CHAPTER 6

APPENDICES

APPENDIX A

STUDY PARTICIPANTS

Study participants

National Park Service

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Pemigewasset Wild and Scenic River Study Committee

INTEREST	MEMBER	ALTERNATE
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Town of Bridgewater	Ronald Towne	
Town of Campton	Paul Weeks	Bertram Pulsifer
Town of Holderness	Susan Webster	Larry Spencer
Town of New Hampton	Robert Fischer	Clare Eckert
Town of Plymouth	David Switzer (Chairman)	Omer Ahern
Town of Thornton	William Lane	
Business community	Thomas Fitzpatrick	Steven Rand
Farmers	Milton Huckins	Calvin Huckins
Lakes Region Planning Commission	Earl Leighton	
NH Assoc. of Conservation Commissioners	Jim Thompson	
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Sportsmen	Adam Tatem	Sam Baker
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APPENDIX B

PEMIGEWASSET RIVER MANAGEMENT PLAN

PEMIGEWASSET

Wild & Scenic River Study

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Staff
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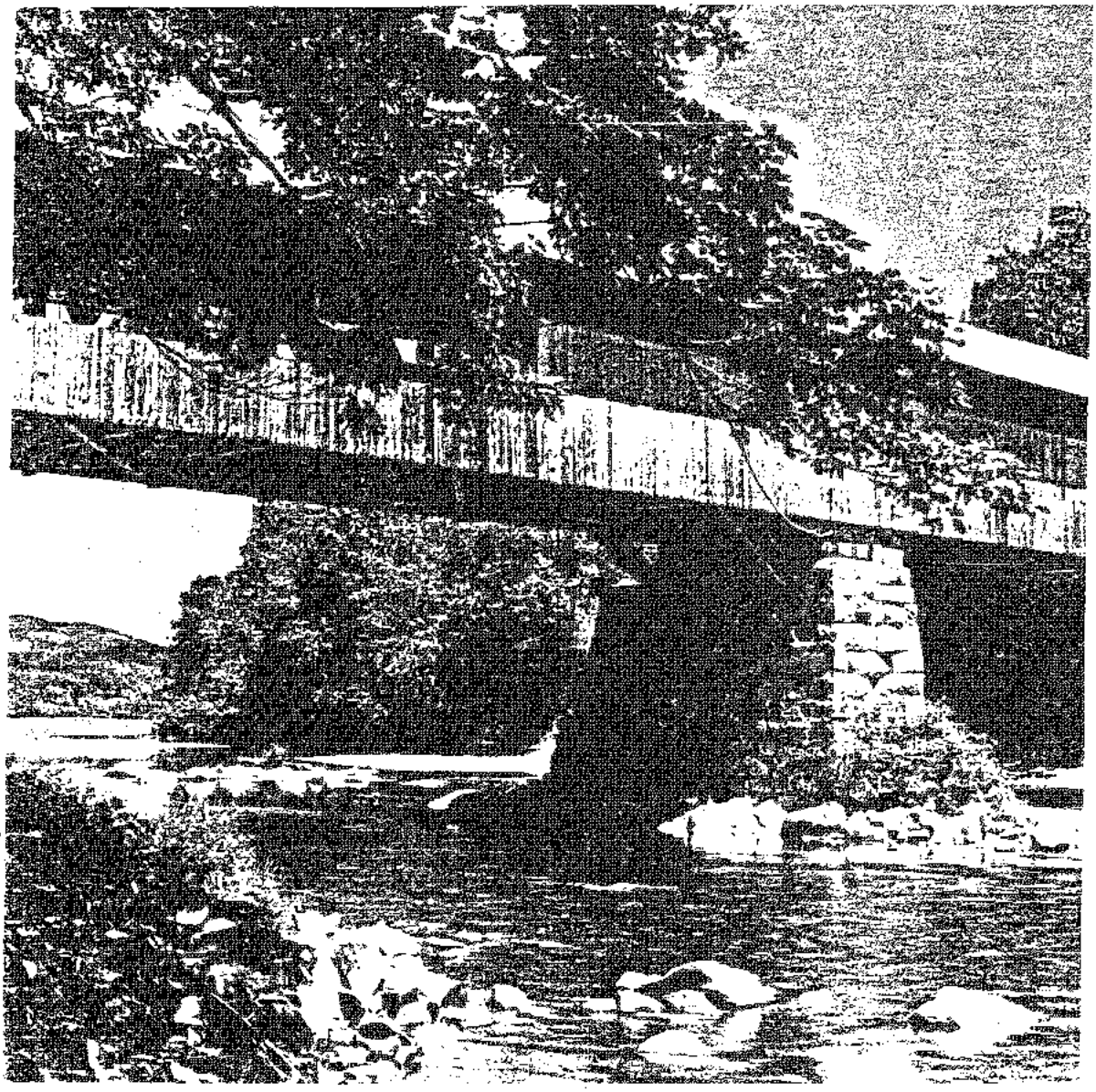
Pemigewasset River Management Plan

DRAFT, 1/20/93



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Pemigewasset River Management Plan - Summary

This river management plan was produced in conjunction with the Pemigewasset Wild and Scenic River Study.

Purpose - The purpose of the plan is to conserve and enhance the river corridor's natural and cultural resources as well as its social and economic vitality. The plan recognizes that a healthy river environment and a viable economy are mutually dependent, and strives to ensure that future growth takes place in harmony with the river.

Protection mechanisms- Existing local, state and federal laws provide the primary river management tools. The plan calls for adequate enforcement of existing laws, and relies strongly upon voluntary actions and education. Voluntary cooperation is sought for key conservation actions such as retaining riverside vegetation, using natural methods of bank stabilization, and clustering development. Riverside landowners, farmers, and recreationists will be provided with technical assistance publications and educational materials relating to conservation of important river resources.

Stricter regulations are sought for the riverbank area in Thornton and Bridgewater where vulnerability to harmful development is too significant to rely exclusively upon voluntary measures. In these two towns, the plan calls for an increased development setback from the river and a managed vegetative buffer. Development of heavy industry near the river would be prohibited.

Management framework - Management responsibilities will remain as they are now: Landowners will continue to be the primary stewards of private riverfront lands; Town boards will retain responsibility for land use control; The state will administer state-owned lands, river flow and water quality, and other existing state permitting functions. Successful management of the Pemigewasset depends upon all these entities working together to meet common goals.

National Park Service role - If the river is designated into the National Wild and Scenic Rivers System, the National Park Service's role in river management will be to guarantee that all future federally assisted water resource projects protect free flow and conform to this management plan. The Park Service will also provide funding, subject to a Congressional appropriation, for specific projects such as historic preservation at Livermore Falls, floodway mapping and production of educational materials. The management plan specifically prohibits acquisition and management of land on the Pemigewasset by the National Park Service.

Advisory committee role - A broad-based river advisory committee will be established to provide a forum for discussion and resolution of river issues, to advise those with authority on the river, and to coordinate outreach activities and studies called for by the management plan.

KEY RESOURCE MANAGEMENT ACTIONS				
	Instream & shoreline resources	**Land-based resources**	**Recreation opportunities**	**Public outreach & landowner assistance**
Town boards	Enforce existing laws; encourage voluntary actions; increase riparian protection in Thornton & Bridgwat.	Encourage cluster development; identify prime wetlands	Provide facilities at town-owned sites (depending on need and funding); enforce trespass laws	
State of New Hampshire	Enforce WQ laws; review projects; establish minimum instream flows; administer a water withdrawal permit system (if authorized)	Franconia Notch: develop protection plan for rare species, provide scenic vistas. Livermore Falls: preserve geologic and historic resources	Provide facilities at state-owned sites (depending on need and funding)	
National Park Service	Review federal water resource projects to protect free flow and river resources	Provide funding for improvements at Livermore Falls	Provide funding for studies and publications	Provide funding for publications
Pemigewasset River Advisory Committee	Coordinate with project review and law enforcement	Coordinate technical assistance efforts	Coordinate rec. needs assessment, produce Recreational User's Brochure	Produce Site Design Handbook and Riverside Landowner's Guide
Pemi River Council/Merrimack River Watershed Council	Coordinate water quality monitoring project			Coordinate hands-on river education courses in schools

PEMIGEWASSET RIVER MANAGEMENT PLAN

Draft, 1/20/93

Introduction

This management plan was produced in conjunction with the Pemigewasset Wild and Scenic River Study. It was prepared in a collaborative effort between the locally based Pemigewasset River Study Committee and the National Park Service.

The purpose of the plan is to conserve and enhance the river corridor's natural and cultural resources as well as its social and economic vitality. The plan recognizes that successful river management depends upon government agencies, private groups and local residents working together to meet common goals. Although the plan was produced as a result of a federal study, most of the actions proposed for conserving river resources utilize existing local and state authorities, or involve education programs or voluntary landowner actions.

The plan is presented in three sections:

* The **Management Philosophy** describes the general approach to resource management.

* The **Administrative Framework** describes the roles and responsibilities of the participants in river management.

* The **Resource Management** section identifies actions to be taken for resource conservation and delineates a framework for future decision-making.

The plan does not contain a prescription for every possible situation that could confront river managers. Rather, it provides a context for future decision-making. A river committee is established to advise those with authority on the river and to help coordinate river management.

The plan is written as though the Pemigewasset River will be designated as a component of the National Wild and Scenic Rivers System. Should this not be the case, however, the plan can still serve as a well-grounded guide for river conservation. The major difference would be that the National Park Service would not be a participant in river management.

Detailed information about the study process, river resources, existing protection mechanisms, political climate, and rationale behind this plan can be found in the final Pemigewasset Wild and Scenic River Study Report.

Management Philosophy

Designation as a component of the National Wild and Scenic Rivers System confers a special status upon the Pemigewasset River, guaranteeing that all future federally assisted water resource projects will be compatible with maintaining a free-flowing river and protecting outstanding river-related resource values.

The Wild and Scenic Rivers Act allows considerable latitude in tailoring river management to suit the individual circumstances of the diverse rivers in the national system. Given the private and state ownership of the Franconia Notch and Valley segments of the Pemigewasset River, a strong federal role in river management would be absolutely inappropriate. Rather, the management plan relies upon existing river protection mechanisms and authorities.

The Franconia Notch segment is owned entirely by the New Hampshire Department of Resources and Economic Development as part of the Franconia Notch State Park. Since current park management is entirely compatible with designation as a wild and scenic river, the management plan calls for a continuation of existing state policies. A few recommendations are made for improving resource protection, but most of the plan focuses upon management of the Valley segment, where river resources are vulnerable to corridor development.

The Valley segment (Thornton through Bridgewater) is primarily owned by private individuals, with scattered state holdings. The management plan recognizes and respects the longstanding patterns of human settlement and use of this river segment. It is understood that a healthy river environment and a viable economy are mutually dependant, and that the corridor landscape will continue to change as communities experience growth over time. The intent of the river management plan, then, is to ensure that future growth is sensitive to river values.

Five goals were developed during the study process to guide development of the management plan. Three of the goals address instream, upland and recreational resources; a fourth pertains to education. The fifth goal concerns corridor character and community growth, and calls for:

> Maintenance or enhancement of existing compatible land uses with provisions and opportunities for new types of community development.

As a package, the five river conservation goals call for an integration of conservation concerns with community growth goals in order to maintain the social and economic vitality of the river corridor.

The plan assumes that, for the most part, existing resource protection mechanisms are

capable of protecting river resources. Local, state and federal regulations, physical constraints to development, and conservation ownership provide good protection for much of the Pemigewasset River. These mechanisms should continue as the primary river management tools.

The plan specifies ways in which existing mechanisms can be more effective in conserving river resources. Focusing existing protection programs on critical conservation concerns, and improving coordination or enforcement of existing regulations are two examples. Additional actions are identified that will help improve river management, such as education efforts and landowner assistance. Stricter regulations are not proposed as primary management tools, and are only recommended in the few instances when vulnerability to harmful development is too significant to rely exclusively upon voluntary measures.

Much concern was expressed throughout the study process about protecting the rights of landowners. As the primary stewards of river corridor lands, the willing cooperation of landowners is critical to the success of the river conservation effort. One of the river management objectives developed during the study process specifically directs the protection of private property rights, and calls for reliance to the greatest extent possible upon voluntary landowner conservation actions and education, rather than additional regulation. The management plan accomplishes this objective, directing relevant entities to encourage and provide technical assistance to landowners to pursue voluntary conservation opportunities.

Federal agencies have played a major role on other designated wild and scenic rivers by managing federally owned lands (such as National Forest lands) or acquiring private lands and easements. For the Pemigewasset River, the National Park Service's role in river management will be limited to review of federal water resource projects and providing limited funding. Federal acquisition of lands or interests in lands will not be permitted on the Pemigewasset. The tool is not needed for resource protection, and there is vocal opposition and fear of its abuse over time. Accordingly, there will be no federal land management. Given the limited federal role in management, the river will not become part of the National Park System nor be subject to the system's rules and regulations.

Administrative Framework

Section 10e of the Wild and Scenic Rivers Act specifically encourages the participation of state and local government in the administration of designated rivers. The clear intent of Congress is to foster a management partnership. This strategy is absolutely appropriate for the Pemigewasset River, given the private and state ownership of the river corridor and existing local and state controls over land use. The Franconia Notch

segment is owned and managed by the state for recreation and resource protection. In the Valley segment, most of the towns have river conservation overlay zones in place. In addition, development is unlikely on some riverside lands because of physical constraints such as floodways, steep slopes and poor access. Both river segments are designated components of the New Hampshire Rivers Management and Protection Program.

Management responsibilities on the Pemigewasset River will remain basically unchanged from the current situation. Landowners will continue to be the primary stewards of private riverfront lands. Town boards will retain responsibility for land use control. The state will administer state-owned lands, river flow and water quality, and other existing state permitting functions. The National Park Service's role will be to ensure federal water resource projects conform to this management plan, and will assist with funding of specific management activities through a Congressional appropriation.

A Pemigewasset River Advisory Committee (PRAC) will be formed to serve as a watchdog over management of the Pemigewasset River. The committee's role will be strictly advisory; it will not usurp or restrict the authority of existing town, state, or federal agencies, and will not constitute an added layer of bureaucracy. Its purpose will be to promote the coordinated long-term protection of the Pemigewasset River.

The PRAC will provide a forum for the many entities with a stake in river management to discuss and resolve river issues. It will evaluate proposals that could affect the river, and provide comments to the relevant authorities as appropriate. The PRAC will take a lead role in coordinating most of the outreach activities and studies called for by the management plan, and will work to ensure that plan goals are being met.

The PRAC should have a broad membership, including representatives from town boards, local residents, business and tourism interests, and conservation and recreation groups. Affected state agencies and the National Park Service could be represented on the committee, could serve in an ex officio capacity, or could just attend meetings as needed. Other Pemigewasset River valley towns could also be represented on the committee if this would further the PRAC's mission.

The management plan will be implemented by a Memorandum of Understanding (MOU) between the major participants in river management: the study towns, state agencies, and the National Park Service. The MOU will reference this management plan, and specify the key actions each party agrees to accomplish. It will serve as a written commitment by the signatories to work cooperatively in the long-term management and protection of the river and to exercise their jurisdiction in a manner that will help to conserve and enhance the Pemigewasset's significant values.

The MOU, management plan, and designation as a wild and scenic river do not preclude future changes in existing river regulations. However, signatories to the MOU are promising to uphold the spirit of the management plan. As with any agreement, each

party to the MOU can expect others to fulfill their responsibilities only if they do likewise. The penalty for failing to uphold the agreement is the loss of assurance that others will perform their agreed-upon management role.

Acquisition of land or easements by the National Park Service will not be used as a management backup to guarantee resource protection; its use is prohibited on the Pemigewasset. However, if river resources are allowed to degrade, the river's status as a nationally designated river may become jeopardized.

Each of the signatories to the MOU plays a key role in river management. These roles are summarized below:

TOWNS - Towns are primarily responsible for planning community growth and establishing and enforcing land use controls via zoning and floodplain ordinances, subdivision regulations and site plan review. Most towns in the corridor have river conservation overlays which, in combination with physical constraints to development and conservation ownership, provide at least adequate protection for river resources. Hence, additional regulations are not called for, with the exception of stronger basic riparian protection in Thornton and Bridgewater.

The critical management responsibility for the towns is to maintain and adequately enforce local ordinances, particularly those regulations pertaining to the riverbank area. Changes in zoning and other regulations can be consistent with this management plan as long as resource protection is not weakened. Town boards will encourage landowners and developers whenever possible to integrate river conservation concerns into their land use activities and development proposals. The boards will also look for innovative ways to improve river protection and implement them if appropriate and locally supported.

STATE of NEW HAMPSHIRE - The Department of Resources and Economic Development (DRED) and the Fish and Game Department (F&G) are responsible for managing lands owned along the river, including Franconia Notch State Park, Livermore and Blair State Forests, and several areas recently acquired with LCIP funds, including Livermore Falls.

Under the New Hampshire Rivers Management and Protection Program, the Department of Environmental Services (DES) is charged with establishing a protected instream flow for the Pemigewasset that will maintain water for instream public uses. The DES also records sizeable water withdrawals, and the state legislature is discussing whether to establish a permitting system for new withdrawals.

The state rivers program designated the Franconia Notch reach as an outstanding natural resource water and allows no degradation of water quality; significant adverse impacts on water quality are not allowed in the Valley segment. The state has the responsibility to protect water quality and other river-related resources via permitting for water pollution

and waste disposal, dredge and fill in wetlands, terrain alteration, excavation and pesticide applications. State law also limits timber harvest.

The DRED will preserve historic and geologic resources at Livermore Falls, make scenic/recreational improvements in Franconia Notch State Park, and will write a protection plan for rare species and natural communities found in the Notch. The DES will enforce water quality-related laws, ensure that a protected instream flow is established which is sufficient to maintain the Pemigewasset's outstandingly remarkable values - fisheries and flatwater boating - and will implement an effective water withdrawal permitting system, if authorized by the legislature. The Fish and Game Department will provide recreational facilities on their lands, consistent with resource protection, need and funding, and will consider creating a trophy fishery below Livermore Falls.

