. It is a flexible planning document in order to permit modification as warranted by future conditions. Approval of this Master Plan will rescind the Blackwater Reservoir - Master Plan for Reservoir Development dated February 1967.

1.2.4 Planning Process

An interdisciplinary team consisting of Corps of Engineers, New England District staff (Planning Branch, Construction/Operations Division, Merrimack River Basin and Franklin Falls and Blackwater Projects) and New Hampshire Department of Resources and Economic Development (DRED) staff provided the principal inputs to the Master Plan. The team included the following disciplines:

(a) planning, civil engineering, economics

(b) landscape architecture

(c) forestry

(d) environmental resources

(e) biology

(f) archaeology, cultural resources

Contributions to the planning process were: surveys and management plans for natural, wetlands and cultural resources and the analyses of recreational capacities and projected needs for project lands. These were integrated into a series of project-wide and compartmental objectives to protect and enhance all of the resources in the project area and promote and develop, as appropriate, those resources of interest for public use, education and visual access.

Also, areas of potential public interest for recreational development were identified. The implementation of these will depend largely on partnerships with local, regional and state entities.

Public input into the master planning process was facilitated through public notices, coordination with local, regional, and state officials, a meeting with the public to discuss and receive input to the plan, and a posting of the draft Master Plan in easily accessible places for the public's review and comment.

The Master Plan is a policy document that serves as an overall management guide while specific management recommendations are reserved for the project's Operational Management Plan (OMP). The OMP must be consistent with the Master Plan. Following completion of the Master Plan, the OMP will be revised to describe in detail how the objectives and concepts prescribed in the Master Plan will be implemented and achieved.

1.2.5 Reevaluation of Master Plan

The Master Plan is a flexible planning document that will be periodically reevaluated and kept up to date. It will be reviewed every five years and revised as required. The district engineer will approve supplements and revisions to the Master Plan.

1.2.6 Application of Federal Laws

Master Plans are required for civil works projects and other fee-owned lands for which the Corps has administrative responsibility for management of their natural and manmade resources. The following federal laws and directives apply to the preparation and update of the Master Plan for the Blackwater Project:

(a) **Historic Sites, Buildings and Antiquities Act of 1935** (16 U.S.C. 461-467). Known as the Historic Sites Act, this Act declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides for designation, acquisition, administration, and protection of such sites. (Additionally, National Historic Landmarks are designated under authority of this Act.)

(b) Public Law 78-534 (**The Flood Control Act of 1944**), as amended by the Flood Control Acts of 1946, 1954, 1960 and 1962, authorizes the Corps of Engineers to construct, operate and maintain public park and recreation facilities at water resource development projects, and to permit local interests to construct, operate and maintain such facilities.

(c) Public Law 85-624 (**The Fish and Wildlife Coordination Act**) requires that the Corps and any agency impounding, diverting, or controlling water, consult with the United States Department of the Interior, Fish and Wildlife Service. The Department of the Interior would evaluate proposed water resources development measures, and determine potential impacts to wildlife resources and measures needed to prevent such impacts.

(d) **Reservoir Salvage Act of 1960** (16 U.S.C. 469-469c). This Act is also known as the Archaeological and Historic Data Preservation Act, Archaeological and Historic Preservation Act, "Moss-Bennett Act", and the Archaeological Recovery Act. When enacted in 1960, this law simply authorized the Secretary of the Interior to conduct salvage archaeology in advance of dam and reservoir construction by the Corps of Engineers and other agencies. In 1974, it was amended comprehensively to authorize salvage in connection with all kinds of federal, federally assisted, and federally licensed projects. As amended, it also directs federal agencies to cooperate with the Department of the Interior in conducting salvage, or to fund such work themselves, and to report to Interior on archaeological programs and any disturbance of archaeological sites.

(e) Public Law 86-717 (**Forest Cover Act,** 6 September 1960) provided a statutory mandate for multiple use forest management, or other vegetative cover management, on project land and waters.

(f) Public Law 89-72 (**The Federal Water Project Recreation Act of 1965**), accompanied by House Committee Report No. 254, requires that the Corps of Engineers and other federal agencies give full consideration to fish and wildlife enhancement. It also provides for non-federal participation in land acquisition, and in the development and management of recreational facilities and fish and wildlife resources.

(g) Public Law 89-665 (**The National Historic Preservation Act of 1966**), as amended in 1992, directs the Corps of Engineers and other federal agencies to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation.

(h) Public Law 91-190 (**The National Environmental Policy Act of 1969**), directs the Corps of Engineers and other federal agencies to prepare environmental impact statements or assessments that describe the environmental effects of proposed projects and measures necessary to minimize any adverse effects.

(i) Public Law 91-604 (**The Clean Air Act, as amended**), specifies that any federal activity, which may result in discharge of air pollutants,

comply with federal, state, interstate, and local requirements concerning control and abatement of air pollution.

(j) Public Law 03-205 (**The Endangered Species Act of 1973, as amended**), requires federal agencies to utilize their authorities to carry out programs for conservation of endangered and threatened species protected by the Act.

(k) Executive Order 11988 (**Floodplain Management**, 24 May 1977) requires that the Corps of Engineers and other federal agencies prevent avoidable adverse or incompatible developments in floodplains by assessing proposed actions, considering alternative approaches when adverse effects would result, and formulating designs and project modifications to minimize impacts.

(l) Executive Order 11990 (**Protection of Wetlands**, 24 May 1977) requires that all federal agencies take action to minimize destruction, loss, or degradation of wetlands. It stipulates that federal agencies must avoid providing assistance for new construction located in wetland unless no practicable alternatives exist, and the proposed action includes measures to minimize harm to wetlands.

(m) Public Law 95-217 (**Clean Water Act of 1977, as amended**). Section 404 imposes requirements with respect to dredge and fill activities in waterways of the United States, including wetlands. Any fill activities in wetlands must comply with Section 404(b)(1), Guidelines for the Specification of Disposal Sites for Dredge or Fill Material. These guidelines allow fill activities for only the least environmentally damaging practicable alternative.

(n) Public Law 95-341 (**American Indian Religious Freedom Act of 1978 AIRFA)**. This act formalizes a policy whereby federal agencies will preserve the inherent right of American Indians to express and exercise their traditional religions. These rights include access to sites (which may be on federal lands), use and possession of sacred objects and the freedom to worship through ceremonials and traditional rites. The Act requires agencies to consult with Native American groups, but agencies need not accede to Native American requests.

(o) Public Law 96-95 (**Archaeological Resources Protection Act of 1979 (ARPA)**. This statute provides protection for archaeological resources requiring any interested parties to apply for a permit from the controlling federal agency to excavate, or remove any archaeological resource located on public or Indian lands. The Act also provides for civil and criminal penalties for individuals disturbing or looting sites (including military personnel that allow such actions).

(p) Public Law 101-601 (**Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)** . This act requires federal agencies to inventory and repatriate certain Native American cultural items recovered from federal property to associated Native American groups. These items are human remains, associated funerary objects, unassociated funerary objects, sacred objects, and objects of cultural patrimony. The Act describes in detail the items included in these classifications and the procedure for repatriation. The Act also provides for the inadvertent discovery of Native remains and objects. If related to an activity on federal land such as construction, logging, and agriculture to name a few, such activity must cease until proper notification is conducted.

(q) **Advisory Council on Historic Preservation, Protection of Historic Properties (36 CFR 800)**. These are the implementing regulations which govern the Section 106 review process established by the National Historic Preservation Act of 1966, as amended for federal agencies. In essence, it implements the process by which we are required to assess a federally approved, assisted, or funded undertaking and its effect upon properties which are or may be eligible for listing on the National Register of Historic Places.

(r) **National Register of Historic Places, Nominations by States and Federal Agencies (36 CFR 60).** These regulations govern the process whereby state and federal agencies would nominate specific resources under their control to the National Register which is the country's basic inventory of historic resources and is maintained by the Secretary of the Interior. This inventory includes buildings, structures, objects, sites, districts, and archaeological resources which may be significant at the national, state, or local levels.

1.2.7 Corps of Engineers Guidance

The Master Plan has been prepared in accordance with guidance contained in the following Corps regulations, pamphlets, and manuals:

ER 1130-2-438	Historic Preservation Program
ER 1130-2-540	Environmental Stewardship Operations and Maintenance Policies
ER 1130-2-550	Recreation Operations and Maintenance Policies
ER 1165-2-400	Recreation Planning, Development and Management Policies
ER 1130-2-500	Project Operations, Partners and Support, Work Management Policies
EP 1130-2-540	Environmental Stewardship Operations and Maintenance Guidance and Procedures
EP 1130-2-550	Recreation Operations and Maintenance Guidance and Procedures
EP 1130-2-500	Project Operations, Partners and Support, Work Management Guidance and Procedures
EM 1110-1-400	Recreation Planning and Design Criteria

1.2.8 Pertinent Reports

- Bolian, Charles E. and Gengras, Justine B., Report on Phase IB and Phase II Archaeological Investigations of the Camp Sargent Road Relocation and an Associated Wetland Mitigation Project, 1991.

- Coler and Colantonio, Inc.,Wetland Survey for the Blackwater Dam Flood Control Facilities, 4 February 1997.

- Corps of Engineers, New England Division, Recreational and Natural Resources at Corps Flood Control Projects in New Hampshire, March 1994.

- Corps of Engineers, New England Division, Operation Management Plan for Blackwater Dam, 17 May 1995.

- King, Marsha K. and Mowchan, Denise of the Public Archaeology Laboratory, Inc.,Pawtucket, Rhode Island, Archaeological Reconnaissance Survey of the Blackwater Dam and Reservoir in Salisbury and Webster, New Hampshire, November, 1989.

- New Hampshire Department of Resources and Economic Development, Division of Forests and Lands and Corps of Engineers, New England Division, Forest Management Plan and Fish and Wildlife Management Plan-Blackwater Flood Control Reservoir, Webster and Salisbury, New Hampshire, October 1980.

- Corps of Engineers, New England Division, Blackwater Reservoir-Master Plan for Reservoir Development, February 1967.

- New Hampshire Natural Heritage Program/The Nature Conservancy, Department of Resources and Economic Development and New Hampshire Fish and Game Division, Nongame and Endangered Wildlife Division, A Natural Features Survey of the Blackwater Dam Property, January 1996.

- New Hampshire Office of State Planning, New Hampshire State Comprehensive Outdoor Recreation Plan (SCORP) 1994-1999, July 1994.

II. DESCRIPTION OF AUTHORIZED PROJECT

2.1 Location

Blackwater Dam is located on the Blackwater River in the town of Webster, New Hampshire, 8.2 miles above its confluence with the Contoocook River in the Merrimack River Basin. It is just north of the village of Swetts Mills and 18 miles by road northwest of Concord. The reservoir extends into the town of Salisbury.

2.2 Project Description

2.2.1 Facilities

The main structure is a 1,150-foot long rolled earth dam with a protective rock shell rising a maximum 75 feet above the streambed to a top elevation of 584 feet above Mean Sea Level 1929 datum (MSL), a reinforced concrete spillway, and appurtenant structures, including two earth fill dikes, the project office, garage, etc. that are managed and operated in accordance with the authorized flood control purpose of the project. The dam was constructed with a provision for future modification for power generation, although there appears to be little or no local interest in this prospect. Completed at a cost of approximately $1.3 million in 1941, it can impound a 3,280-acre reservoir capable of storing approximately 15 billion gallons of water at a spillway crest of 566 feet MSL. To date, the facility has prevented damages of approximately $15.9 million. The reservoir and the adjacent relatively undisturbed environment provides excellent opportunities for outdoor recreational opportunities for land and water based activities in addition to timber and wildlife management.

2.2.2 Project Operations

The Blackwater Project is considered a "dry reservoir" in that the pool level is fixed to provide no storage during normal operations. The outlet works consist of three gated conduits that are in operation and one ungated conduit that is plugged. The outlets are at 515 feet MSL. The gates normally remain open at three foot settings which allows the pool to reach an elevation of 525 feet MSL. The reservoir storage capacity is 46,000 acre feet with a pool surface area of 3,280 acres when filled to the spillway crest elevation of 566 feet MSL. A full reservoir is equivalent to 6.74 inches of runoff from the 128 square mile drainage area. A minimum release of 20 cfs is generally maintained to sustain aquatic habitat downstream of the dam.

2.2.3 Land Acquisition and Outgrants

The project consists of 3,580 acres, all of which is held in fee under the jurisdiction of the Corps of Engineers. Approximately 82.9 percent is forested, 11.3 percent is swamp/marsh, 4.8 percent is hay and corn, 0.4 percent each is project infrastructure and water and 0.2 percent is grass and old fields.

There are a number of outgrants in the project area for agricultural and civil works uses. Approximately 167.3 acres have been leased to individuals for periods up to five years for agricultural use for hay and corn. The civil works easements are perpetual. The State of New Hampshire holds three easements for the relocation of roads (5.72 acres), the construction of Peters Bridge (1.0 acres), and the widening of Warner (South) Road (no acreage indicated). The town of Salisbury holds an easement for the relocation of Little Hill Road (1.0 acres).

DRED holds a 25-year license (1 July 1989-30 June 2014) for approximately 3,179.2 acres land and contiguous water resources at the Blackwater Project. See below for additional information.

2.2.4 Reservoir Management

Under the authority of Section 4 of the Acts of Congress approved 22 December 1944, as amended (76 Stat. 1195, 16 U.S.C. 460d), the Corps granted DRED a license (DACW33-3-89-63) for a period of twenty-five (25) years, beginning 1 July 1989 and ending on 30 June 2014, to use and occupy approximately 13,034 $\pm$ acres of land and water areas in the management unit and under the primary jurisdiction of the Department of the Army. The DRED license is for fish and wildlife, forest management and other natural resource purposes for the Blackwater, Franklin Falls, and Hopkinton-Everett Projects. With respect to Blackwater, the management unit consists of all project lands except those in Compartments 7 and 8, which are reserved for the operation of the flood-control project. DRED's management responsibilities cover approximately 3,197.2 acres of land and contiguous water resources of the project's 3,580 acres. The ultimate responsibility for the project's natural resources rests with the Corps of Engineers. See Figure 1 and Table 1.

DRED administers the license under the principles of forest sustainability as recommended by the Recommended Voluntary Forest Management Practices (RVFMP) manual giving consideration to all resources and amenities provided by the forest: timber, water and scenery; trees, shrubs and herbaceous plants, soil bacteria, fungi, and nutrients; wildlife and insects. It requires compromise and tradeoffs among competing uses and the balancing of individual and societal needs, rights and

Table 1
Blackwater Project Master Plan
MANAGEMENT RESPONSIBILITIES FOR PROJECT LANDS
(Acres)

Compartments	Corps of Engineers Proj. Oper.	Agr. Leases	NH Department of Resources and Economic Development (Leased Area)	Totals
1		49.7	303.7	353.4
2			910.4	910.4
3		4.6	248.7	253.3
4			390.7	390.7
5		41.6	319.7	361.3
6		58.5	442.2	500.7
7	29.0		440.7	469.7
8	115.4	12.9	141.1	269.4
Subtotals	144.4	167.3	3,197.2	3,508.9
			Water	130.0
			Adjustment	-58.9
			TOTAL	3580.0

responsibilities. This is accomplished with the assistance of the State lands Management Team consisting of the Division of Parks and Recreation and Bureau of Trails, Division of Forests and Lands (Forest Management Bureau and Natural Heritage Inventory, Forest Protection Bureau, State Forest Nursery), NH Fish and Game Department and the Division of Historical Resources. This Team is a multi-agency organization that provides coordinated and inter-disciplinary resource management assistance on all state-owned lands under DRED's jurisdiction and Franklin Falls, Hopkinton-Everett and Blackwater Projects. Responsibilities include the identification and protection of threatened and endangered species, wetlands, exemplary natural communities, and cultural resources. In addition, all project lands must be monitored for any addition or reduction of threatened and endangered species.

DRED manages all lands under its jurisdiction guided by the principles of forest sustainability in the RVFMP manual. The manual provides practical guidelines for sustainable forest management practices to maintain the structure, function and composition of forest ecosystems; and meet the diverse needs of the human community.

Timber production on project lands is managed under DRED's license as part of a multiple-use management program guided by the principles of sustained yield in compliance with New Hampshire State law. The Society of American Foresters defines sustained yield as "the yield that a forest can produce continuously at a given intensity of management". Sustained yield management therefore implies continuous production so planned as to achieve, at the earliest time, a balance between incremental growth and cutting.

For all compartments, a boundary marking and maintenance program is a requirement as part of overall resource management and protection. This will limit opportunities for unauthorized use and identify the government boundary for management practices and public use. Prescribed burns can be carried out to stimulate vegetative growth and remove underbrush for improving wildlife and forest habitat. Erosion and runoff preventive measures are to be carried out as an important part of the resource management activities, such as harvesting operations, road maintenance, and trail work. Illegal dumping and cutting activities are to be controlled through established enforcement and surveillance programs to maintain the aesthetic quality of the project and the overall health of the forest lands.

Reservoir management has proceeded according to the Blackwater Reservoir, Master Plan for Development dated February 1967. The project is staffed by a project manager, and three park rangers who perform operation, maintenance, license and lease administration for both the Franklin Falls and Blackwater Projects. Other duties

include flood control, the implementation of the Master Plan, interpretative services, visitor assistance, recreation and natural resources management.

2.2.5 Relationship to Other Projects

The Blackwater Project is a key unit of a coordinated system of reservoirs including Franklin Falls, Hopkinton-Everett and Edward Mac Dowell Lakes in a comprehensive plan of flood damage reduction for the Merrimack River Basin. Staff at the Reservoir Control Center (RCC), located at Corps New England District headquarters, Waltham, Massachusetts, manage the operation of these dams and reservoirs. RCC closely monitors precipitation, and river and reservoir levels throughout New England. State-of-the-art communications equipment, including the Geostationary Operational Environment Satellite (GOES) System, relays hydrologic and meteorological data to the RCC where it is examined and analyzed to evaluate potential flood conditions. During flooding, the data is used to determine how to regulate river flows. The flood control system provides protection to residents and properties in downstream communities including Webster, Penacook and Boscawen, New Hampshire and major industrial centers including Concord, Manchester, and Nashua, New Hampshire and Lowell, Lawrence, and Haverhill, Massachusetts. The system is administered from the Merrimack River Basin Office at Hopkinton Lake, Contoocook, New Hampshire.

During times of flood emergencies the Flood Emergency Plan for Blackwater Dam, in accordance with ER 1130-2-419, becomes operational and includes provision for the evacuation of downstream populations, should it become necessary. In order to provide adequate protection for the health and safety of the public, the dam and appurtenant structures undergo periodic inspections in accordance with the Corps Periodic Inspection Program required in ER-1110-2-100 for all completed civil works projects.

2.2.6 Water Storage

Since the Blackwater Project was completed in 1941, significant storage of water occurs a little more than once per year. This is usually about 10 percent of reservoir capacity or 4,600 acre-feet of water. Water storage exceeding 22 percent reservoir capacity occurs 2.25 times every 10 years on average. Large storage events occurred in 1953, 1969, and 1987. The 1987 flood event brought the reservoir to 90 percent capacity.

Normal water storage events are generally of short duration. Drawdown occurs once the river channel can accommodate additional water.

2.2.7 History

The Merrimack River Valley region of New Hampshire is probably the best documented area for prehistory in all of New Hampshire (Bolian and Gengras 1991:6). The Blackwater Project area is located along the Blackwater River, a tributary of the Contoocook River, which empties into the Merrimack River northwest of Concord. A high frequency of sites along the Merrimack are located along the terraces and alluvial surfaces bordering the Merrimack.

2.2.7.1 Prehistoric Era

The earliest period of human occupation in New Hampshire is known as the PaleoIndian of approximately 14,000 to 10,000 years ago characterized by hunter-gatherer populations. This period is poorly represented in the archaeological record, limited to finds from the Neville and Smyth sites in Manchester. During the Early Archaic Period (10,000 to 8,000 years ago), sites were found in riverine and lacustrine settings in New England with the closest such site to the project area being the Weirs Beach site on Lake Winnipesaukee. The Middle Archaic (8,000 to 6,000 years ago) is well represented throughout the Merrimack drainage with most of these sites located at falls or rapids where anadromous fish could be exploited. The Neville site at Amoskeag Falls is a famous site of this period. During the Archaic, Native groups became permanent year round residents, unlike the earlier groups whose resources gathering and procuring activities made them more nomadic. By the Late Archaic (6,000 to 4,000 years ago) and the Terminal Archaic (4,000 to 3,000 years ago) population increase is prominent together with the rise of sedentism and trade patterns. The Woodland Period (3,000 to European Contact) comprises early, middle and late epochs and is marked by the use of pottery and distinctive material culture such as projectile points indicating changing settlement, subsistence and social behaviors.

The Pennacook Tribe occupied the Merrimack River Valley of southern and central New Hampshire including parts of northeastern Massachusetts and southern Maine. After 1676 the Pennacook had been forced to abandon the lower Merrimack. While some villages continued along the upper Merrimack until 1730, most of the Pennacook had moved north to Abenaki country in Maine or to the Sokoki (Western Abenaki) at St. Francois du Lac in Quebec.

2.2.7.2 Historic Era

The presence of a fur trading post during the 1660's in nearby Pennacook suggests that white men had explored the Blackwater area by that time. Permanent settlements did not occur until the early 1700's. The threat of attack by French and Indian forces from Canada held extensive clearing of the land to a minimum until 1760. Agriculture, and finally industrial expansion, followed the trappers and lumbermen in altering the original white pine and American chestnut forests which existed in the region.

The water power potential of Merrimack County rivers and streams began to be realized during the early nineteenth century. Industrial development continued at a fast pace through the nineteenth century in New Hampshire and with the development of the Corliss engine, steam power replaced water power as the principal motivating force, with electricity taking the lead role in the twentieth century.

Population and economic shifts after the Civil War led to the abandonment of farms and an increase in nonagricultural jobs. Second growth white pine reforested the abandoned farmlands. Logging in the late 1800's created a third growth which exists today. During the twentieth century, the population of Merrimack County nearly doubled. The popularity of New Hampshire as a vacation resort area and as a retirement location contributed to this growth, as did the expansion of Concord and suburban communities. Agriculture remained an important component in the county's economy, with dairy herds and orchards as the major foci. Industrialization continued, though disrupted by the flood of 1936, labor strikes, and increasing competition from other producers. The construction of the Blackwater Project in 1940 and 1941 and subsequent flooding of the reservoir caused the displacement of residents in the towns of Salisbury and Webster and the destruction of residential, commercial, and public structures and properties.

2.3 Topography

The Blackwater Project lies within a narrow section of the Blackwater River Valley characterized by hills and gently sloped bottom lands. During periods of normal flow, the river meanders approximately 14 miles along the valley floor at a slope of about 6 feet per mile. The flood reservoir pool is elongated and irregular in shape with a maximum length of approximately 7 miles and a maximum width of 2 miles.

The watershed covers 128 square miles and forms part of the upper Merrimack River Drainage Basin. Cook Brook and Mill Brook discharge into the Blackwater River, which empties into the Contoocook River, which in turn, empties into the Merrimack

River. The highest peak in the watershed is Mount Kearsarge, which lies west of the river at an elevation of 2,920 feet MSL.

2.4 Climate

Weather is influenced by continental air rather than air from the Atlantic Ocean. The prevailing winds are from the northwest. The average length of frost-free season is about 160 days. The average yearly temperature in the project area is 45 degrees Fahrenheit with the average monthly temperature varying from 70 to approximately 20 degrees Fahrenheit. The warmer summer months of June to August have 70 to 80 degree temperatures during the day with cooler evenings of 50 to 60 degrees Fahrenheit. During December to early March, temperatures range from zero and below to the low thirties.

The mean annual precipitation over the watershed is about 37 inches and is distributed uniformly throughout the year. Average monthly precipitation varies from a minimum of 3.3 inches in February to a maximum of 3.9 inches in November. Normal annual snowfall is about 75 inches. Warmer temperatures in late March and April result in spring thaw, which can cause runoff equivalent to 6 to 8 inches of precipitation. Intermittent tropical storms and /or nor'easters serve as the only major violent source of damage to the project forest.

2.5 Transportation

Access to Blackwater Dam and the administrative area and overlook is provided from Route 127 on the southeast of the project. This access is also within easy reach of Interstates 89 and 93. See Figure 1. The project has a number of roads which provide access to project lands, as well as, a number of access points to the river for launching of small boats and canoes. However, none of these sites is designated or approved. People have simply decided to use them on their own.

Transportation within the project is facilitated by gravel/dirt roads running parallel to the river on both sides. Ground transportation across the Blackwater River is provided by Warner (South) Bridge at the intersection of Compartments 2, 4, 6, and 7 and by Peters Bridge in Compartment 5 at the north end of the project. A network of woods roads and paths in the project area are used for vehicular and foot travel including snowmobiling, sledding, biking, hiking, etc. A system of snowmobile trails has been designated and is managed by local snowmobile clubs. All terrain vehicles (ATV's) and trailbikes are not allowed on project lands except by officials in the performance of their duties and related training.

III. RESOURCE INVENTORIES AND ANALYSIS

3.1 Introduction

The Blackwater Project provides important and valuable natural resource and recreational opportunities for the surrounding area. Fish and wildlife management and forestry management programs are carried out on project lands. Recreational activities include hiking, fishing, bird watching, hunting, cross-country skiing, and snowmobiling.

3.2 Natural Resources

The land area is occupied by 82.9 percent forest and brush, 0.2 percent in open land (grass/old fields), and 0.4 percent by the infrastructure in Compartment 8 for fulfilling the flood control purpose of the project. Other areas include 4.8 percent agriculture (hay/corn), 11.3 percent wetlands, and 0.4 percent water. See Table 2.

3.2.1 Geological Resources

The Blackwater Project area lies within a large area of elevated terrain in central and southern New England referred to as the New England Upland. The bedrock geology of the area consists of primarily metamorphic and volcanic rocks. The area is underlaid by two major bedrock formations. The first of the two underlies the majority of the project area, and consists of two series of the sillimenite zone of the Lower Devonian Littleton Formation. One series is composed of gray gneiss, much of it rusty brown. The other series is a gray micaceous quartzite and gray coarse-grained mica schist, with such minerals as biotite, garnet, sillimenite, and locally, andalusite. The second bedrock formation under the project area is Kinsman quartz monzonite of Upper Devonian age classified in the New Hampshire plutonic series.

The primary soils series within the Blackwater Project are Rumney, Adams, Podunk, and Medomak. Other series, including Becket, Croghan, and Lyman, are also present. Rumney soils are deep, poorly drained soils formed in alluvium on floodplains. Adams soils are deep, sandy, excessively drained soils formed in glacial outwash on terraces. Podunk soils are deep, moderately well drained soils formed in alluvium on floodplains. Medomak soils are deep, very poorly drained soils formed in floodplains.

Soils are moderately to highly acidic, and most are sandy with rapid water permeability, or poorly drained silty sand. The predominant soil association is characterized by loose structure, moderate erosion potential, and mild slopes with intermittent steep slopes and depressions.