NATIONAL PARK SERVICE - The National Park Service's current role in river management (limited to the duration of the study plus a maximum of three years after the study report is submitted to Congress), is to ensure that federally-assisted water resource projects do not adversely affect the free flowing character or outstanding resource values of the river. The NPS accomplishes this by reviewing applications for any federal water resource permit, license or grant affecting the designated reaches; the regulatory agency must consider NPS comments and mitigate any impacts to free-flow or outstanding resources. Designation into the National Wild and Scenic Rivers System would make this protection permanent. The effect would be to make all federal actions affecting the river consistent with this management plan.

The NPS will be responsible for providing funding for projects as specified in the plan, such as development of Livermore Falls State Park, production of educational brochures, and a demonstration riverbank stabilization project. This funding would come from a Congressional appropriation. The NPS will also provide technical assistance with planning, flow studies and other topics on request.

Resource Management

This section describes resource objectives, management direction, and a set of conservation actions. The **key actions** are those of greatest importance for realizing resource management objectives. Management participants are committed to accomplishing these actions, and the **responsibility** column shows which agency or group will take the lead. **Supporting activities** and **planning recommendations** are additional recommendations that will further river conservation objectives. The **management direction** describes key management concerns and provides a context for future decision-making.

Four resource management themes are addressed: instream and shoreline resources, land-based resources, recreation opportunities, and public outreach and landowner assistance.

INSTREAM and SHORELINE RESOURCES

OBJECTIVE 1: Maintain or enhance the water quality of the main stem and tributaries

Management Direction: Water quality should be maintained at Class B or better in the Valley segment and Class A in the Franconia Notch segment. This should be accomplished primarily by active enforcement of laws relating to point and non-point sources of pollution, including state water pollution and waste disposal laws and town controls over riverside development. A water quality monitoring program should be implemented, and the general public should be involved.

Key Actions:	**Responsibility**
1. Ensure adequate enforcement of state, federal and local water quality-related laws	Existing state, federal and local authorities
2. Initiate an ongoing water quality monitoring program, expanding upon existing programs if possible; focus particular attention around known point sources of pollution; assess impacts of non-point sources of pollution	PRC/MRWC

Supporting Activities:
* Implement actions identified to conserve the riverbank area
* Educate river users, landowners and town officials on ways to protect and enhance water quality (PRC/MRWC)
* Monitor snow dumps and salt piles located near the river for one year to evaluate whether a problem exists (PRC/MRWC)
* Alert downstream communities of emergency water quality situations (DES)
* Work with Bridgewater Power to minimize impacts of cooling pond releases (PRAC)
* Locate old underground storage tanks and test for leakage (DES)

Additional Planning Recommendations:
* Develop model erosion control and stormwater management guidelines for distribution to the towns (RPAs)
* Encourage or require that development proposals minimize land clearing and impervious surface coverage (Town boards)
* Prohibit development that poses a serious threat to water quality from siting near the river or its tributaries (Town boards)
* Ensure adequate spillage protection for petroleum tanks near the river (Town boards)

OBJECTIVE 2: Maintain the river's free-flowing character and conserve the natural integrity of the riverbanks and riparian area

Management Direction: The Wild and Scenic Rivers Act prohibits dams and other federally assisted water resource projects, including channel alterations, that would adversely affect free flow. The NH Rivers Management and Protection Program provides state protection against adverse channel alteration activities, and precludes dams in the Franconia Notch segment and most of the Valley segment. As much as possible, the natural processes of the river should be allowed to continue. Riverbank modifications should be discouraged. Proposed channel alteration activities should be evaluated based on their purpose and extent, and their on-site and off-site hydrologic and biologic impacts. The primary permitting authorities are the U.S. Army Corps of Engineers and NH Wetlands Board.

The natural integrity of the riverbank area should be preserved for purposes of bank stability; runoff filtration; control of erosion, flooding and ice damage; and fish and wildlife habitat. Agencies, boards and landowners should recognize that the river will alter its course over time and plan growth accordingly to minimize future problems. Development should be set back from the river's edge and a vegetative buffer should be retained. The amount of setback deemed adequate will vary depending upon type and extent of possible development, topography, soils and vegetation; in most instances, the setback should be at least 100 feet. The vegetative buffer can be managed, but a residual stand of healthy, multi-aged, well-distributed trees, shrubs and ground covers (similar to the buffer envisioned by the state Shoreland Protection Act) should be retained to safeguard water quality and riparian function. Retention of riverbank vegetation can be accomplished by town ordinances, project review, and/or voluntary cooperation; the appropriate tool will depend, among other factors, upon the extent of possible riverside develoment.

Key Actions:	**Responsibility:**
1. Coordinate with state and federal agencies to ensure that water resource projects do not adversely affect the river's free-flowing character. When riverbank stabilization is deemed necessary, encourage the use of natural techniques (bioengineering)	NPS, DES
2. Encourage retention of a managed buffer of riverside vegetation through landowner/developer education, incentives and other innovative means; amend zoning ordinances to require a buffer in Thornton and Bridgewater	Town boards

3. Maintain structural setbacks adequate to safeguard water quality and riparian function (Note: existing setbacks adequate in most towns; Thornton and Bridgewater residential setbacks should be at least 100'; more for commercial/industrial development)	Town boards
4. Prohibit heavy industry from siting along the river (Note: existing ordinances accomplish this in most towns)	Town boards

Supporting Activities:

* Provide technical assistance to landowners on erosion control, revegetation and other riverbank management; implement key actions under "landowner education & public outreach" (PRAC)
* Retain riverside vegetation wherever possible (Landowners)
* Use natural methods when bank stabilization is deemed necessary (Landowners)
* Coordinate with Plymouth State College to revegetate their existing riprap area as a demonstration project (PRAC, NPS funding)
* Seek voluntary cooperation from landowners in maintaining riverside vegetation and not cutting through banks for river acces (Town boards)
* Plan periodic river and riverbank cleanup events (PRC/MRWC)
* Ensure Heritage Trail is sited so as not to degrade riverbank (PRAC)
* Obtain trees from forestry agencies to be given to landowners for shoreline stabilization (PRAC)
* Encourage railroad operator to retain as much riverbank vegetation as possible, consistent with safety, for riverbank stability (PRAC)
* Implement an adopt-a-stream program (PRC/MRWC)

OBJECTIVE 3: Maintain flow adequate to support important river resource values

Management Direction: River flows are currently monitored at gaging stations in Plymouth and Woodstock, and the main stem does not appear to be over-allocated. However, the flashy nature of the Pemigewasset watershed seasonally yields very high and very low flows. Two of the three outstanding values of the Valley segment - fisheries and flatwater canoeing - are flow dependant. Management should seek to maintain or improve present flows. Large new withdrawals, particularly during periods of low flow, should not be allowed. The NH Rivers Management and Protection Program prohibits interbasin transfers of water, and is also charged with identifying and protecting a minimum instream flow on the Pemi; this process is ongoing. Currently, a state legislative committee is investigating whether to create a permitting system for new water withdrawals. The government and private sectors should investigate opportunities to improve river flows by conserving and using recycled water.

Key Actions:	**Responsibility**
1. Identify and manage for minimum instream flows needed to protect identified outstanding resource values (fisheries and canoeing) through the NH Rivers Management and Protection Program	DES
2. If authorized by the state legislature, administer a permitting system for future water withdrawals to protect fisheries and recreation	DES

Supporting Activities:

* Conduct a hydrologic study to better understand the Pemi's flow, erosion, ice scouring and ways to minimize damage in an environmentally sound manner (PRAC)

OBJECTIVE 4: Conserve or enhance habitat and angling opportunities for resident and anadromous fish

Management Direction: Fish habitat conservation or enhancement should be achieved largely by implementing actions designed to accomplish flow, water quality, and riverbank objectives. Angling opportunities should be provided as called for by recreation objectives and actions. In addition, the Merrimack River Anadromous Fish Restoration Program, a well established, multi-jurisdictional program which has seen considerable federal, state and private investment, should be supported, and management actions called for by this plan should be harmonious with the restoration program.

Key Actions:	**Responsibility**
1. Implement key actions identified to accomplish water quality, riverbank, and flow objectives in order to protect fish habitat; implement recreation actions pertinent to providing angling opportunities.	As stated

Supporting Activities:

* Consider designating the reach from Livermore Falls to the Pemi/Baker River confluence as a special management area for trophy fishing (NH F&G)
* Enhance river access for fishermen by working with the conservation easement donation program (PRAC, SPNHF)
* As part of the recreational demand study, survey fishermen regarding boat and foot access, stocking, fishing pressure and other pertinent issues; inventory existing walk-in access (PRAC)

LAND-BASED RESOURCES

OBJECTIVE 1: Protect floodplains and floodplain functions, and foster traditional open space land uses such as agriculture and forestry

Management Direction: Agriculture and forestry are an intrinsic part of the cultural heritage of the Pemigewasset River Valley and should be actively encouraged through town ordinances and local, state or federal incentives. These open space uses are compatible with river conservation and should be preferred uses for many floodplain areas. Existing agricultural regulations should be relied upon, with best management practices encouraged. Open space uses of the floodplain should be encouraged by continuing the current use taxation program and working with landowners interested in donating conservation easements. Development should be directed away from the 100-year floodplain whenever possible for hydrologic, water quality, wildlife habitat, and public safety reasons. Structures should be prohibited in the floodway.

Key Actions:	**Responsibility**
1. Provide incentives for cluster development designs that site structures off the floodplain and maintain open space along the river that can serve as farming, forestry or natural areas	Town boards
2. Provide farmers and woodlot owners with a list of agencies and organizations that offer assistance, as well as contact people and phone numbers (part of Riverside Landowners' Guide); inform them about the conservation easement donation program and new assistance programs as they become available	PRAC

Supporting Activities:
* Work with FEMA to delineate the floodway in Thornton, Campton, and Ashland (Bridgewater and parts of Ashland and New Hampton are scheduled for completion in spring of 1993 (NPS funding)

Additional Planning Recommendations:
* In Thornton, establish a minimum commercial lot size and revise the extent of the commercial and industrial zones to address floodplain concerns and land capability and to target development goals (Town boards)
* Provide planning boards with information about good cluster development design and encourage them to have developers consider cluster as an option (RPAs)
* Discourage floodplain development apt to increase flood levels or incur a future emergency response or expense (Town Boards)

OBJECTIVE 2: Conserve and enhance corridor wildlife habitat and wetlands within the watershed, and protect rare plants and animals and exemplary natural communities

Management Direction: Important wildlife habitat such as riparian zones and deer yards should be conserved wherever possible through state timber harvest restrictions, town ordinances, project review, conservation easements and voluntary actions. Wetlands are especially important for their hydrologic and water quality functions as well as their wildlife habitat value; towns should identify and protect prime wetlands through the state program. Open space should be retained for its value to wildlife.

Ten occurrences of rare native plants and animals and exemplary natural communities have been identified in the Franconia Notch segment. One rare animal located in the Valley segment is believed to have left the area. These sightings should be field verified, and plans to protect the Franconia Notch agglomeration should be devised.

Key Actions:	**Responsibility**
1. Implement key actions to maintain the natural integrity of the riverbank area (vegetative buffer, structural setback).	Town boards
2. Identify and work toward designation of prime wetlands	Town conservation commissions
3. Develop a protection plan for the rare plants and animals and exemplary natural communities in Franconia Notch State Park	DRED

Supporting Activities:

* Retain open space whenever possible (Town boards, Landowners)
* Provide technical assistance to landowners regarding habitat management (NH Cooperative Extension and NH F&G)

OBJECTIVE 3: Maintain and enhance scenic vistas of the river and from the river

Management Direction: Scenic values are especially important in the highly visited Franconia Notch segment, where scenery is an identified outstanding resource value. State park management recognizes the value of scenery, but has inadequate funding to maintain existing vistas and create new ones. Scenery in the Valley segment will be addressed largely by actions for riverbank area, land-based resources, and recreation opportunities. Vista points of the Valley segment should be developed where possible.

Key Actions:	**Responsibility**
1. Open scenic vistas along hiking trails and at lookout points in Franconia Notch State Park	DRED

Supporting Activities:
* Work with Heritage Trail commissions to include vista points along trail (PRAC)
* Develop scenic turnout areas on state lands along river with parking and picnic facilities; explore other opportunities as available (State agencies, PRAC)

OBJECTIVE 4: Preserve important geologic, historic and cultural features related to the river

Management Direction: Outstanding geologic features in both river segments are located in areas owned and managed by the NH Division of Parks and Recreation. State management policies do currently, and should continue to protect these features. Archaeological sites have been discovered in the Valley segment. Several buildings and bridges in the corridor are listed or are eligible for listing on the National Register of Historic Places, which offers some protection, though minimal. These sites and structures should be preserved as an integral part of our cultural heritage. The corridor should be surveyed in a comprehensive way for additional cultural or historic resources, subject to landowner approval.

Key Actions:	**Responsibility**
1. Preserve the historic and geologic resources at Livermore Falls and provide interpretive displays for the public	DRED, NPS (funding)

Supporting Activities:
* Work with the owner of the Livermore Falls pumpkin seed bridge to preserve the structure (PRAC)
* Survey public lands in the corridor (and private lands on request) for historic/cultural resources; pay particular attention to confluence areas (Div. of Historic Resources)
* Work with town historical societies and Heritage Trail committees to interpret corridor historic resources (PRAC, DRED)

RECREATION OPPORTUNITIES

OBJECTIVE 1: Maintain existing opportunities for river-related recreation, provide additional opportunities where desirable, and ensure adequate public access

Management Direction: The Pemigewasset River is a tremendous recreational asset to local communities. Franconia Notch State Park is the most highly visited park in the state, and a national attraction; access to the river through the park is very good, with trails paralleling the watercourse for much of its length. Canoeing in the Valley segment of the river was rated one of the three best flatwater canoeing opportunities in the region. Boat access to this part of the river is provided on public lands about every 5 miles except in Campton, where the two access points commonly used by boaters are on private property. Legal access in Campton should be assured (through agreement, easement, etc.), and an additional access point should be developed in Ashland. Legal foot access for fishermen at specific locations in the Valley segment should also be assured. Additional recreation opportunities should be developed to meet demand, primarily on lands newly acquired by the state. However, recreational use must not be allowed to degrade the natural and cultural values of the river corridor.

Initially, the primary focus for recreation management should be upon education. Little is known about recreational demand among residents or tourists. Many locals are unaware of the recreational potential in their own backyard, and many don't know where to access the river. The Pemigewasset River Advisory Committee should take the lead in conducting a recreational study and disseminating information to recreationists.

Key Actions:	**Responsibility**
1. Conduct a recreational needs assessment, focusing on the present and projected future supply and demand for river-related activities and facilities such as canoe camping, swimming, and riverside picnic areas	PRAC, NPS (funding)
2. Produce a Recreational Users Brochure, to include information about: river corridor recreation opportunities; approved river access points; areas of public lands and activities allowed; safety; commercial outfitters and guides; pertinent laws on trespass, fire permits, litter and boat speed, and; resource education on topics such as water quality and potential for bank erosion from recreational use. Distribute broadly through chambers of commerce, commercial businesses and recreational clubs.	PRAC, NPS (funding)

3. As use warrants and funding allows, provide facilities at recreation sites and access points such as lookout points, toilets and hardened parking areas and paths to the river	NH F&G, Town boards

Supporting Activities:

* Perform recreational improvements in Franconia Notch State Park such as vista cutting along hiking trails and at lookout points, trail improvement and maintenance and signage; coordinate volunteer laborers; develop an adopt-a-trail program (DRED)
* Allow public access and recreational use consistent with resource protection at the newly acquired state riverside parcels (Livermore, Cersosimo, Ballou properties) (DRED, NH F&G)
* Maintain access at Blair Bridge and the Route 49 bridge area in Campton through voluntary landowner cooperation (PRAC, Landowners)
* Explore potential for access near Riverbend condos in Ashland (PRAC)
* Coordinate with and support park development and recreation initiatives along the river and in the region, such as at Livermore Falls, the Plymouth and Holderness riverfront parks, and the Heritage Trail (PRAC)
* Provide thematic interpretive signs at access points and recreation sites depicting the river, access, and points of interest; begin on an experimental basis to assess problems with vandalism; work with Plymouth State College to provide original art work (PRAC)
* Provide for the needs of the elderly and handicapped at developed access points and recreation sites (NH F&G, Town boards)
* Provide trails beneath I-93 bridges where appropriate (NH DOT)

OBJECTIVE 2: Protect public and private landowners from the adverse impacts of recreationists

Management Direction: Riverside landowners have reported problems with trespass, litter and unauthorized fires on their property, and fear that the situation might worsen should recreational use of the river increase. Town-owned parcels and newly acquired state parcels, some of which will be unsupervised, may suffer similar problems. Management can reduce these problems, even with increasing recreational use, by directing river users to approved access points, informing them of areas of public versus private lands, encouraging them to respect the rights of landowners, and making them aware of the consequences of their actions. Pertinent laws should be enforced. The Pemigewasset River Advisory Committee should work with landowners to correct past and ongoing problems related to recreational use.

Key Actions:	**Responsibility**
1. Actively distribute the Recreational Users Brochure and use it as a tool to encourage recreationists to respect private property rights	PRAC
2. Enforce trespass, open fire, litter and boat speed laws	Existing state and local authorities

Supporting Activities:

* Organize efforts to assist landowners in cleaning up refuse left by recreationists (PRC/MRWC, Landowners)
* Provide landowners who are willing to allow limited recreational use of their property with standard signs to inform recreationists of private ownership and proper conduct (AMC, Landowners)

PUBLIC OUTREACH and LANDOWNER ASSISTANCE

OBJECTIVE 1: Inform riparian landowners about river system dynamics and current laws and management, and provide guidance on conservation of land and riverbanks

Management Direction: This management plan relies heavily upon voluntary cooperation with river management goals. The plan recognizes that river conservation and economic growth can be compatible, and that development in harmony with the river is economically beneficial to all concerned. Information should be distributed to riverside landowners and prospective developers on the special problems of developing riverfront property. The tone should be helpful, not authoritative, and should provide tips on ways to manage their land with the dual benefit of conserving river resources while saving time and money.