Table 2
Blackwater Project Master Plan
LAND COVER
(Acres)

Compartments	Project Infra-structure	Grass/ Old Fields	Hay/ Corn	Swamp/ Marsh	Water	Forest/ Brush	Totals
1			49.7			303.7	353.4
2				38.5	12.8	859.1	910.4
3			4.6	109.2		139.5	253.3
4				75.0		315.7	390.7
5			41.6			319.7	361.3
6		4.8	58.5	172.5		264.9	500.7
7						469.7*	469.7
8	14.6	3.7	12.9			238.2	269.4
TOTALS	14.6	8.5	167.3	395.2	12.8	2,910.5	3,508.9
PERCENT	0.4	0.2	4.8	11.3	0.4	82.9	100.0

* Includes dikes and gravel pit.

The depth of the water table varies from 0-5 feet. Most of the soils are considered immature, having very little horizon development. All typically have a thin B horizon, although many of the non-stony soils have been modified by past plowing. Appendix D relates soil conditions to recreational development potential in the project area.

3.2.2 Surface Waters and Wetlands

Water resources in the project area include a 14 mile stretch of the Blackwater River, Greenough's Pond, Cook Brook, Mill Brook and several unnamed streams (See Figure 1). The Blackwater River watershed covers a 128 square mile area and forms a part of the upper Merrimack River drainage.

The Blackwater River is designated by the state of New Hampshire as a Class A river. Objectives for Class A waters are to achieve and maintain the highest level of quality which consistently exhibits excellent aesthetic value and provides the highest quality habitat for aquatic biota, fish and wildlife. Class A waters shall be considered potentially acceptable for water supply uses after adequate treatment. The New Hampshire Class A waters shall have dissolved oxygen not less than 6 mg/l and 75 percent of saturation for 16 hours per day at any time, no pH, color and turbidity limits except as they naturally occur. The waters shall also contain not more than 153 coliform bacteria per 100 milliliters.

Water quality can be adversely affected by siltation resulting from flood events. Water fluctuation along the river banks causes scouring of the banks, resulting in slumping and siltation.

The wetlands in the Blackwater Project area provide important functions and values. The wetlands provide flood storage capabilities, as well as, filtering of any pollutants with improvement of water quality conditions. The wetlands provide recharge areas for any groundwater supplies. Wetland areas directly associated with the river can provide important nursery areas for fish. The wetlands are also important habitat areas for birds, reptiles, amphibians, and many species of mammals.

In 1996, delineation and identification of wetlands in the Blackwater Project area were performed using a three phase approach. The first phase located wetland areas using aerial photographs and stereoscopic interpretation. The second phase included field verification and groundtruthing of the delineation. The third phase revised the aerial photograph delineation in accordance with the field survey. Wetlands were classified using the Cowardin et.al. classification system as shown in Table C-1 in Appendix C. The project area contains 1,223.8 acres of wetlands, consisting of two overall wetland systems:

Palustrine: all freshwater wetlands dominated by trees, shrubs, and persistent emergent herbaceous vegetation

Riverine: generally all wetlands and deepwater habitats contained within a channel

The acreage of each wetland category is shown in Table 3. A detailed description of the wetland areas is provided in Appendix C, Wetland Survey for the Blackwater Dam Flood Control Facilities, 1997. Figures C-1 to C-4 illustrate the various wetland categories delineated in the project area within the project compartments. The dominant wetland types found in the project area are: Palustrine Broad Leaved Deciduous Forested Swamp (PF01)(535.6 acres); Palustrine Broad Leaved Deciduous Shrub Swamp (PSS1) (276.7 acres); Riverine (R) (150.0 acres); and Palustrine Needle Leaved Evergreen Forested Swamp (PF04) (107 acres). The wetland areas in the Blackwater Project area are located in the oxbow areas around the Blackwater River with a significant amount of wetlands associated with streams that are tributary to the river. The wetland types are tolerant of long term inundation and low energy hydrology because of the gentle topography of the area. These wetlands tend to have low nutrient levels, indicated by the presence of sphagnum bogs.

A brief description of notable wetland types by compartment is provided below.

Compartment 1 contains a large hemlock and balsam fir swamp (PF04) and large areas of red maple swamps (PF01) west of the town of Webster, adjacent to logging roads.

Compartment 2 contains large areas of Forested Broad-Leaved Deciduous (PF01) wetlands along the oxbows of the river, as well as a large Shrub/Scrub Broad-Leaved Deciduous (PSS1) wetland. Two sphagnum bogs (PM) are also located within this compartment.

Greenough's Pond is located in **Compartment 3,** with an associated large Shrub/Scrub Broad-Leaved Deciduous (PSS1) wetland.

Compartment 4 is characterized by Forested Broad-Leaved Deciduous (PF01) wetlands along the oxbows of the river. A large area of Palustrine Emergent Vegetation - Persistent (PEM1) and a large area of wet meadow (PEM1+) dominated by blue joint grass are located in the eastern portion of the compartment.

Compartment 5 is characterized by Shrub/Scrub Broad-Leaved Deciduous (PSS1) and Forested Broad-Leaved Deciduous (PFO1). A large area of evergreen shrub swamp (PSS3) is located in an oxbow area on the east side of the river to the

Table 3
Blackwater Project
Wetland Acreages by Type

Wetland Type	Acreage
Forested Swamp (PF01)	535.6
Palustrine Broad Leaved Deciduous Shrub Swamp (PSS1)	276.7
Riverine Area (R)	150.0
Palustrine Needle Leaved Evergreen Forested Swamp (PF04)	107.0
Palustrine Emergent (PEM1)	84.3
Palustrine Open Water (POW)	25.2
Palustrine Broad Leaved Evergreen Shrub Swamp (PSS3)	23.0
Sphagnum Bog (PM)	19.3
Palustrine Aquatic Bed (PAB1)	2.7
Total Acreage	**1,223.8**
Number of Potential Vernal Pools (VP?)	4
Intermittent Stream Length (miles)	2.7

south of Peters Bridge. Three sphagnum bogs were found in this compartment, as well as, three potential vernal pools.

Compartment 6 contains large areas of Shrub/Scrub Broad-Leafed Deciduous (PSS1) and Forested Broad-Leaved Deciduous (PF01) wetlands.

Compartment 7 contains large areas of Forested Broad-Leaved Deciduous (PF01) along the oxbows of the river and one potential vernal pool.

Compartment 8 is characterized by several large areas of Forested Broad-Leaved Deciduous (PF01) and several Palustrine Emergent Vegetation - Persistent (PEM1) wetlands.

Management objectives throughout the compartments would include protection of wetland areas from road or trail construction, in particular the potential vernal pools located in Compartments 5 and 7, and the sphagnum bogs located in Compartments 2 and 5. Specific spring surveys of the potential vernal pools should be carried out to determine if they are functioning as true vernal pools and used as breeding habitat. Any timber harvesting practices in the vicinity of wetland areas should include protective buffers to prevent any erosion into the wetland areas.

3.2.3 Vegetative Cover

3.2.3.1 Forest Lands

There are approximately 3,197.2 acres of wooded land within the Blackwater Project boundaries managed by DRED. The forest cover is predominately coniferous consisting of white and red pine, hemlock, and red spruce. Mixed hardwoods including maples, birches, and red oak are scattered throughout the area.

DRED leases the majority of project lands for forest and wildlife management. A forest inventory was completed by the state of New Hampshire in 1987. The results of this inventory are shown by compartment in Appendix A. The dominant species in most of the compartments are white pine, hemlock, red oak, and red maple. Stands of red spruce, aspen, beech, and yellow birch are scattered through the compartments. A discussion of forest species associated with wetland habitats is included in the Surface Waters and Wetlands section.

DRED's forest management program is based on consideration of all resources and benefits guided by the principles of sustained yield. Softwood timber types are managed on a 90-year rotation (rotation is the time from seedling to final harvest) as a whole, while hardwood timber types are managed on a 100 to 120 year rotation. This approach provides for net growth in the forest system. Diversity of age classes and species is also important and is strived for in the management of the timber resources.

Diversity of species is dictated by the soil/site capabilities of the property. These capabilities cannot be changed, but can be used to determine how much diversity is possible on this property. Maintaining the health and maximizing the vigor of the timber resources is also achieved through this management.

The forest resources require protection from insects, diseases, fire, and overuse. Management activities include periodic inventories, harvesting timber with accepted silvicultural practices, and monitoring for insect and disease problems. Commercial timber harvesting will be conducted according to sustainable forestry practices recommended in the RVFMP manual while minimizing potential windthrow and erosion problems.

3.2.3.2 Open Land (Grass and Old Fields)

Open lands presently utilized for agricultural purposes total approximately 167.3 acres. These lands are used primarily for cutting hay. DRED's goal is to maintain 3 to 5 percent of land in early successional growth. This open space provides a much needed diversity of habitat for wildlife both on the project lands and for the region. There is a regional shortage of open grass land for wildlife needs as many potential open space zones are being lost to woody growth. The condition of the majority of apple trees on the project is the result of the abandonment of farms when the project was created and the subsequent lack of maintenance. Open land can be partially maintained through the continuation of agricultural leases.

Apple trees on the project consist of surviving aged orchard trees that were present prior to the inception of the project and wild trees that generally become established in clearings or on the edge of fields. These apple trees are extremely valuable to wildlife. There is an ongoing apple tree release program to enhance the productivity of apple trees. This important wildlife program should continue.

Agriculture can be a useful tool for setting back plant succession and maintaining open habitat for wildlife. As it is expensive to artificially open these areas, cultivation is the most economically feasible method to maintain and improve these important areas. Buffer zones of grasses and shrubs should be maintained between the cultivated fields and the river to prevent excess runoff and potential nitrate pollution from fertilization. These open areas contribute to the project's aesthetics, wildlife habitat, and overall environmental quality. Abandoned fields can be opened through mechanical and brush removal and controlled burning. The narrow transitional zone between field and forest often has a diversified vegetative structure which provides cover and seasonally important foods. This transitional zone may also create habitats for edge adapted species. Currently under the agricultural lease agreements, a portion of the crop is required to be left for wildlife. Although there is some open land not presently under lease, it is highly unlikely that it will ever be leased because of serious

constraints such as wetness or poor soil. Keeping these lands open will require means other than agricultural leases.

3.2.3.3 Developed Areas

Developed areas at the Blackwater Project include an administration area, the structural components of the dam and two earthfill dikes. The project has a number of roads which provide access to project lands.

3.2.3.4 Exemplary Natural Communities

The 1996 survey recorded four exemplary natural communities, as well as some natural communities of local significance within the project area. These communities are listed in Table B-1 in Appendix B. Figure B-1 notes the significant natural community observation points (NH NHIP, 1996). Natural communities are natural assemblages of plants and animals that recur in the landscape in similar physical habitats, and are defined by a characteristic vegetation structure and species composition. Communities are considered exemplary because of their largely intact condition and relative rarity or uncommonness within the state and region. A brief description of the various communities is provided below.

(a) The **floodplain forests** were found along a stretch of the Blackwater River one mile north of South Road, to approximately 2-3/4 miles south of Warner Road (NH NHIP, 1996). The floodplain forests form along the meandering river channels, where the river current is slow, and seasonal floods inundate the point bars. Red maple and sliver maple are the dominant tree species.

(b) The **Greenough's Pond wetland complex** contains floating-leaved aquatic, emergent marsh, and acidic fen communities, and the uncommon plant, coontail. It is considered an exemplary community because of the presence of these several community types (particularly the acidic fen community), its relatively large size, significant wildlife habitat, the presence of coontail, and lack of surrounding development.

(c) A small 2-3 acre **dwarf shrub bog** is located in an isolated basin south of South Road and east of the bridge. The area is surrounded by a mixed forest and has no outlet or inlet. Leatherleaf and *Sphagnum sp.* are the dominant species, with large patches of Virginia chain fern and tussock sedge.

3.2.3.5 Natural communities of local significance

As shown on Table B-1 in Appendix B, several natural communities of local significance were noted during the 1996 survey. Although these communities are not exemplary in a state-wide context, they are good examples of the particular habitat

type. The communities identified are: wetland complexes surrounding Cook Brook at the outlet of Greenough's Pond; a mixed forest area near Little Hill Road with large mature white pines, hemlocks, and red oaks; several vernal pools; a dry sandy field at the crossing of Province Road and the Blackwater River which contains the prairie grass species, little bluestem; an acidic streamside shrub thicket along the banks of Meadow Brook along Couchtown Road; moderate to high energy riverbank community along the Blackwater River; and a northern hardwood forest north of Scribner's Corner, near Peters Bridge and along Province Road.

Management objectives for exemplary natural communities and natural communities of local significance would include ensuring that natural resource management and recreational activities do not degrade the integrity of these areas, and that they remain intact and are protected. Interpretative signs explaining the make-up of these habitats could be placed on any adjacent trails to educate the public about these areas. It should be noted that these natural communities were noted by the particular researchers carrying out the survey for exemplary natural communities. Blackwater project personnel, upon consultation with NH NHIP staff would decide on those communities, if any, for particular visual access and protection.

3.2.4 Wildlife

Table A-2 in Appendix A lists wildlife species known or assumed to exist within or adjacent to the project area. This species list represents game animals, animals of special concern, and those species which are readily observed and enjoyed by the general public. Vegetation types are suitable for wildlife food and cover. Apple trees are found in the project area, and there are areas of good low winter cover for small animals. Many of the wildlife species at the project depend on early successional stages of vegetation, with the conifers used as escape cover or winter shelter.

The principal wildlife species that inhabit the project area include white tail deer, ruffed grouse, raccoon, woodcock, snowshoe hare, red and gray squirrel, moose, and black bear. Furbearing species include beaver, mink, otter, and muskrat. Black duck, wood duck, hooded merganser, and mallard are waterfowl species known to breed in the river area. The project area has habitat which is important to raptors for hunting and nesting.

With the exception of the lands reserved for administration and operation, the project lands are available for hunting, and are hunted heavily by local residents.

Wildlife management practices are carried out under the license to DRED. The wildlife management program objectives are to provide for the greatest diversity of natural habitat to support species indigenous to the area compatible with the operation of the facility. Some of the wildlife management practices carried out at the project include vegetative and timber stand improvement. Other practices include

maintaining open areas through periodic mowing, and habitat improvement for deer, ruffed grouse, woodcock, and snowshoe hare. The goal of the state is to increase vegetative diversity to provide cover, food and edge effect in all of the project's compartments to increase wildlife diversity. Census counts should be taken to obtain knowledge of the extent of wildlife populations the project lands support. Also, permanent monitoring plots for bird species should be set up to determine the overall habitat suitability for birds at the project.

The New Hampshire Fish and Game Department releases pheasants four times during the hunting season as part of a put and take program. In 1995, 126 pheasants were released at the Blackwater Project.

3.2.5 Fish

The Blackwater River has a variety of cover and bottom types which support cold and warmwater fisheries. The New Hampshire Fish and Game Department annually stocks the river with brook, brown and rainbow trout. Warm water species that are found include smallmouth bass, brown bullhead, yellow bullhead, chain pickerel, white perch, white sucker, common sunfish, and creek chubsucker. The state will continue this program. Extreme fluctuations of water level affect cover shelter and reproduction habitat that may decrease fish populations considerably. While yearly water level fluctuations have less impact on fish populations, the Blackwater Project provides no water storage during normal operations.

Habitat types which may be found at the project include fallen timber and brush, old snags, rocky and sandy bottoms, underwater caves, and aquatic weed beds. All of these may be influenced by swift currents, slow to moderate currents and still waters.

A buffer strip is required at least 300 feet wide on both sides of all permanent project water courses. Special management practices should be developed to selectively cut timber on slump-prone areas, encourage growth of alders and aspen along the banks, protect and preserve large, overhanging trees which shade the water, and seed the flood prone low areas with grasses to hold the soil. Considerations for aesthetics, wildlife, recreation access areas, agricultural areas, and rest areas for migrating birds are desired.

There are ongoing programs to limit pesticide usage adjacent to the river to protect water quality conditions and fisheries. Use of chemical pesticides is limited to herbicides to prohibit the growth of vegetation on the rock-faced portions of the dam in compliance with New Hampshire regulations. In accordance with Corps of Engineers regulations, pesticide use by agricultural lessees is required to comply with all federal, state, and local laws. Corps of Engineers review and approval is required before pesticides are applied.

3.2.6 Rare or Protected Species

No federally listed or proposed threatened and endangered species are known to occur in the project area, with the exception of occasional, transient bald eagles *(Haliaeetus leucocephalus)* or peregrine falcons *(Falco peregnnus).*

A rare and endangered species survey was conducted by the Corps of Engineers in 1996 to determine the status of rare or protected species in the Blackwater Dam project area. The survey was completed by the New Hampshire Natural Heritage Inventory Program (NH NHIP) and the Nature Conservancy in collaboration with the NH Fish and Game Department, Nongame and Endangered Wildlife Division. The primary objective of the survey was to characterize the flora and fauna of the Blackwater Project area, identify areas of exemplary natural communities and rare species, and provide management recommendations for their protection.

No state plants were located during the 1996 survey. Several uncommon species were documented, however. Coontail *(Ceratophyllum echinatum),* an aquatic plant, was found at the north end of Greenough's Pond. This species is presently being considered for tracking and/or listing by the New Hampshire Natural Heritage Program due to the few collections of the species in the state. Poison sumac *(Toxicodendron vernix)* was found in wet woods west of Greenough's Pond. Central New Hampshire represents the northern margin of its range.

The Blanding's turtle, a species of Special Concern in New Hampshire, was located on Greenough's Pond. Greenough's Pond and the large emergent wetland along Cook Brook contain the only suitable habitat for the Blanding's turtle within the Blackwater Project. The biological integrity of Greenough's Pond and the adjacent wetlands and uplands must be preserved to protect the turtle's habitat.

A wood turtle was found in the Blackwater River. Although this species is not listed as rare or threatened, it is currently becoming rare, and declines in its populations have led the U S Fish and Wildlife Service to study its appropriateness for listing as a federally endangered species. Its habitat adjacent to the river, and the river's channel and bank characteristics, should be protected as well as nearby meadow and upland forest habitat.

Potential habitat exists for the spotted turtle and eastern hognose snake. Both species are of Special Concern in the state.

The red-shouldered hawk and northern goshawk were documented during the survey. No other rare bird species were located, although there is potential habitat for grass and wetland species. The interspersion of forests and openings in the project area provide suitable habitat for the red-shouldered hawk and northern goshawk. Management objectives for these species would be to protect any nests found (none

were located during the survey) during any timber harvesting operations, with restrictions on harvesting in the vicinity of any nests. Also, if any nest sites are located, the area should be protected from recreational activity during the nesting season.

The surveys for freshwater mussels identified the presence of the brook floater (*Alasmidonta varicosa*). The brook floater is a mussel species that is considered rare in New Hampshire and is listed as Endangered by the New Hampshire Endangered Species Conservation Act. The brook floater population was identified with an upstream limit at Bridge Street in Andover and the downstream limit at East Penacook Road in Hopkinton. The NH NHIP recommended that further study be conducted to assess the brook floater population trends in the Blackwater River. Sites in the river where the mussels were located could be monitored to detect trends in population size, size class distribution and shifts in populations over time. The integrity of the river habitat must be maintained to protect the mussel's habitat.

3.3 Archaeological Resources

3.3.1 Historic and Archaeological Resources

CENAE completed an archaeological reconnaissance survey of the Blackwater Project in Salisbury and Webster, New Hampshire in November 1989. This survey was conducted by the Public Archaeology Laboratory (PAL), Inc. under contract with Daylor Consulting Group, Inc. and CENAE and included an area of 3,580 acres held by the Corps in fee simple. This information is taken from the subject report prepared by Marsha K. King and Denise Mowchan of PAL, Inc. Please note that archaeological site locations are not to be divulged to the general public and are exempt from Freedom of Information Act requirements.

The purpose of the reconnaissance level survey was to provide information on the archaeological sensitivity of the Blackwater Project area and to review the possible effects of current project operations on cultural resources. This data was used to make recommendations for the development of an effective management plan for cultural resources within the project area and future investigations at the intensive survey level. This survey has also assisted the Corps in meeting a responsibility for partial compliance with the National Historic Preservation Act of 1966, as amended and applicable regulations including NEDER 1130-2-540 (newly revised as of November 12, 1996) among others.

3.3.2 Prehistoric Resources

No prehistoric archaeological resources were recovered during the Blackwater Project reconnaissance survey. One possible Contact Period (1550-1700 A.D.) site was noted from historic documents and informant testimony, and a single collector's findspot from a private collection was noted, however, scheduling did not permit testing these locations. A

number of areas of high and moderate prehistoric archaeological sensitivity were identified and an archaeological sensitivity map was prepared for the Blackwater Project area. This map is part of the archaeological survey report. Archaeological site locations are not to be divulged to the public as indicated above.

Archaeologically sensitive areas (prehistoric and historic) are located throughout the project with the majority of high sensitive areas located in the northern extremes of the study area and some in the southern portion. Moderate sensitivity areas are primarily in the mid-section area of the project around Greenough's Pond and towards the western boundary. Specifically, areas of high sensitivity are situated within Forest Compartments 1, 2, 4, 5, 6, and 8. Moderate sensitivity is located in Compartments 2, 3, 4, 6, and 7.

Although prehistoric resources were not discovered as part of the reconnaissance study, this is not indicative of the project area as a whole. Due to the limited nature of subsurface testing completed for the large project area, zones of prehistoric archaeological sensitivity which were not subject to testing are expected. Prior to any future work or development in areas of archaeological sensitivity as defined within the archaeological sensitivity map, a cultural resource assessment and further subsurface testing at an intensive survey level may be required. Please refer to the Cultural Resources Checklist within the Operational Management Plan (OMP) for a listing of management activities which are potentially damaging to cultural resources. Prior to any of these developments, a CENAE archaeologist should be contacted for assistance.

It is recommended that all zones of high and moderate prehistoric archaeological sensitivity be subjected to an intensive level archaeological survey in order to compile a more complete inventory of cultural resources at Blackwater Dam. The results of the reconnaissance survey suggest that further testing in these areas could identify unknown prehistoric sites. In addition, the two potential prehistoric sites identified by informant testimony, the Burbank Mill collection loci and the possible wigwam site, should also be subjected to further intensive survey to pinpoint their exact locations. As per Section 110 of the National Historic Preservation Act of 1966, as amended, all federal agencies are required to identify, evaluate, inventory, and nominate to the National Register of Historic Places, all cultural resources within their jurisdiction on federal land.

Prior to the implementation of any forest management activities on Corps fee lands, DRED will consult and coordinate with the NH State Archaeologist for potential impacts on cultural resources. Any required survey or testing will be accomplished prior to any forest management activity with the concurrence of the State Archaeologist. Copies of all correspondence will be provided to the CENAE archaeologist, who reserves the right to make recommendations or determinations, as required, and in compliance with Section 110 of the National Historic Preservation Act.

3.3.3 Historic Resources

A total of fifty-four (54) historic archaeological resources were identified from historic documents, maps, informant interviews and as part of the reconnaissance survey. Three of the historic sites may be located just outside of the project area boundaries. A number of the historic sites may be potentially significant based on the limited information collected during the reconnaissance survey. Again, these site locations are confidential and are not to be made public.

At the time of the survey (1989), none of the 54 historic sites appeared to be in danger of damage from normal operation and use of the reservoir. Damage to sites is possible from a number of sources including periodic inundation and changes in water levels caused by flood conditions or poor management which may cause erosion. Construction projects such as new recreation areas, roadways, or other areas as described above for prehistoric resources, can disturb the integrity of existing sites, and, in addition, human intervention which may be intentional (vandalism) or unintentional (dirt biking) can damage historic sites.

Recommendations for additional archaeological and documentary research on the historic sites are presented within the reconnaissance report. Briefly, twenty-two sites are recommended for further archaeological evaluation which would include subsurface testing and/or additional documentary research. No further archaeological or documentary evaluation is required for seventeen of the historic sites which are mainly roads or bridges for which little additional information is likely to be available. Finally, fifteen historic sites within the Blackwater Project area have been destroyed or severely damaged during construction of the dam and dikes. No further archaeological research is required for these sites. Compliance requirements for forest management activities relative to historical sites or sensitive areas are identical to those for prehistoric resources.

3.4 Recreation Resources

3.4.1 Suitability of the Reservoir for Recreational Use

Blackwater Reservoir and the adjacent relatively undisturbed environment provides excellent year round opportunities for outdoor recreational activities. The pristine environment includes an eight-mile meandering stretch of the Blackwater River through forests comprised mostly of mixed hardwoods interspersed with pine and a diversity of plant types. Agricultural lease lands provide cover and food for wildlife and hunting opportunities in accordance with state and local laws. The river provides an excellent canoe stream stocked with brown and rainbow trout. Anglers can also try their luck at catching perch, bass, sunfish and pickerel. Bow and gun hunters enjoy a wide variety of game species, including bear, moose, deer, pheasant (stocked), rabbit, grouse, and water fowl.

The reservoir has many miles of woods' roads for hiking, horseback riding, snowmobiling, snowshoeing and cross-country skiing. A network of over 20 miles of snowmobile trails has been established and are maintained in cooperation with local snowmobile clubs. Controlled releases of water from the dam permit white water activities downstream from the dam in the spring.

The Corps of Engineers maintains an overlook and parking area at the dam site. Considering that the authorized purpose of the project is flood control, the recreational plan for the project area, in general, will support dispersed recreational activities. There are opportunities for the development of canoe launching sites and picnic areas. These developments will depend largely on state, regional, and local partnerships. Resource inventories have been used to verify that recreation use will not compromise protection of natural and cultural resources.

3.4.2 Natural and Scenic Qualities

The Blackwater Project provides an attractive natural environment including a combination of forest and open fields on gently sloping lands extending from the Blackwater River to the project boundaries. The Blackwater River flows through the reservoir with a uniform slope of about six feet per mile. It contains a variety of exemplary natural communities and natural communities of local significance. These conditions provide an attractive, varied landscape and an aesthetically pleasing experience for visitors.

A continuation of past management practices to provide the greatest diversity of plant, fish, and animal species in the area, within the multiple natural resource use framework, will be most important in maintaining the natural and scenic qualities of the project. Management activities will be continued to open or maintain scenic views and to protect visually and environmentally sensitive areas.

3.4.3 Existing Recreational Activities

The Blackwater Reservoir Project lands are currently used for the following water and land based activities.

<u>Water Based</u>
fishing
boating
swimming

<u>Land Based</u>
interpretative programs
bird watching
hiking

bicycling
horseback riding
picnicking
plant, wildlife and historical/cultural site viewing and photography
food gathering (berries)
hunting, trapping by permit
snowmobiling
cross country skiing
snowshoeing
dog sledding

Controlled releases are made every spring to provide adequate river flows below Blackwater Dam for the New England Division Kayak Championships and the Snyder's Mill Kayak Slalom. Participation attracts around 150 participants with 200 to 300 spectators. Water stored the previous two weeks allows the Corps of Engineers to provide adequate water for these races. Since April 1995, Blackwater Dam has been the location for the East Regional Trials for the U S Olympic Festival in kayaking and canoeing.