Key actions:	**Responsibility**
1. Produce a Site Design Handbook, modelled after similar publications, that graphically depicts how to build along a river to protect financial investment as well as important river resources; distribute to landowners and developers during town permitting and site plan review processes.	PRAC, NPS (funding)
2. Produce a Riverside Landowner's Guide (pamphlet) with sections addressing site concerns (such as water quality, bank stability, and flooding), pertinent laws and river management (such as permitting authorities and Ayers Island dam management), and sources of technical and financial assistance; distribute to all riverside landowners	PRAC, NPS (funding)

Supporting activities:

* Distribute copies of the USDA's "Riparian Forest Buffers", addressing the function of streamside vegetation, to riverside landowners (PRAC)

OBJECTIVE 2: Involve the general public in the river, facilitating an awareness of the river corridor, its history and management

Management Direction: It is essential to keep the general public informed and involved in river management. The success of the river management plan depends upon broad, active, local support; a knowledge of the significance of the river and its resources provides the basis for this support. Many interests will be represented on the Pemigewasset River Advisory Committee, serving as one link to the public. Additional public outreach is needed to ensure everyone who cares about the river has a chance to be involved in its management.

Key actions:	**Responsibility**
1. Introduce or expand upon river education courses in the elementary and high schools and Plymouth State College; include a hands-on component, such as water quality monitoring, wildlife enhancement and river cleanup events.	PRC/MRWC
2. Produce a pamphlet describing the natural and cultural resources of the corridor including fish, wildlife, wetlands, geologic and historic resources	PRAC, NPS (funding)

Supporting management recommendations:

* Produce and display a graphic rendering of the river corridor in area Visitor Centers; work with PSC to create the art work (PRAC)
* Keep community organizations informed about river management activities (PRAC)
* Provide information to the general public about unusual PSNH management activities at Ayers Island Dam (such as impoundment drawdowns) (PSNH)

National Park Service Funding

Activity	Estimated cost
1) Livermore Falls park Development, including stabilization and preservation of historic mill ruins, recreational improvements and interpretative materials - Cost share with DRED	$150,000 - $450,000
2) Riverbank revegetation demonstration project at Plymouth State College - Cooperative project with PSC	$ 20,000
3) Map the floodway in Thornton, Campton and Ashland - Cost share with FEMA	$ 25,000
4) Production and distribution of publications: Recreational User's Brochure, Riverside Landowner's Guide, Site Design Handbook, and river resources pamphlet	$ 15,000
5) Conduct recreational needs assessment among residents and river users	$ 30,000
6) Assist towns with enforcement of laws protecting river resources and riparian landowners (land use ordinances, building codes, trespass, open fire and litter laws)	$ 70,000
	Total $310,000 - $610,000

NOTE: All funding is contingent upon Congressional appropriation

APPENDIX C

DRAFT ELIGIBILITY AND CLASSIFICATION REPORT

Pemigewasset Wild and Scenic River Study

DRAFT ELIGIBILITY and CLASSIFICATION REPORT

March 24, 1993

Prepared by:
U.S. Department of the Interior
National Park Service
North Atlantic Region
Division of Planning and Design

Drew Parkin, Division Chief
Gary Weiner, Project Manager
Matt Dupee, Research Assistant

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EXECUTIVE SUMMARY

The purpose of this Eligibility and Classification Report is to evaluate two segments of the Pemigewasset River in north central New Hampshire for potential designation as components of the National Wild and Scenic Rivers System.

The results of this report will accompany an evaluation of the river's *suitability* for national designation in the Final Study Report, to be submitted to the Secretary of the Interior by August, 1993

FINDINGS

To be eligible for inclusion in the National System, a river must 1) be free flowing and 2) possess, along with its adjacent land area, at least one river-related "outstandingly remarkable" resource value. Outstandingly remarkable resources are defined as resources that are either rare or exemplary from a regional or national standpoint.

Based on systematic evaluations, interviews with resource experts, research of published materials and site visits, the National Park Service has determined that the entire study area meets the eligibility criteria for designation. Both study segments are free-flowing and contain several outstanding river-related resources.

Free-flowing character. The entire study river was found to be free-flowing, as defined by the Wild and Scenic Rivers Act. There are no dams or major diversions or channelization within either segment. While the lower part of the Valley segment is affected by the backwaters of the Ayers Island Dam, its character remains flowing and riverine.

Outstanding resource values: Franconia Notch segment. Outstanding resources of the Franconia Notch segment include geology, recreation, scenery, and rare plants and wildlife.

Geology - The Pemigewasset River in Franconia State Park flows through, over, and past some of the most significant geological features in the State of New Hampshire, some of which are noteworthy regionally and even nationally. Features such as the basin, the pool and the flume, and the Old Man of the Mountain, Cannon Cliffs and talus slope lead state authorities to consider Franconia Notch the most unique geological area in the State of New Hampshire. The area was designated a National Natural Landmark in 1971 as "a prime example of a deep glaciated mountain pass that is almost without equal in the Northeastern United States".

Recreation - Franconia Notch State Park, located within a day's drive of over 62 million people, offers a myriad of recreation opportunities to its many visitors. These opportunities range from automobile sightseeing to climbing the sheer face of Cannon Cliff, and include almost everything in between. Picnicking, camping, boating, fishing, swimming, hiking, and mountain biking are enjoyed during the warmer months, while winter brings cross country skiing and snowmobiling. Many of these activities occur in or alongside the Pemigewasset River and Profile Lake; others are enhanced by the river's presence.

Visited by 1.75 million people annually, Franconia Notch State Park is by far the most heavily used park in the state, accounting for 40% of New Hampshire's annual state park income. Scenic grandeur, interesting geologic/hydrologic features, unparalleled recreational opportunities, and ease of access via Interstate 93 combine to make Franconia Notch State Park the cornerstone of New Hampshire's park system, and a national attraction.

Scenery - Franconia Notch State Park boasts tremendous scenic variety, including spectacular views of and from the Pemigewasset River valley. Sweeping vistas of mountains, sheer cliffs, granitic outcroppings such as the Old Man of the Mountain, forests, lakes and waterways can be seen by recreationists in the river valley as well as by motorists driving on the Parkway paralleling the river. Automobile sightseeing is in fact the most popular activity within the park. Even more spectacular are views of the river corridor in its undeveloped setting as seen from the surrounding mountain peaks and high altitude hiking trails. High quality views of this scope and character are rare in the northeastern United States. In addition, trails which parallel or bridge the Pemigewasset offer foreground views of fascinating geologic/hydrologic features and a continuously cascading river character.

Rare plants and wildlife - There are ten occurrences of rare native plant and animal species and exemplary natural communities in the Franconia Notch study corridor; all are listed on the New Hampshire Natural Heritage Inventory. Most of the plants and plant communities are found on the Cannon Cliffs and Talus. One plant is endangered in the state, the rest are threatened. Another threatened plant as well as an animal of concern (rock vole) were recorded near Profile Lake. Few places in the state have such an aggregate of rare species within a small area.

Outstanding resource values: Valley segment. Outstanding resources of the Valley segment include resident and anadromous fisheries, flatwater canoeing, and geology.

Anadromous fishery - The Pemigewasset River is critical to the success of the ongoing effort to restore viable runs of Atlantic Salmon to the Merrimack basin. $25 million dollars has been spent to date on this effort - one of the three largest programs

in New England to re-establish historic salmon runs. Three fourths of the Merrimack basin's Atlantic salmon nursery habitat and the vast majority of its spawning habitat is found within the Pemigewasset River and its tributaries. The mainstem of the Pemi is particularly important because many of its tributaries are now blocked by dams. The goal of the program is to have 3000 adult Atlantic salmon returning to the Merrimack basin each year, many of which will complete their life cycle in the waters of the Pemigewasset.

Resident fishery - The reach of the Pemigewasset from the East Branch to the Baker River is considered among the top five New Hampshire coldwater fisheries. Cool, clean and well-oxygenated waters with numerous riffles, rapids and pools provide very good habitat for brook trout, rainbow trout and brown trout. The results of a comparative evaluation completed by fisheries experts from state and federal agencies and private sportsman's clubs rated this reach of the Pemi as one of the best in the state for habitat quality, diversity and value of species, aesthetic experience, and recreational importance. The reach rated better than average for numbers of fish, natural reproduction, size and vigor, and access. The river from Sawhegenit Falls to the downstream end of the study segment is part of a very popular bass fishery, adding to the segment's value.

Flatwater canoeing - A comparative evaluation was conducted to determine the relative significance of canoeing on the Pemigewasset. A team of boating experts evaluated flatwater/quickwater/Class I rivers at least 7 miles long, runnable for an extended season (longer than spring high water), and located within 2 hours of Concord. Of the 25 rivers evaluated, the reach of the Pemigewasset between Thornton and Blair Bridge rated among the top three. High scores were given for character of the run, scenery, and associated opportunities such as fishing and swimming. Camping opportunities also contributed to the high rating. Canoeing use was described as light to moderate. The reach from Plymouth to the downstream end of the segment was not as well known and was regarded less highly, but still scored better than average boating values overall. Of particular significance to boaters was the length of the Pemi existing in a free-flowing state; many other segments evaluated included dams, necessitating portages.

Geology/Hydrology - The Pemigewasset River at Livermore Falls drops through a steep-sided gorge, cascading 12 feet into a splashpool at the site of an old mill. The area is unique in that no other waterfall in the region has as much water falling from as great a height. While there are many waterfalls in the area, all are located on smaller tributary streams.

Livermore Falls has other geologic features which make it notable, including bedrock crosscut by numerous dikes, quartz veins and deposits of black mica; potholes 1 to 5 feet in diameter cut into the river's bedrock floor; and a very rare igneous rock first found here and named Camptonite in honor of the location. The technical clarity of the

geologic morphology at Livermore Falls offers great regional value for geologic interpretation and appreciation; the area is a field trip destination for geology and geography classes given at Plymouth State College.

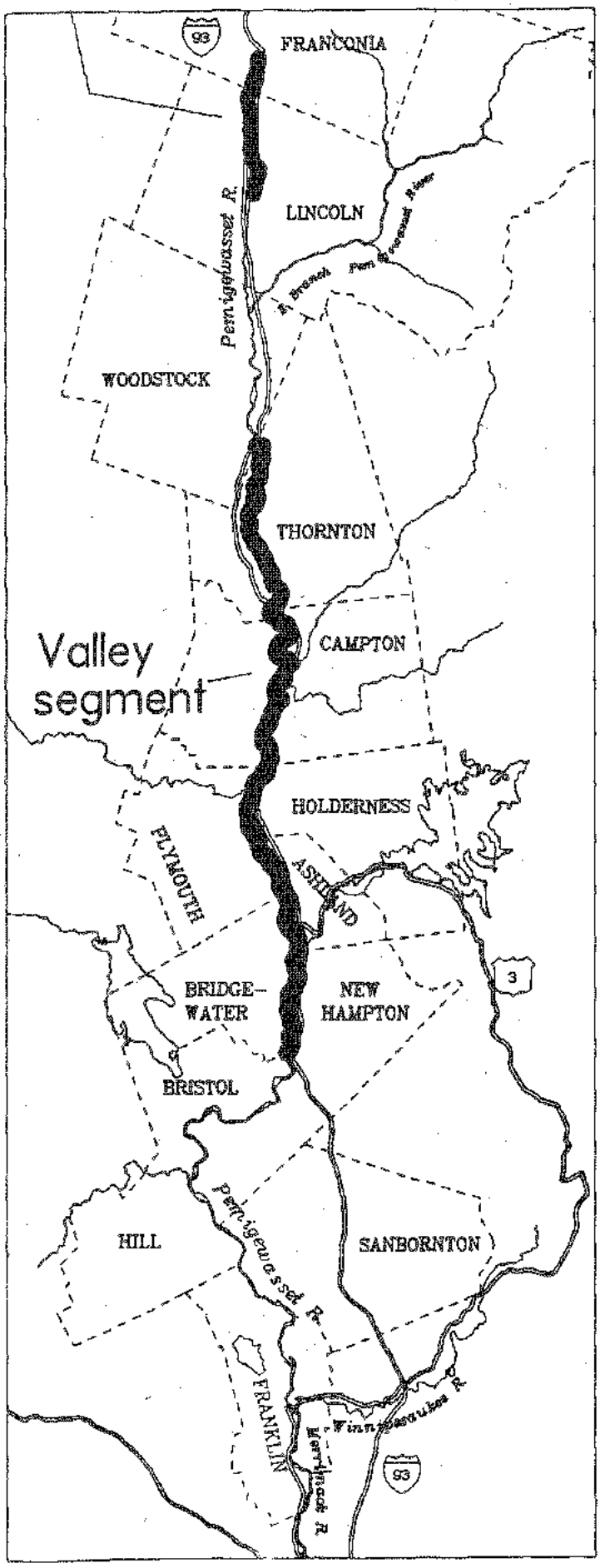
Proposed classification. The Wild and Scenic Rivers Act specifies that eligible study segments should be classified as "Wild", "Scenic", or "Recreational", based on the amount of development and the accessibility of the river corridor.

Proposed classifications are:

Franconia Notch segment:
* Outlet of Breeding Pond to southern park boundary (6 miles): **Scenic**

Valley segment:
* Woodstock/Thornton town line to Thornton railroad bridge (7 miles): **Scenic**
* Thornton RR bridge to Bridgewater/Bristol town line (19.5 miles): **Recreational**

Franconia Notch segment



Pemigewasset River General Area Map

Pemigewasset River study segments

SCALE 1 in. = 6 mi.

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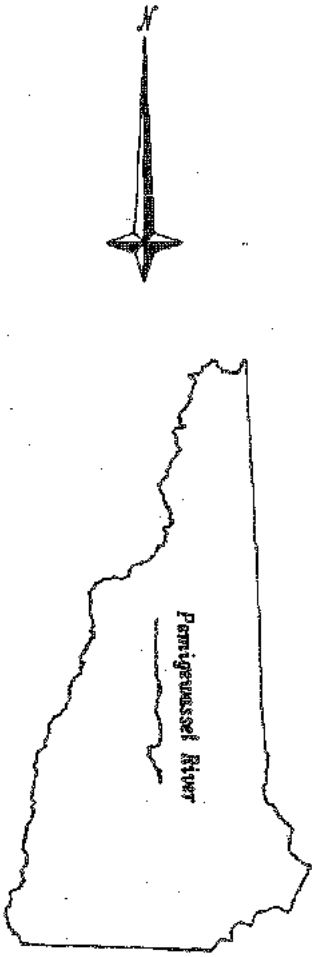

NEW HAMPSHIRE

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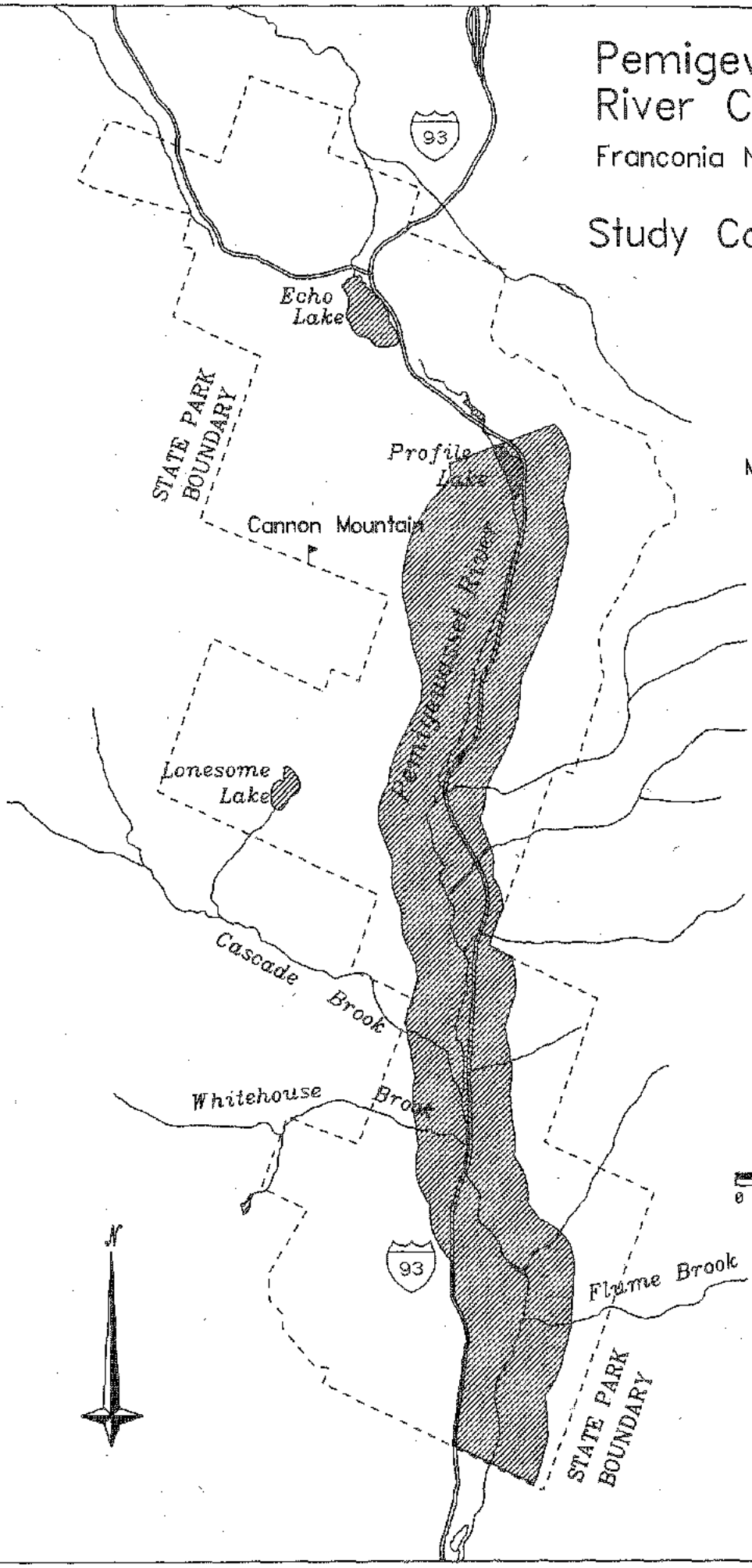
GRANIT

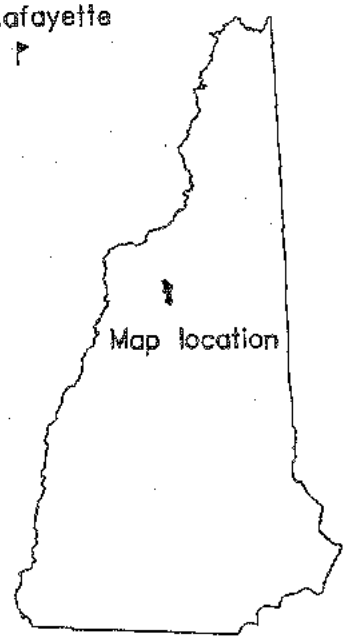
Geographically Referenced Analysis and Information Transfer System

Pemigewasset River Corridor

Franconia Notch Segment

Study Corridor Location





Scale in Miles

NEW HAMPSHIRE

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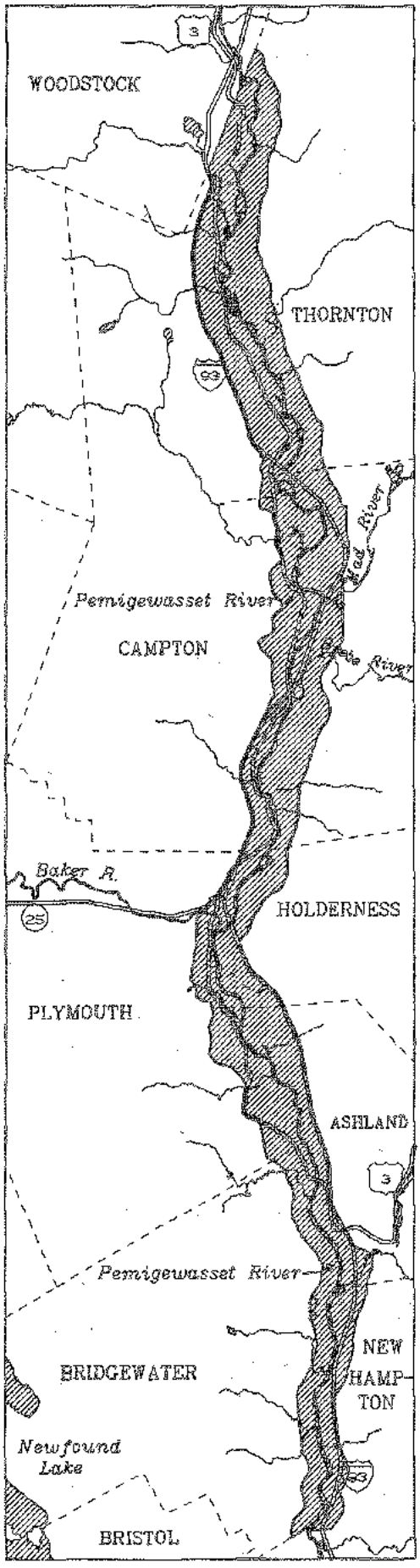
Geographically Referenced Analysis and Information Transfer System



Pemigewasset River Corridor

Valley Segment

Corridor Location

Scale in Miles

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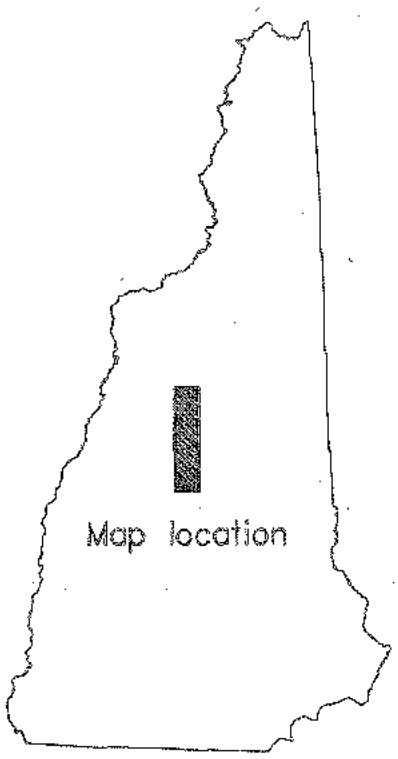
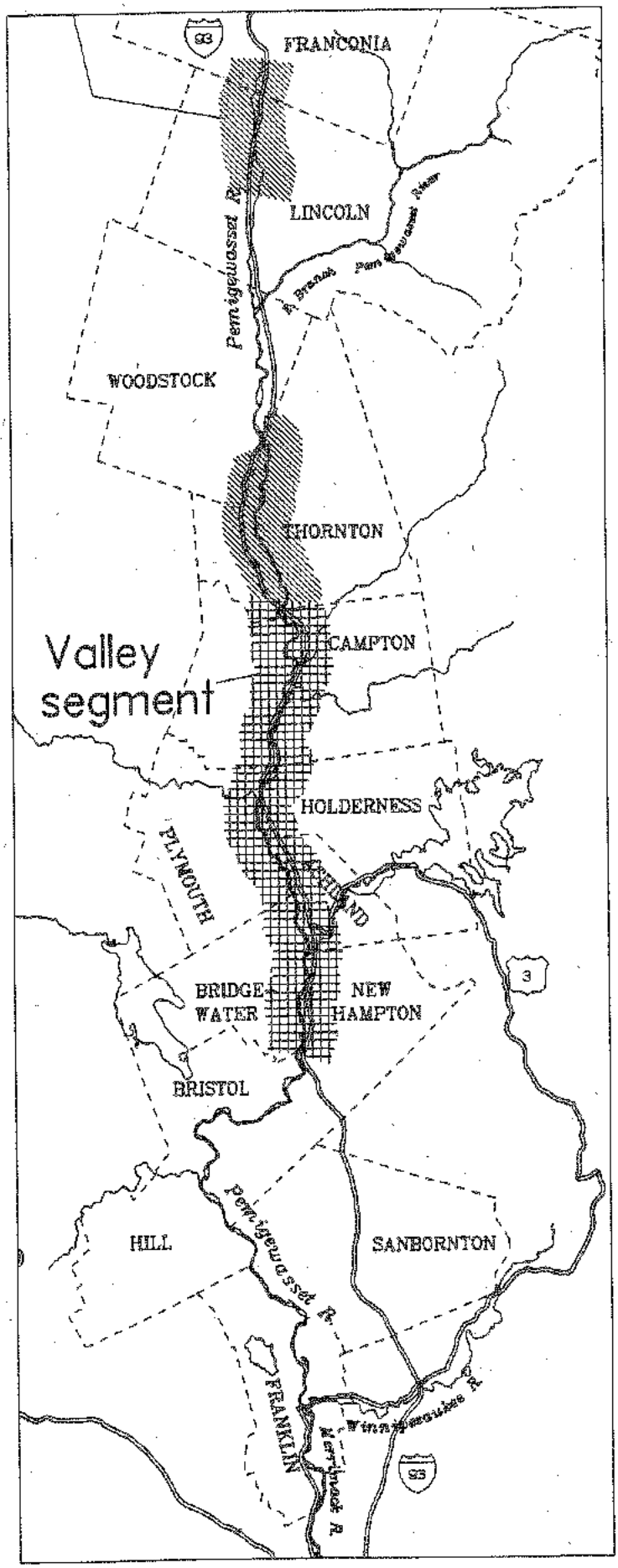


Franconia Notch segment



Pemigewasset River
Wild and Scenic Classification

Classified "Scenic"

Classified "Recreational"

SCALE: 1 in. = 6 mi.

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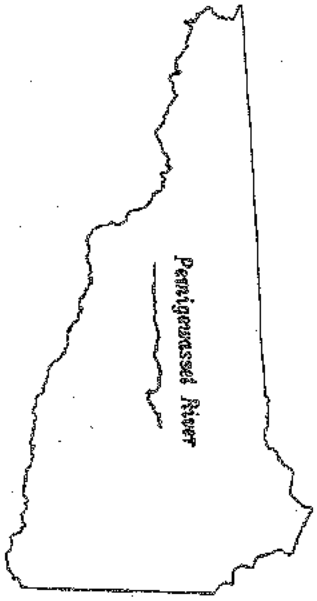

NEW HAMPSHIRE

NEW HAMPSHIRE GRANIT

Geographically Referenced Analysis and Information Transfer System

CHAPTER 1: INTRODUCTION

1.1 WILD and SCENIC RIVER STUDY and DESIGNATION

The Wild and Scenic Rivers Act (Public Law 90-542) was passed by Congress in 1968 to protect certain free-flowing rivers for the use and enjoyment of present and future generations. The Act was intended to balance the nation's longstanding water resource development policies with a river conservation policy. Rivers designated into the national system receive protection from federally assisted projects, including projects funded, licensed, or sponsored by the federal government, which would alter the rivers' free-flowing condition or have a direct and adverse effect on outstanding resources. Rivers may be designated either through an act of Congress (by amending the Wild and Scenic Rivers Act) or through an administrative action by the Secretary of the Interior upon application by the governor of the state through which the river flows.

Currently, the National Wild and Scenic Rivers System includes 152 rivers, comprising over 10,300 river miles, with another two dozen rivers under study for possible designation. The majority of designated rivers are in the weastern states, but several New England rivers are currently under study, and two - the Allagash in Maine and the Wildcat in New Hampshire - have been added to the national system.

At the request of nine towns bordering the river, the Pemigewasset River Study was authorized by Congress in August of 1990. Two river segments are being studied: a 6-mile segment in Franconia Notch State Park and a 26.5-mile segment in the towns of Thornton, Campton, Plymouth, Holderness, Ashland, Bridgewater and New Hampton.

The purpose of the study is to determine whether portions of the river should be designated into the National Wild and Scenic Rivers System, and to develop plans to guide conservation and management of river resources. The National Park Service is conducting the study in cooperation with a broad-based local advisory committee representing the study towns, organizations and individuals with a stake in river management.

This report completes the first phase of the Pemigewasset River study, documenting the eligibility and proposed classifications for the two study segments. The report makes no recommendation as to whether the eligible river segments *should* be placed in the national system. The second phase of the study, assessing the *suitability* of the river segments for designation, will be completed by August of 1993.

1.2 ELIGIBILITY REQUIREMENTS

To be eligible for inclusion in the National Wild and Scenic Rivers System, a river must 1) be free flowing and 2) possess, along with its adjacent land area, at least one river-related "outstandingly remarkable" resource value. Free-flowing rivers have no major impoundments, diversions, or channelization. Outstandingly remarkable resource values are scenic, recreational, geologic, fish and wildlife, historic, cultural, ecologic or other similar values which are either rare or exemplary from a regional or national standpoint.

River resources are described in depth in Chapter 3, with outstanding resources highlighted. Free flow is discussed in Chapter 4.

1.3 CLASSIFICATION CRITERIA

The Wild and Scenic Rivers Act specifies that eligible study segments should be classified as "Wild", "Scenic", or "Recreational", based on their level of development. Criteria for this determination include water resources development, shoreline development, accessibility and water quality. Classification is discussed in depth in Chapter 5.

1.4 REPORT METHODOLOGY

An intensive analysis of the Pemigewasset River's resource values was conducted during the summer and fall of 1992, with particular attention paid to those resource values thought to have potential regional or national significance: fisheries, recreation, scenery, rare plants and wildlife, historic sites, and geology.

River resources were determined to be "outstandingly remarkable" if they were either rare or exemplary in at least a regional context. An example of a rare river resource might be the only Class V rapid in the region. An example of an exemplary resource might be one of the best examples of a floodplain forest in a region where they are common.

The region used as the basis for evaluating the significance of a particular river resource varied depending upon what was most logical for the resource in question. For canoeing, the region of comparison was defined by the population served - similar rivers within a 2-hour travel time radius of Concord, NH. For resident fisheries, the region corresponded to the area with which resource experts were familiar - the state of New Hampshire.

Federal, state and local agencies, private conservation organizations, local colleges and

individual resource experts were contacted and available literature was reviewed for relevant information on the value of the resources found along the Pemigewasset River. Established indicators of significance were used whenever possible, such as the NH Natural Heritage Inventory of rare species and the National Register of Historic Places. For two resources, resident fisheries and flatwater canoeing, teams of experts were assembled and comparative analyses conducted.

CHAPTER 2 - RESOURCE DESCRIPTION

2.1 REGIONAL SETTING and RIVER DESCRIPTION

Originating high in the White Mountains of north-central New Hampshire, the Pemigewasset River flows south for 62 miles from its headwaters in Franconia Notch State Park to the confluence with the Winnepesaukee River in the town of Franklin, where it gives rise to the Merrimack River. Of the 5,010 square miles in the entire Merrimack watershed, the Pemigewasset sub-basin drains 1000.8 square miles.

The Pemigewasset begins at an elevation of 1940 feet at the outlet of Breeding Pond, located in the height-of-land in Franconia Notch. Spilling first into Profile Lake, the mountain stream wends its way across the deep valley floor for six miles through the state park. Gradient is very steep as the river tumbles and cascades over and past exposed bedrock, often fully canopied by riparian trees. The northern study segment (referred to henceforth as the "Franconia Notch segment") consists of the full length of the river through Franconia Notch State Park.

South of the park boundary, gradient slackens as tourism-related development lines the west bank of the river through Lincoln and North Woodstock. Ten miles from its source, the East Branch Pemigewasset joins the mainstem, more than doubling its volume.

Through Woodstock and Thornton, the river is far larger and more open than in the Notch, meandering across a wide valley floor and over numerous terraced gravel deposits. In Campton, the Mad and Beebe Rivers again augment the river's size. Through these towns, the river area is rural in character, consisting primarily of forested lands, idle fields and widely scattered development.

In south Campton, the river enters a narrow gorge and plunges over Livermore Falls at the site of an historic mill. Spilling onto a sandy intervale, the river's gradient again slackens as it enters the towns of Plymouth and Holderness. The Baker River augments its volume as it flows past the Plymouth town center, the densest development in the corridor. From here, the Pemi winds southward into an area of broad floodplains, wetlands and agricultural operations, then courses through a short industrialized area in Ashland and north Bridgewater. The Squam River adds its volume as the river riffles over Sawhegenit Falls, then slows again until it eventually becomes fully impounded by the Ayers Island Dam after another few miles. The southern study segment ("Valley segment") extends for 26.5 miles from the Woodstock/Thornton town line to the backwaters of the Ayers Island Dam at the Bridgewater/Bristol town line.

Below Ayers Island Dam, the river flows for 12 miles through an undeveloped reach to Franklin Falls Dam. Most of this land is owned by the Army Corps of Engineers as part of the Franklin Flood Control Project. In the next couple miles, the Pemigewasset spills over the Eastman Dam, then joins the Winnepesaukee River at an elevation of 270 feet to form the Merrimack.

Much of the north half of the Pemigewasset's watershed is publicly owned land in the White Mountain National Forest and Franconia Notch State park. The valley floor itself is primarily in private ownership. For much of the river's length, the river corridor is the site of a major north/south transportation corridor. From Franconia Notch south to Bristol, Interstate 93, U.S. Route 3, state and town-owned roads and a rail line parallel and often bridge the river. Roads and bridges and the sounds or traffic provide the primary indicators of development in this otherwise largely undeveloped corridor.

Precipitation amounts vary substantially along the Pemigewasset corridor with changes in elevation and local topography. Rainfall records in Franconia Notch indicate annual averages ranging from 62 inches/year at the summit of Cannon Mountain to 32 inches/year at the base of the tramway. Snowfall averages at Cannon Mountain typically vary between 85 and 200 inches/year. Most of Franconia Notch, except above timberline, has a "humid continental cool summer climate" (NHDPW, 1979).

The river area from Thornton through Bridgewater averages 43 inches of total precipitation annually which is fairly evenly distributed throughout the year. Monthly mean air temperatures in this segment range from 19 degrees fahrenheit in January to 67 degrees in July, with an annual average of 44 degrees (FERC, 1990).

The Pemigewasset River area is situated north and west of the region's major population centers: Travel time to the river's midpoint at Plymouth is about two hours from Boston, one hour from the state capital in Concord, and one and a half hours from Portland, Maine.

2.2 HISTORY

Native Americans lived in the Pemigewasset River Valley prior to the arrival of the Europeans, although they left few marks upon the land. The Pemigewasset Tribe of the mighty Algonquin race peopled the river valley, using it, as did other regional tribes, as a main transportation route and source of food (Musgrove, 1976).

Settlement of the region by white pioneers was delayed until after the conclusion of the last of the French and Indian Wars in 1763 when freedom from Indian attack encouraged homesteaders to travel north to the Pemigewasset River Valley. First to be settled were the lands adjacent to the river and its tributaries. River frontage offered good agricultural yields, fish harvests, easy access to transportation avenues, and mill

development sites - most towns in the area had water-powered saw and corn grinding mills. Later on, settlers moved up into the higher elevations as well, clearing land for planting and livestock grazing. Farming was the main staple of early pioneer life, augmented by game hunting and logging. By the early to mid-1800s, fully half of the state was in agriculture.

During the 19th and 20th centuries, several major developments transformed the Pemigewasset River Valley - socially, economically, and physically.

The number of working farms in the Pemigewasset River valley, as well as the entire northeastern United States, were drastically reduced in the mid to late 1800s due to a number of factors: the opening of cheap, fertile land in the midwest; the advent of innovative and highly productive midwestern commercial agriculture; the development of rail lines and the Erie Canal, both of which ensured ready access to eastern markets; and the loss of farm labor to jobs in the large New England manufacturing centers. The civil war also contributed to the exodus from New Hampshire farms as Union soldiers from the Northeast were exposed to the superior farmlands and longer growing seasons of Virginia and the Carolinas.