3.4.4 Visitations

The Visitor Estimating and Reporting System (VERS) is the official procedure used to compute visitation, reported in visitor hours, at Corps of Engineer projects. VERS consists of four microcomputer-based programs designed to estimate and report visitation to projects. The estimates used by VERS to compute visitation are based on recreation use surveys conducted at recreation areas where automatic counters are used to monitor vehicular traffic to estimate load factors. At the Blackwater Project, three counters are used to track traffic entering the project. Estimated load factors are being used in the VERS program until such time that recreation use surveys are conducted. Table 4 presents the attendance in visitor-hours at the Blackwater Project.

Table 4
Blackwater Project
ATTENDANCE IN VISITOR-HOURS

Year	
1995	13,710
1996	22,000

Source: Corps of Engineers, New England District, Franklin Falls Project Office, Franklin, NH.

3.4.5 Area of Influence

Since Blackwater and Franklin Falls Projects are expected to serve the same market area, a single analysis has been undertaken in order to estimate future outdoor recreational demands on the two facilities. Franklin Falls, with more than four times as much water area and more than twice as much stream length as Blackwater Reservoir, will continue to attract a major portion of the visitors. Primary and secondary areas of influence have been defined for the market area. The number of communities and persons residing within an approximately 10 mile radius or primary market area was estimated at 22 communities with a 1990 population of 94,706, including the city of Concord with 36,006 inhabitants. An additional 76,420 residents live in 21 communities between the 10 and 20 mile areas. See Figure 2.

3.4.6 Regional Demands

New Hampshire Outdoors - State Comprehensive Outdoor Recreation Plan (SCORP) 1994-1999 (July 1994) was prepared by the NH Office of State Planning (OSP) with assistance from DRED and the Land and Water Conservation Fund (L&WCF). It serves as the state's official policy plan for outdoor recreation and conservation for the indicated period. The SCORP provides an overview of demand for residents of the state of New Hampshire to the year 2015. It does not indicate geographic distribution. More detailed analysis of local conditions is needed for regional and community analyses. Since some outdoor activities such as camping, fishing, golfing, and skiing draw from other states, it is possible that the projected needs are understated. In 1993, the OSP distributed the SCORP Outdoor Recreation Questionnaire to community recreation leaders in order to gain a better understanding of recreational needs. The result was the need ranking for the state presented in Table 5. It also presents the projected recreational facility needs to the year 2005 based on population gains and coefficients of utility needs per 1,000 inhabitants.

3.4.7 Regional Demands on Blackwater and Franklin Project Facilities

CENAE estimated the projected facility needs for the Franklin Falls and Blackwater market area for the years 2000 and 2005, as well as 2002, the terminal year for the Master Plan, based on a portion of the state's projected needs. The SCORP estimates that the population of the state of New Hampshire will increase from 1,109,117 inhabitants in 1990 to 1,335,748 in 2015 or a gain of about 20.4 percent for the 25-year period. The primary market area for the Blackwater and Franklin Falls Projects comprised about 8.5 percent of the state's population in 1990. The Lakes Region Demographic Profile (June 1993) prepared by the Lakes Region Planning Commission found a higher rate of population increase for its region compared to that of the state. The Commission comprises more than one half of the communities in the primary

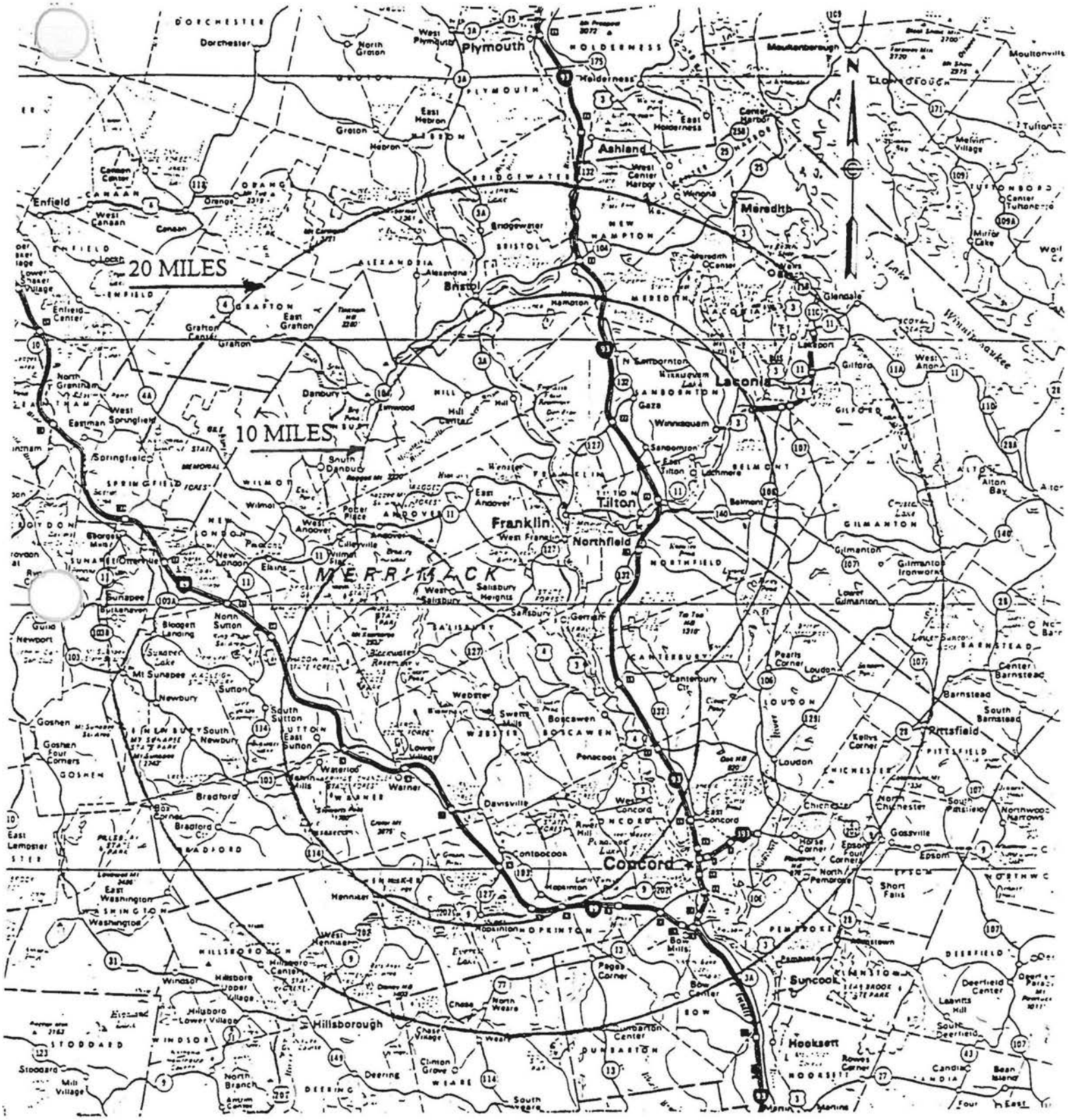


Figure 2
Franklin Falls Dam/Blackwater Dam
OUTDOOR RECREATION MARKET AREAS

Table 5

1993 RECREATIONAL FACILITY NEEDS RANKING AND PROJECTIONS TO 2000, 2002 AND 2005

1993 NH Need Ranking	Facility	Projected Needs New Hampshire 2000	2005	FF & BW Market Area* 2000	2002	2005
1.	Softball/Baseball Fields	71	134	7	9	13
2.	Tennis Courts	61	116	6	8	12
3.	Trails (Miles)					
	Hiking	142	269	14	19	27
	Snowmobile	251	476	25	34	48
4.	Outdoor Basketball	52	98	5	7	10
5.	Playgrounds	32	61	3	4	6
6.	Swimming Pool/Beaches	41	78	4	6	8
7.	Community Center/Park	386	733	38	53	73
8.	Gymnasiums	16	31	2	2	3
9.	Skating/Hockey Rink	12	23	1	1	2
10.	Tracks	3	5	0	0	0
11.	Picnic Tables	515	977	52	70	98
12.	Bicycle Paths	not projected				
13.	Boat Launches	116	220	12	15	22

*Market Area includes twenty-two cities and towns within ten miles of the projects.

Sources:

- New Hampshire: New Hampshire Office of State Planning, Statewide Comprehensive Outdoor Recreation Plan, July 1994
- FF and BW: Corps of Engineers, New England District

market area. It was assumed the recreation facility needs for the Franklin Falls and Blackwater Projects market area would comprise a higher portion of the state's needs and was estimated at 10 percent. In turn, the Blackwater Project area has the potential for satisfying a portion of the regional demand for the following facilities, that have been ranked high in need by the New Hampshire SCORP.

3.4.7.1 Softball/Baseball Fields, Outdoor Basketball, & Playgrounds

These facilities respectively rank first, fourth and fifth in New Hampshire's recreational needs. Although project lands could likely be developed to accommodate these facilities, it remains to be seen whether the remote location of the project would be convenient for communities and organizations.

3.4.7.2 Hiking and Snowmobile Trails

In the 1993 questionnaire, hiking and snowmobile trails ranked third in the state's outdoor recreational needs. In a similar survey, the 1987 NH Community Recreation Leaders Survey reported the top sixteen recreational facilities needs. Trails were not among these.

Woods' roads/trails exist on both the east and west sides of the Blackwater River. These are maintained by snowmobile clubs for their activities. The development of the existing trail system can support considerable growth in visitations. Opportunities exist for developing universal access hiking trails in Compartments 2 and 4. Short trails can provide visual access to a planned forest management demonstration area, the exemplary natural communities identified in the Master Plan, and to generally support interpretative programs for natural and cultural resources. Support services, including brochures, maps, and signage, would encourage the use of the trails. Other trails are available within the Squam and White Mountain areas.

Approved snowmobile trails follow a portion of the hiking trails and parallel both sides of the Blackwater River. Some of the approved snowmobile trails have not yet been established. Peters Bridge and the bridge on Warner (South) Road permit the crossing of the Blackwater River.

3.4.7.3 Picnic Tables

The SCORP projects a need for about 800 picnic tables for the state by the year 2003. An estimated 80 would be required in the primary FF and BW market area. Presently there are no picnic tables in the Blackwater Project. Picnic tables existed but have since been removed from the Wayside Area. Opportunities exist for installing picnic tables in the Project Operations area west and upstream of the dam and in the Burbank Mills area, which is accessed from Guide Board Hill Road. See Figure 4.

3.4.7.4 Boat Launches

Based on the NH SCORP, this study projects a need for an estimated additional 18 boat launches in the Franklin Falls and Blackwater market area. Opportunities for canoe launching sites have been identified in Compartments 5 and 7. The nature of the Blackwater River does not lend itself to becoming a major destination for boaters. Within the market area are Newfound, Webster, Sunapee, Little Sunapee, Hopkinton, Everett, and Highland Lakes and Lakes Winnisquan, Waukewan, Massasecum, Winnipocket and Winnipesaukee. These bodies of water are more conducive to recreational water activities.

The development of any of these opportunities will depend largely on partnerships with state, regional, and local entities.

IV. PUBLIC INVOLVEMENT AND COORDINATION

Coordination with other agencies and the public is an integral part of the Master Planning process. A stated purpose of the Master Plan is to provide the best combination of responses to regional and ecosystem needs, project resource capabilities and suitabilities and expressed public interests and desires. Public interest was addressed initially with the issuance of a Public Notice on 30 October 1996 which invited communities within a 20-mile radius of the dam and beyond, and elected officials and local and regional organizations to participate in and provide input to the plan. A meeting was held at the Salisbury Town Hall on 30 April 1997 for those who had earlier expressed an interest. The draft Master Plan, which was made available at local libraries and town halls during the review period, provided another opportunity for the public to comment on the plan.

The solicitation of public comment resulted in the following:

(a) Support for the development of canoe launch facilities at Little Hill Road and Peters Bridges in Compartments 7 and 5. These were proposed in earlier correspondence from and discussions with the Salisbury Conservation Commission.

(b) The Chairman of the Salisbury Conservation Commission expressed the Salisbury Elementary School's interest in developing an interpretative trail for fourth grade school children. Such a trail could be incorporated into the proposed Forest Management Demonstration Area in Compartment 2.

(c) Support for publicizing development opportunities in the project area and the need for public and private groups to become involved in developing project resources.

The Master Plan deals with concept level issues that support specific development opportunities, which will have to be evaluated for feasibility before implementation. Recreational improvements and fish and wildlife enhancement activities will need to be accomplished by cost sharing with public and /or private agencies and groups. Appendix E includes pertinent correspondence relative to the Master Plan and its public review.

V. RESOURCE MANAGEMENT OBJECTIVES

5.1 Introduction

Resource management objectives were developed to guide future design, development and management of the resource base, natural and developed, to obtain the greatest possible benefit in meeting the needs of the public and protecting and enhancing environmental quality. Resource objectives, at a minimum, are consistent with the authorized project purpose, flood control, and consistent with federal laws and directives, regional needs, resource capabilities, and expressed public desires. In addition to the above, the following resource objectives are specific to the natural, cultural, and developed resources of the Blackwater Project.

5.2 Project-wide Objectives

5.2.1 Natural Resources

The overall objectives to protect and enhance natural resources, including wetlands, fish and wildlife habitat, and forestry resources were prepared in cooperation between the Corps of Engineers and DRED. The Corps administers the natural resource program and the state of New Hampshire, through DRED, manages it under its license.

(a) Monitor to identify newly established threatened or endangered species and protect them in accordance with federal and state laws and directives.

(b) Protect wetlands, including potential vernal pools, from construction activity, (roads and trail construction, etc.) and during timber harvesting activities, using, among others, protective buffers.

(c) Ensure that the several identified exemplary natural communities remain intact, are enhanced and protected.

(d) Promote those identified exemplary natural communities and natural communities of local significance that are of interest to the public and are worthy for particular visual access without impairing protection of the resource.

(e) Provide visual access to those communities, as appropriate. Visual access may include openings for viewing, signage and interpretative programs, literature, and maps.

(f) Manage forest land under sustained yield for the production of forest products.

(g) Improve vegetation health and vigor for sustained yield timber production.

(h) Effect management practices that provide the greatest natural diversity of plant, fish and wildlife species indigenous to the area, compatible with the authorized purpose of the project.

(i) Continue annual fish stocking programs.

(j) Monitor wildlife species within the project limits to determine their overall habitat suitability.

(k) Monitor wildlife species within the project limits and the effects of management practices on them.

(l) Maximize wildlife carrying capacity and recreational use of forested areas through maintenance of a diversity of age groups, species composition (timber, open fields, etc.), and early succession control with timber harvesting.

(m) Maintain areas of the project as open space with public access to help meet existing and future regional diversity for recreational activities, visual appeal, and vegetation and wildlife enhancement.

(n) Promote and evaluate public requests for the use of the project lands including special event activities, agriculture, etc.

5.2.2 Cultural Resources

(a) Protect known and documented prehistoric and historic archaeological resources. Measures may include, but not be limited to:

(1) Avoid known sites, if possible. If resources cannot be avoided, every effort should be made to minimize these impacts. If impacts to significant resources are unavoidable, then further archaeological investigations may be required prior to implementation. In all cases, development activities should be reviewed by a CENAE staff archaeologist and may require coordination with the New Hampshire State Historic Preservation Officer (NH SHPO).

(2) Monitor the project area for evidence of unauthorized excavation or collection of cultural resources and damage to sites. Known sites should be maintained and preserved as important project resources.

(b) Consult with the CENAE archaeologist prior to development or disturbance in archaeologically sensitive areas as defined in the Archaeological Reconnaissance Report. These sensitive areas have the potential to contain additional archaeological resources and are afforded the same protection as for known sites. Further evaluation

and testing may be required in areas of sensitivity, as determined on a case-by-case basis by CENAE archaeologists, and in consultation with the NH SHPO.

(c) Cultural resources are a public benefit and should be available for public enjoyment, enlightenment, and education. Support interpretive programs for historic and archaeological resources, where appropriate and in accordance with federal laws and directives.

5.2.3 Recreation Resources

(a) Maintain existing recreation areas to enhance specific and dispersed/passive recreation experiences, public health, safety, and universal access where possible for a diverse population.

(b) Look for opportunities and promote development of suitable recreation sites on a sustained basis to afford the public a diversity of recreational opportunities and/or enhance public use of the project resources.

(c) Maintain existing trails on project lands.

(d) Identify, develop and promote trails through project lands to meet regional needs.

(e) Maintain and continue to improve the Interpretive Services and Outreach Program to enhance the public's understanding and appreciation of the role of the Corps of Engineers in the administration and management of Blackwater Project land.

(f) Provide recreational activities for both consumptive and non-consumptive use of fish and wildlife, including maintenance of the existing fish and pheasant stocking programs.

(g) Optimize the use of leveraged resources to maintain and provide quality public experiences at Corps water resources projects.

5.3 Specific Objectives for Management Units

The Blackwater Project area has been divided into eight compartments based on natural and man-made features and administrative limits. See Figure 1. Table 6 summarizes the natural communities and wetlands and their location by compartment. The particularity of some of the compartments require additional objectives. Portions of Compartments 7 and 8 are devoted to Project Operations or to fulfilling the flood control purpose of the project. In addition the Project Operations portion of Compartment 8 offers specific recreational opportunities in the form of picnic areas. Canoe launching sites have been identified in Compartments 4 and 5. Universal access trails are possibilities in Compartments 2 and 4 and an opportunity for the development

of a forest management demonstration area in Compartment 2 has been identified. The management of dispersed recreational development, extending throughout the entire project area, supports the development of minimal recreational facilities.

Because of the need to protect the confidentiality of the location of prehistoric and historic sites, they are not referenced in this section.

All compartmental areas cited in the next pages include both land and water, including the Blackwater River. Because the Blackwater Project provides no storage during normal operations, the riverine system within the project boundaries is limited to an estimated 150 acres within the channel. These comprise only about 12 percent of the wetlands identified in the project area.

Table 6

Blackwater Project Master Plan

SUMMARY OF NATURAL COMMUNITIES AND WETLANDS

Compartments	Observation Points Exemplary Natural Communities	Observation Points Natural Communities of Local Significance	Number of Wetlands
1			(8)
2	8,*	39	17
3	1,2,5		(5)
4	*	21,22,23,24	14
5		14,15	25
6	*	13	(8)
7	*	18,19	8
8		46	7
Totals	**19**	**15**	**92**

Exemplary Natural Communities

Floodplain forest	continuous communities/Compartments 2,4,6,7*
Floating-leaved aquatic and deep emergent marsh communities	1
Greenough Pond acidic fen	2,5
Dwarf shrub bog	8

Natural communities of local significance

Cook Brook Wetlands Complex	
Emergent marsh	21
Emergent/graminoid marsh	23
Acidic fen	22
Red maple swamp	24
Forests bordering Little Hill Road	18,19
Vernal pool	14,15,39
Dry Sandy Field	46
Couchtown Road acidic streamside shrub thicket	13
Riverbank vegetation (High-energy riverbank)	Found along the entire river between between the floodplain and the river.
Sugar maple-beech-yellow birch forest	15,19

( )Extensive acreage of wetlands occur in Compartments 1,3, and 6.

* Fifteen floodplain forest observation points were identified along meandering parts of the Blackwater River in Compartments 2,4,6 and 7 (Figure B-1 in Appendix B).

5.3.1 Compartment 1

5.3.1.1 Features

Compartment 1, occupying approximately 353.4 acres in the southeasterly limits of the project, is bordered by the project limits and Province Road in the town of Webster. About one-half of the forest cover is white pine with stands of white pine-red oak-red maple and an individual stand of white pine-hemlock (6.9 acres). Approximately 49.7 acres are covered by agricultural leases in hay production. A stand of balsam-elm-red maple occupies 39.4 acres and two stands of hemlock cover 36.8 acres.

Compartment 1 contains eight wetlands including a large hemlock and balsam fir swamp and large areas of red maple swamps west of the town of Webster, adjacent to logging roads. The wetlands are:

- 3 Forest broad-leaved deciduous wetlands cover an extensive area

- 2 Shrub/scrub broad-leaved deciduous wetlands

- 2 Forested needle-leaved evergreen wetlands

- 1 Emergent vegetation, persistent wetland

5.3.1.2 Objectives

1. Protect the eight identified wetlands.

2. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.2 Compartment 2

5.3.2.1 Features

Compartment 2, located east of the Blackwater River between Province Road and Warner Road in the towns of Webster and Salisbury, is the largest compartment. It covers about one quarter of the project area with 910.4 acres. About one-half of the compartment is covered mainly by white pine and some white pine-red oak-red maple stands (458.7 acres), fifteen percent in hemlock (138.9 acres) and about nine percent in red spruce (78.7 acres). The remainder of the compartment is covered by stands of red maple (72 acres), hemlock-yellow birch (28.3 acres), alder (25.8 acres), water (12.8 acres) and marsh (5 acres).

Compartment 2 is occupied by several exemplary natural communities consisting of floodplain forest located along meandering parts of the Blackwater River ,and a dwarf shrub bog. It also includes a natural community of local significance, a vernal pool. Compartment 2 contains seventeen wetlands including large areas of forested broad-leaved deciduous wetlands along the oxbows of the river, as well as a large shrub/scrub broad leaved deciduous wetlands. Specifically, these wetlands are:

- 5 Shrub/scrub broad-leaved deciduous wetlands, one of which extends into Compartment 3

-5 Forested broad-leaved deciduous wetlands

-4 Emergent vegetation, persistent wetlands

-2 Sphagnum bogs

-1 Forested needle-leaved evergreen wetlands

The Master Plan has identified an opportunity for establishing a forest management demonstration area and universal access trails in Compartment 2.

5.3.2.2 Objectives

1. Protect and promote, for possible visual access, the exemplary natural communities consisting of floodplain forest and the dwarf shrub bog, and protect the seventeen identified wetlands.

2. Promote the development of a forest management demonstration area, universal access trails, and supporting interpretive and outreach activities.

3. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.3 Compartment 3

5.3.3.1 Features

Compartment 3, which encompasses Greenough's Pond, is located in the town of Salisbury and is the smallest of the compartments with an area of 253.3 acres. Some 43 percent of the compartment is covered by swamp/marsh (109.2 acres), 97 acres in white pine, white pine in combination with red oak-red maple-hemlock and separate stands of red maple (19.5 acres), hemlock (11.5 acres), hemlock-yellow birch (11.5 acres), and 4.6 acres of hay.

Compartment 3 contains five wetlands. Two shrub/scrub broad-leaved deciduous wetlands cover a large area of the compartment. In addition there are one each of an open water (Greenough's Pond), emergent vegetation, persistent and a forested, broad-leaved deciduous wetland. Also found in Compartment 3 were three exemplary natural communities: a floating-leaved aquatic and deep emergent marsh community, and two Greenough Pond acidic fen communities.

5.3.3.2 Objectives

1. Protect and promote for possible visual access the three exemplary natural communities and protect the five identified wetlands.

2. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.4 Compartment 4

5.3.4.1 Features

Compartment 4, containing approximately 390.7 acres, is located east of the Blackwater River between Warner and Loverin Hill Roads in the town of Salisbury. Land cover consists of nearly 36 percent white pine (139.9 acres), 19 percent marsh (75 acres) and stands of white pine-hemlock, hemlock, red oak, white pine-red oak-red maple, basswood-elm-red maple and red maple.

The compartment includes several exemplary natural communities consisting of floodplain forest located along meandering parts of the Blackwater River, and four natural communities of local significance as part of the Cook Brook wetlands complex (emergent marsh, emergent/graminoid marsh, acidic fen, and red maple swamp). Fourteen wetlands, consisting of the full range of wetland types (except the forest needle-leaved evergreen wetland) were identified in Compartment 4.

-4 Shrub/scrub broad-leaved deciduous wetlands

-1 Shrub/scrub broad-leaved evergreen wetlands

-2 Forested broad-leaved deciduous wetlands

-3 Emergent vegetation, persistent wetlands

-1 Sphagnum bog

-2 Open water wetlands

-1 Aquatic bed vegetation, rooted vascular

The Master Plan identified opportunities for developing universal access trails in Compartment 4.

5.3.4.2 Objectives

1. Protect, and promote for possible visual access, the exemplary natural communities consisting of floodplain forest, and protect the identified wetlands.

2. Promote the development of universal access trails and supporting interpretive and outreach activities.

3. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.5 Compartment 5

5.3.5.1 Features

With 361.3 acres extending north from Loverin Road in the town of Salisbury, Compartment 5 comprises the northerly portion of the project. It extends on both sides of the Blackwater River. Land cover consists of 132.5 acres in white pine-red oak-red maple, 108.1 acres in white pine, 41.6 acres in hay, 29.1 acres in red maple, and stands of hemlock, basswood-elm-red maple, silver maple-beech-yellow birch, red oak and brush.

Two natural communities of local significance, vernal pools, were identified as well as the following twenty-five wetlands. These are:

-11 Forested broad-leaved deciduous wetlands, one of which straddles Compartment 6

-6 Shrub/scrub broad-leaved deciduous wetlands

-3 Open water wetlands, that are possible vernal pools

-3 Sphagnum bogs

-1 Emergent vegetation, persistent wetland

-1 Shrub/scrub broad-leaved evergreen wetland

The Master Plan identified an opportunity for establishing a canoe launch on the east side of the Blackwater River at Peters Bridge. See Figure 4.

5.3.5.2 Objectives

1. Protect the twenty-five identified wetlands.

2. Promote recreational, including canoeing, activities.

3. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.6 Compartment 6

5.3.6.1 Features

With 500.7 acres, Compartment 6 is the second largest compartment. It is located on the west side of the Blackwater River and generally between Warner and Loverin Roads in the town of Salisbury. An estimated one-third of the land is marsh (172.5 acres) and another third in white pine (172.8 acres). Approximately 58.5 acres are in agricultural leases and devoted to hay and corn. The remaining land cover is red pine, white pine-hemlock, white pine-red oak-red maple, and other small stands of different varieties.

Compartment 6 contains several exemplary natural communities consisting of floodplain forest located along meandering parts of the Blackwater River and one community of local significance, an acidic streamside scrub thicket adjacent to Couchtown Road. It also contains eight wetlands including large areas of shrub/scrub broad-leaved deciduous and forested broad-leaved deciduous wetlands. These are:

-3 Forested broad-leaved deciduous wetlands, one of which straddles Compartment 5

-2 Shrub/scrub broad-leaved deciduous wetlands, one of which is extensive

-2 Emergent vegetation, persistent wetlands

-1 Shrub/scrub broad-leaved evergreen wetlands

5.3.6.2 Objectives

1. Protect, and promote for possible visual access, the exemplary natural communities consisting of floodplain forest and protect the eight identified wetlands.

2. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.7 Compartment 7

5.3.7.1 Features

With a long narrow configuration and approximating 469.7 acres, Compartment 7 is located on the west side of the Blackwater River between Province and Warner Roads in the towns of Salisbury and Webster. The compartment is managed under license by DRED, except for approximately 29 acres of land containing Little Hill Dike and a borrow area that are managed by the Corps of Engineers for the authorized flood control purpose of the project. Two-thirds of the land cover or 306.4 acres is stands of white pine-red oak-red maple and white pine. The remaining land cover is hemlock, aspen, red pine, red oak, red maple, hemlock-yellow birch, white pine-hemlock and silver maple-beech-yellow birch.

Compartment 7 includes exemplary natural communities of floodplain forest located along the meandering portions of Blackwater River and two communities of local significance: two forests bordering Little Hill Road. It also encompasses the following eight wetlands:

-3 Forested broad-leaved deciduous wetlands

-2 Emergent vegetation, persistent wetlands

-2 Shrub/scrub broad-leaved deciduous wetlands

-1 Shrub/scrub broad-leaved evergreen wetland

The Master Plan identified an opportunity for establishing a canoe launching site off Little Hill Road in Compartment 7 in the town of Salisbury. See Figure 4.

5.3.7.2 Objectives

1. Protect, and promote for possible visual access, the exemplary natural communities consisting of floodplain forest and protect the eight identified wetlands.

2. Promote recreational, including canoeing, activities.

2. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

5.3.8 Compartment 8

5.3.8.1 Features

Compartment 8, containing approximately 269.4 acres of land and water, occupies the southwesterly portion of the project. It is located west of the Blackwater River and south of Province Road and within the project boundaries in the town of Webster. Some 115.4 acres, containing the dam, appurtenant facilities and the project office, are managed by the Corps of Engineers to fulfill the flood control purpose of the project. Eighty percent of the land cover (215.1 acres) is roughly divided equally between stands of red maple, white pine and white pine-red oak-red maple. The remaining cover consists of land occupied by the project infrastructure (14.6 acres), paper birch, aspen, hemlock, agricultural leases planted in hay (12.9 acres) and grass/old fields (3.7 acres).

One natural community of local significance has been identified: a dry sandy field. Compartment 8 contains the following seven wetlands:

-3 Forested broad-leaved deciduous wetlands

-3 Emergent vegetation, persistent wetlands

-1 Shrub/scrub broad-leaved deciduous wetlands

The Master Plan has identified two opportunities for the development of picnic areas west of the Blackwater River in the Project Operations portion of the compartment. One would be upstream of the dam. The other would be located in the Burbank Mills area and accessed via Guide Board Hill Road.

5.3.8.2 Objectives

1. Fulfill the authorized project purpose: flood control

2. Protect the seven identified wetlands.

3. Promote recreational activities.

4. Implement the project-wide natural resources, cultural resources and recreational management objectives, as appropriate.

VI. LAND ALLOCATION AND CLASSIFICATION

6.1 Land Allocation

All lands for the Blackwater Dam Project have been allocated in accordance with the authorized purpose for which they were acquired: flood control. No separable land acquisitions were made for recreation, fish and wildlife or mitigation.

6.2 Land Classification

Guidance for the preparation of Master Plan requires that allocated lands be further classified into the following categories. See Figure 3.

Project Operations
Intensive Recreation
Mitigation
Environmental Sensitive Areas
Multiple Resource Management
    Low Density Recreation
    Wildlife Management General
    Vegetative Management (Forest Management)
    Inactive and/or Future Recreation Areas
Easement Lands

At the Blackwater Project 3580 acres are held in fee.

6.2.1 Project Operations

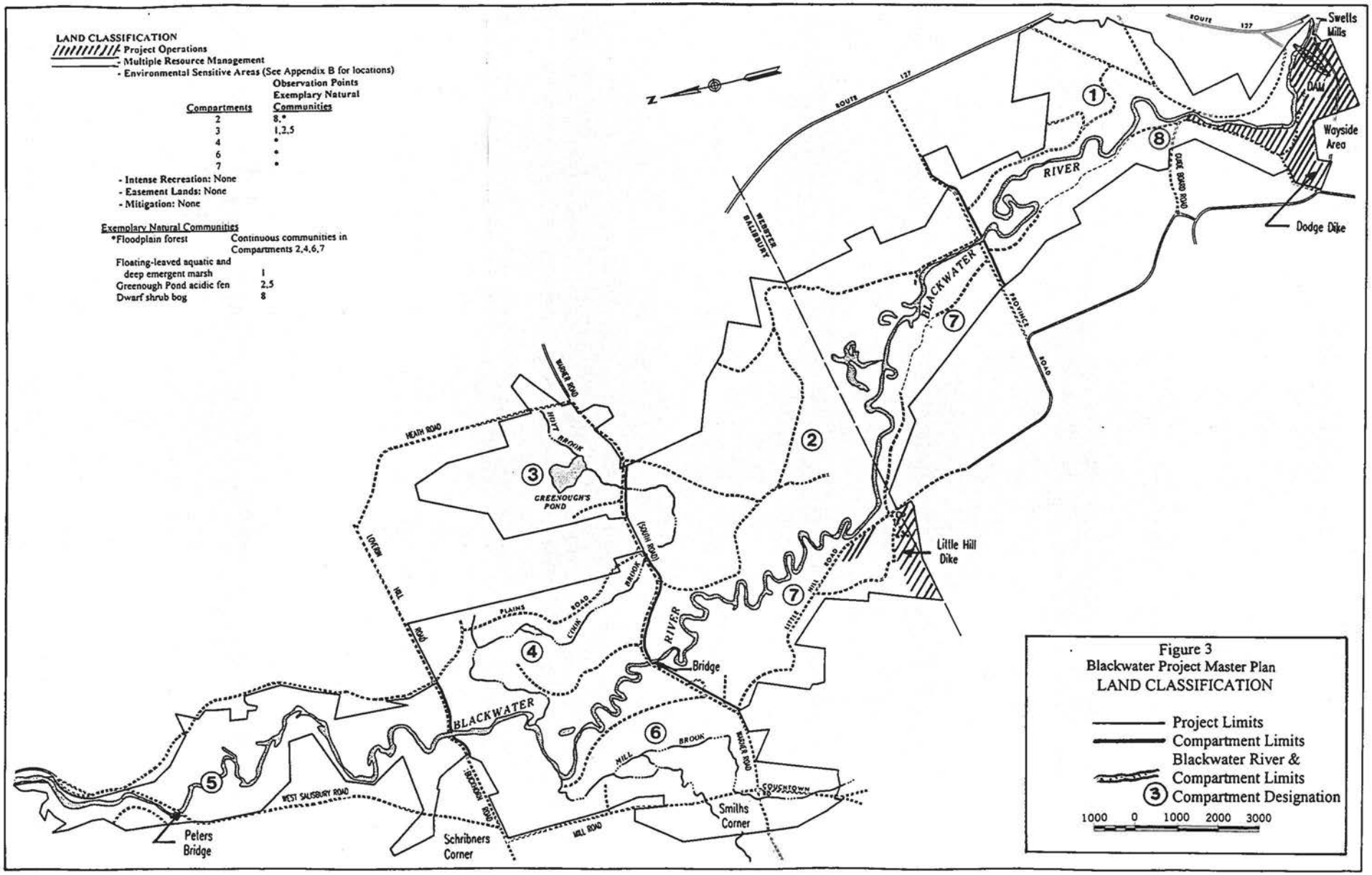
Approximately 115.4 acres of land in Compartment 8 and 29 acres in Compartment 7 occupied by the dam structure and appurtenant facilities, operations center, office, and maintenance facilities are classified as Project Operations.

6.2.2 Intensive Recreation

No land has been classified for intensive recreation.

6.2.3 Mitigation

No land has been acquired or designated specifically for mitigation at the Blackwater Project.


LAND CLASSIFICATION
Project Operations
- Multiple Resource Management
- Environmental Sensitive Areas (See Appendix B for locations)
Observation Points
Exemplary Natural Communities
Compartments
2 8.*
3 1,2,5
4 *
6 *
7 *
- Intense Recreation: None
- Easement Lands: None
- Mitigation: None
Exemplary Natural Communities
*Floodplain forest Continuous communities in Compartments 2,4,6,7
Floating-leaved aquatic and deep emergent marsh 1
Greenough Pond acidic fen 2,5
Dwarf shrub bog 8
N
ROUTE 127
Swells Mills
DAM
Wayside Area
Dodge Dike
RIVER
BLACKWATER
WEBSTER SALISBURY
CLARK BOARD ROAD
PROVINCE ROAD
WHITE ROAD
HEATH ROAD
HUTT BROOK
GREENOUGH'S POND
LOCUST HILL ROAD
SOUTH ROAD
Little Hill Dike
PLAINS ROAD
COLIN BROOK
LITTLE HILL ROAD
Bridge
MILL BROOK
WHITE ROAD
COUSHNOWN RD
Smiths Corner
WEST SALISBURY ROAD
JACKSON ROAD
MILL ROAD
Peters Bridge
Schribners Corner
1
2
3
4
5
6
7
8
Figure 3
Blackwater Project Master Plan
LAND CLASSIFICATION
Project Limits
Compartment Limits
Blackwater River & Compartment Limits
3 Compartment Designation
1000 0 1000 2000 3000

6.2.4 Environmental Sensitive Areas

Environmental sensitive areas are those where scientific, ecological, cultural or aesthetic features have been identified. The exemplary communities that have been identified in this study and viewed from nineteen observation points in Compartments 2,3,4,6 and 7, qualify as environmental sensitive areas. They are listed in Tables 7 and B-1 and Figure 3 and shown on Figures B-1 through B-2c. They are managed under the multiple resource management classification to ensure that they are not adversely affected.

6.2.5 Multiple Resource Management

With the exception of the 144.4 acres of land in Compartments 7 and 8 containing the infrastructure for managing the authorized project purpose, all of the land and water resources in the project area are classified as multiple resource management and managed under license to DRED. Integrated forest and wildlife management is carried out on these lands. The nineteen exemplary natural communities require management practices for their protection and, as appropriate, provide visual access and passive and dispersed recreational activities. Historical and archaeological resources surveys were conducted but the results are not recorded on Figure 4 because of the need to protect these resources from unauthorized disturbance. Multiple resource management also includes low density recreation, wildlife and vegetative management, and inactive and/or future recreation areas. The latter are found throughout the eight compartments. The inactive and/or future recreation areas are discussed in Chapter 3, Resource Inventory.

6.2.6 Easement Lands

No lands have been acquired in easement for the Blackwater Project.

VII. RESOURCE DEVELOPMENT PLANS

The following is a list of opportunities resulting from the master planning process to meet recreational and other needs at the Blackwater Project and complementary activities. See Figure 4.

a) Develop two canoe launching facilities along the Blackwater River in Compartment 5 and 7.

(b) Develop two day use/picnic areas in Project Operations area in Compartment 8.

(c) Provide a forest management demonstration area with an interpretive trail in Compartment 2.

(d) Provide universal access trails in Compartments 2 and 4.

(e) Develop projects to provide visual access to selected exemplary natural communities.

(f) Enhance the visitor assistance program to attract visitors to use the facilities at the Blackwater Project including publicity, signage, marking of trails, pamphlets, maps, and the extension of hours during the week and on weekends with the cooperation of local communities, organizations, volunteers and summer help.

Recreation improvements and fish and wildlife enhancement activities will need to be accomplished by cost sharing with public and private agencies and groups. New recreation development is possible if developed and maintained by other public or private entities. Improvements and developments will require specific proposals for Corps review and approval.

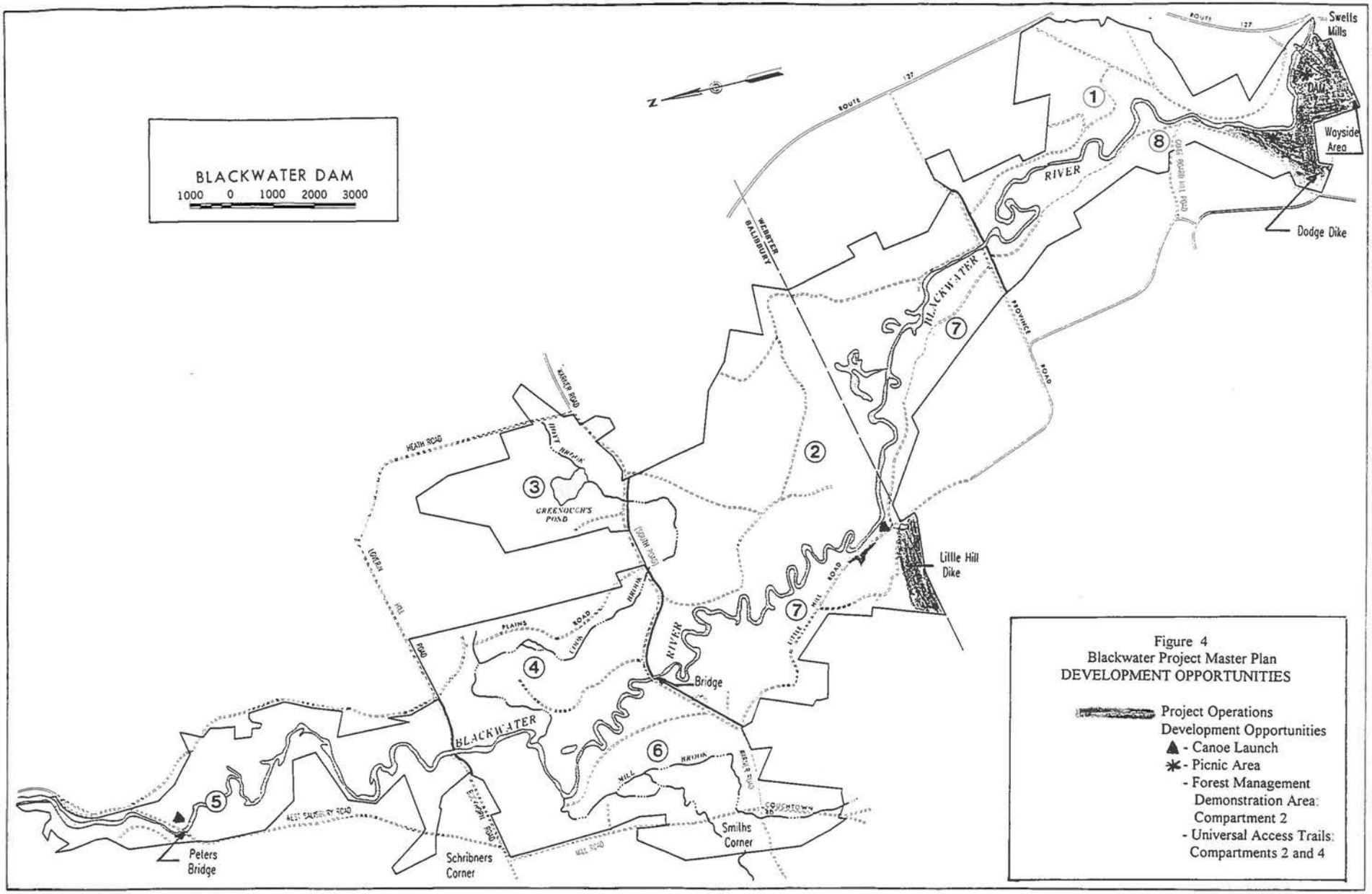


Figure 4
Blackwater Project Master Plan
DEVELOPMENT OPPORTUNITIES

Project Operations
Development Opportunities
▲ - Canoe Launch
✱ - Picnic Area
- Forest Management Demonstration Area: Compartment 2
- Universal Access Trails: Compartments 2 and 4

VIII. CONCLUSIONS

The natural and man-made resources of Blackwater Project will continue to be administered and managed to provide the best combination of responses to regional and ecosystem needs, project resource capabilities and suitabilities and public interests consistent with the authorized flood control purpose of the project. During the span of the Master Plan (1997-2002), the project's 3,580 acres will continue to be administered by the CENAE. DRED will continue to manage all natural resources under its current license which expires in 2014 except those lands managed by CENAE for Project Operations (144.4 acres in Compartments 7 and 8) and agricultural leases (167.3 acres in Compartments 1,3,5,6 and 8).

Natural and man-made resources have been located and identified, including wetlands, exemplary natural communities and cultural resources that require particular management practices for their protection. Recreational opportunities have also been identified through an analysis of regional needs and a public participation process.

The planning process has identified opportunities in the project area for the development of canoe launching facilities, day use/picnic areas, a forest management demonstration area, universal access trails, visual access to selected exemplary natural communities and a proposed forest management demonstration area. In addition, the Master Plan includes the enhancement of the visitor assistance program to attract more visitors to use the facilities at the Blackwater Project.

All specific proposals for the development of the natural and man-made resources at the Blackwater Project must comply with this Master Plan, the flood control purpose of the project, the National Environment Policy Act and other applicable federal and state requirements.

IX. RECOMMENDATION

It is recommended that the Blackwater Project Master Plan be approved as a guide to the protection, orderly use, and development of the natural and man-made resources in the project area.

APPENDIX A

BLACKWATER PROJECT
FOREST AND WILDLIFE INVENTORIES

Table A-1
Blackwater Project-Forest Stand Summary

	Stand #	Cover type	Size class	Acres
Compartment	1	Wp-Ro-Rm	4	12.3
1	2	Ro	4	34.8
	3	Wp-Ro-Rm	4	8.4
	4	Wp	4	13
	5	Wp	4	7.2
	6	Wp-Ro-Rm	5	6.5
	7	Wp	4	20.3
	8	He	4	13.6
	9	Wp-He	4	6.9
	10	Wp	4	28.9
	11	He	4	23.2
	12	Wp	4	16
	13	Wp-Ro-Rm	4	24.3
	14	Wp	4	19.3
	15	Wp-Ro-Rm	4	5
	16	Wp	4	7.5
	17	Rm	3	17.1
	18	Hay	0	10.1
	19	Hay	0	9.5
	20	Hay	0	4.8
	21	Hay	0	5.1
	22	Hay	0	3.2
	23	Hay	0	10.6
	24	Hay	0	6.4
	25	Ba-E-Rm	4	39.4
			Total	**353.4**

Table A-1 (continued)

	Stand #	Cover type	Size class	Acres
Compartment	1	Wp	2	6.8
2	2	Wp	4	110
	3	Wp	5	13.1
	4	Wp	3	13
	5	Wp	4	19.2
	6	Rs	3	15.7
	7	Wp-He	5	6.2
	8	Rm	4	4.2
	9	Wp-Ro-Rm	4	31
	10	Rs	3	5.9
	11	Wp-Ro-Rm	4	9.3
	12	He	4	93.5
	13	He-yb	4	28.3
	14	Wp-He	5	12.1
	15	Rm	4	18.3
	16	Wp-He	4	5.2
	17	Wp-He	4	33.2
	18	Wp	4	17.7
	19	Wp	4	48.6
	20	Rs	4	31
	21	He	4	45.4
	22	Wp	4	135.4
	23	Wp	4	22.6
	24	Wp-Ro-Rm	4	6.1
	25	Rs	3	26.1
	26	Rm	4	49.5
	27	Wp-Ro-Rm	4	25.9
	28	Marsh	0	33.5
	29	Alder	2	12.7
	29	Alder	2	13.1
	30	Marsh	0	5
	31	Water	0	12.8
			Total	**910.4**

Table A-1 (continued)

	Stand #	Cover type	Size class	Acres
Compartment	1	Wp-Ro-Rm	4	6.2
3	2	Rm	3	8.6
	3	Wp	4	11.1
	4	Wp	4	5.1
	5	Wp	5	8.8
	6	Wp-Ro-Rm	4	10.6
	7	He	4	11.5
	8	Wp-Ro-Rm	4	8.3
	9	Wp	4	11
	10	Wp-He	4	13.2
	11	Wp	4	22.7
	12	Rm	4	10.9
	13	He-yb	4	11.5
	14	Marsh	0	99
	15	Hay	0	4.6
	16	Swamp	0	10.2
			Total	**253.3**
Compartment	1	Wp-Ro-Rm	4	26.1
4	2	Wp-He	4	18.8
	3	Wp	4	23.9
	4	Wp	4	53.4
	5	Wp-He	4	11.4
	6	He	4	31.1
	7	Wp-He	4	19.9
	8	Wp	4	62.6
	9	Wp-Ro-Rm	4	7.5
	10	Ba-E-Rm	4	11.5
	11	Ro	4	34.5
	12	He	4	7.4
	13	Rm	3	7.6
	14	Marsh	0	75
			Total	**390.7**

Table A-1 (continued)

	Stand #	Cover type	Size class	Acres
Compartment	1	Wp-Ro-Rm	4	8.4
5	2	Ba-E-Rm	4	10
	3	Sm-Be-Yb	4	9.7
	4	He	4	5.9
	5	Wp	4	4.5
	6	Wp	5	10.4
	7	Wp-Ro-Rm	4	52.8
	8	Wp-Ro-Rm	4	9.8
	9	Wp-Ro-Rm	4	24.8
	10	Ro	4	8.4
	11	Rm	5	22.9
	12	Wp	4	16.2
	13	He	4	7.9
	14	Wp	5	23.5
	15	Wp-Ro-Rm	4	22
	16	Wp	5	9.2
	17	Wp	3	5.1
	18	Wp-Ro-Rm	4	14.7
	19	Wp	4	16.2
	20	Wp	5	23
	21	Rm	4	6.2
	22	Hay	0	6
	23	Hay	0	9.8
	24	Hay	0	10.3
	25	Hay	0	10.7
	26	Brush	1	8.1
	27	Hay	0	4.8
			Total	**361.3**
Compartment	1	Rp	4	10.7
6	2	Hay	0	36.6
	3	Wp	4	64.3
	4	Wp-He	5	9.7
	5	Rm	5	20.9
	6	Rm	4	12
	7	Wp	4	33.4
	8	Wp-Ro-Rm	4	8.2
	9	Wp-Ro-Rm	4	8.8
	10	Wp	4	23.5
	11	Wp	4	4.8
	12	Wp-Ro-Rm	5	6.7
	13	Wp	5	4.9
	14	Wp	4	9.3
	15	Wp	5	32.6
	16	Wp-Ro-Rm	4	4
	17	Sm-Be-Yb	4	4.3
	18	Wp-Ro-Rm	4	6.8
	19	Marsh	0	129.3
	20	Marsh	0	29.2
	21	Grass / Old field	0	4.8
	22	Hay	0	8.1
	23	Corn	0	7
	24	Corn	0	6.8
	25	Marsh	0	14
			Total	**500.7**

Table A-1 (continued)

	Stand #	Cover type	Size class	Acres
Compartment	1	Rp	4	12
7	2	Wp	5	38.6
	3	Wp-Ro-Rm	4	87.1
	4	Ro	4	16.7
	5	He	4	16.3
	6	Wp-Ro-Rm	4	23.1
	7	Wp	4	64
	8	Wp-Ro-Rm	4	24.3
	9	He	4	5.3
	10	Rp	3	3.5
	11	Aspen	4	37
	12	Wp-He	4	10.6
	13	Wp	5	8.7
	14	Rm	4	22.7
	15	Wp-Ro-Rm	4	25.5
	16	Sm-Be-Yb	4	7.2
	17	He-yb	4	14.7
	18	He	4	17.3
	19	Wp-Ro-Rm	4	7.5
	20	Wp	5	14.8
	21	Wp	4	12.8
			Total	**469.7**
Compartment	1	Wp-Ro-Rm	4	8.4
8	2	Pb	3	6.5
	3		0	14.6
	4	Aspen	3	11.4
	5	Wp	5	16.2
	6	He	4	5.2
	7	Wp-Ro-Rm	3	23.4
	8	Rm	3	15.4
	9	Wp	3	4.4
	10	Wp-Ro-Rm	3	9.9
	11	Rm	4	6
	12	Wp	4	22.3
	13	Rm	4	25.2
	14	Wp-Ro-Rm	4	11
	15	Wp	4	7.6
	16	Wp-Ro-Rm	4	22.2
	17	Wp	4	15.1
	18	Rm	4	7.5
	19	Wp	5	4.2
	20	Rm	3	11.2
	21	Rm	3	5.1
	22	Hay	0	4.7
	23	Hay	0	3.9
	24	Hay	0	4.3
	25	Grass / Old field	0	3.7
			Total	**269.4**
			Total	**3508.9**

Table A-1 (continued)

Aspen	Aspen
Ba/Bass	Basswood
Be	Beech
Bo	Black Oak
E	American elm
Gb	Gray birch
He	Hemlock
N spr.	Norway Spruce
Or	Red oak
Pb	Paper Birch
Rm	Red maple
Rp	Red pine
Rs	Red Spruce
Sm	Sugar maple
Wp	White pine
Yb	Yellow birch

STATE OF NEW HAMPSHIRE

DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS

A	S 39°- 38' - 36" W	176.45'
B	S 13°- 36' - 15" W	222.73'
C	S 34°- 13' - 04" E	33.68'
D	S 28°- 30' - 45" W	212.15'
E	S 09°- 49' - 07" E	114.76'
F	S 18°- 16' - 15" W	125.24'
G	S 83°- 15' - 17" W	137.48'
H	S 06°- 49' - 50" E	93.00'
I	S 83°- 32' - 32" E	57.09'
J	S 49°- 38' - 36" E	88.90'
K	S 39°- 48' - 45" E	35.89'
L	S 83°- 49' - 49" E	11.10'
M	S 38°- 33' - 09" W	268.05'
N	S 49°- 37' - 39" W	107.88'

N.H. GRID NORTH

15°- 27'

MAGNETIC NORTH

N

TO BOSCAWEN

ROUTE 127

TO SALISBURY

LONG ST. EXT.