Sheep husbandry, once a prominent industry in New Hampshire, also declined rapidly during the latter half of the 19th century when cheaper wool from Australia and the midwestern United States became available on the world market. Figures from Bristol, New Hampshire tell the story: in 1844, town taxes were levied on 1,265 sheep; in 1902, just 119 (Merrill, et. al., 1977).

As a consequence of the general decline of farming in the state, forests began reclaiming the abandoned farmland. By the 20th century, dairy farming and the growing of orchard crops represented the bulk of what remained of the state's agricultural base.

The rise of tourism marked another significant development in the region's history. In 1805, the Old Man of the Mountains in Franconia Notch was discovered by the white man. By the mid 1800's, the Notch's spectacular mountain scenery, pristine lakes, geological wonders, and refreshingly cool summer climate had become a magnet to tourists. Grand hotels sprung up to accommodate the legions of well-heeled guests who came first by horse-drawn coach, and later in the century by train, to relax in this premier vacation spot. Many of the era's most prominent people - such as President Franklin Pierce, Nathaniel Hawthorne, Ralph Waldo Emerson, Henry Wadsworth Longfellow, Mary Baker Eddy, and P.T. Barnum - frequented the Notch area. The Profile House, built in 1853 to cater to such guests, was the grandest of the area's resorts, ultimately becoming nationally known.

By the 1920's, the advent of the automobile and other factors led to the decline of the Notch's "golden age", and one by one the grand hotels went out of business. Yet tourism continued unabated as tens of thousands of visitors came to the Notch each year to view

the Old Man, the Flume and other sights.

Concurrent with the rise of tourism in the area, commercial mills proliferated in the region. Throughout much of the Northeast, local economies which had been primarily based on agriculture were shifting towards industry and manufacturing. This trend was evident in the Pemigewasset River valley south of the Notch where mills sited on the river's tributaries produced woolens, shoes, hosiery, wood cabinetry, and other products, leading to a dramatic economic expansion between 1850 and 1870. Ultimately, most of the area's mills folded due to an over-supply in New England and the resulting drop in profits (Stearns, 1906). Huge mills in Manchester, Dover, Rochester and Somersworth hastened the demise of the smaller local concerns by enticing away their workers.

As local manufacturing was beginning to wane in the Pemigewasset River valley in the late 19th century, the timber industry was born. The opening of the region's timberlands to commercial harvesting had a dramatic effect, changing the area's economics as well as the landscape practically overnight. Freshly laid rail lines provided a ready means for moving massive quantities of timber to market. Another means of transport was provided by the river, as rafts of logs were floated south to be processed. So intensive were these operations that by the beginning of the 20th century, much of the White Mountain area had been denuded. Rampant forest fires, soil erosion, and downstream flooding followed in the wake of this unbridled exploitation - as did a growing conservation ethic.

Subsequent public concern over the abuse of the White Mountain region led to the passage of the Weeks Act of 1911 which authorized the establishment of national forests in the eastern United States, including the White Mountain National Forest. While the land adjacent to the northern mainstem of the Pemigewasset River (Franconia Notch) was not included in the National Forest, the river still benefited greatly because many of its tributaries now had protected watersheds (Bofinger, 1992). Later, when the hotel interests began allowing indiscriminate logging in Franconia Notch during the 1920's, another public uproar ultimately led to the 1928 acquisition of the Notch by the State of New Hampshire and the Society for the Protection of New Hampshire Forests - and the subsequent birth of Franconia Notch State Park. Establishment of the National Forest and State Park, along with the adoption of new fire laws, resulted in recovery of the area's vegetative resources.

The paper and pulp industry became an important part of the region's economic base early in the 20th century. Unfortunately, the industrial effluent from the mills which provided a livelihood to so many of the area's residents proved deleterious to the Pemigewasset River and the local tourist trade. After some 80 years of river pollution problems associated with the mills, the last paper plant closed in 1979.

During the 1980's, many of the area's towns experienced marked growth in year-round and seasonal populations. Fueled by a booming regional economy and the advent of relatively easy highway access, many homes and condominiums were built and sold to

city dwellers eager for a home in the country. Today, the local economy reflects the general recession which grips the state and country at large with housing construction at a virtual standstill and overall economic activity in the region sharply curtailed. Many of the condominium units built in the 1980's today stand empty and unsold.

Throughout the history of European settlement, the story of the Pemigewasset River valley has essentially been one of use and overuse. The effort to strike a balance between use and protection of the area's natural resources continues to this day.

2.3 HYDROLOGY and WATER QUALITY

Flow. The Pemigewasset River is free-flowing for 42 miles from its headwaters at the outlet of Breeding Pond to the Ayers Island Dam impoundment in Bridgewater/New Hampton. While some channel alteration has occurred (most notably a 10' dam in North Woodstock which no longer impounds the river), this is the longest free-flowing reach in New Hampshire except for three segments of the Connecticut.

The Pemigewasset River is characterized by dramatic swings in flow volume as a consequence of the valley's convergent drainage patterns: runoff from the steeply sloped hillsides on the both sides of the valley is quickly concentrated in the valley floor. Annual run-off volume in the area is approximately 70% of the area's annual rainfall yield (FERC, 1990), creating "flashy" conditions in which the river may swell to more than one hundred times its previous discharge level after a storm. Floods occur in all seasons and typically peak within 6 hours of a rainstorm's climax (Billings, 1956).

Historic flow levels at the Plymouth gauging station, located just downstream of the Holderness Bridge (drainage area: 622 square miles) include a low flow of 39 cubic feet per second (CFS) in October, 1948 and a high flow of 65,400 CFS in March, 1936. The 87-year average discharge of the river at the Plymouth station is 1,363 CFS; the 100-year flood level is 63,011 CFS (Toppen, 1992). Major tributaries of the Pemigewasset River include the East Branch, Mad, Beebe, Baker and Squam Rivers with drainage areas of 117, 62, 30, 213, and 65 square miles respectively.

Water withdrawal. Much of the Pemigewasset River for the length of the community study segment is underlain by a moderate to high-yield aquifer. The Towns of Campton, Plymouth and Woodstock are currently dependent on this aquifer for their municipal water supply. The New Hampton Village Precinct is investigating drawing municipal water from the aquifer. Ashland drilled test wells into the aquifer in the mid 1980's but found excessive levels of salt in the water, possibly due to the proximity of an Interstate 93 interchange (Hounsell, 1992). The town is considering drilling new test wells to the north of the old site in the hope of finding cleaner water.

Other users of groundwater include "non-community public wells" in the smaller communities lacking a municipal water supply, which serve enterprises such as resorts, trailer parks, motels, and schools. Residential growth from year round and seasonal home development has also placed demands on the river and aquifer.

Surface water withdrawals of more than 20,000 gallons/day or 600,000 gallons/30-day period must be registered with New Hampshire's Water Resources Division. Table 1 lists the major water users for the Pemigewasset sub-basin with their average daily withdrawal amounts for 1991. Because the averages are figured over a twelve month period, seasonal water users (snow making, irrigation, etc.) typically withdraw far more than the stated average daily use during those months when they are actually withdrawing. Months during which water is withdrawn by seasonal users are listed in the last column.

Table 1

WATER WITHDRAWALS - Pemigewasset River watershed

Withdrawal point	AVGDU*	Name	Purpose
Loon Pond Brook (Lincoln)	363.7	Town of Lincoln	Water works
Loon Pond (Lincoln)	42.6	Loon Mtn. Rec. Corp.	Snowmaking (Nov.- Mar.)
Boyle Brook Dam (Lincoln)	45.5	Loon Mtn. Rec. Corp.	Snowmaking (Nov.- Mar.)
Boyce Brook (Lincoln)	471.4	Town of Lincoln	Water works
Pemigewasset River (Lincoln)	72.8	Loon Mt. Rec. Corp.	Snow making (Nov.- Mar.)
Pemigewasset River (Campton)	36.4	Campton Sand & Gravel	Mining
Pemigewasset River (Plymouth)	0.0	Plymouth State College	Irrigation
Pemigewasset River (Bristol)	608129.0	Ayers Island Hydro	Hydropower

Unnamed Stream (Woodstock)	92.9	Jack O' Lantern, Inc.	Irrigation (May- Sept.)
Gordon Pond Brook (Woodstock)	15.0	Town of Woodstock	Water works (Apr.- Dec.)
Beaver Brook (Woodstock)	15.0	Town of Woodstock	Water works (Apr.- Dec.)
Mad River (Campton)	44169.5	Mad River Power Assoc.	Hydropower
Mad River (Campton)	918.0	Waterville Val Ski Area	Snow making (Jan.- Mar.)
Tributary of Baker River (Rumney)	0.0	Cersosimo Lumber Co.	Industrial
Unnamed Brook (Plymouth)	no data	Tenney Mtn. Ski Area	Snow making
Baker River (Wentworth)	22.5	Precision Lumber, Inc.	Industrial (May- Aug.)
Cold Spring Brook (Ashland)	75.1	White Mtn. Country Club	Irrigation (Mar.- Oct)
Cold Spring Brook (Ashland)	no data	Freshwater Hydro, Inc.	Hydropower
Squam River (Ashland)	69757.5	L.W. Packard & Co.	Hydro power
Squam River (Ashland)	219.2	L.W. Packard & Co.	Industrial
Squam River (Ashland)	32210.0	Town of Ashland	Hydropower
Jackson Pond (New Hampton)	180.2	Town of Ashland	Water works (Jan.- May)
Newfound River (Bristol)	78583.0	Newfound Hydro. Co.	Hydropower

Dickerman Brook (New Hampton)	.4	New Hampton Fish Hatch	Aquaculture
Dickerman Pond (New Hampton)	1.4	New Hampton Fish Hatch	Aquaculture
Newfound River (Bristol)	308109.6	Freudenburg/NOK	Hydropower
Newfound River (Bristol)	29688.0	Freudenburg/NOK	Hydropower
Newfound River (Bristol)	1795.1	N.E. Fish Farming, Inc.	Aquaculture
Smith River (Alexandria)	227.2	Alexandria Power Assoc.	Electrical plant coolant
Pond (Danbury)	165.1	Ragged Mtn. Ski Area	Snow making (Nov.- Feb.)
Mountain Pond (Sanbornton)	30.0	New Hampton Vil Prec.	Water works

* thousands of gallons per day
Note: Some water uses (such as hydropower withdrawals) are non-consumptive as the withdrawal and return of the water to the river is instantaneous.

Water quality. The Pemigewasset River is viewed as a dramatic success story in pollution remediation. Originally one of New England's most picturesque mountain streams noted for its cool, clear water and superb trout fishing, the Pemigewasset had been degraded by paper and textile plant effluent and untreated sewage since the turn of the century. Today, the Pemigewasset River boasts Class B water which supports a wide range of recreation activities and aquatic life forms.

Numerous industries had a hand in the Pemigewasset River's decline. The Franconia Paper Company, the Ashland Paper Company, the L.W. Packard & Co. textile mill in Ashland and others all contributed their share of untreated industrial effluent to the river. Untreated sewage from a number of area municipalities including Lincoln, North Woodstock, Plymouth, Ashland, and Bristol served to further degrade the river. During the heyday of the paper industry, "rafts of paper mill sludge floated downstream along

discolored waters, degrading the shoreline" (EPA, 1979) and releasing hydrogen sulphide gas into the air which peeled the paint from buildings along the river.

Several major events occurred in the 1960's which lead to the river's ultimate revival, beginning with the passage of the federal Water Quality Act of 1965 which (1) required that water quality standards be adopted for all of the nation's interstate waterways, and (2) authorized the expansion of a federal grant program designed to assist local communities in constructing wastewater treatment plants.

Largely financed by federal and state funds, the towns along the Pemigewasset River built wastewater plants to handle their municipal and industrial wastes in order to come into compliance with water quality standards set by the New Hampshire Legislature in 1967.

Federal and state law specified strict new discharge limitations in 1972 for all municipal and industrial effluent. The Franconia Paper Corporation in Lincoln tried several means of in-house effluent processing during the 1970's, until their final closure in 1980 put an end to one of the last major sources of river pollution.

The elimination of raw municipal and industrial discharges into the river lead to a spectacular recovery: by the summer of 1972, the river met state Class B fishable/swimmable water quality standards. Two substantial floods in 1973 - a 25-year flood and a 10-year flood measuring 47,680 and 42,900 CFS respectively at the Plymouth Gauging Station - served to scour the river bottom of much of its accumulated sludge, hastening the river's recovery.

Water quality samples taken throughout the Pemigewasset sub-basin in 1991 by the State of New Hampshire's Department of Environmental Services were all in compliance with surface water bacteria standards. The lone exception was a sample taken at the confluence of the Baker and Pemigewasset Rivers; a nearby abandoned sewage lagoon (Fox Park lagoon) is suspected as the source. Two other samples taken during the same year at the same site showed the water to be in compliance, leading state authorities to speculate that non-compliance conditions may have been a temporary aberration (Flanders, 1992)).

Several different types of pollution sources have been identified within, adjacent to, or upstream of the community study segment. These sources include leaking underground petroleum storage tanks; leaking municipal sewage lagoons; unlined municipal landfills; salt storage and application on roads; and several erosion sites.

In 1984, gasoline leaking from underground storage tanks on Main Street in Plymouth resulted in a sheen on the Pemigewasset River. Nearby gas stations contributing to the problem were identified and have undergone, or are undergoing, remediative measures. Another underground storage tank near the river, this one owned by the Plymouth

Department of Public Works, leaked 3,000 gallons of gasoline in 1989. The leaking tank was removed from the ground along with a second non-leaking tank and remediative measures implemented. The gasoline had contaminated groundwater, but apparently has not impacted the river (Cote, 1992; Carlson, 1992). Monitoring wells indicate that at least half of the product has been recovered so far. A third underground tank used to store diesel fuel was not leaking and was left in the ground. Continued monitoring and remediation will likely be necessary in the future as other aging underground storage tanks in the area begin to leak (Nowack, 1992).

The Town of Lincoln's unlined sewage treatment lagoons are located on the bank of the East Branch Pemigewasset and represent another potential threat to the mainstem Pemigewasset. Exfiltration of effluent into the surrounding area as a consequence of increased pressure in the system from additional loading has lead to noncompliance with state groundwater laws. Currently, state monitoring indicates that groundwater bacterial standards are being exceeded, and that contaminated groundwater is present on the surface adjacent to the lagoon due to seepage. While some of these seeps are entering an adjacent wetland which empties into the East Branch, no impact on the river has been noted (Lombardo, 1992). In order to come into compliance with state groundwater laws, Lincoln will either have to line the lagoons or obtain a groundwater discharge permit from DES.

The Town of Ashland's unlined sewage treatment lagoons, located by the confluence of the Pemigewasset and Squam Rivers, are also leaking effluent. Large volume losses have been observed, and test wells to the south of the facility have revealed nitrates in the groundwater (Ewall, 1992). The EPA, which requires routine monitoring of the Squam River above and below the plant's effluent pipe, inspected the wastewater treatment plant in August of 1992 and found it to be operating in compliance with all applicable regulations (Hounsell, 1992).

There are two unlined landfills currently operating within or immediately adjacent to the community study corridor in the Towns of Thornton and Ashland. A third unlined landfill, recently closed down and temporarily graded over, is located in the Town of Bristol. The Ashland and New Hampton landfills are leaching iron and salt into the Pemigewasset River; monitoring wells have not yet been drilled at the Thornton landfill. Ongoing hydrologic studies of these areas will be conducted to determine how best to close the landfills with a minimization of iron and salt leachate (Clark, 1992).

Salt applied to winter roads is a potential non-point source of pollution. In addition, many of the towns store road salt in outdoor piles, although the salt piles are usually covered. Snow dumps located near the river are another source of concern, since the plowed snow contains road salt. The effect on the Pemigewasset's water quality as a consequence of salt runoff from these sources has not yet been determined. It is believed that any resulting ecological disruption is probably minimal (Flanders, 1992; Thoits, 1992).

The only other pollution sources in the Pemigewasset sub-basin of immediate concern to state officials are several development-related potential erosion sites along the river's tributaries.

Other potential pollution sources identified by the state include areas of densely packed septic systems, pesticide applications and agricultural runoff (NHDES, 1990).

2.4 GEOLOGY

The White Mountain and Northern New England Upland regions are overlain by eroded Littleton schist, the precursors of which were deposited at the bottom of an ancient sea some 450 million years ago (MYA). Subsequent folding and compressing during the Devonian Period lifted the land and transformed the soft sedimentary rock into harder metamorphic schist. Injections of molten granitic materials from beneath the metamorphic rock began approximately 350 million years ago, resulting in the formation of pegmatite dikes and quartz veins in the schist. Basaltic intrusions from approximately 250 MYA added lamprophyre dikes to the area's geology (Dow, 1992).

From the Pennsylvanian Period (255 MYA) to the Cretaceous Period (120 MYA), erosive forces removed thousands of feet of schist exposing the underlying granite. By the start of the Tertiary Period (60 MYA), erosion had reduced the land surface to a low, undulating plain where the highest points were the small mountains of exposed weather resistant granite, probably no higher than 1300 feet. During this time period, the land surface was gradually raised to an average elevation of between 4,000 and 5,000 feet (Kostecke, 1983). Stream erosion again carved V-shaped valleys into the newly elevated land surface, taking approximately 55 million years to produce the White Mountains of today.

The finishing touches were provided by a series of scouring glaciers, the first of which dating from the Pleistocene Epoch (2.5 MYA). The last ice sheet retreated from the White Mountain region some 12,000 years ago, shaping the land even as it disappeared.