ROUTE 127

BLACKWATER DAM

BLACKWATER RIVER

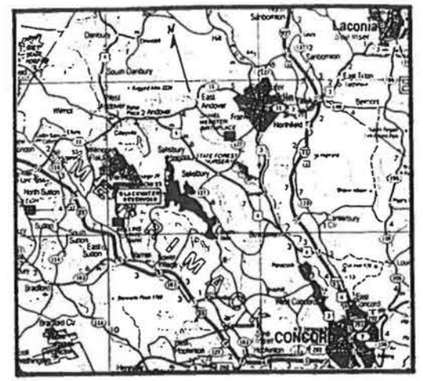
BEAVER POND

OPEN

PROVINCE ROAD

COMPARTMENT #2

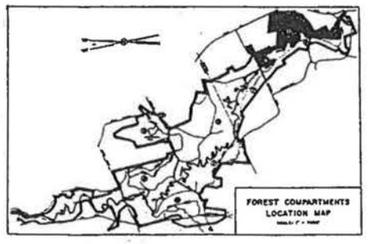
LOCATION MAP



400' 0 400' 800'

LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE



STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

LEASED BY:
STATE OF NEW HAMPSHIRE
DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #1

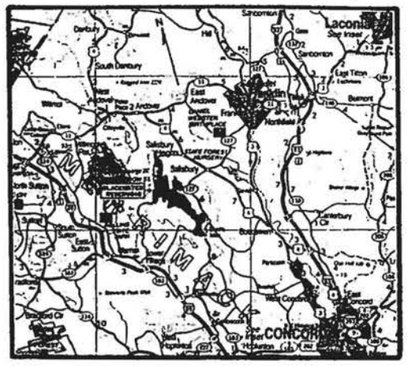
CRUISED BY L. STARTS, S. FRANCHER 7/87

MAP DRAWN BY L. GARDNER 12/87

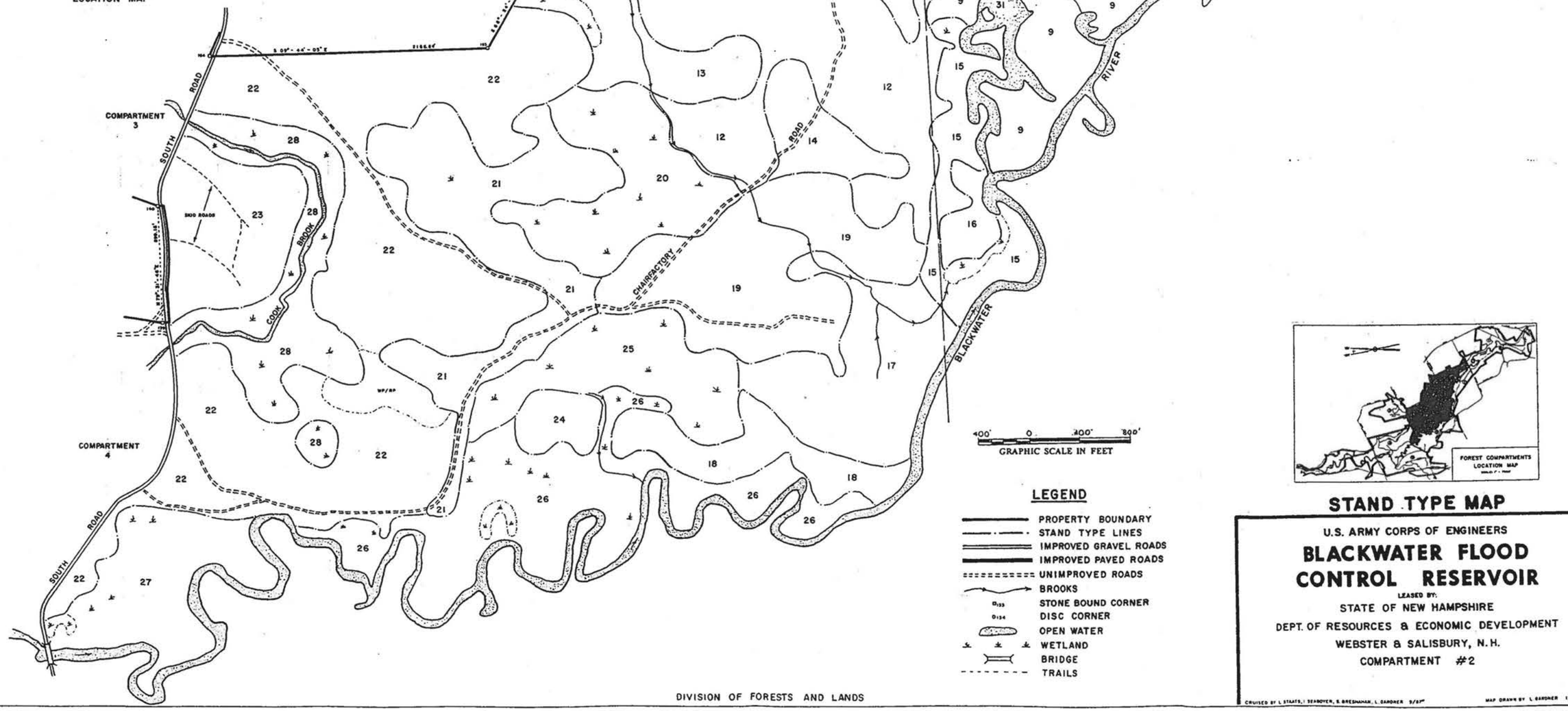
Figure A-1

STATE OF NEW HAMPSHIRE

DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT



LOCATION MAP



LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE
- TRAILS

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

LEASED BY:

STATE OF NEW HAMPSHIRE

DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT

WEBSTER & SALISBURY, N.H.

COMPARTMENT #2

CRUISED BY L. STAATS, J. SEABOYER, B. BRESNAHAN, L. GARDNER 9/67

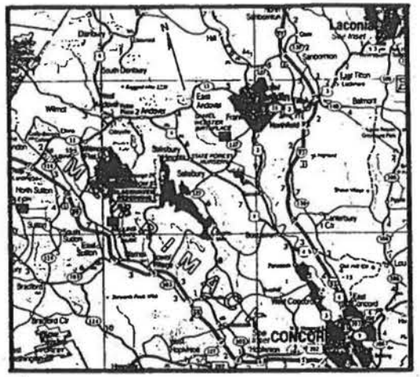
MAP DRAWN BY L. GARDNER 1/68

DIVISION OF FORESTS AND LANDS

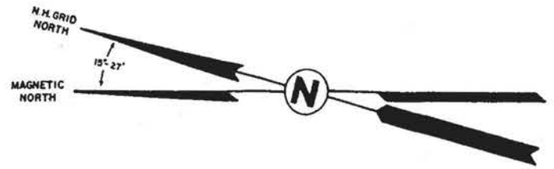
Figure A-2

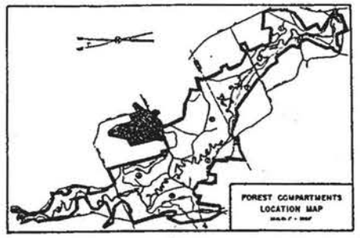
STATE OF NEW HAMPSHIRE

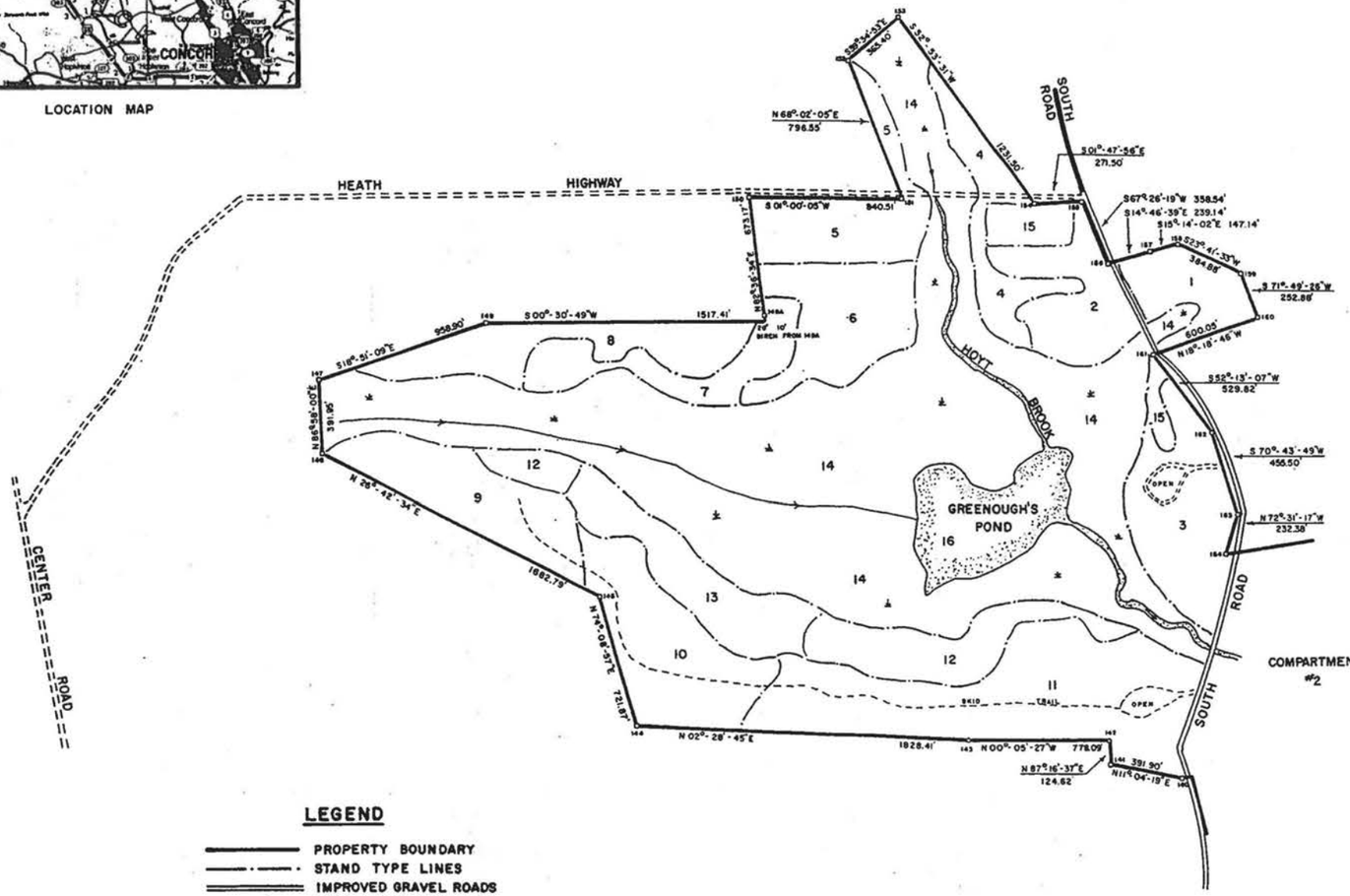
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS



LOCATION MAP







LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE

400' 0 400' 800'
GRAPHIC SCALE IN FEET

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

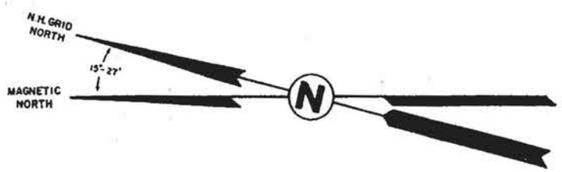
LEASED BY:
STATE OF NEW HAMPSHIRE
DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #3

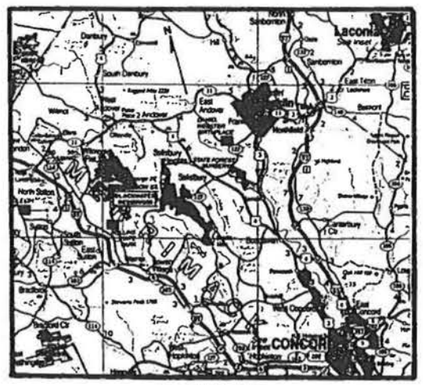
CRUISED BY L. STRATT, S. FRANCHER 3/87 — MAP DRAWN BY LEE SARDNER 9/87

Figure A-3

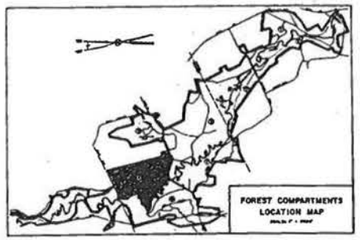
STATE OF NEW HAMPSHIRE

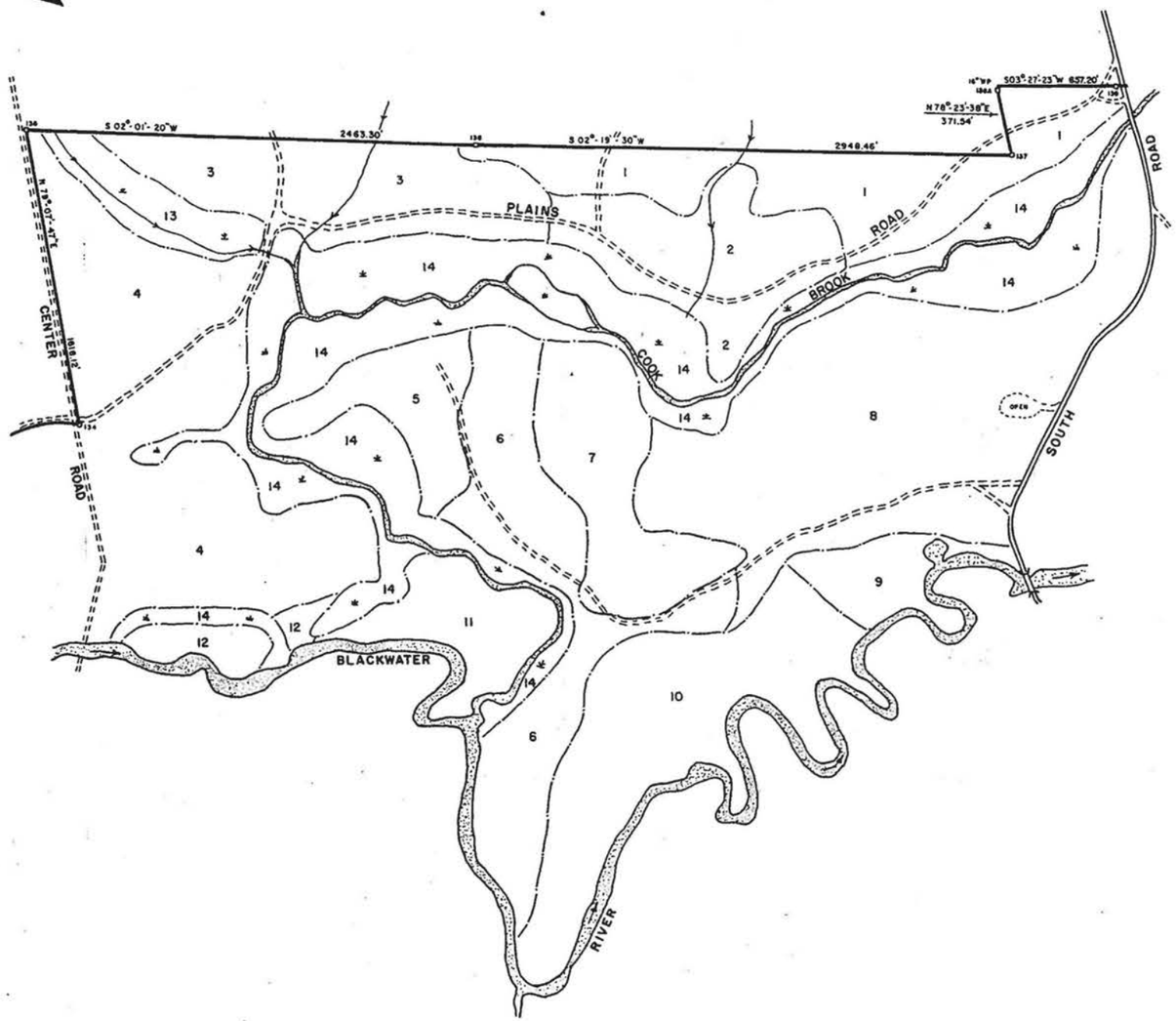
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS





LOCATION MAP





LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE

400' 0 400' 800'
GRAPHIC SCALE IN FEET

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

LEASED BY:
STATE OF NEW HAMPSHIRE
DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #4

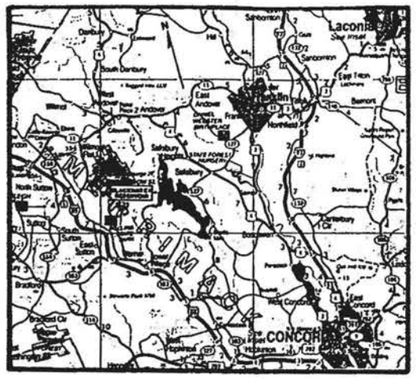
CRUISED BY L. STARTZ & S. FRANCHER 5/87

MAP DRAWN BY LEE GARDNER 9/87

Figure A-4

STATE OF NEW HAMPSHIRE

DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS



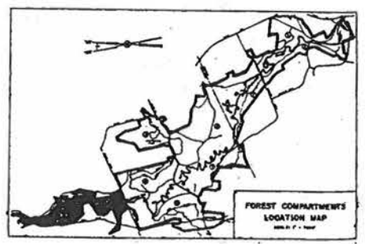
LOCATION MAP

N H. GRID NORTH
15°-27'
MAGNETIC NORTH

GLINES ROAD
MILL ROAD
CENTER ROAD
OPEN WITH SCATTERED TREES
OPEN WITH SCATTERED TREES

COMPARTMENT #4

COMPARTMENT #6



LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE
- TRAILS

400' 0 400' 800'
GRAPHIC SCALE IN FEET

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

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DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #5

CRUISED BY L. STARTS, S. FRANCHER 7/87

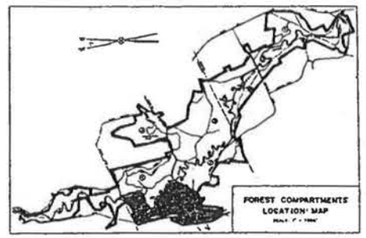
MAP DRAWN BY LEE GARDNER 12/87

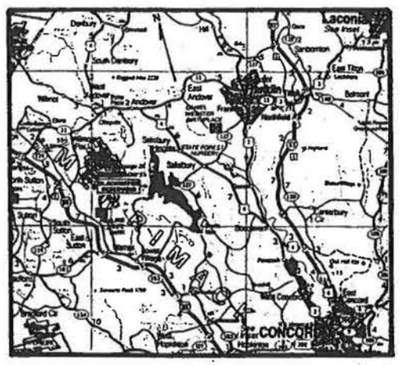
Figure A-5

STATE OF NEW HAMPSHIRE

DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS

N.H. GRID NORTH
15° 27'
MAGNETIC NORTH





LOCATION MAP

COMPARTMENT #5
COMPARTMENT #7
SOUTH ROAD
CENTER ROAD
MILL RD.
BLACKWATER RIVER
MILL BROOK
SCRIBNERS CORNER
SMITHS CORNER
COUCHTOWN MEADOW BROOK ROAD
HEDGE ROW
20" HEMLOCK CORNER 7.8' FROM S.B. NO. 48A

N 78°-00'-07"E 94.81'
N24°-26'-03"E 503.57'
N19°-45'-49"E 835.58'
S10°-15'-10"E 250.16'
N79°-23'-47"E 299.27'
N 00°-29'-30"W
2577.33'
N09°-21'-27"W 806.91'
N10°-58'-17"E 618.18'
S78°-07'-59"E 247.77'
S76°-44'-52"E 331.71'
S11°-25'-02"W 710.88'
N37°-40'-18"E 1282.38'
N 08°-08'-10"E
2099.97'
N07°-58'-57"E 51.15'
N07°-37'-18"E 721.36'
N12°-30'-50"W
N17°-48'-00"W 331.48'
S85°-57'-20"W 523.59'
S08°-25'-05"W 617.23'
N50°-05'-06"W 852.78'
S 21°-23'-08"W 2106.51'
N61°-10'-15"W 118.33'
S 88°-51'-04"W 268.13'
N55°-11'-34"W 259.58'
455.54'
N22°-30'-23"W
843.30'

LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE
- TRAILS

400' 0 400' 800'
GRAPHIC SCALE IN FEET

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

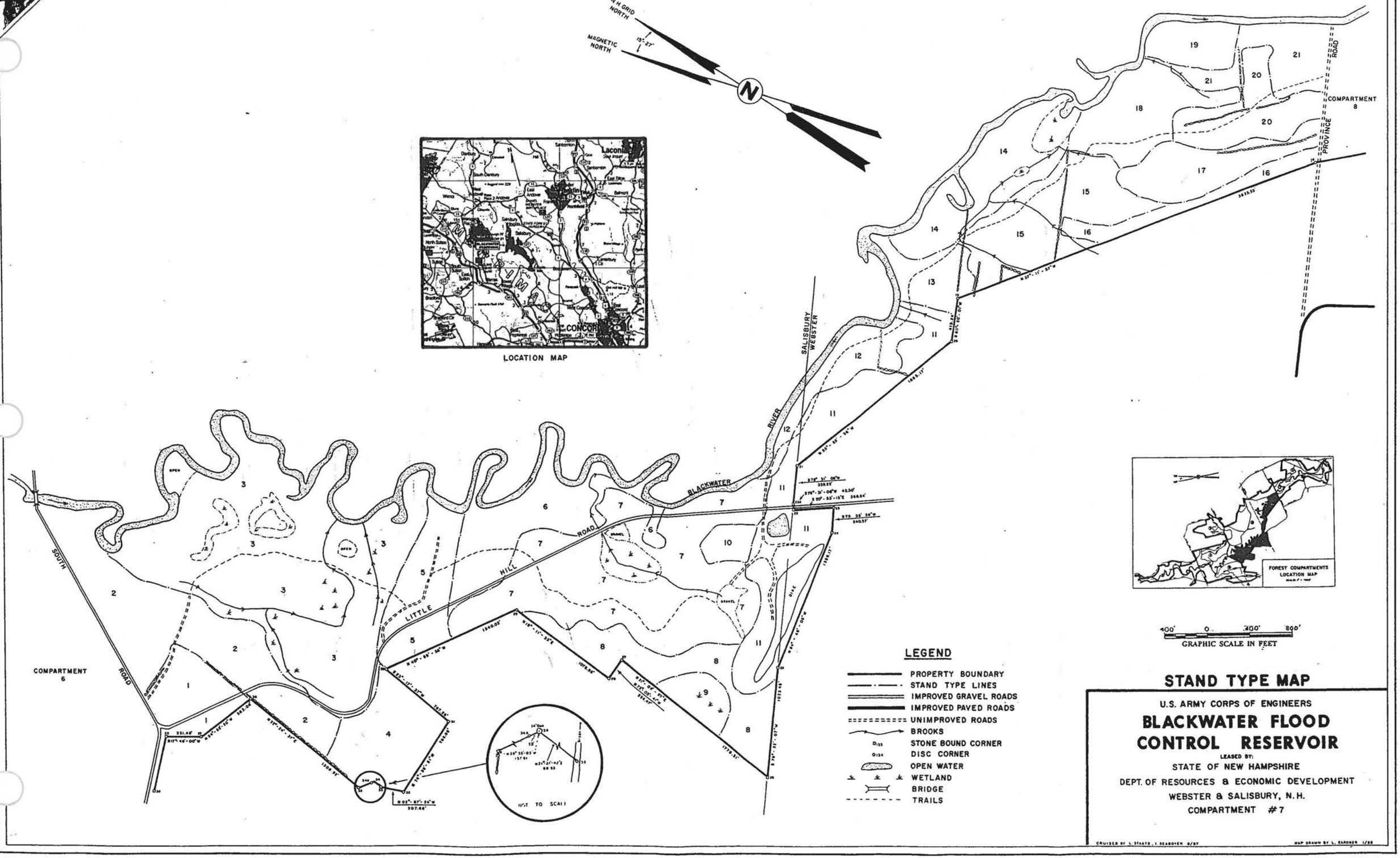
LEASED BY:
STATE OF NEW HAMPSHIRE
DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #6

CRUISED BY L. STRATTI, S. FRANCHER 6/87
MAP DRAWN BY LEE GARDNER 10/87

Figure A-6

STATE OF NEW HAMPSHIRE
DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS

LOCATION MAP



400' 0 400' 800'
GRAPHIC SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- D_{135} STONE BOUND CORNER
- O_{134} DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE
- TRAILS

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

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DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #7

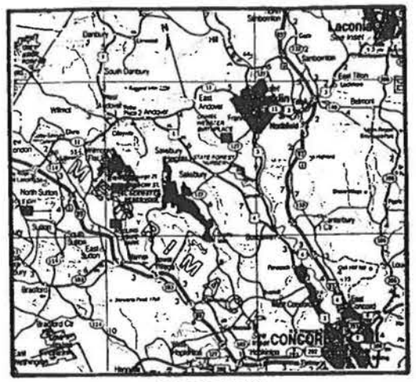
CRUISED BY L. STAATS, J. SEABOYER 6/57

MAP DRAWN BY L. GARDNER 1/58

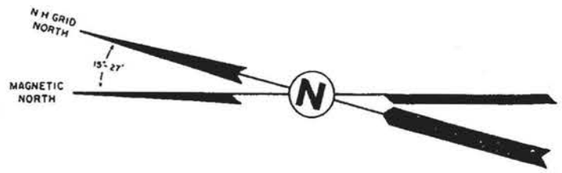
Figure A-7

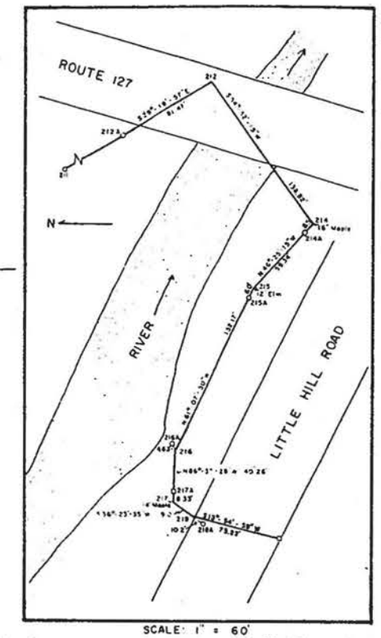
STATE OF NEW HAMPSHIRE

DEPARTMENT OF RESOURCES AND ECONOMIC DEVELOPMENT
DIVISION OF FORESTS AND LANDS

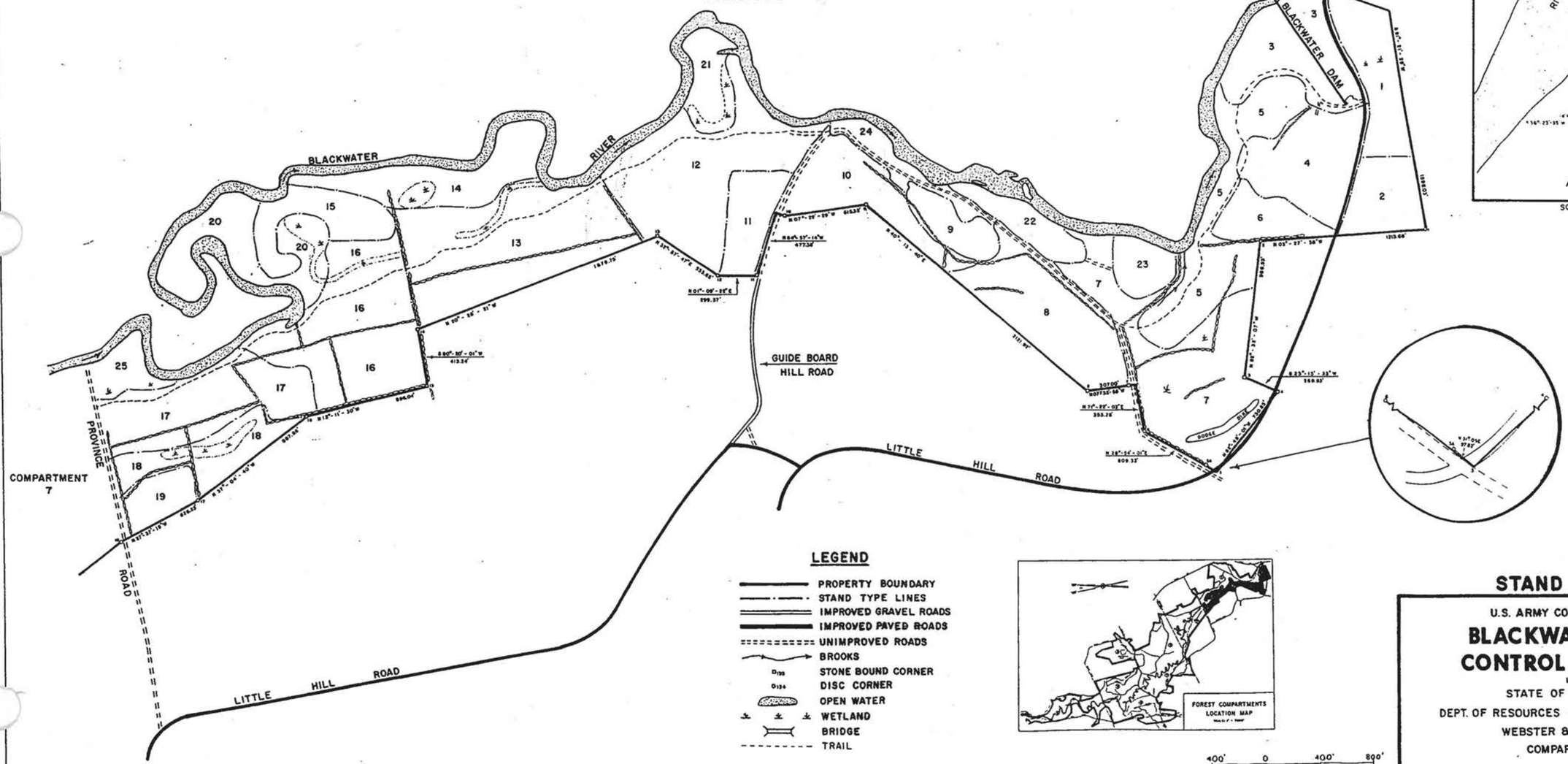


LOCATION MAP





SCALE: 1" = 60'



LEGEND

- PROPERTY BOUNDARY
- STAND TYPE LINES
- IMPROVED GRAVEL ROADS
- IMPROVED PAVED ROADS
- UNIMPROVED ROADS
- BROOKS
- STONE BOUND CORNER
- DISC CORNER
- OPEN WATER
- WETLAND
- BRIDGE
- TRAIL

400' 0 400' 800'
GRAPHIC SCALE IN FEET

STAND TYPE MAP

U.S. ARMY CORPS OF ENGINEERS

BLACKWATER FLOOD CONTROL RESERVOIR

LEASED BY:
STATE OF NEW HAMPSHIRE
DEPT. OF RESOURCES & ECONOMIC DEVELOPMENT
WEBSTER & SALISBURY, N.H.
COMPARTMENT #8

CRUISED BY L. STAATS, S. FRANCHER 6/87

MAP DRAWN BY L. BARONER 12/87

Figure A-8

Table A-2
Wildlife Species Found at Blackwater Reservoir

MAMMALS (1)

Common Name	Scientific Name
Whitetail Deer	Odocoileus virginianus
Black Bear*	Ursus americana
Moose	Alces alces
Bobcat	Felis rufus
Coyote	Canis latrans
Red Fox	Vulpes vulpes
Gray Fox	Urocyon cinereoargenteus
Varying (Snowshoe) Hare	Lepus americanus
New England Cottontail (2)	Sylvilagus transitionalis
Gray Squirrel	Sciurus carolinensis
Meadow Vole	Microtus pennsylvanicus
White Footed Mouse	Peromyscus leucopus
Mink	Mustela vison
Otter	Lutra canadensis
Beaver	Castor canadensis
Muskrat	Ondatra zibethicus
Striped Skunk	Mephitis mephitis
Short Tailed Weasel	Mustela erminea
Fisher	Martes pennanti
Northern Flying Squirrel	Glaucomys sabrinus
Red Squirrel	Tamiasciurus hudsonicus
Deer Mouse	Peromyscus maniculatus
Short Tailed Shrew	Blarina brevicauda
Woodchuck	Marmota monax
Eastern Chipmunk	Tamias striatus
Raccoon	Procyon lotor
Opossum	Didelphis virginiana

Table A-2 (continued)

BIRDS (Including Migrants) (3)

Ruffed Grouse	Bonasa umbellus
American Woodcock	Philohela minor
Ringneck Pheasant	Phasianus colchicus
Indigo Bunting	Passerina cyanea
Snow Bunting	Plectrophenax nivalis
Eastern Bluebird	Sialia sialis
Peregrine Falcon (4)	Falco peregrinus
Sparrow Hawk (Kestrel)	Falco sparverius
Pigeon Hawk (Merlin)	Falco columbarius
Great Horned Owl	Bubo virginianus
Osprey (5)	Pandion haliaetus
Bald Eagle (4)	Haliaeetus leucocephalus
Red-tailed Hawk	Buteo jamaicensis
Goshawk	Accipiter gentilis
Marsh Hawk	Circus cyaneus
Broad Winged Hawk	Buteo platypterus
Common Crow	Corvus brachyrhynchos
Turkey Vulture*	Cathartes aura
Canada Goose	Branta canadensis
Hooded Merganser	Lophodytes cucullatus
Common Merganser	Mergus merganser
Common Loon (5)	Gavia immer
Black Duck	Anas rubripes
Mallard	Anas platyrhynchos
Wood Duck	Aix sponsa
American Golden Eye	Bucephala clangula
Ring-necked Duck	Aythya collaris
Snow Goose*	Chen caerulescens
Great Blue Heron	Ardea herodias
Green Winged Teal	Anas crecca
Blue-winged Teal	Anas discors
Sparrows	Family Fringillidae
Finches	Family Fringillidae
Warblers	Family Parulidae
Pileated Woodpecker	Dryocopus pileatus
Flicker	Colaptes auratus
Hairy Woodpecker	Picoides villosus
Downy Woodpecker	Picoides pubescens
Mourning Dove	Zenaida macroura

Table A-2 (continued)

REPTILES

Northern Water Snake	Nerodia sipedon
Milk Snake	Lampropeltis triangulum
Eastern Garter Snake	Thamnophis sirtalis
Eastern Ribbon Snake	Thamnophis sauritus
Black Rat Snake	Elaphe obsoleta
Snapping Turtle	Chelydra serpentina
Musk Turtle - Stinkpot	Sternotherus odoratus
Wood Turtle **	Clemmys insculpta
Painted Turtle	Chrysemys picta
Spotted Turtle	Clemmys guttata

AMPHIBIANS

Bullfrog	Rana catesbeiana
Northern Leopard Frog	Rana pipiens
Green Frog	Rana clamitans
Tree Frog	Hyla spp.
Peepers	Hyla crucifer
American Toad	Bufo americanus
Eastern Spadefoot Toad **	Scaphiopus holbrooki
Eastern Newt	Notophthalmus viridescens
Spotted Salamander	Ambystoma maculatum

* Occasional Visitor
** Population status unknown
(1) Burt and Grossenheider, 1952
(2) of special concern in New Hampshire
(3) American Ornithological Union, 1973
(4) endangered in New Hampshire
(5) threatened in New Hampshire

APPENDIX B

EXEMPLARY NATURAL COMMUNITIES
AND
NATURAL COMMUNITIES OF LOCAL SIGNIFICANCE

Table B-1

List of community types and observation points discussed in the text.

COMMUNITY TYPE	OBSERVATION POINT
Exemplary (state significant) natural communities *	
Floodplain forest	10-12, 26, 27, 32-36, 38, 39, 41, 42, 44
Floating-leaved aquatic and deep emergent marsh communities	1
Greenough Pond acidic fen	2, 5
Dwarf shrub bog	8
Natural communities of local significance **	
Cook Brook wetland complex	
Emergent marsh	21
Emergent/graminoid marsh	23
Acidic fen	22
Red maple swamp	24
Forests bordering Little Hill Road	18, 19
Vernal pool	14, 15, 39
Dry sandy field	46
Couchtown Road acidic streamside shrub thicket	13
Riverbank vegetation (high-energy riverbank community)	37, 43 (Found along entire river between floodplain and river)
Sugar maple-beech-yellow birch forest community (northern hardwood forest)	15, 19

* See Figure B-1 for locations. Numbered circles denote compartments.

** See Figures B-2a through B-2c for locations. Numbered circles denote compartments.

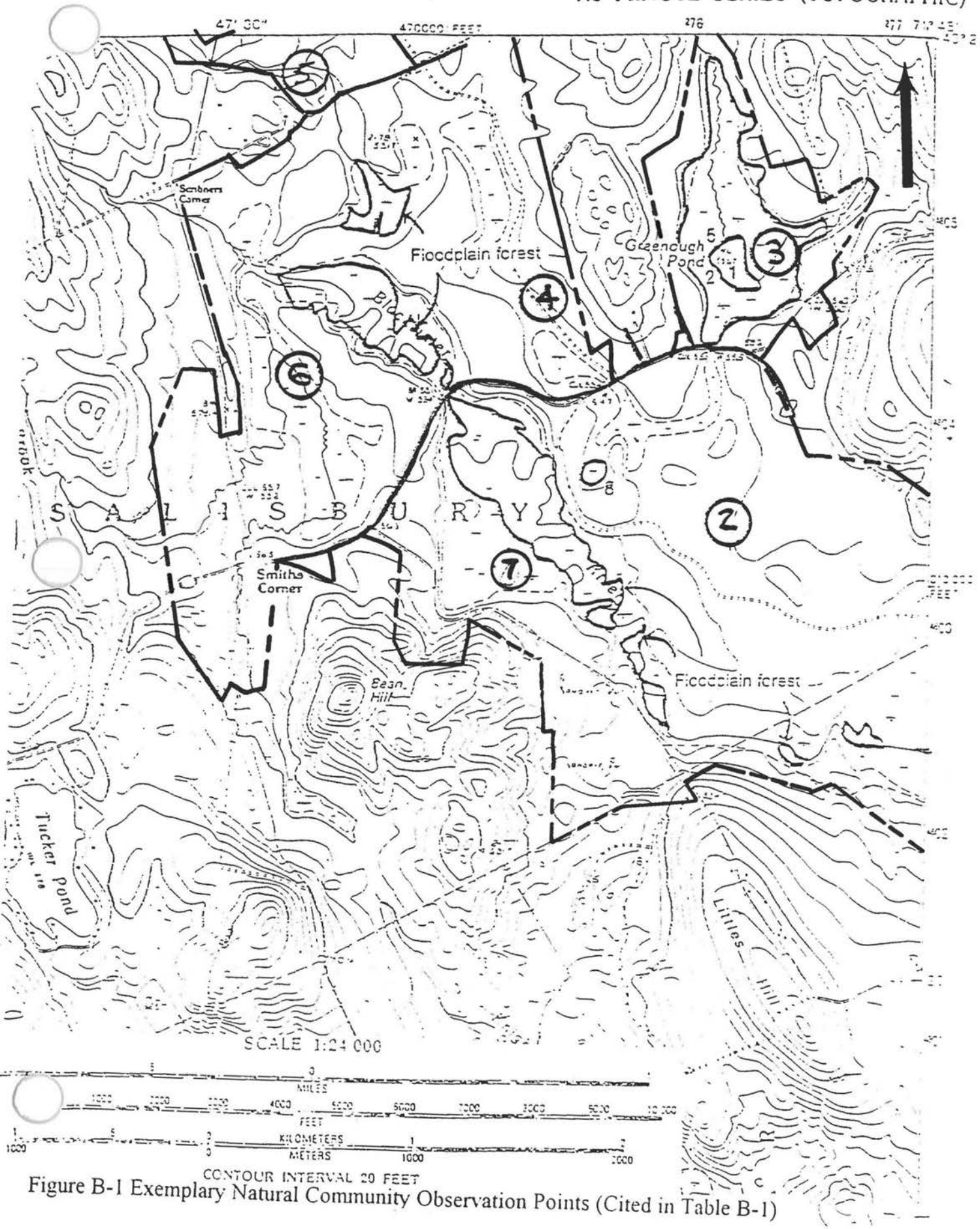


Figure B-1 Exemplary Natural Community Observation Points (Cited in Table B-1)

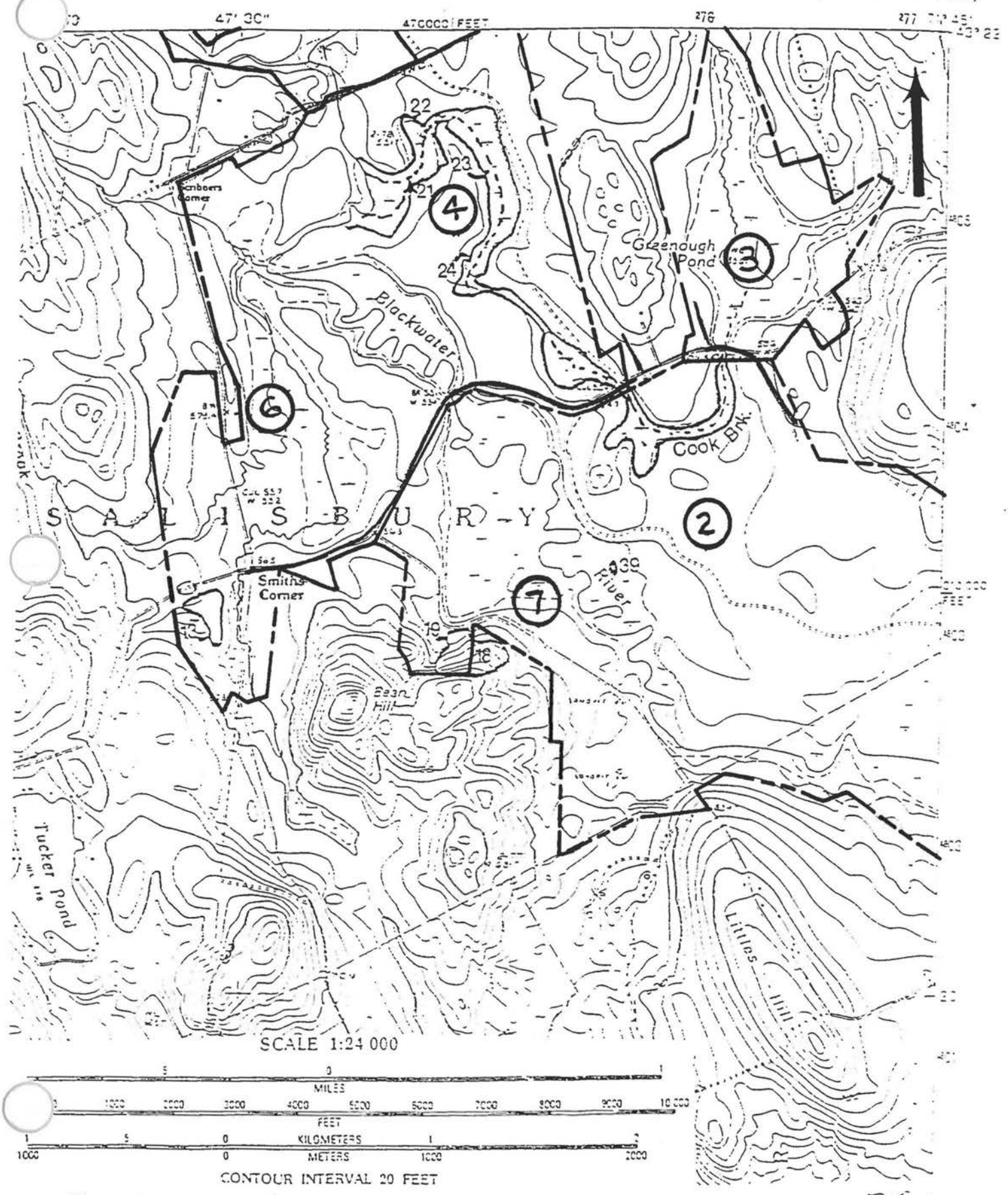


Figure B-2a Communities of Local Significance Observation Points (Cited in Table B-1)

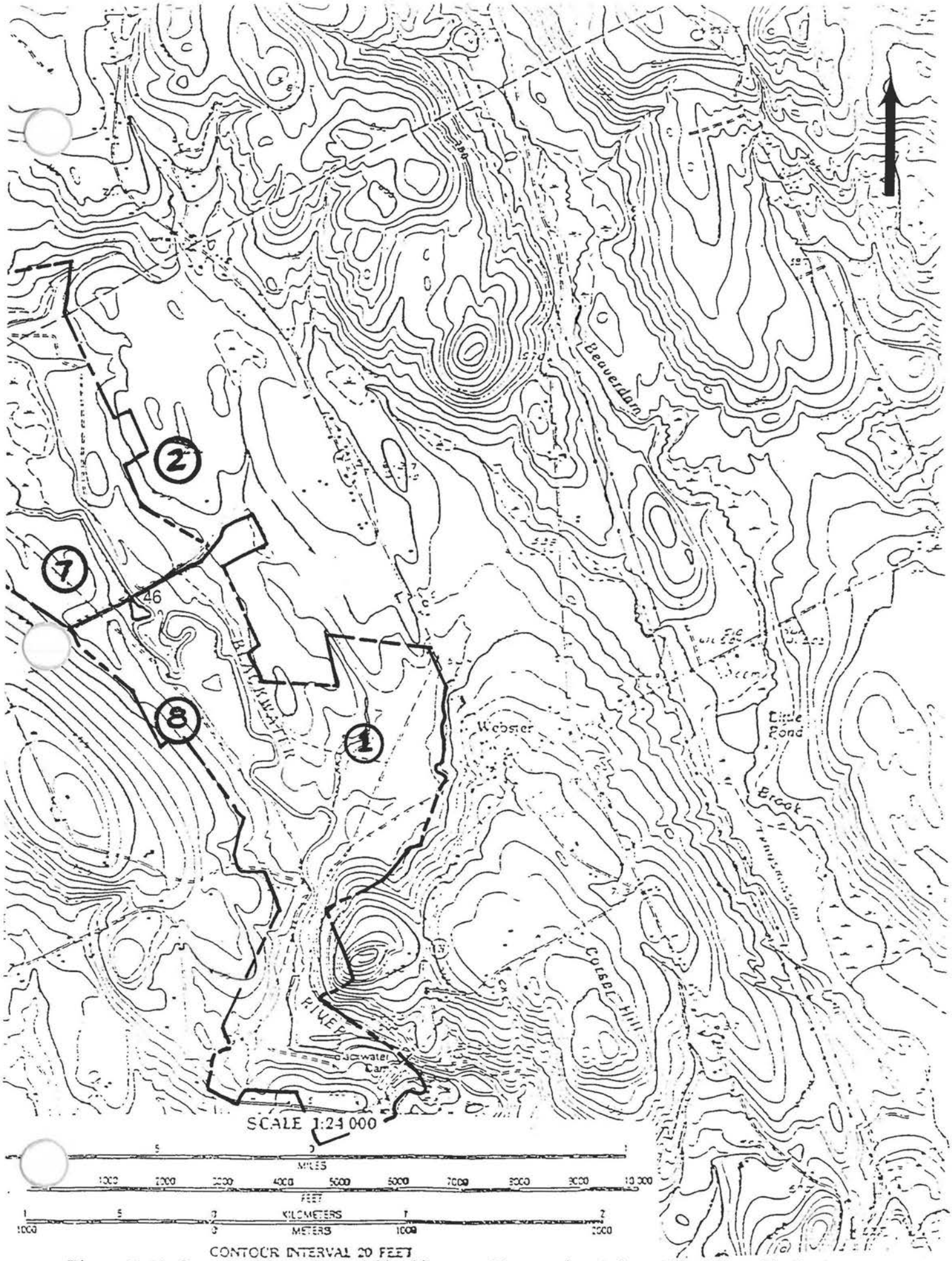


Figure B-2b Communities of Local Significance Observation Points (Cited in Table B-1)

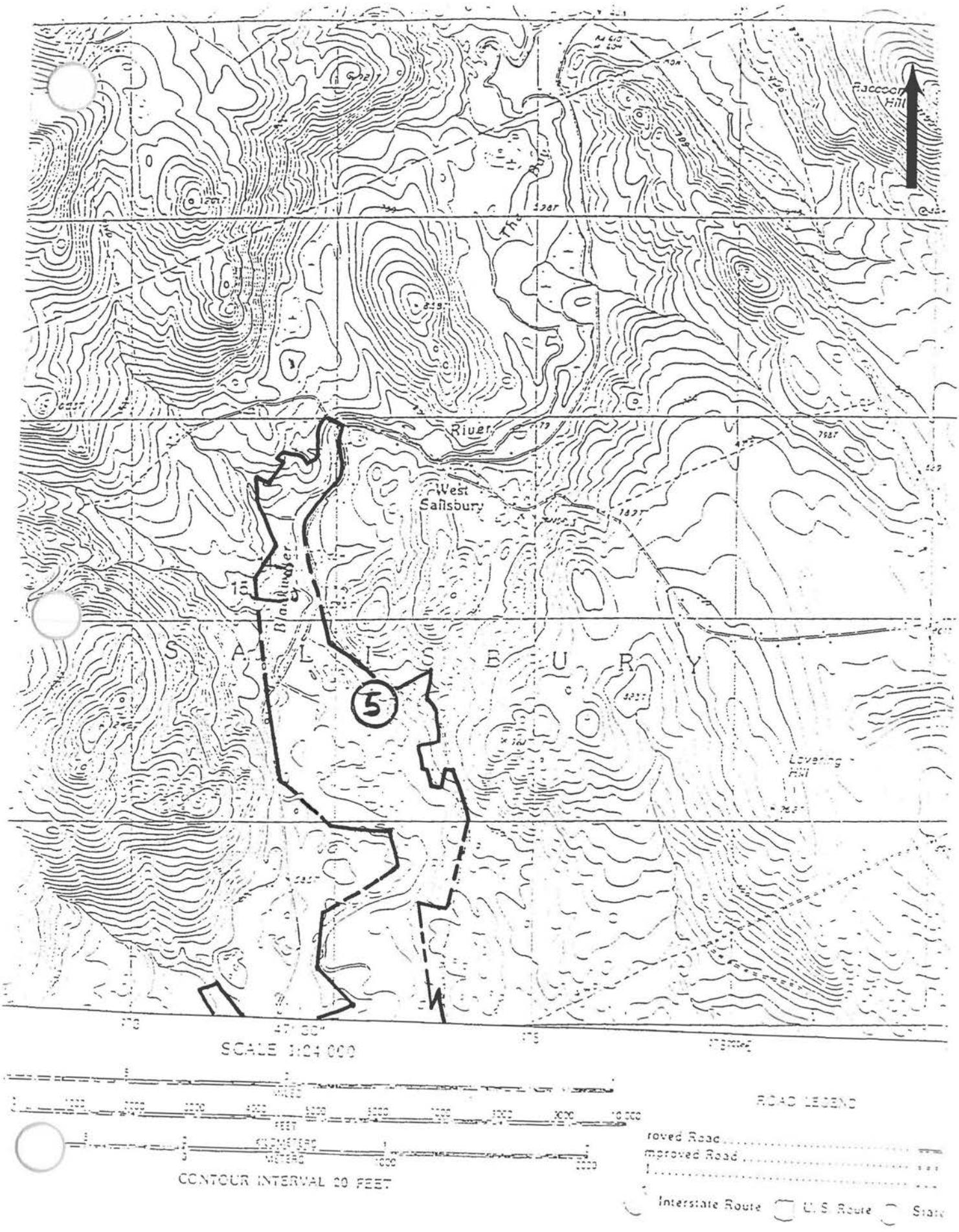


Figure B-2c Communities of Local Significance Observation Points (Cited in Table B-1)

APPENDIX C

WETLANDS SURVEY FOR THE BLACKWATER DAM FLOOD CONTROL FACILITIES

FINAL

WETLAND SURVEY FOR THE BLACKWATER DAM FLOOD CONTROL FACILITIES

Submitted to

Department of the Army
U.S. Army Corps of Engineers
New England Division

Contract No. DACW33-96-0005
Delivery Order No. 3

February 4, 1997

Prepared by

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101 ACCORD PARK DRIVE
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Under Contract to

BATTELLE OCEAN SCIENCES
397 Washington Street
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(617) 934-0571

Wetland Description

I. Introduction

The Blackwater Dam Project area is an area of 3,580 acres surrounding the Blackwater River. The project area has fairly even and gentle terrain that has generally formed in glacial till with some areas of glacial outwash. As a result of the gentle terrain, the river has a meandering channel pattern. Wetlands are found in large oxbow areas near the river and there are sizable areas of wetlands associated with ponds and streams that drain into the River. Because of the gentle topography of the area, the wetland classes and vegetation within the wetlands are tolerant of long term inundation and low energy hydrology. These wetlands tend to have low nutrient levels which is illustrated by the presence of sphagnum bogs.

II. Wetland Delineation Methodology

The wetlands determination for Blackwater Dam was conducted through interpretation of aerial photography and follow-up onsite field inspections (groundtruthing) of wetlands locations in order to confirm boundaries, determine areal extent and confirm classification.

The offsite wetlands determination was conducted primarily through interpretation of stereo-paired black and white aerial photographic 9 inch x 9 inch contact prints. Wetlands and deepwater habitats were located based on identifying observable, characteristic photographic signatures evidenced by color (gray-scale), texture, landscape position, vegetation and relative depth of field. Wetlands and other waters were then identified and delineated onto the acetate overlays. Wetlands were individually demarcated and classified based on the *Classification of Wetlands and Deepwater Habitats* (Cowardin et al., 1979) system, including applying the ACOE-NED modifiers specific to this assessment. In instances where cover types were obscured, or where determination of hydrologic regime (upland vs. wetland) was difficult (e.g. palustrine forested wetlands), a note was made to conduct a field inspection.

Once draft wetland maps (on acetate overlays) were completed, areas identified as wetlands were groundtruthed. Groundtruthing afforded the opportunity to refine wetlands boundaries, classify wetlands cover types, identify dominant plant species and confirm hydrologic regime. Acetate overlays were used during field groundtruthing efforts and were modified where necessary based on the field inspections.

Wetland areas were transfered to a photomosaic mylar of the entire project area. In addition, ACOE Project Boundaries and some geographic features (i.e. roads, towns, etc.) were added to aid users in locating individual wetland areas. Once all inking was completed, the mylar basemap was appropriately sized, and cut for mounting on an 11 inch x 17 inch template and individual wetland locations were labelled in accordance with the classification scheme. Acreage was

calculated for each wetland area and tabulated by cover type (see Table 1).

III. Plant Species by Wetland Class

Described below are the wetland classes that were identified within the project area. Included with the classes is a description of the vegetational communities and a list of plant species that were identified in the wetland class.

Wetland Class-POW Palustrine Open Water

The Palustrine Open Water classification is used for areas of standing water smaller than 20 acres. Palustrine Open Water bodies contain no identifiable surface vegetation (such as coontails, water lilies, cattails or grasses) because of the lack of sunlight or unsuitable soil substrate biochemistry. These areas are generally fed by intermittent or perennial streams. Approximately 25.2 acres of Palustrine Open Water areas were identified.

Wetland Class-PAB1 Palustrine Aquatic Bed Vegetation-Rooted Vascular

Palustrine Aquatic Bed Vegetation-Rooted Vascular is found in areas of permanent ponding where the water depth varies from 1.5 to 6.0 feet. In this water regime there is enough sunlight to allow plant growth. Plant species root in the substrate and produce leaves and flowers at or near the surface of the water. Approximately 2.7 acres of this wetland type were identified in the project area.

Plant species that were identified in this class are as follows:

Nuphar variegatum	yellow pond lily
Elodea canadensis	waterweed
Najas guadalupensis	bushy pondweed
Polygonum amphibium	water smartweed
Brasenia schreberi	water shield

Wetland Class-PEM1 Palustrine Emergent Vegetation-Persistent

Palustrine Emergent Vegetation-Persistent is found in areas of permanent and seasonal inundation where the water depth generally does not exceed 1.5 feet. This water regime is favorable for plant species that prefer or are adaptable to root growth in permanently saturated or inundated soils. There are generally two types of wetlands in this class, marshes and wet meadows. Marshes are generally wetter than wet meadows and are typically associated with borders of

shallow ponds. Typical vegetation within a marsh includes cattails, arrowheads and smartweed. Wet meadows tend to be dominated by wildflowers such as joe-pye weed and a wide variety of grasses and grass-likes. Approximately 84.3 acres of this wetland type were identified in the Blackwater Dam project area. Within the project area, a large area of Palustrine Emergent Vegetation-Persistent is located west of Greenough's Pond and a large area of wet meadow dominated by blue joint grass is located to the west-northwest of Greenough's Pond.