Franconia Notch segment. The Pemigewasset River flows through, over, and past some of the most significant geologic features in the State of New Hampshire (Dow, 1992; Middlekauff, 1992). Formed by glacial and fluvial erosion of uplifted, intruded granite, Franconia Notch exhibits the rounded features of a "mature" landscape. While the Notch's U-shaped valley and rounded mountain peaks are the result of several glacial scourings, a number of the park's most significant geological features owe their existence directly to the ongoing erosive action of the Pemigewasset River and its tributaries.

Numerous potholes have been carved out of the underlying bedrock by the Pemigewasset River. Of particular note is an unusually large and exemplary glacial pothole known as

the Basin. Measuring 30 feet in diameter and nearly 15 feet deep, the Basin is believed to have been formed some 25,000 years ago when run-off from the retreating glacier eroded the granite bedrock. Subsequent scourings by silt-laden Pemigewasset currents have served to smooth the Basin into its current condition (Kostecke, 1983).

Outstanding resource: GEOLOGY

The Pemigewasset River corridor through Franconia Notch is home to many outstanding geologic features, such as the Basin, Flume, Cannon Cliffs and Talus, and is considered by state authorities to be the most unique geologic area in the State of New Hampshire. A number of these features are noteworthy on a New England-wide and even a nationwide basis.

Also noteworthy is a series of smaller potholes located immediately upriver from the Basin. These potholes become increasingly more developed moving downstream, ultimately culminating in the Basin itself. This sequence of evolving potholes provides a unique opportunity to view the classic stages of pothole formation (Dow, 1992). In addition, the bed of a pool located just upriver from the potholes is composed of breccia (fragments of older rock within a granitic matrix of newer rock). It is unusual to be able to observe breccia in outcrop that serves as the bed of a stream (Middlekauff, 1992).

Another geologic/hydrologic point of interest within Franconia Notch State Park is the Pool. Formed by glacial run-off during the retreat of the last glaciers, the Pool has long been considered "one of the natural wonders of Franconia Notch State Park" (Doherty, 1988). The Pool is a large basin (40 feet deep by 150 feet in diameter) located at the base of a cascade within the Pemigewasset River.

The Flume, carved out of the side of Mt. Liberty by a tributary of the Pemigewasset River, is also considered to be an exemplary geologic feature (Dow, 1992; Middlekauff, 1992). Located less than 1/4 mile from the Pemigewasset River, this 800-foot long narrow gorge has perpendicular walls rising 70-90 feet. The Flume is the result of water eroding six basaltic dikes in echelon (laid end to end) which were formed when molten rock intruded into fractures in the Conway granite.

Numerous waterfalls, often interspersed with cascades, are located on the steeply-sloping tributaries of the Pemigewasset River: Rocky Glen, Kinsman, and Liberty Falls are examples of such falls. The Pemigewasset River itself has a cascading character through much of the Park due to a boulder strewn riverbed and an average gradient in excess of 150 feet/mile.

Less associated with fluvial erosion but located in close proximity to the Pemigewasset River are some of the larger and more spectacular geologic features of the park, including the "Old Man Of The Mountain" and the Cannon Cliffs and Talus. The Old

Man is a granitic outcrop on the east face of Cannon Mountain which nature has fashioned into an extraordinary likeness of a man's profile. This spectacular attraction, first discovered in 1805, is the Park's number one tourist attraction, and its likeness provides the state's logo.

Beneath the Old Man's gaze are the exfoliated Cannon Mountain Cliffs and Talus. Measuring 1000 feet high at its tallest point and 1 1/2 miles long, Cannon Cliff is the largest cliff in the northeast. In addition, the cliff is considered to be the best example of exfoliation (the weathering away of rock in layers) east of the Mississippi (Dow, 1992). The result of this postglacial wearing away of the Cliffs is the Talus below. Composed of pieces of dislodged Conway granite, this particular talus slope is the most extensive of its kind in New Hampshire (NHDPW, 1979). The Cannon Mountain Cliffs and Talus are among the Notch's most dramatic sights, particularly as one approaches the area from the south on Interstate 93.

Falling rock has left its mark elsewhere in the Park, particularly on the slopes of Mt. Lafayette and Eagle Cliff on the east side of the river valley. The Debris Avalanche Scars and Deposits are yet another striking geologic feature of the area. The result of past landslides, these features are particularly visible when climbing Mt. Lafayette.

This wealth of exceptional geologic features led the National Park Service to designate the Franconia Notch area as a National Natural Landmark in 1971. National Natural Landmarks are nationally significant natural areas exhibiting one of the best examples of a type of biotic community or geologic feature within a given physiographic province. The 1969 eligibility report which recommended the Notch's inclusion into the National Natural Landmark Program called the Notch a "prime example of a deep, glaciated mountain pass that is almost without equal in the Northeastern United States." The report further cited as significant the Notch's "outstanding natural erosional features - the Cannon Cliffs talus, the Lafayette Mountain landslides, the Flume and the Basin."

Valley segment. Sand and gravel deposits occur regularly in the Pemigewasset River valley south of the Notch. Most of this material was deposited by meltwater from the last glacier. Gradual subsiding of glacial lakes which had formed in the river valley left successive terraces of sand and gravel, creating the sand plains and sand/gravel intervales found along this reach of the Pemigewasset River. Sand and gravel ridges called eskers formed inside meltwater tunnels within the glacier; these features extend from the Plymouth/Bridgewater town line into the Merrimack River valley, paralleling the east bank of the Pemigewasset River.

The gravels and coarse sands underlying much of the riverbed produce a highly productive aquifer in many locations along the Valley segment. Areas of lesser productivity, such as the playing field at Plymouth State College in Holderness, are underlain by relatively non-permeable fine sands, silts and clays which once formed the

bottom of the glacial lakes.

While the quantity of deposited material is typical compared to other New Hampshire river valleys, it is present in sufficient quantities, and in many instances is sufficiently accessible, to be attractive to the extraction industry. The economic viability of local gravel excavation is underscored by the fact that gravel is increasingly hard to come by in New Hampshire: Some commercial operations are now blasting rock to obtain gravel (Cotton, 1992). The local sand and gravel extraction industry has been an important part of the economy in some study area towns, providing inexpensive aggregate for construction (Lane, 1992).

Livermore Falls, located in south Campton, is widely recognized for its outstanding geologic/hydrologic features. The Pemigewasset River at Livermore Falls drops through a steep-sided gorge, cascading 12 feet into a splashpool at the site of an old mill. The area is unique in that no other waterfall in the region has as much water falling from as great a height. While there are many waterfalls in the area, all are located on smaller tributary streams.

Outstanding resource: GEOLOGY/HYDROLOGY

Rare and exemplary geologic/hydrologic features located at Livermore Falls include New Hampshire's largest volume waterfall, exposed volcanic intrusions, large riverbed potholes, and the type locality for a rare basalt named Camptonite.

Notable or unique geologic features at Livermore Falls include: "type locality" for the basalt, Camptonite (the place where scientists first discovered and described this particular rock, making the site important to the international scientific community)(Dow, 1992); bedrock crosscut by numerous dikes, quartz veins and deposits of black mica; and potholes 1 to 5 feet in diameter cut into the river's bedrock floor. The technical clarity of the geologic morphology at Livermore Falls offers great regional value for geologic interpretation and appreciation; the area is a field trip destination for geology and geography classes given at Plymouth State College. Continued field surveys at Livermore Falls are likely to aid in the evolution of theories relative to the history of tectonic and intrusive forces in central New Hampshire (FERC, 1990).

The subject of much controversy in recent years due to a hydropower proposal, Livermore Falls was purchased by the State of New Hampshire in August of 1992 for its recreational, fisheries, geologic and historic values.

Another, lesser falls occurs at the confluence with the Squam River in Bridgewater/New Hampton. The river at Sawhegenit Falls drops about four feet over exposed bedrock,

although the backwater behind Ayers Island Dam usually reduces this drop to little more than a riffle.

2.5 VEGETATION

Franconia Notch segment. The diversity of topography and climatic conditions in the Franconia Notch study corridor has produced a broad variety of vegetative cover types. Northern Hardwoods (beech, yellow birch, sugar maple) predominate under 2500 feet in elevation, with spruce/fir (red spruce, balsam fir) predominant over 2500 feet). Species from both forest types are found in the ecotone around 2500 feet (NHDPW, 1979)

Other cover types with more limited coverage are found in swamps, talus and landslide areas, and cliffs and ledges. Swamp areas support alders (mountain, black, and speckled), mountain holly, witherod, red maple, red spruce, balsam fir, labrador tea and mosses. Several groups of plants can be found in talus and landslide areas: Talus areas include dwarf mountain maple, pin cherry, paper birch, mountain ash, mountain alder, red spruce, balsam fir, and meadow sweet; landslide areas support deer's hair, highland rush, mountain avens; and flowering plants such as red baneberry, purple trillium, and black currant can be found in wet areas. Cliffs and ledge areas support may and ring lichen and rock tripe (NHDPW, 1979).

In addition to the indigenous plants, areas of the valley floor have been planted with grass to provide ground cover and to enhance recreation activities.

Seven rare plants and two exemplary natural communities have been documented in the Franconia Notch study corridor and are listed on the New Hampshire Natural Heritage Inventory (NHNHI). Most of the plants and communities occur on the Cannon Cliffs and Talus, although the exact location of some species is uncertain. Common butterwort is listed as endangered in the state; scirpus-like sedge, mountain avens, black crowberry, pond reed bent-grass and silverling are all state threatened. A Northern New England Calcarious Cliff Community and a Northern New England Cold-Air Talus Forest/Woodland have also been documented on the cliffs and talus slope. Bailey's sedge, another state threatened species, was observed in 1861 along

Outstanding resource:
RARE PLANTS & WILDLIFE

There are ten occurrances of rare native plant and animal species and exemplary natural communities in the Franconia Notch study corridor; all are listed on the NH Natural Heritage Inventory. Few places in the state have such an aggregate of rare species within a small area.

the river, possibly between Breeding Pond and Profile Lake; it is the oldest sighting listed on the inventory (Cutko, 1992). Few places in the state have such a concentration of rare plants and natural communities in a small area.

Table 2 lists the rare plants, animals and natural communities found in the study segments along with their rank and status.

Valley segment. There are fewer extremes in topography and climate in this part of the river corridor than are found in the Notch, yet the community study corridor is still an ecologically diverse area. Plant communities range from higher elevation conifer forests to mixed deciduous forests to the wetlands of the Pemigewasset River's vast floodplain.

The most common cover types are conifer/hardwood forests, with oak/pine forests predominating. In addition to red oak and white pine, other species found in these stands include red and sugar maple, american beech, white and yellow birch, big-toothed aspen, white ash, and butternut (Gengras and Bolian, 1991).

Table 2
NH NATURAL HERITAGE INVENTORY

Scientific Name	Common Name	Ranks	Status
Pinguicula vulgaris	Common butterwort	S1 G5	SE
Carex baileyi	Bailey's sedge	S1 G4	ST
Carex scirpoidea	Scipus-like sedge	S1 G5	ST
Geum peckii	Mountain avens	S2 G2	ST
Empetrum nigrum	Black crowberry	S3 G5	ST
Calamagrostis lacustris	Pond reed bentgrass	SU G2	ST
Paronchyia argyrocoma var. albimontana	Silverling	S3 G4	ST
Microtus chrotorrhinus	Rock vole	S4 G5	--
Ammodramus savannarum	Grasshopper sparrow	S1 G5	--
Northern N. E. Calcareous Cliff Community		S1	--
N. New England Cold-air Talus Forest/Woodland		S1	--

Table 2 (cont.) - definitions

RANKS - State and global element ranks are assigned by the New Hampshire Natural Heritage Inventory in cooperation with the Nature Conservancy.

State Element Ranks:
S1 = Critically imperiled in state due to extreme rarity (5 or fewer occurrences) or because some factor of its biology makes it especially vulnerable to extirpation from the state. (Critically endangered in state).

S2 = Imperiled in state because of rarity (6 to 20 occurrences) or due to other factors making it demonstrably very vulnerable to extirpation from the state. (Endangered in state).

S3 = Rare in state (20+ occurrences). (Threatened in state).

S4 = Apparently secure in state.

S5 = Demonstrably secure in state.

SU = Possibly in peril in state but status uncertain; need more information.

Global Element Ranks:
G1 = Critically imperiled globally due to extreme rarity (5 or fewer occurrences) or because some factor of its biology makes it especially vulnerable to extinction. (Critically endangered throughout range).

G2 = Imperiled globally because of rarity (6 to 20 occurrences) or due to other factors demonstrably making it very vulnerable to extinction. (Endangered throughout range).

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single state, a physiographic region) or because of other factors making it vulnerable to extinction throughout its range. (21 to 100 occurrences). (Threatened throughout range).

G4 = Apparently secure globally.

G5 = Demonstrably secure globally.

STATUS - In accordance with the New Hampshire Native Plant Protection Act and New Hampshire Fish And Game Department rules, listed species are assigned a status of:

SE = State Endangered.
ST = State Threatened.

Conifers play a more dominant role at higher elevations, and stands of eastern hemlock are found on steep river embankments. Hardwood-only stands are somewhat rare in the area and occur primarily on islands and floodplains (Gengras and Bolian, 1991).

Wetlands in the river corridor contain trees and shrubs such as red maple, alder, buttonbush, winterberry, and maleberry, as well as persistent emergent plants such as cattails, rushes, sedges, and burreed (Erler, 1992). These areas are ecologically diverse and are utilized by numerous bird and mammal species.

Other vegetative cover types include shrub/scrub areas, located on overwash islands and some upland areas, and hayfields and lawns in agricultural and residential areas.

No listed threatened or endangered plant species have been recorded in the community study corridor.

2.6 WILDLIFE

Franconia Notch segment. Some of the more significant wildlife habitats in the Franconia Notch corridor include: deer yards (wintering areas located on lower elevation slopes that receive the most winter sunlight); waterfowl areas (lakes, ponds, wetlands, and beaver ponds); raptor nesting areas (hawks and other birds of prey utilize inaccessible rock outcroppings and cliffs as well as remote trees for nesting and roosting); beaver flowages (beaver dams have created ecosystems providing habitat to trout, water birds, moose and other species) (NHDPW, 1979).

Mammal species include black bear, bobcat, fisher, canadian lynx, white tailed deer, weasel, skunk, marten, varying hare, red squirrel, chipmunk, woodchuck, porcupine, mole, and several species of shrews and mice (Kostecke, 1983). Riparian species include mink, beaver, and raccoon. Although black bear are not riparian, they typically use river corridors as seasonal migration routes.

Aquatic areas in the corridor provide habitat to amphibians and reptiles. Amphibians: Red eft, salamanders (dusky, red-backed and spotted), spring peeper, American toad, and frogs (pickerel, green, wood, bull and mink). Reptiles: wood and painted turtles, and snakes (garter, green, milk, red-bellied, northern ring-necked, ribbon) (Kostecke, 1983).

Nearly 100 species of birds have been recorded in the Notch, either in residence or passing through while migrating. The different elevations within the Notch provide numerous life zones which are utilized by different bird species. Some of the riparian songbird species found in the Notch include the red-winged blackbird, veery, yellow throat, swamp and song sparrow, northern water thrush, and yellow warbler. Other riparian birds utilizing the Pemigewasset River include the horned and pied-billed grebe, black and wood duck, teal, and migrating Canada goose.

A thorough study of macroinvertebrate populations of aquatic area has yet to be undertaken (NHDPW, 1979).

One rare species has been documented in the Franconia Notch study corridor and is listed on the NHNHI: A rock vole was observed near the north end of Profile Lake. The animal is "apparently secure in the state" and "demonstrably secure globally". Peregrine falcons have been known to nest on Eagle Cliff, beyond the study corridor on the east side of the valley. See table 2.

Outstanding resource:
RARE PLANTS & WILDLIFE

See Outstanding resource box under "Vegetation, Franconia Notch segment".

Valley segment. Twelve deer yards have been documented in the community study corridor by the New Hampshire Fish and Game Department. The yards are typically located under dense stands of conifers and provide critical winter habitat to deer when temperatures are low and/or snow cover is greater than 18 inches deep. The sheltered yards enable the deer to move around and find food on the generally exposed forest floor. The cover also helps the deer to stay warm when temperatures fall. During harsh winters, deer yards are an important habitat, often essential to the deer's survival.

Mammal species known or expected to occur in the corridor include: white-tailed deer, moose, black bear, bobcat, coyote, river otter, beaver, woodchuck, long-tailed weasel, fisher, mink, red and gray fox, muskrat, snowshoe hare, New England cottontail, eastern pipistrelle, ermine, porcupine, raccoon, striped skunk, Virginia opossum, Norway rat, shrews (masked, short-tailed, pygmy, smoky and water), star-nosed and hairy-tailed moles, voles (woodland, southern red-backed and meadow), eastern chipmunk, squirrels (gray, red, southern flying and northern flying), mice (woodland jumping, white-footed, meadow jumping, house and deer), and Myotis (Keen's, small-footed and little brown) (Gengras and Bolian, 1991).

Mammals using the Pemigewasset River for their primary habitat include otter, mink, beaver and muskrat. Other species which use the river in a more peripheral way include: moose, raccoons, red and gray foxes, fisher, coyote, bobcats, weasels, voles and shrews.

Reptiles and amphibians known or expected to occur in the river, in adjacent wetlands or in upland areas include: American and Fowler's toads, frogs (gray, green, bull, leopard, pickerel and wood), spring peepers, snakes (brown, garter, milk, redbelly, ring-necked, smooth green and water), black racer, salamanders (blue-spotted, dusky, red-spotted, red-backed, spotted, spring and two-lined), red-spotted newt, and turtles (wood, painted and common snapping) (Gengras and Bolian, 1991).

One hundred seventy three bird species live out all or part of their life cycle in the Valley segment river corridor. Riparian songbirds include the kingbird, alder and willow flycatcher, common yellow throat, northern water thrush, veery, swamp and song sparrow, yellow warbler, and several types of swallows. Other riparian species include the kingfisher, great blue and green-back heron, American bittern, wood and black duck, mallard, hooded and common merganser and spotted sandpiper (Erler, 1992).