Plant species that were identified in this class are as follows:

Typha latifolia	cattail
Onoclea regalis	royal fern
Onoclea sensibilis	sensitive fern
Iris versicolor	blue flag iris
Scirpus cyperinus	woolgrass
Scirpus atrovirens	dark green bulrush
Cyperinus strigosus	umbrella sedge
Sparganium spp.	burreed
Carex crinita	fringed sedge
Carex stricta	tussock sedge
Carex scoparia	pointed broom sedge
Carex vulpinoidea	fox sedge
Carex stipata	sedge
Carex intumescens	bladder sedge
Carex lurida	shallow sedge
Eleocharis spp.	spike rush
Calamagrostis canadensis	blue joint grass
Poa palustris	fowl meadow grass
Leerzia oryzoides	rice cut grass
Glyceria canadensis	rattlesnake grass
Juncus effusus	soft rush
Juncus canadensis	Canada rush
Polygonum spp.	smartweed
Sagittaria latifolia	broad leaf arrow-head
Eupatorium perfoliatum	boneset
Eupatoriadelphus maculatus	joe-pye-weed
Impatiens capensis	jewelweed
Cladium mariscoides	twig rush
Hypericum virginicum	marsh St. John's-wort
Lycopus virginicus	bugleweed

Wetland Class-PM Sphagnum Bog Vegetation

Sphagnum Bogs are found in areas of permanent inundation where there is little nutrient exchange. These areas tend to be found in isolated pockets that have no surface water flow. Because of the lack of nutrient flushing, low pH levels are found in bogs. Low pH levels are a result of the containment of natural acids. Sphagnum moss generally is the dominant plant species in bogs, but there are a number of other plant species which can tolerate the low nutrient levels and low pH. Approximately 19.3 acres of Sphagnum Bog vegetation were identified. Two bogs are found approximately 3,500 ft to the west southwest of Greenough's Pond.

Plant species that were identified in this class are as follows:

Sphagnum spp.	sphagnum moss
Chamaedaphne calyculata	leather-leaf
Kalmia polifolia	bog laurel
Eriophorum virginicum	bog cotton
Myrica gale	sweet gale
Vaccinium corymbosum	high bush blueberry
Thelypteris thelypteroides	marsh fern
Onoclea sensibilis	sensitive fern

Wetland Class-PSS1 Palustrine Broad-Leaved Deciduous Shrub Swamp Vegetation

Palustrine Broad-Leaved Deciduous Shrub Swamp vegetation is found in areas of temporary inundation. Deciduous shrub swamp vegetational communities can have a wide variety of plant species. In the areas of hydrologic energy near the shores of the rivers and around the islands in the rivers, shrub swamp communities are found which are composed of alders and viburnums. In the deeper sections of the rivers, oxbows shrub swamp communities are composed of silky dogwood, northern arrow-wood and spicebush. Approximately 276.7 acres of Palustrine Broad-Leaved Deciduous Shrub Swamp vegetation were identified in the Blackwater Dam project area.

Plant species that were identified in this class are as follows:

Alnus spp.	alder
Ilex verticillata	wintergreen
Viburnum dentatum	northern arrow-wood
Viburnum cassinoides	withe-rod
Cornus amomum	silky dogwood
Vaccinum corymbosum	high bush blueberry
Lindera benzion	spicebush
Nemopanthus mucronata	mountain holly
Salix spp.	willow

Onoclea regalis	royal fern
Onoclea sensibilis	sensitive fern
Thelypteris thelypteroides	marsh fern
Sphagnum spp.	sphagnum moss
Spirea latifolia	meadowsweet
Acer rubrum	red maple
Pteretis pensylvanica	ostrich fern

Wetland Class-PSS3 Palustrine Broad-Leaved Evergreen Shrub Swamp Vegetation

Palustrine Broad-Leaved Evergreen Shrub Swamp vegetation is found in areas of seasonal inundation and permanent saturation. This community is generally found in areas where there is a significant amount of sphagnum moss and a variety of evergreen shrubs grow over the sphagnum moss mat. Approximately 23.0 acres of Palustrine Broad-Leaved Evergreen Shrub Swamp vegetation were identified in the Blackwater Dam project area. A large area of evergreen shrub swamp is located in an oxbow area on the east side of the River to the south of Peter's Bridge.

Plant species that were identified in this class are as follows:

Chamaedaphne calyculata	leather-leaf
Kalmia polifolia	bog laurel
Myrica gale	sweet gale
Ledium groenlandicum	labrador tea
Andromeda glaucophylla	bog rosemary
Onoclea sensibilis	sensitive fern
Sphagnum spp.	sphagnum moss

Wetland Class-PFO1 Palustrine Broad-Leaved Deciduous Forested Swamp Vegetation

Palustrine Broad-Leaved Deciduous Forested Swamps are found in areas of seasonal inundation or saturation. The overstory is generally dominated by red maple trees with an understory of high bush blueberry, winterberry or viburnum shrubs. Approximately 535.6 acres of Palustrine Broad-Leaved Deciduous Forested Swamp vegetation were identified in the Blackwater Dam project. Large sections of red maple swamps are found adjacent to logging roads to the west of Webster.

Plant species that were identified in this class are as follows:

Acer rubrum	red maple
Rhamnus frangula	European buckthorn
Populus tremula	trembling aspen
Populus deltoides	eastern cottonwood

Ulmus americana	American elm
Ilex verticillata	wintergreen
Viburnum dentatum	northern arrow-wood
Viburnum cassinoides	withe-rod
Cornus amomum	silky dogwood
Vaccinum corymbosum	high bush blueberry
Lindera benzion	spicebush
Onoclea regalis	royal fern
Onoclea sensibilis	sensitive fern
Thelypteris thelypteroides	marsh fern
Osmunda cinnamomea	cinnamon fern
Parthenocissus quinquefolia	Virginia creeper
Impatiens capensis	jewelweed
Boehmeria cylindrica	false nettle
Galium tinctorum	bedstraw
Rubus hispidus	swamp dewberry
Toxicodendron radicans	poison ivy
Aster divaricatus	white wood aster
Thalictrum polygamum	meadow rue

Wetland Class-PFO4 Palustrine Needle-Leaved Evergreen Forested Swamp Vegetation

Palustrine Needle-Leaved Evergreen Forested Swamps are found in areas of seasonal inundation or saturation. The plant communities are generally composed of white pine, hemlock or balsam fir trees that provide a dense overstory. The understory vegetation tends to be thin and is comprised of various species of ferns, dewberry and goldthread. Approximately 107.0 acres of Palustrine Needle-Leaved Evergreen Forested Swamp vegetation were identified in the Blackwater Dam project area. A large area of hemlock and balsam fir swamp is located adjacent to logging roads to the west of Webster (near the red maple swamps mentioned above) in the Blackwater Dam project.

Plant species that were identified in this class are as follows:

Pinus strobus	white pine
Tsuga candensis	eastern hemlock
Abies balsamea	balsam fir
Boehmeria cylindrica	false nettle
Impatiens capensis	jewelweed
Parthenocissus quinquefolia	Virginia creeper
Coptis trifolia	goldthread
Sphagnum spp.	sphagnum moss
Thelypteris thelypteroides	marsh fern

Vaccinium corymbosum	high bush blueberry
Rubus hispidus	dewberry

Wetland Class-R Riverine-Open Water Contained in a Channel

The Riverine classification is used for areas of flowing water within a confined channel. This classification is for Riverine areas where there is no surface vegetation and includes rivers and perennial and intermittent streams. The area of Riverine wetlands was calculated where the widths of the water bodies are measurable. For smaller rivers and perennial and intermittent streams the lengths of the waterbodies were calculated. Approximately 150.0 acres of Riverine wetlands and approximately 2.7 miles of smaller rivers and streams were found in the Blackwater Dam project area.

Wetland Class-VP? Potential Vernal Pool

Vernal Pools are generally low areas that contain water for only part of the year or may contain water throughout the year, but do not support a fish population. Vernal pools are an important wetland resource because the pools serve as breeding habitat for a number of amphibian macro-invertebrate species including spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opacum*), red-spotted newt (*Notophthalmus viridescens*) wood frog (*Rana sylvatica*) and fairy shrimp (Order Anostraca). Vernal pools provide a safer breeding ground than permanent waters because there are no fish to prey on the eggs and larvae.

Identification of vernal pools is generally based on whether certain amphibian or macro-invertebrate species are present. Vernal pool identification must be timed such that the amphibians are in the breeding, egg or larval stage and that the macro-invertebrates are in the larval or adult stage.

For the purpose of this study, potential vernal pools were located. Low areas containing water were identified as potential vernal pools if it appeared that the pools would hold water for a period of time (two months) and were isolated from a hydrologic system that may contain fish. No work was conducted to identify if a potential vernal pool actually supported vernal pool wildlife. Four potential vernal pools were found in the Blackwater Dam project area.

IV. Conclusion

The Blackwater Dam is a flood control project located on the Blackwater River. The project area of 3,850 acres contains approximately 1,223.8 acres of wetland resource areas (please refer to Table 1.). There are a number of wetland types varying from red maple swamps to sphagnum bogs. The wetlands are located in the oxbow areas around the Blackwater River with a significant amount of wetlands associated with streams that are tributary to the River.

Wetland Classification	Area in Acres
POW Palustrine Open Water	25.2
PAB1 Palustrine Aquatic Bed	2.7
PEM1 Palustrine Emergent	84.3
PM Sphagnum Bog	19.3
PSS1 Palustrine Broad Leaved Deciduous Shrub Swamp	276.7
PSS3 Palustrine Broad Leaved Evergreen Shrub Swamp	23.0
PFO1 Palustrine Broad Leaved Deciduous Forested Swamp	535.6
PFO4 Palustrine Needle Leaved Evergreen Forested Swamp	107.0
R Riverine Area	150.0
VP? Number of Identified Potential Vernal Pools	4
Total Stream Length (miles)	2.7
Total Area of Wetland Resources	1,223.8

Table 1.
Areas of Wetlands by Classes

Table C-1
Wetland Classification System for
Corps of Engineers Flood Control Facilities

Palustrine System

POW - water body less than 20 acres
PAB1 - aquatic bed vegetation in palustrine system - rooted vascular (i.e. water-lily, water-shield, etc.)
PAB2 - aquatic bed vegetation in palustrine system - floating vascular (i.e. coontail, Duckweed, etc.)
PEM1 - emergent vegetation in palustrine system - persistent (i.e. cattail, carex, etc.)
PEM2 - emergent vegetation in palustrine system - nonpersistent (i.e. pickerelweed, arrowhead, etc.)
PM - moss wetland - sphagnum
PSS1 - broad-leaved deciduous (i.e. alder, buttonbush)
PSS2 - needle-leaved deciduous (i.e. larch)
PSS3 - broad-leaved evergreen (i.e. Bog-laurel, labrador tea)
PSS4 - needle-leaved evergreen (i.e. black spruce)
PFO1 - broad-leaved deciduous (i.e. red maple)
PFO2 - needle-leaved deciduous (i.e. larch)
PFO4 - needle-leaved evergreen (i.e. Atlantic white cedar)

Riverine System

R - open water contained within a channel
RAB1 - aquatic bed vegetation in riverine system - rooted vascular (i.e. water-lily, water-shield, etc.)
RAB2 - aquatic bed vegetation in riverine system - floating vascular (i.e. coontail, duckweed, etc.)
REM1 - emergent vegetation in riverine system - persistent (i.e. cattail, carex, etc.)
REM2 - emergent vegetation in riverine system - nonpersistent (i.e. pickerelweed, arrowhead, etc.)

Lacustrine System

L - water body over 20 acres in size
LAB1 - aquatic bed vegetation in lake water - rooted vascular (i.e. water-lily, water-shield, etc.)
LAB2 - aquatic bed vegetation in lake water - floating vascular (coontail, duckweed, etc.)
LEM1 - emergent vegetation in lake water - persistent (i.e. cattail, carex, etc.)
LEM2 - emergent vegetation in lake water - nonpersistent (i.e. pickerelweed, arrowhead, etc.)

Table C-1 (continued)

Wetland Classification System for
Corps of Engineers Flood Control Facilities

Non-wetland

U - upland

Modifiers

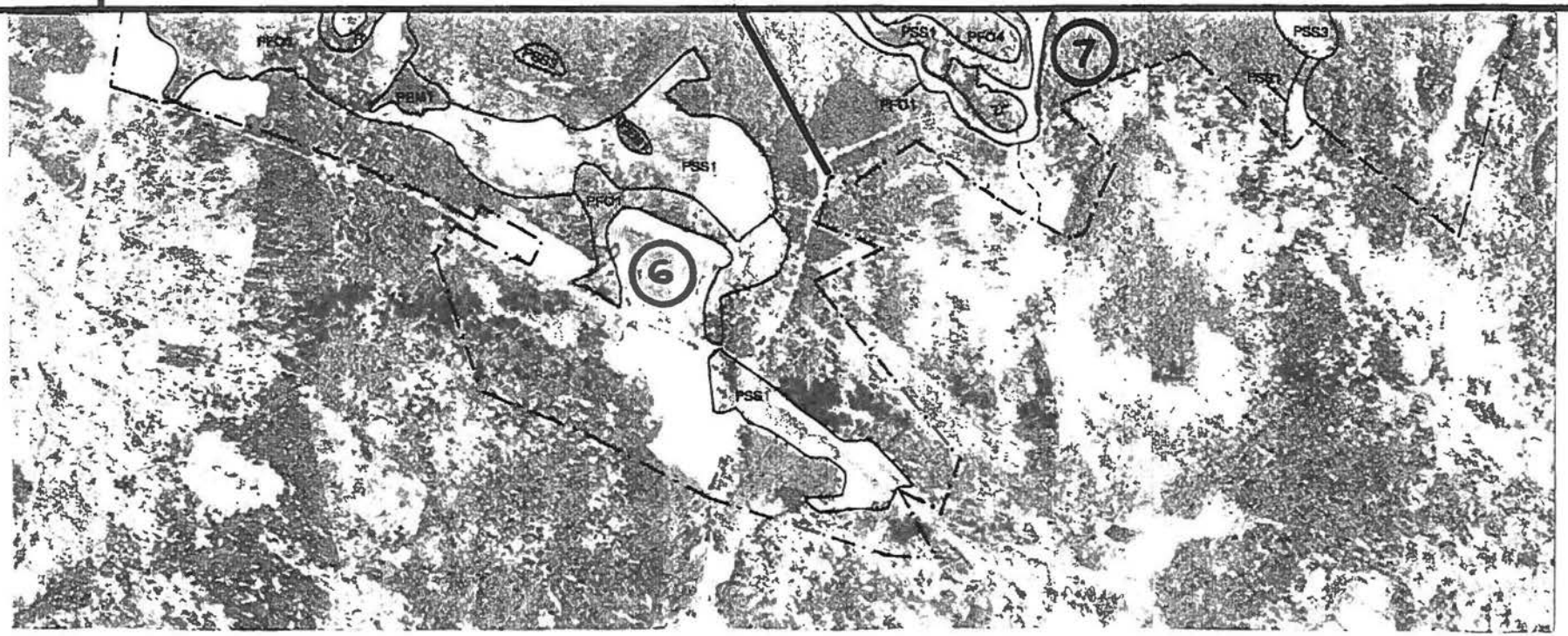
* - area dominated by sphagnum (common associates include cotton-grass, pitcher-plants, sundew, cranberry leather-leaf, labrador tea, etc.)
^ - marsh or area characterized by emergent vegetation which is semipermanently flooded
+ - wet meadow or area characterized by narrow-leaved persistent emergent vegetation which is seasonally flooded
o - standing, mostly dead deciduous/evergreen forest

----- intermittent stream

VP? possible vernal pool

A

MATCH LINE



WETLAND MAP
Merrimack River Basin
BLACKWATER DAM

ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS

N

Scale **1: 18,000**

LEGEND

PALUSTRINE SYSTEM

POW Open Water, Less Than 20 Acres (25.2 Acres)
PAB1 Aquatic Bed Vegetation, Rooted Vascular (2.7 Acres)
PEM1 Emergent Vegetation, Persistent (84.3 Acres)
PM Sphagnum Bog (19.3 Acres)
PSS1 Shrub/Scrub Broad-Leaved Deciduous (276.7 Acres)
PSS3 Shrub/Scrub Broad-Leaved Evergreen (23.0 Acres)
PFO1 Forested Broad-Leaved Deciduous (535.6 Acres)
PFO4 Forested Needle-Leaved Evergreen (107.0 Acres)

RIVERINE

R Open Water Contained Within Within a Channel (150.0 Acres)
---- Intermittent Streams (2.7 Miles)

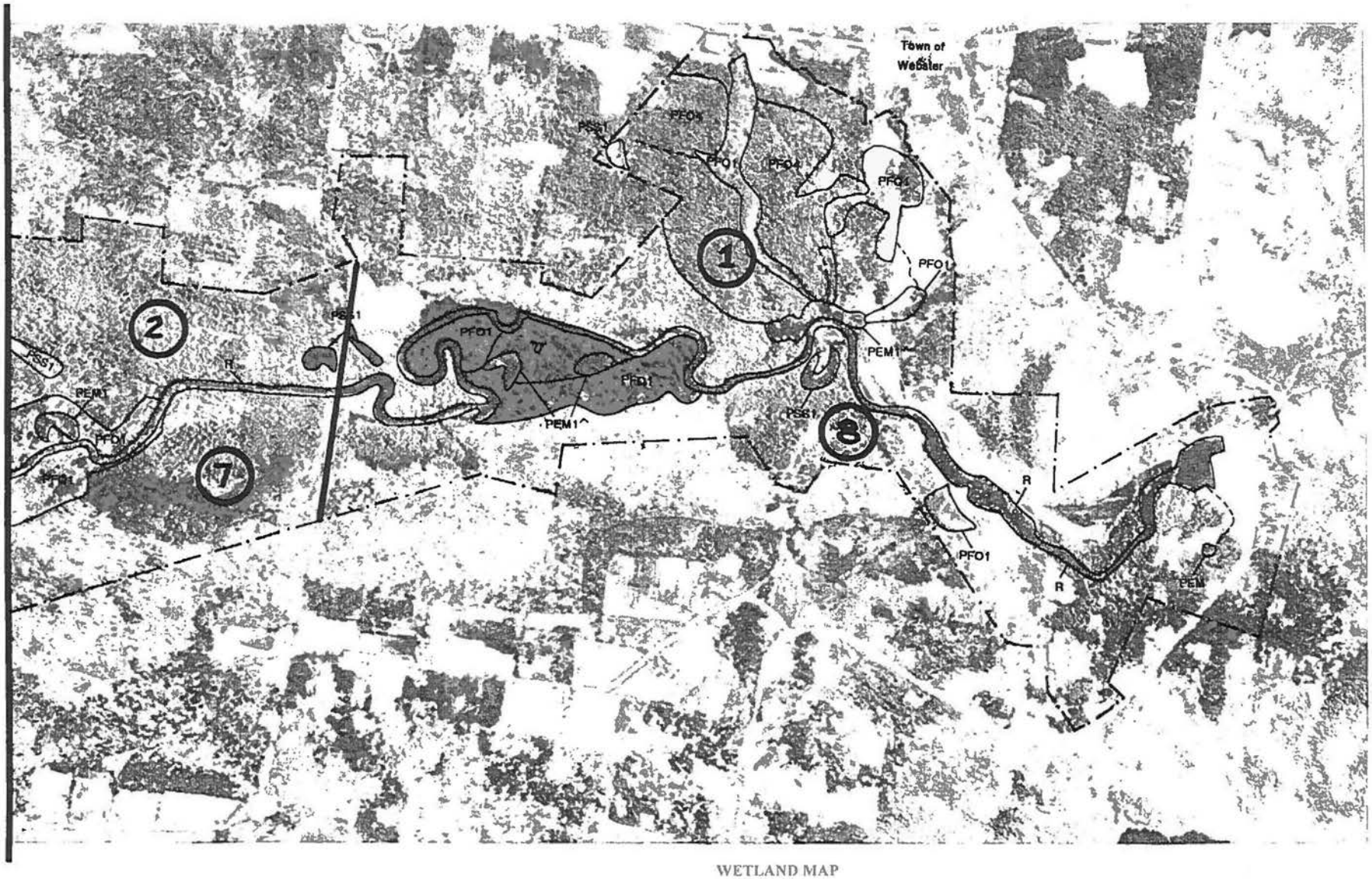
NON-WETLAND

U Upland
—·— Project Boundary

MODIFIERS

^ Marsh, Semipermanently flooded
+ Wet Meadow, Seasonally flooded
VP? Possible Vernal Pool
Compartment Limit
7 Compartment Designation

Figure C-1

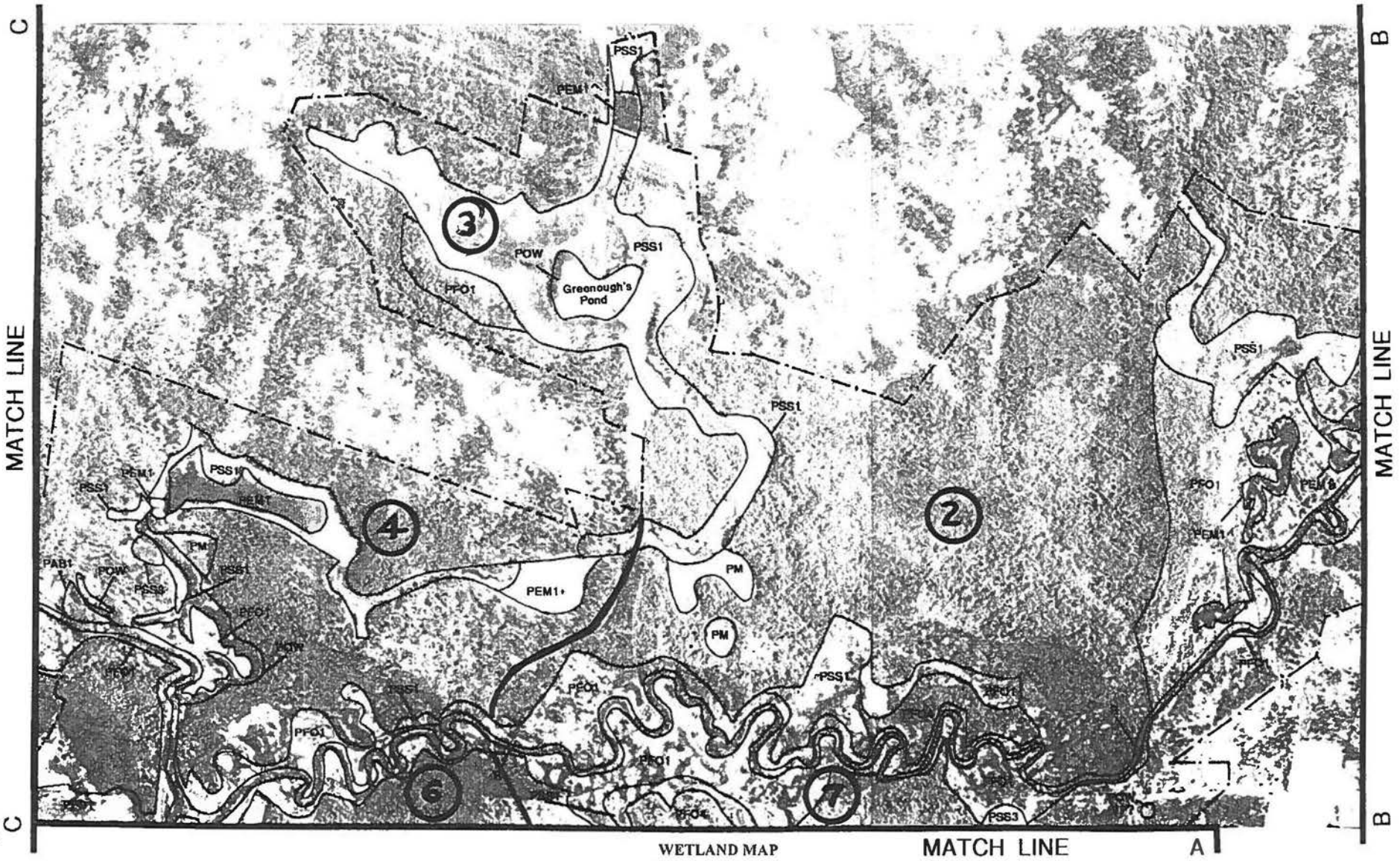


WETLAND MAP
Merrimack River Basin
BLACKWATER DAM

ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS

Scale **1: 18,000**

Figure C-2



WETLAND MAP
Merrimack River Basin
BLACKWATER DAM

ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS

Figure C-3

Scale **1: 18,000**

N

C
MATCH LINE
C
A
Page 4 of 4
WETLAND MAP
Merrimack River Basin
BLACKWATER DAM
ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS
N
Scale 1: 18,000
Waller's Bridge
PEMI
PSS1
PFO1
PSS
PFO