The corridor is an important migration route for "neo-tropical migrant" birds (birds that breed in North America in the summer and winter in South and Central America) such as tanagers, warblers, thrushes and osprey (Foss, 1992).

Bald eagles have been sighted in the study towns, and reportedly use the Pemigewasset River just south of the study corridor. An Audubon raptor migration survey conducted in Bristol in September, 1992 noted 4000 hawks and eight bald eagles flying over the Pemigewasset. There has also been an undocumented sighting of Loons using the Pemigewasset River near Blair Bridge.

One rare species listed on the NHNHI has been sighted within the corridor: A grasshopper sparrow has been documented in a floodplain field in northern New Hampton. The species is secure on a global basis, but rare in the State of New Hampshire. Historical records indicate that New Hampshire is on the edge of the grasshopper sparrow's range. The bird has in the past nested in a hay field by the confluence of the Pemigewasset and Squam Rivers, but has not done so for several years since the field was planted with corn (Foss, 1992).

No other species of concern were identified within the study area, although future fieldwork may reveal additional declining species or natural communities (Cutko, 1992).

2.7 ANADROMOUS FISHERIES

The Pemigewasset River is of particular importance to the ongoing Merrimack River Anadromous Fish Restoration Program. Begun in 1969, this cooperative effort between the State fishery agencies of New Hampshire and Massachusetts - as well as federal government agencies and private utility and conservation organizations - has been directed towards the reestablishment of Atlantic salmon, American shad, and river herring populations to the Merrimack River basin. Impassable dams, pollution, and over fishing all contributed to a drastic reduction (elimination, in the case of salmon) in fish runs during the last century. Today, annual counts of returning fish at fish passage facilities on the Merrimack River are marking the return of these sea-run fish.

To date, an approximate total of $25 million has been spent on the Merrimack River Anadromous Fish Restoration Program. Twelve million has been contributed by the various government agencies ($419,000 of this amount from the State of New

Hampshire) to conduct program activities. The remainder (approximately $13 million) has come from utility companies - primarily for fish passage facility construction, operation, maintenance, and associated environmental studies (Stolte, 1992).

Outstanding resource: ANADROMOUS FISHERY

The Pemigewasset river is critical to the success of the ongoing Merrimack River Atlantic Salmon Restoration program, one of the three largest salmon restoration programs in New England. Three fourths of the Merrimack basin's Atlantic salmon nursery habitat and the vast majority of its spawning habitat is found within the Pemigewasset River and its tributaries.

The importance of the Pemigewasset River to the Merrimack restoration program is based on the fact that the Atlantic salmon is dependent on the Pemigewasset to complete its life cycle. Historically, the Pemigewasset's cool, clear, and well oxygenated waters flowing unobstructed over cobble/gravel substrate provided returning Atlantic salmon with the majority of their prime spawning and nursery habitat (McKeon, 1992). Detailed studies conducted over the last several years indicate that over three quarters (77%) of the Merrimack River basin's salmon nursery habitat is found within the Pemigewasset River and its tributaries (Greenwood, 1992). Accordingly, the Pemigewasset sub-basin is at the center of salmon restoration efforts, with 65% of the program's salmon fry being released upstream from Ayers Island Dam (McKeon, 1992).

The Pemigewasset sub-basin also contains the vast majority of the Merrimack River basin's present-day salmon spawning habitat (FERC, 1990), although this habitat has yet to be quantified. Future plans call for the utilization of this spawning habitat by returning adult salmon when necessary fish transport procedures and/or upstream fish passage facilities are in place. Due to the critical importance of this habitat to the Atlantic Salmon, the Pemigewasset River upstream of Ayers Island dam is currently closed to salmon fishing and likely to remain so in the future.

The mainstem of the Pemigewasset River is particularly important to current restoration efforts because many of its tributaries, which historically provided additional spawning and nursery habitat to returning salmon, are no longer available to the fish. In the Pemigewasset sub-basin, only the Baker and East Branch Pemigewasset Rivers are completely unobstructed and thus potentially significant in terms of tributary salmon habitat. The study segments are significant in that they contain approximately 51% of the total mainstem Pemigewasset River nursery habitat "units" surveyed (1 unit = 100 square yards) (Greenwood, 1992). Most of this habitat falls within the Valley segment; the Franconia Notch segment is a minor component of the restoration effort due to its small size (McLaughlin, 1992.)

The Merrimack River Restoration Program's overall goal for Atlantic Salmon is:

> To restore the Atlantic Salmon resource to a level of optimal utilization of the existing habitat in the Merrimack River basin for public benefit.

In order to achieve the above, restoration efforts are being focused on (1) re-establishing a self-perpetuating population of returning, sea-run Atlantic salmon into parts of the Merrimack River basin, primarily the Pemigewasset sub-basin area, and (2) providing a surplus of adult salmon for sport fishing by stocking juvenile salmon in those tributaries where dams will continue to block salmon migration.

Restoration efforts depend upon providing salmon passage through the seven major dams which impound the Merrimack River. To date, facilities have been installed at the three most downstream dams (the Essex and Pawtucket dams in Lawrence and Lowell, Massachusetts, and the Amoskeag Dam in Manchester, New Hampshire) enabling returning salmon to get part way upriver. Construction of fish passage facilities at the four remaining upstream dams will be triggered by increasing returns of fish at downstream locations. Construction of fish passage facilities at Ayers Island Dam is expected early in the next century.

Between 1982 and September 1992, 1635 adult salmon have returned to the Merrimack River. The majority of these fish were captured at the Essex dam in Lawrence and transported to the Nashua National Fish Hatchery in New Hampshire where they have been used as brood stock for egg production. Between 1975 and 1992, approximately 9.2 million fry, 778,000 parr, and 1.4 million smolts were produced and released into the system. As fish passage facilities allow salmon to migrate to the headwaters of the river, the artificial stocking program for the Pemigewasset River section of the basin will become unnecessary as natural spawning and rearing becomes established (Stolte, 1992).

The Merrimack River program is notable for its unusually high success rate with regard to fry stocking (recently hatched salmon under 2" in length). Fry have the advantage of being less costly to produce than parr or smolts (older juvenile fish) and furthermore, those fish that survive to return to the Merrimack watershed to spawn are found to be more genetically fit to the river system. The ratio of adult fish returning from the ocean to juvenile fish released into the river is one of the better indicators of a program's level of success. The Merrimack River program has demonstrated that a significant return on fry stocking is possible by averaging 0.27 returning adults per 1000 fry stocked (Stolte, 1991). This high ratio is testimony to the Pemigewasset River's capacity to rear juvenile salmon and helps explain the importance attached to the river by the Merrimack River Anadromous Fish Restoration Program.

There are a number of ongoing anadromous fish restoration programs in New England. The Merrimack, Connecticut, and Penobscot River restoration programs are the largest programs with the highest level of funding and federal government involvement. The

three rivers were targeted because they are the largest river systems in New England with the most available spawning and rearing habitat for Atlantic Salmon (Greenwood, 1992). Historically, the three were the major salmon-producing rivers in the Northeastern United States.

Table 3
ANADROMOUS FISH RETURNS

Year	No. of Salmon	No. of Shad*
1982	23	
1983	114	5,000
1984	115	5,000
1985	213	13,000
1986	103	18,000
1987	139	16,000
1988	65	13,000
1989	84	7,000
1990	248	6,000
1991	331	16,000
1992	199**	20,000

* rounded to nearest thousand
** salmon count as of 9/29/92; some additional fish are expected to return before the spawning season is over (Stolte, 1992).

Differences in program start-up dates, funding levels, numbers of dams on the rivers, resident predator populations, available biological stock, and geographic location in

relation to the Atlantic Salmon's historical habitat make scientific comparisons between these three programs difficult.

The Merrimack River program has had its share of successes. Table 3 details the numbers of Atlantic salmon and American shad returning to the Merrimack River basin. The fish were captured and counted at the Essex Dam in Lawrence, Massachusetts. In 1991, a record 332 adult salmon were captured at the Essex Dam during the fish passage season. This number is less than the number of fish tallied on the Penobscot River but more than the number for the Connecticut River during the same year. The figure represents significant progress over the 23 returning fish captured on the Merrimack in 1982.

Salmon population trends throughout the Northeastern United States are cyclical with many factors contributing to a natural fluctuation. Most significant of these factors is the availability of food in the ocean (dependent on ocean currents), predator populations (seals, bluefish, etc.), and international fish harvesting activities (Marancik, 1992). Prospects for the success of the restoration program have received a boost from recently enacted fishing moratoriums and fisherman buyouts in other countries. In addition, ongoing fish cultural research relative to hatchery rearing techniques, diet, disease prevention and genetics holds out the promise of improved salmon stock.

Ultimately, the goal of the Merrimack River Anadromous Fish Restoration Program is to have some 3,000 adult atlantic salmon returning to the Merrimack River basin each year to complete their life cycle in the waters of the Pemigewasset River and its tributaries. Stocked fish would augment this number and, downstream of Ayers Island Dam, provide sport to a public eager for the return of this prized game fish.

2.8 RESIDENT FISH

Franconia Notch segment. The Franconia Notch segment of the Pemigewasset River contains native brook trout in addition to shiners, sculpin, and blacknose dace (McKeon, 1992). The waters along this section are cool, clear, and well oxygenated - ideal for salmonid species - with boulders, submerged logs, and undercut banks providing ample protection from predators. The river's overhanging canopy of trees provides additional protection and serves to keep the water cool. The water is generally nutrient-poor along this segment keeping the trout from attaining any substantial size. No stocking is done along this stretch of the river, and fishing pressure is light, owing partly to the construction of the parkway and the consequent increase in difficulty of access (Olsen, 1992).

There are two lakes at the headwaters of the Pemigewasset: Breeding Pond and Profile Lake. Profile Lake is stocked with brook trout, and used heavily by fly fisherman. Surveys done by the New Hampshire Department of Fish and Game indicate that Profile

Lake is highly productive in terms of fish catches (Perry, 1992).

Breeding Pond, located just upstream of Profile Lake, is not stocked, probably contains only small forage fish such as shiners and minnows, and is closed to fishing (Perry, 1992). At one time, stocked Brook Trout in Profile Lake used the pond for fall spawning. A small dam was later placed at the outlet of the pond, and although fish passage was installed, low water flows often make navigation of the fish ladder impossible (Miller, 1992).

In order to ascertain the regional significance of the Pemigewasset River fishery, a comparative study was conducted. Fifty-three New Hampshire rivers or river segments rated as "highly significant" for inland fisheries by a 1983 study conducted by the New England Rivers Center were used for the comparative analysis. Three segments of the Pemigewasset River were evaluated: Profile Lake to the East Branch Pemigewasset confluence; East Branch Pemigewasset confluence to Sawhegenit Falls; and Sawhegenit Falls to the Winnepesaukee confluence in Franklin. Explicit criteria used to evaluate the resource included structural habitat quality, diversity and value of species, populations of species, natural reproduction, size and vigor of fish, quality of aesthetic experience, level of use, and access (see appendix). Each river segment was rated for each criteria on a scale from 1 to 4, with 1 indicating that the value in question was largely insignificant in the context of the region and 4 indicating that the particular value was present to an outstanding degree. The survey team that completed the questionnaires was comprised of experts from the U.S. Fish & Wildlife Service, New Hampshire Department of Fish and Game, New Hampshire Wildlife Federation, Trout Unlimited, and the Pemigewasset Fish and Game Club.

The northern study segment was rated about average overall of the rivers evaluated. It was rated as one of the best in the state for "aesthetic experience" and "recreational importance", better than average for "habitat quality" and "access", and typical for "diversity and value", "abundance," "size and vigor," and "natural reproduction."

Valley segment. Habitat in the upper part of the Valley segment (Thornton through Campton) is also characterized by cool, clear, well oxygenated though nutrient-poor waters. Water temperatures are somewhat warmer than in the Notch due to more-open topography and a wider river bed less well-shaded by riparian tree canopy. The river is generally broad and shallow with numerous riffles, rapids, and scoured pools providing very good habitat for brook trout, rainbow trout, brown trout and Atlantic salmon. About 2500 trout are stocked each year on the Pemi as far south as Livermore Falls (Olsen).

This stretch of the river is popular with trout fishermen, particularly summer and weekend tourists. Generally moderate fish catches are reported (Perry, 1992; Phinney, 1992), in part due to the expansiveness of the river - the fish are more spread out and some of the prime fishing spots can only be accessed by boat. Most fishing pressure has

been observed at the more easily accessed parts of the river, particularly around the riverside campgrounds. While some canoe fishing does occur, most fishermen cast from the banks (Olsen, 1992).

Outstanding resource: RESIDENT FISHERY

The Pemigewasset River from the East Branch Pemigewasset to the Baker River rates as one of the best coldwater fisheries in the state in terms of habitat quality, diversity and value of species, aesthetic experience and recreational importance. The reach from Sawhegenit Falls to the southern study boundary is part of a popular bass fishery.

The river slows considerably through the lower part of the segment (Plymouth through Bridgewater) due to decreased gradient and the effect of the Ayers Island impoundment. Increased water temperatures provide habitat for warmwater species which include small mouth and large mouth bass, sunfish, chain pickerel, shiners, yellow perch, white and longnose sucker, blacknose dace, brown bullhead, fall fish, and American eel (Greenwood, 1992). Most of the fishing done between Plymouth and Ayers Island Dam is for warmwater species, primarily bass, with moderate to good results reported (Perry, 1992; Phinney, 1992).

Use of the river below Sawhegenit Falls by bass fishermen is heavy, beginning just after the ice melts and lasting into the fall; it is not uncommon to see 15 boat trailers parked at the Bristol boat launch on a summer day. Fishermen often motor up as far as Sawhegenit and fish the shoreline down to the dam. Bass tournaments are held here, and many fishermen, particularly members of bass clubs, release the fish they catch (Phinney, 1992).

The results of the comparative analysis indicate that the reach of the Pemigewasset from the East Branch Pemigewasset to Sawhegenit Falls is among the top five of the New Hampshire rivers surveyed for resident fisheries. The reach was rated as one of the best in the state for "habitat quality," "diversity and value," "aesthetic experience," and "recreational importance", and rated better than average for "abundance", "natural reproduction", "size and vigor", and "access". The high ratings were probably generated primarily by the upper part of the segment from the East Branch to the Baker River, with its high water quality, extensive salmonid structural habitat, and pleasant scenery.

The reach from Sawhegenit Falls to Franklin ranked about average overall of the rivers evaluated. It was rated as one of the best in the region for "size and vigor", "aesthetic experience", and "recreational importance", and better than average for "habitat quality", "diversity and value", "abundance" and "access". "Natural reproduction" was rated as typical.

2.9 RECREATION

Franconia Notch segment. Franconia Notch State Park, located within a day's drive of over 62 million people, offers a myriad of recreation opportunities to its many visitors. These opportunities range from automobile sightseeing to climbing the sheer face of Cannon Cliff, and include almost everything in between. Picnicking, camping, boating, fishing, swimming, hiking, and mountain biking are enjoyed during the warmer months, while winter brings cross country skiing and snowmobiling[1]. Many of these activities occur in or alongside the Pemigewasset River and Profile Lake; others are enhanced by the river's presence.

Outstanding resource: RECREATION

Franconia Notch State Park offers an exceptional diversity of recreational opportunities, and receives the heaviest use of any park in the state. The Pemigewasset River corridor is the focus for much of this activity, and provides staging areas for hikers and climbers bound for higher altitude areas.

Sightseeing is a major recreation activity in this highly scenic state park. Hundreds of thousands of day and overnight visitors are drawn to the park annually by sweeping vistas which include mountains, lakes, rivers, forests, sheer cliffs and rock outcrops such as the Old Man of the Mountain. Many of these spectacular sights can be seen from the river valley while driving on the Parkway along the river[2]. Automobile sightseeing is in fact the most popular recreation activity within the park (NHDPW, 1979).

The Franconia Notch area is among the four most heavily hiked areas in the White Mountains, with several trails being used year round (Hutchings, 1992). All of the Park's trails are accessed by parking areas and low elevation trails and trailheads in the Pemigewasset River corridor. Within the Park, 18 trails totaling 30 miles in length are used by hikers to access the Kinsman Range to the west and the Franconia Range to the east. The Appalachian Mountain Trail crosses the Pemigewasset River in the southern end of the park and is one of the area's major draws (NHDPW, 1979). High country

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[1] Downhill skiing is also enjoyed at the Cannon Mountain Ski Area located just north of the Pemigewasset River corridor.

[2] After decades of intense controversy, Interstate 93 was constructed through Franconia Notch State Park, but was built as a two-lane Parkway rather than the standard four lanes as originally proposed. Recreation facilities and public access to them were upgraded during the Parkway's construction in the mid 1980's.

trails, such as the Franconia Ridge Trail, are accessible from park trails, providing high quality alpine hiking experiences which are rare in the region (Rajala, 1992).

Two valley trails parallel the Pemigewasset River through the park. The Pemi Trail follows the river for several miles along the floor of the valley. The Pemi Trail is one of the more popular paths in the park, due to the ease and relative shortness of the hike combined with frequent and appealing views of the river (Weldon, 1992). The Bike Path also parallels the river and is popular with mountain bikers. This paved pathway offers occasional views of both the Pemigewasset River and the mountains beyond. The Parkway is rarely seen from these two trails, though traffic noise is evident.

Camping is also very popular in the park. Lafayette Campground's 97 sites are generally booked well in advance from June through September. The Pemigewasset River flows right through the campground, and riverside sites are usually the first to be booked (Weldon, 1992). While inclement weather can lead to no-shows, any pleasant summer day will likely see all the sites occupied. Many campers are return visitors who have been coming to the Park for years (Ireland, 1992).

Profile Lake, a 15-acre lake at the base of Cannon Mountain known as the "Crown Jewel" of the White Mountains, is used for boating, picnicking, sightseeing, and fishing. Profile Lake was the centerpiece of early White Mountain tourism when well-to-do 19th century visitors frequented nearby grand hotels.