Figure C-4

APPENDIX D

SOIL CONDITIONS AT THE BLACKWATER PROJECT FOR RECREATIONAL DEVELOPMENT

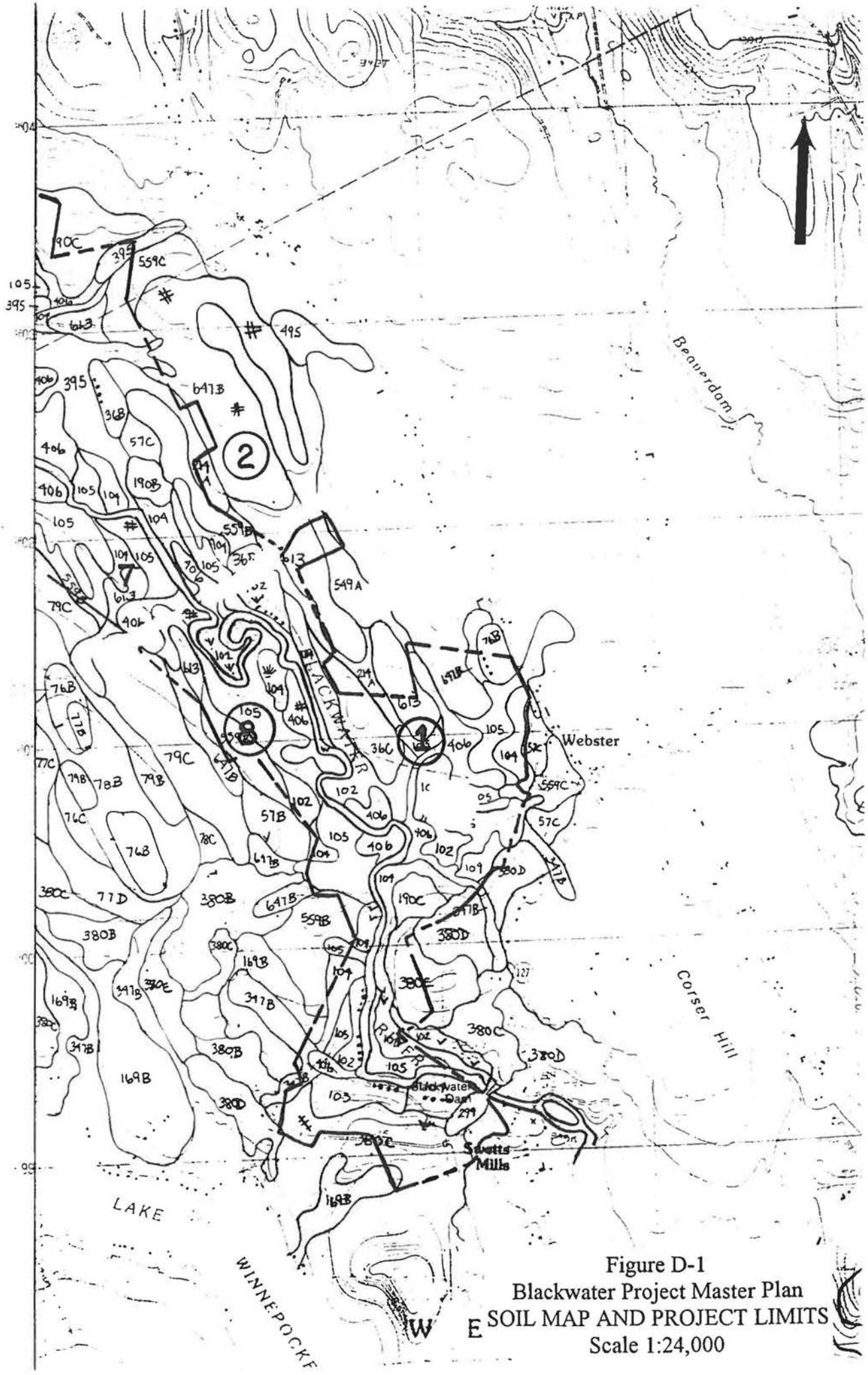


Figure D-1
Blackwater Project Master Plan
SOIL MAP AND PROJECT LIMITS
Scale 1:24,000

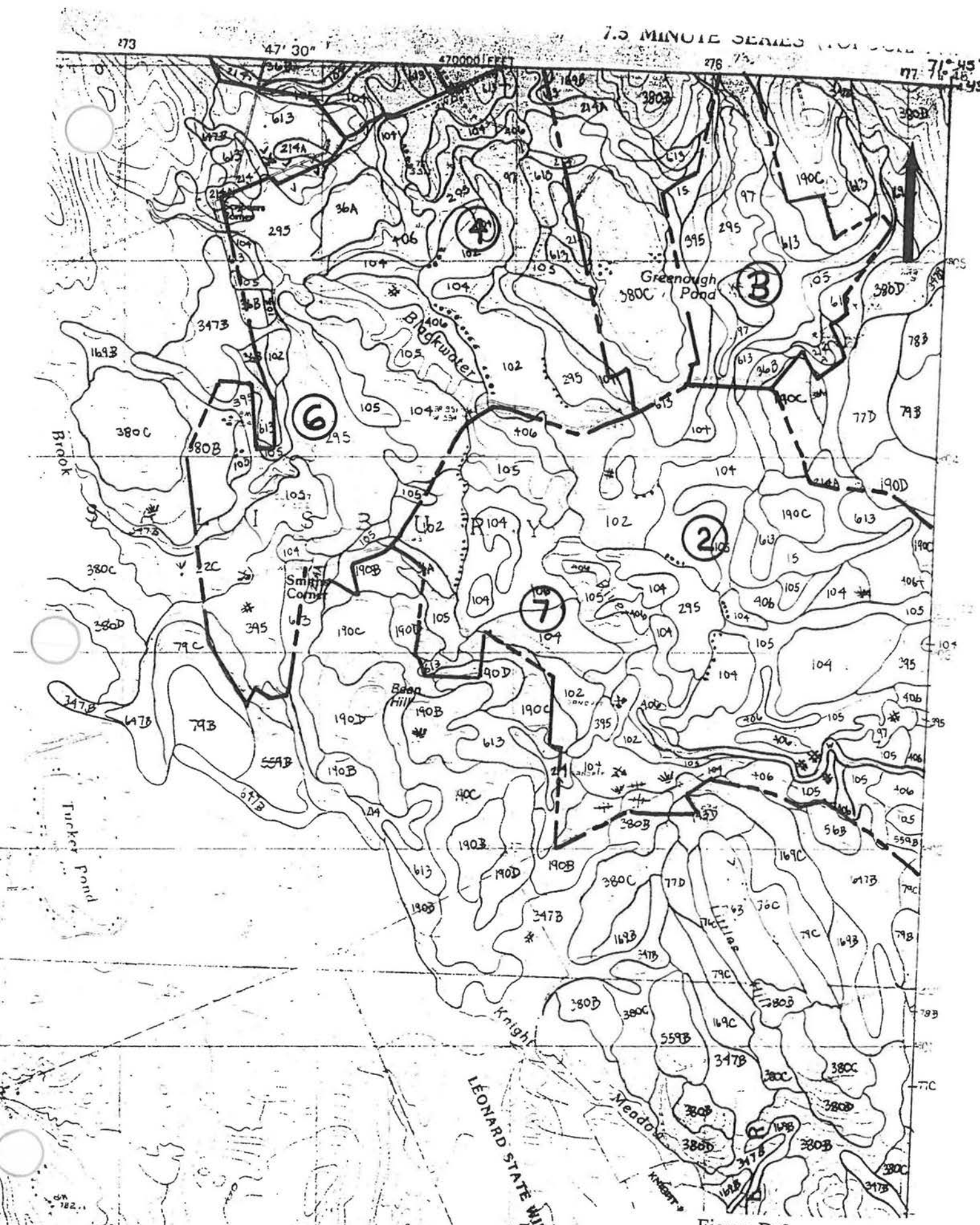


Figure D-2
Blackwater Project Master Plan
SOIL MAP AND PROJECT LIMITS
Scale 1:24,000

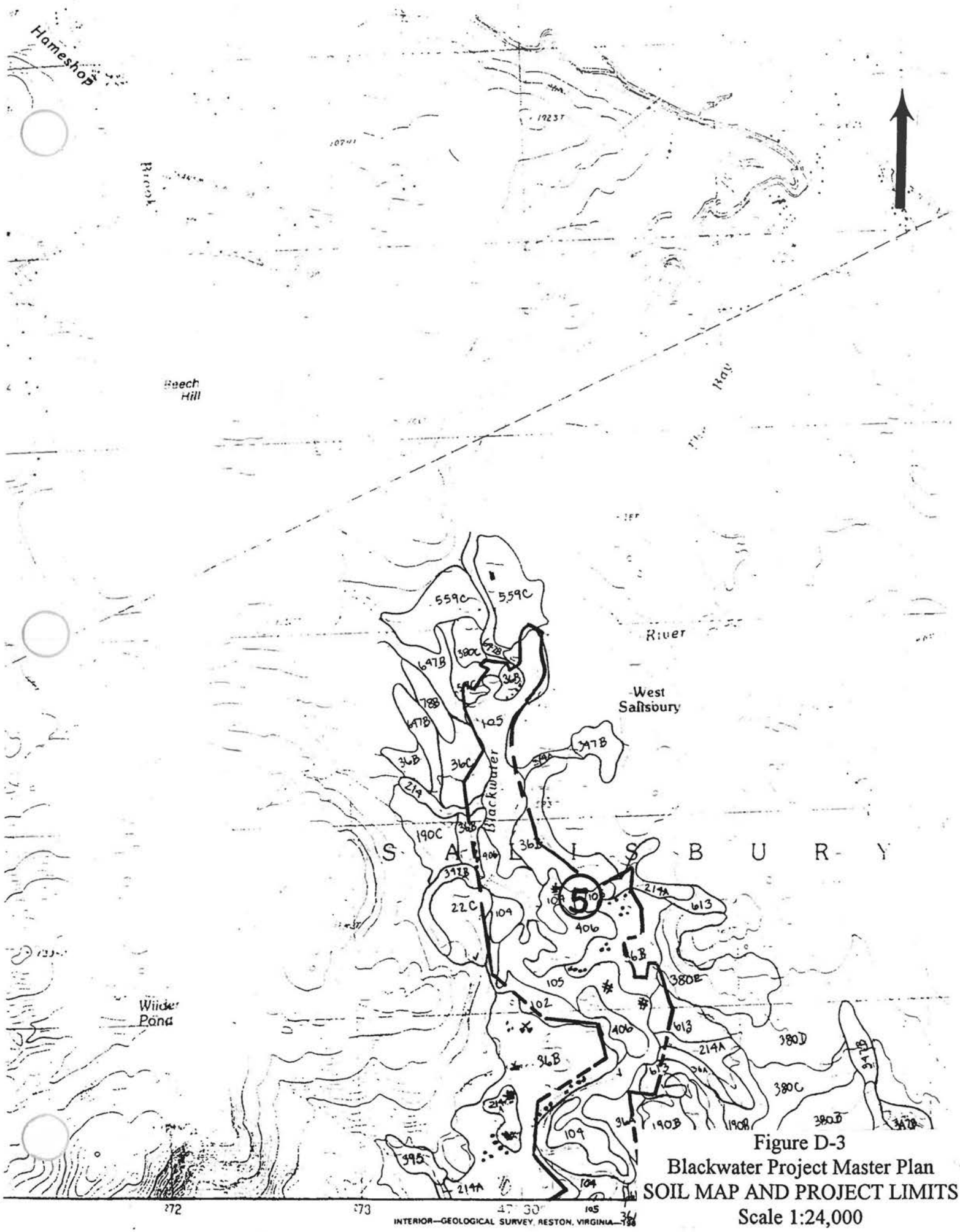


Figure D-3
Blackwater Project Master Plan
SOIL MAP AND PROJECT LIMITS
Scale 1:24,000

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

RECREATIONAL DEVELOPMENT
Blackwater

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
15:					
Searsport	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding	Severe: ponding, excess humus	Severe: ponding, droughty, excess humus
22A:					
Colton	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: small stones, droughty
22B:					
Colton	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: small stones, droughty
22C:					
Colton	Moderate: small stones, slope	Moderate: small stones, slope	Severe: slope, small stones	Slight	Severe: small stones, droughty
22E:					
Colton	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: small stones, droughty, slope
36A:					
Adams	Slight	Slight	Slight	Slight	Severe: droughty
36B:					
Adams	Slight	Slight	Moderate: slope	Slight	Severe: droughty
36C:					
Adams	Moderate: slope	Moderate: slope	Severe: slope	Slight	Severe: droughty

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
36E:					
Adams	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
55C:					
Hermon	Moderate: slope, large stones	Moderate: slope, large stones	Severe: large stones, slope, small stones	Moderate: large stones	Severe: droughty
57B:					
Becket	Moderate: percs slowly	Moderate: percs slowly	Moderate: large stones, slope	Slight	Moderate: large stones
57C:					
Becket	Moderate: slope, percs slowly	Moderate: slope, percs slowly	Severe: slope	Slight	Moderate: large stones, slope
57D:					
Becket	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
76B:					
Marlow	Moderate: percs slowly	Moderate: percs slowly	Moderate: slope, small stones	Slight	Slight
76C:					
Marlow	Moderate: slope, percs slowly	Moderate: slope, percs slowly	Severe: slope	Slight	Moderate: slope
77B:					
Marlow	Moderate: percs slowly	Moderate: percs slowly	Moderate: large stones, slope	Slight	Moderate: large stones
77C:					
Marlow	Moderate: slope, percs slowly	Moderate: slope, percs slowly	Severe: slope	Slight	Moderate: large stones, slope

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
77D:					
Marlow	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
77E:					
Marlow	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
788:					
Peru	Moderate: wetness, percs slowly	Moderate: wetness, percs slowly	Moderate: slope, small stones, wetness	Moderate: wetness	Moderate: wetness
798:					
Peru	Moderate: wetness, percs slowly	Moderate: wetness, percs slowly	Moderate: large stones, slope, wetness	Moderate: wetness	Moderate: large stones, wetness
79C:					
Peru	Moderate: slope, wetness, percs slowly	Moderate: slope, wetness, percs slowly	Severe: slope	Moderate: wetness	Severe: large stones, wetness, slope
97:					
Greenwood	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding	Severe: ponding, excess humus	Severe: ponding, excess humus
Ossipee	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding	Severe: ponding, excess humus	Severe: ponding, excess humus
101:					
Ondawa	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding
102:					
Sunday	Severe: flooding	Moderate: too sandy	Moderate: too sandy, flooding	Moderate: too sandy	Severe: droughty

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
104:					
Podunk	Severe: flooding	Moderate: flooding, wetness	Severe: flooding	Moderate: wetness, flooding	Severe: flooding
105:					
Runney	Severe: flooding, wetness	Severe: wetness	Severe: wetness, flooding	Severe: wetness	Severe: wetness, flooding
143C:					
Monadnock	Moderate: slope, large stones	Moderate: slope, large stones	Severe: slope, small stones	Slight	Moderate: large stones, slope
143D:					
Monadnock	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
169B:					
Sunapee	Moderate: large stones, wetness	Moderate: wetness, large stones	Severe: small stones	Moderate: wetness	Moderate: small stones, large stones, wetness
190C:					
Adams	Moderate: slope	Moderate: slope	Severe: slope	Slight	Severe: droughty
Lyman	Severe: depth to rock	Severe: depth to rock	Severe: large stones, slope, depth to rock	Slight	Severe: depth to rock
190D:					
Adams	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Lyman	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: large stones, slope, depth to rock	Severe: slope	Severe: slope, depth to rock

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
190B:					
Adams	Slight	Slight	Moderate: slope	Slight	Severe: droughty
Lyman	Severe: depth to rock	Severe: depth to rock	Severe: large stones, depth to rock	Slight	Severe: depth to rock
214A:					
Naumburg	Severe: wetness, too sandy	Severe: wetness, too sandy	Severe: too sandy, wetness	Severe: wetness, too sandy	Severe: wetness
295:					
Greenwood	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding	Severe: ponding, excess humus	Severe: ponding, excess humus
347A:					
Lyme	Severe: wetness	Severe: wetness	Severe: small stones, wetness	Severe: wetness	Severe: wetness
Moosilauke	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
347B:					
Lyme	Severe: wetness	Severe: wetness	Severe: small stones, wetness	Severe: wetness	Severe: wetness
Moosilauke	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
380C:					
Tunbridge	Moderate: slope, small stones	Moderate: slope, small stones	Severe: large stones, slope, small stones	Slight	Moderate: small stones, large stones, droughty
Lyman	Severe: depth to rock	Severe: depth to rock	Severe: large stones, slope, depth to rock	Slight	Severe: depth to rock

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
380C (con.):					
Becket	Moderate: slope, percs slowly	Moderate: slope, percs slowly	Severe: slope	Slight	Moderate: large stones, slope
380B:					
Tunbridge	Moderate: small stones	Moderate: small stones	Severe: large stones, small stones	Slight	Moderate: small stones, large stones, droughty
Lyman	Severe: depth to rock	Severe: depth to rock	Severe: large stones, depth to rock	Slight	Severe: depth to rock
Becket	Moderate: percs slowly	Moderate: percs slowly	Moderate: large stones, slope	Slight	Moderate: large stones
380D:					
Tunbridge	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Moderate: slope	Moderate: small stones, large stones, droughty
Lyman	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: large stones, slope, depth to rock	Moderate: slope	Severe: slope, depth to rock
Becket	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
380E:					
Tunbridge	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Moderate: small stones, large stones, droughty
Lyman	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: large stones, slope, depth to rock	Severe: slope	Severe: slope, depth to rock

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
380E (con.):					
Becket	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
395:					
Chocorua	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding	Severe: ponding, excess humus	Severe: ponding, excess humus
400:					
Udorthents, Sandy	Severe: too sandy	Severe: too sandy	Severe: small stones, too sandy	Severe: too sandy	Severe: droughty
406:					
Medomak	Severe: flooding, wetness	Severe: wetness	Severe: wetness, flooding	Severe: wetness	Severe: wetness, flooding
495:					
Ossipee	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding	Severe: ponding, excess humus	Severe: ponding, excess humus
549:					
Peacham	Severe: ponding, percs slowly	Severe: ponding, excess humus	Severe: large stones, excess humus, ponding	Severe: ponding, excess humus	Severe: large stones, ponding, excess humus
559A:					
Skerry	Moderate: large stones, wetness	Moderate: wetness, large stones	Moderate: large stones, wetness	Moderate: wetness	Moderate: large stones, wetness
559B:					
Skerry	Moderate: large stones, wetness	Moderate: wetness, large stones	Moderate: large stones, slope	Moderate: wetness	Moderate: large stones, wetness

RECREATIONAL DEVELOPMENT--Continued
Blackwater

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
559C:					
Skerry	Moderate: slope, large stones, wetness	Moderate: slope, wetness, large stones	Severe: slope	Moderate: wetness	Moderate: large stones, wetness, slope
613:					
Croghan	Moderate: wetness	Moderate: wetness	Moderate: slope, wetness	Moderate: wetness	Severe: droughty
647A:					
Pillsbury	Severe: wetness	Severe: wetness	Severe: small stones, wetness	Severe: wetness	Severe: wetness
647B:					
Pillsbury	Severe: wetness	Severe: wetness	Severe: small stones, wetness	Severe: wetness	Severe: wetness

RECREATIONAL DEVELOPMENT

Endnote -- RECREATIONAL DEVELOPMENT

The soils of the survey area are rated in this report according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In this report the degree of soil limitation is expressed as "Slight," "Moderate," or "Severe." "Slight" means that soil properties are generally favorable and that limitations are minor and easily overcome. "Moderate" means that limitations can be overcome or alleviated by planning, design, or special maintenance. "Severe" means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in this report can be supplemented by information available in other reports, for example, interpretations for septic tank absorption fields in the Sanitary Facilities report and interpretations for dwellings without basements and for local roads and streets in the Building Site Development report.

CAMP AREAS require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

PICNIC AREAS are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

PLAYGROUNDS require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or hardpan should be considered.

PATHS AND TRAILS for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, and not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

GOLF FAIRWAYS are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

APPENDIX E

PERTINENT CORRESPONDENCE

City of Concord, New Hampshire
ADMINISTRATION DEPARTMENT
CITY HALL • 41 GREEN STREET • 03301

DUNCAN R. BALLANTYNE
CITY MANAGER

November 12, 1996

Joseph L. Ignazio, Director of Planning
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254-9149

Dear Mr. Ignazio:

The City Manager is in receipt of your letter indicating that you are initiating studies to update the Master Plans at Franklin Falls Reservoir and Blackwater Reservoir.

Please be advised that your public notice has been posted and a copy of your communication and attached information has been forwarded to the Concord Conservation Commission and to the Central New Hampshire Regional Planning Commission. City Manager Ballantyne has suggested that I forward to you a copy of our staff listing to allow you to contact any of our Department Heads should you so desire.

Very truly yours,

Jean A. Tessier
Administrative Aide

j

attachment

cc: Conservation Commission
Central NH Regional Planning Commission

CITY OF CONCORD
DEPARTMENT HEADS

DEPARTMENT	NAME/ADDRESS	PHONE
ADMINISTRATION	Duncan R. Ballantyne, City Manager Frederick E. Enderle, Assistant City Manager	225-8570 225-8570
ASSESSING	Michael J. Ryan, Dir. of Real Estate Assessment	225-8550
CODE ENFORCEMENT	C. Hamilton Rice, Code Enforcement Admin.	225-8580
ECONOMIC DEVELOPMENT	Kenneth G. Lurvey, Economic Development Dir	225-8595
ENGINEERING	Richard K. Perkins, City Engineer	225-8520
FINANCE	James R. Howard, Finance Director	225-8560
FIRE	John M. Dionne, Fire Chief *(35 Green Street)*	225-8690
GENERAL SERVICES	John L. Forrestall, Director of General Services *(311 No. State Street)*	228-2737
LEGAL	Paul F. Cavanaugh, City Solicitor	225-8505
LIBRARY	Louis Ungarelli, Library Director *(45 Green Street)*	225-8670
PERSONNEL	Norman C. O'Neil, Personnel Director	225-8535
PLANNING	Randall P. Raymond, Planning Director	225-8515
POLICE	David G. Walchak, Chief of Police *(35 Green Street)*	225-5600
PURCHASING	Joseph C. Musumeci, Purchasing Director	225-8530
RECORDS	Elizabeth Campbell, City Clerk	225-8500
RECREATION	Carolyn Tracy, Recreation Superintendent *(White Park Administration Building)*	225-8690
WELFARE	Joan M. Callahan, Welfare Director *(37 Green Street)*	225-9575

NOTE: All departments are located in City Hall, 41 Green Street, except those which indicate otherwise (Fire, Library, Police, Welfare, Recreation, and General Services)

TOWN OF SALISBURY
9 Old Coach Road
PO Box 214
Salisbury, NH 03268
(603) 648-2473
FAX (603) 648-6658

Date: *November 12, 1996*

From: *Margaret A. Hurtubise*
Administrative Assistant

To: *Martin Curran*
Merrimack River Basin
2097 Maple Street
Contoocook, NH 03229

Per our phone conversation of today's date, enclosed please find an updated "Town" map for the town of Salisbury. I am also enclosing the map (with changes) which was included in the packet sent to the Selectmen by the *Department of the Army* concerning updating the existing Master Plans at the Franklin Falls and Blackwater Reservoirs. I hope this information is of help to you.

If you have any questions concerning the enclosed information, please feel free to contact me.

/miw

Enclosures

To: Charles L. Joyce
New England Division
US. Corps. of Engineers
424 Trapelo Road
Waltham, MA 02254-9149

January 23, 1997

Dear Mr. Joyce

The Salisbury Conservation Commission would like to offer its input to the proposed revision of the Blackwater Dam Master Plan update.

The flood control area is a natural wildlife area. The present trails, old roads, snowmobile trails, and access roads provide outlet for walkers hunters, snown machines, etc. It is an excellent mix of uses.

The river from Salisbury's Peters Bridge on the northwest side of Salisbury to Webster town line, has relatively gentle flow. We would like to recommend that the master plan update include a plan to add two designated canoe launch sites for access to the river.

The up stream launch site suggested would be on the west bank of the river just over Peters Bridge. Here there is a short dirt road on the southwest side that goes down to a hay field. The site is just before the hay field.

The second recommended access point in Salisbury, is off Little Hill Road. Presently there is a bar-gate where a flood control area dirt road leads off toward the river on the east side of the road. This site is within a couple of tenths of a mile of the Webster town line. The river bank at this site is somewhat steep, but shouldn't pose a problem for canoe carry and launch.

Periodic cutting and removing of trees that fall across the river each spring run during run off is requested to reduce obstacles and improve safety for canoe users.

The town conservation commission would be willing to work with DRED and Corps. of Engineers maintaining these access sites.

Marking of trails and access roads might be useful and add safety.

We appreciate and praise both NH DRED and the Corps. of Engineers for continuing policy allowing multiple uses of this land; hunting, fishing, snownmobiling, cross country skiing, etc. It is a wonderful area.

Any questions, please feel free to contact me.

Sincerely,

Alvin E Tanner

Alvin E Tanner, Chairman Conservation Commission

POBox 56 Salisbury NH
03268

Webster Conservation Commission
Betsy Janeway - 225 Tyler Road - Webster, NH 03303-7733 746-3818

August 11, 1997

Charles L. Joyce
Engineering and Planning Division
U. S. Army Corps of Engineers, New England District
424 Trapelo Road
Waltham, MA 02254-9149

Dear Mr. Joyce:

I have studied the Master Plan for the Blackwater Project for Salisbury and Webster, NH. and have a few comments to make.

First, the trivial:There are two typos on Page v ("Histiric"), and on each map, Little Hill Road in Webster has been marked as "Newbury Road." In the descriptions of Compartments 1,2,7 and 8, Province Road is wrongly called "Providence" Road. On Page 24, line two, please see "agriculyural."

More serious problems: On Page 10 or wherever it is appropriate, I would like to see some mention of the fact that the building of the Blackwater Dam caused the disruption of families and the destruction of many homes and of the heart of a community. Houses of beauty and historical value were destroyed to build this dam. To ignore this part of the dam's history is, I think, insulting to the people of Webster. I hope you can add this important part of the dam's history.

There is no mention of safety. This dam is now 55 years old. It is a big strong-looking dam, but I have seen it filled to within a few feet of its top, and what worries me is that directly below this rolled earth dam is the Webster Elementary School. Most people seem to think in terms of twenty-five year floods - I think in terms of 100 years and more, and with increased global warming we are told to expect more floods than "usual." If this dam should fail during school hours, a major tragedy would occur. Also the Town Offices and Town Hall and several homes are below the dam - but it's the school I think about most often, and so should you!

I would like to see some mention of the school, and of the absolute necessity to maintain the dam to the highest possible levels of quality

Webster Conservation Commission
Betsy Janeway - 225 Tyler Road - Webster, NH 03303-7733 746-3818

and safety. Frequent inspections for instance - I see no mention of these or of any issues of safety. Why have they been omitted from the Plan? Surely they are of primary importance?

Chemical brush removal is mentioned at the bottom of Page 23, and I would like some assurance that chemical brush control along the watershed will not take place. I am concerned about run-off and water pollution. I am pleased to see this concern shown elsewhere in the Plan.

On Page 19, the Plan says the River is Class B. I have always understood that it is a Class A River, so designated by the NH Legislature in 1972 when the Town of New London was planning to dump treated sewage into the headwaters of the River. Am I wrong about this?

I was glad to read on Page 27 that "a" wood turtle was found along the River - I live above the River and I have seen this species along the riverbank - I know there are more than one.

I am worried about all those picnic tables mentioned on Page 35; who will maintain them, keep them from being swept away in the spring floods, and remove what will surely be a greatly increased amount of littering and trash that unfortunately is often found at picnic areas?

Thank you for this opportunity to comment upon the Draft Master Plan for the Blackwater Project.

Sincerely,

Betsy Janeway

Betsy Janeway, Chairwoman, Webster Conservation Commission

CC: Webster Selectmen

CNHRPC

Central New Hampshire Regional Planning Commission

August 20, 1997

US Army Corps of Engineers
New England District
ATTN: Mr Charles L Joyce (Planning Branch)
424 Trapelo Road
Waltham MA 02254-9149

Dear Mr Joyce:

Thank you for the opportunity to review the Master Plan Draft for the Blackwater Dam Project.

Various minor changes are indicated. Overall, the draft is well done and very informative. As with the Franklin Falls Master Plan, I hope the Resource Development Plans will be implemented, and I again offer the services of CNHRPC to publicize the need for public and private groups to become involved in seeing the resources developed. Please let us know if we may be of any assistance.

Again, thank you for the chance to be part of this process.

Very truly yours,

Patricia R Welch
Administrative Assistant

Phone: (603) 796-2129 Fax: (603) 796-2121 E-mail: cnhrpc@kear.tdsnet.com
329 Daniel Webster Highway, Boscawen, New Hampshire 03303-2410