The Pool, the Flume, and the Basin are among the most popular points of interest with park visitors. The Flume is annually visited by some 175,000 people (Reid, 1992), many of whom complete a loop trail that goes past the Pool. The opportunity to view such an assortment of unique geologic/hydrologic features within a very limited geographical area is unparalleled in New Hampshire and rare in New England (Dow, 1992; Middlekauff, 1992).

A three-mile reach of the Pemigewasset River from the Basin to an area south of the park boundary provides an opportunity for expert kayakers to negotiate a Class IV/V/VI river through a superb canyon replete with boulder drops, bedrock chutes and falls. The average gradient through this reach is over 150 feet per mile, with the steepest mile dropping 280 feet. While only a few possess the skill level demanded by this run, and while the runnable season is very limited, the reach provides one of only a very few high quality expert kayak runs in the region.

Several facilities are located within the river corridor to accommodate recreationists and visitors. The Flume Visitor Center at the south end of the park serves as a regional information center, with approximately 500,000 visitors each season (Hunt, 1992). Lafayette Place is the hub of hiking activity in the Notch and the site of an Interpretive Center where visitors can attend lectures and workshops to sharpen their mountaineering skills. The center also provides current information to hikers on trail and weather

conditions (Weldon, 1992). Additional picnicking and rest areas are located along the Parkway and river.

Outside the river corridor, two Appalachian Mountain Club huts (Greenleaf and Lonesome Lake) located in the Kinsman and Franconia ranges provide respite and lodging to hikers.

Visited by some 1.75 million people annually[3], Franconia Notch State Park is by far the most heavily used park in the state, accounting for 40% of New Hampshire's annual state park income. Scenic grandeur, exemplary geologic/hydrologic features, unparalleled recreational opportunities, and ease of access via Interstate 93 combine to make Franconia Notch State Park the cornerstone of New Hampshire's park system, and a national attraction as well (Reid, 1992).

Valley segment. A wide variety of recreational activities occurs along the river in the valley study corridor. Responses from surveys of riverside landowners and the general public indicate that boating, fishing and swimming are the most common activities (see table 4). Access to the river exists primarily on town and state-owned parcels and at road right-of-ways, with the exception of two popular privately owned access points in Campton.

The corridor includes commercial campgrounds in Thornton, Campton, Bridgewater and New Hampton, and golf courses in Thornton and Ashland. Sawhegenit Falls, a relatively undeveloped town park in Bridgewater, receives a fair amount of use by picnickers, swimmers, and sunbathers during the summer months. The towns of Plymouth and Holderness are both pursuing plans for primitive parks on riverfront property.

Livermore Falls is a popular recreation site providing a unique recreational opportunity in the region (FERC, 1990). Although not developed in any way to accommodate recreationists, the falls annually attract an estimated 5,000 visitors who come to swim, picnic, sunbathe, and enjoy the area's unique scenic qualities. Much of the site's appeal can be attributed to its geologic/hydrologic features. Livermore Falls was purchased by the state in the summer of 1992 and will be jointly managed by the Division of Parks and Recreation and the Fish and Game Department. Some facility development is planned to better accommodate recreationists, but the state has not yet developed a recreation plan for the area.

Possibly the most significant of the recreational activities occurring in the community study corridor is flatwater/quickwater boating for the beginner or low intermediate canoeist.

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[3] This figure reflects use of the Cannon Mountain Ski Area as well as recreational use in the Pemigewasset River corridor.

Table 4
RECREATIONAL ACTIVITIES OCCURRING ALONG THE PEMIGEWASSET RIVER

Activity	Percent of riverside landowner survey respondents observing activity*	Percent of general public survey respondents engaging in activity**
Canoeing or kayaking	77	54
Fishing	76	42
Swimming	76	52
Walking or hiking	61	12
Picnicking	47	39
Bird/wildlife watching	42	35
Camping	35	14
Snowmobiling	35	0
Hunting or trapping	25	6
Power boating	18	0
Jet skiing	7	0

* 95 of approximately 400 riverside landowners in the study area responded to the survey, for a 25% response rate.
** 140 people responded to the general public survey, 134 of whom are permanent, seasonal or weekend residents of a Pemigewasset River valley town.

Flatwater canoeing - The river reach from Thornton to Blair Bridge in Campton is predominantly quickwater with occasional class I riffles. A multi-channelled river bed offers interesting alternative routes to the paddler. Sizeable tributaries join the mainstem along this stretch, adding volume, scenic and hydrologic diversity, and wetlands at the confluences. The scenery consists largely of foreground views of forest and old fields, with sparsely scattered houses and a few condominium developments. Occasional views of the White Mountains are available upon looking back upstream. Although the reach is bracketed and bridged by an interstate highway and two 2-lane highways, roads are only visible from the river in a few locations. Road noise, however, is usually evident.

The four miles of river below Blair Bridge encompass Livermore Falls and adjacent rapids up- and downriver to the Baker River confluence. Livermore Falls is a Class V rapid which is rarely run intentionally. It is preceded by Class II riffles and followed by Class II/III rapids.

The reach from the Pemigewasset/Baker River confluence to the downstream end of the study segment has a single channel and deeper, slower moving water. A riffle at Sawhegenit Falls grows to a four-foot cascade when the Ayers Island impoundment is lowered. Below Sawhegenit Falls, the river slows and deepens further, until its character at the bottom of the study segment becomes largely impounded with steep, sandy banks.

Vast areas of floodplain, numerous sandy beaches, oxbows and associated wetlands occur in the upper part of this reach. The corridor is generally more developed than through Thornton and Campton, with some riverside urban development in Plymouth town center, two large condominium complexes in Ashland, and an area of industrial development in Ashland and Bridgewater. Roads parallel the river through this area as well, occasionally visible but usually audible.

Outstanding resource: CANOEING

The Pemigewasset River through Thornton to Blair Bridge in Campton provides one of the top three flatwater/quickwater canoe runs within a 2-hour travel radius of Concord, New Hampshire. High-ranking attributes of the reach include character of the run, scenery, associated opportunities such as fishing, swimming and camping, and length of free-flowing river.

A comparative analysis was conducted to determine the regional significance of flatwater/quickwater canoeing on the Pemigewasset River. Twenty-six river segments were chosen for the analysis from canoe guidebooks and by consulting with experts in the field. Criteria for selection included: Predominantly flatwater/quickwater/class I; length of at least seven miles; location within two hours of Concord in New Hampshire, Vermont and Maine; and an extended runnable season. The intent of this last criterion was to weed out a number of rivers which offered similar boating values but only for an extremely short season.

The evaluation team was comprised of experts from the Appalachian Mountain Club, Merrimack Valley Paddlers, United States Canoe Association, American Canoe Association, Sub Sig, and a private canoe outfitter. Criteria used to rate the rivers included length of boatable season, consistency of flow, river character, scenery, access, level of recreational use, camping potential and other associated opportunities (see appendix). As with the fisheries comparative analysis, numerical ratings were assigned to each river for each criterion. The results of the survey were augmented by information gleaned from New England canoe guidebooks.

Three separate reaches of the Pemigewasset River were evaluated, including two reaches encompassing much of the southern segment: the downstream-most Route 175 Bridge in lower Woodstock to Blair Bridge; and Holderness Bridge in Plymouth to Route 104 Bridge in Bristol.

The reach from the Route 175 Bridge in Woodstock to Blair Bridge was among the 3 top-rated river segments evaluated, scoring very highly for "character of run", "scenery", and "associated opportunities" (fishing, picnicking, swimming, etc.). Camping opportunities along the Pemigewasset River, including islands and low water sand bars as well as commercial campgrounds, contributed to the reach's high rating. Access to the river was rated as easy, while flow was considered somewhat unpredictable, primarily due to the flashy character of the watershed. The river was judged average in terms of its runnable season, and described as lightly to moderately used for canoeing.

Few evaluators had knowledge about the reach from Holderness Bridge in Plymouth to the Route 104 Bridge in Bristol. Those that did judged the reach as having better than average boating resource values overall, scoring seventh highest of the 26 segments evaluated. The reach scored relatively well for "associated opportunities", "opportunity to camp", "length of season", and "consistency of flow". Flows and length of season rated higher for this reach than for the reach from Woodstock through Campton due primarily to the volume added by tributaries and the effect of the impoundment in Bridgewater and New Hampton. River character and scenery were rated about average, and access was judged to be easy. Use was rated light, a fact underscored by the few evaluators with information about this reach.

Particularly significant about canoeing on the Pemigewasset River is the length which exists in a free-flowing state; many other segments evaluated included dams, necessitating portages.

2.10 SCENERY

Franconia Notch segment. Franconia Notch State Park boasts tremendous scenic variety, including spectacular views of and from the Pemigewasset River valley. Sweeping vistas of mountains, sheer cliffs, granitic outcroppings such as the Old Man of the Mountain, forests, lakes and waterways can be seen by recreationists in the river valley as well as by motorists driving on the Parkway paralleling the river. Automobile sightseeing is in fact the most popular activity within the park. Many of the park's visitors use Parkway turnouts to view the Old Man, Cannon Cliffs and Talus, as well as waterway features such as Profile Lake and the Basin.

Even more spectacular are views of the river corridor in its undeveloped setting as seen from the surrounding mountain peaks and high altitude hiking trails. These views can be accessed via trailheads adjacent the river. Alternatively, sightseers can ride the Cannon Mountain Aerial Tramway to the summit of 4,200-foot Cannon Mountain, where a short walk to one of the south facing lookout points reveals commanding views of the valley and Pemigewasset River below - as well as the rugged Franconia Range which frames the eastern wall of the Notch.

Trails which parallel and bridge the Pemigewasset River itself offer foreground views of fascinating geologic/hydrologic features, such as the Basin and Pool, wetlands and lakes, and a continuously cascading river character. At isolated locations, hikers are also rewarded with a view through riparian vegetation of the surrounding cliffs and mountain sides. Other trails take hikers to view tributary attractions such as the Flume and Boise Rock.

Outstanding resource: SCENERY

Trailside views of fascinating riverbed geology, roadside vistas of dramatic cliffs and crags, and high-altitude panoramas of the Pemigewasset River valley combine to create an outstanding scenic resource in the Franconia Notch segment. High quality views of this scope and character are rare in the northeastern United States.

All told, scenery comparable to the grandeur and diversity found in Franconia Notch is very rare in the northeastern United States, lending national significance to the Park (Reid, 1992). Many people report Franconia Notch State Park to be the most beautiful state park they have ever visited (Ireland, 1992).

Valley segment. Views from the river through this segment reveal a very rural corridor. Scenery consists largely of foreground views of forests and old fields with sparsely scattered residential, commercial and industrial development. Occasional views of the White Mountains are available upon looking back upstream. Scenic diversity is provided by islands, floodplain wetlands, oxbows, tributary confluences and numerous gravel and sandy beaches. Scenery through Thornton and Campton was rated very highly in a comparative analysis of flatwater canoeing rivers in the region.

The character of the river varies from lively, shallow and braided to broad, deep and slow-moving, with several areas of boulder-strewn riffles. Livermore Falls punctuates the segment with a 12-foot waterfall and accompanying rapids set within a deep gorge at the site of an historic mill and bridge. The area attracts thousands of visitors each year, partially due to its scenic quality.

Sawhegenit Falls, at the confluence with the Squam River, is another especially scenic area, offering views of a river-wide bedrock ledge and two mid-stream islands. When the Ayers Island impoundment is low, a falls forms over the ledge, and an extensive mid-river sandbar is revealed.

Views of the river can be seen from the roads paralleling and bridging the waterway, including Interstate 93, Routes 3 and 175, and River Road. While these roads and bridges can be visually and auditorially intrusive to the river user, they provide an important visual resource for the many motorists travelling through the river valley.

2.11 CULTURAL/HISTORIC RESOURCES

Franconia Notch segment. Despite the extensive history of Native American life throughout much of New Hampshire, there is little record of activity in Franconia Notch. It is thought that Native Americans rarely trod the mountainous areas of the region.

Nor are there historic structures attesting to early European settlement of the area. The first historical reference to the Franconia Notch area dates to 1805, when surveyors laying out a carriage road first glimpsed the "Great Profile" (the Old Man of the Mountain). The grand hotels of the 19th and early 20th Century - including the Flume House and Profile House - burned to the ground; no trace of these early structures remains today. Some historical exhibits are on display in the Flume Building.

Valley segment. Little is known about prehistoric human habitation in the area. While no exhaustive, professional survey has been done, few Native American artifacts or sites have been found in the area. This dearth of habitation sites is most likely due to a more severe climate and lesser biomass as compared to more southern areas of the state where sites are more common (Gengras and Bolian, 1991).

Six archaeological sites containing Native American artifacts are listed in the New Hampshire Historical/Archaeological Resources Inventory. Two of the sites, located by the confluence of the Baker and Pemigewasset Rivers, were destroyed when the armory in Plymouth was built in 1965. Of the remaining sites, only one has been field verified; the others have yet to be formally surveyed. Two of the four remaining sites are located in Ashland, one is in New Hampton and one in Bridgewater. Most are located by stream confluences with the Pemigewasset River and were used for temporary encampments, seasonal fishing stations, food processing locations, and seasonal habitation (Gengras and Bolian, 1991).

There are several sites located in the study corridor that are listed on the National Register of Historic Places or are eligible for such listing. These include buildings, bridges, and a pulp mill. Numerous other structures on the register are located beyond the study corridor in the towns of Holderness, Ashland and New Hampton.

Buildings included on the National Register include the old Grafton County Courthouse and the Plymouth Historic District, both located in the Plymouth town center. Information about these structures came from National Register nomination forms.

The Old Grafton County Courthouse, built in 1774, is one of the oldest surviving public structures in New Hampshire. Although the building has been remodeled several times and its uses have changed over the centuries, it still illustrates the form of an 18th century public structure and in addition contains much detailing added in the late 19th

century under the influence of the colonial revival. The structure is also significant for its judicial history (Daniel Webster argued his first criminal case in the courthouse in 1806) and the fact that it housed the first public library in Plymouth (established in 1876). The Plymouth Historical Society currently occupies the building.

The Plymouth Historic District is comprised of five buildings which represent the political, judicial, religious, literary, and commercial history of the community. In addition to the Old Grafton County Courthouse, the historic district includes the Plymouth Town Hall and Courthouse (built in 1890); the Plymouth Congregational Church (rebuilt in 1985 maintaining the scale and materials of the original church built on the site in 1836); the Pemigewasset National Bank Building (constructed in 1885 to house the recently chartered bank); and the Plymouth Post Office (built in 1936). Also contributing to the historic value of the district is the Plymouth Common, set aside since colonial times as open space.

Although the buildings in the Plymouth Historic District date from various periods and represent different architectural styles, they nevertheless reflect most of the major activities that made Plymouth a regional center in the early twentieth century.

Two other sites are eligible for listing on the National Register, providing them with essentially the same protection afforded to sites on the register. The Plymouth Rail Road Station, located near the river in the town center, was found eligible due to its significance to New Hampshire railroads and winter recreation. The depot was built in 1909-1910 and opened for business in 1910. While later changes altered the structure and its composition somewhat, it is still considered to be of sufficient architectural and historic significance to warrant its inclusion in the National Register (Wilson, 1992). Plans are in place to remodel the structure to house a new Senior Center; construction will be in accordance with historic themes.

Livermore Falls has also been found eligible for the National Register. The falls saw its first industrial development in 1773 when a grist mill was established on the site. At the end of the 19th century, a paper pulping operation known as the Livermore Falls Mill was built. The remains of the mill, including brick and granite structure and piping, is eligible due to its historic associations with the local economy and the pulp and paper industry of central New Hampshire (FERC, 1990). Of additional note is the Livermore Falls Bridge, a rare lenticular truss bridge built in 1885 just south of the falls. The Livermore Falls Bridge is the only one of its kind in New Hampshire, making it also eligible for the National Register (Hume, 1992). The state owns the mill ruins; the Pumpkin Seed Bridge is privately owned.

Several other bridges in the study corridor have met specific requirements of historicity, technological significance, and environmental quality and are also deemed eligible for the National Register of Historic Places. These bridges are listed in table 5. According to NH Department of Transportation personnel, this density of historic bridges is

considered average for New England.

Finally, a recent study of the Pemigewasset River valley south of the study area has led state authorities to expect future identification of many sites in the study area itself. These sites would be related to "settlement, resource extraction and milling, agriculture, ice-making, home manufacturing, industry, transportation, tourism, commerce, community life, recreation, education, religion, and government". Some would likely be eligible for inclusion in the National Register of Historic Places (Hume, 1992).

Table 5
BRIDGES ELIGIBLE for the NATIONAL REGISTER of HISTORIC PLACES

Town	Location
Lincoln (Flume Bridge)*	FNSP road over Pemigewasset River
Lincoln (Sentinel Pine Bridge)*	Flume footpath over Pemigewasset River
Campton	Route 49 over Pemigewasset River
Campton	Route 175 over Beebe River
Campton	Route 175 over Mad River
Campton (Blair Bridge)*	Blair Road over Pemigewasset River
Campton (Turkey Jim)*	Private road over Branch Brook
Plymouth	Route 3 over Baker River
Ashland/ Bridgewater	Route 3 over Pemigewasset River

Note: Covered bridges are denoted by an asterisk.

2.12 LAND USE, OWNERSHIP AND SOCIOECONOMICS

Franconia Notch segment. The entire corridor falls within the Franconia Notch State Park, managed by the Division of Parks and Recreation, and is almost entirely forested. Developments are limited to the I-93 Parkway and recreation facilities such as the Flume Visitor Center, Lafayette Campground and Interpretive Center, parking areas and trails.

Valley segment.

Land use - The community study corridor is primarily forest land interspersed with agricultural lands and sparse residential development. Principal uses of the corridor are year-round and seasonal residential dwellings, including a few condominium developments; agricultural operations (hayfields, cornfields, Christmas tree farms); transportation and utility routes; commercial activities including retail trade and sand and gravel mining; recreational facilities including four commercial campgrounds, two golf courses, state and town parks, and school athletic fields; and limited industrial development. The percentages of the corridor in various cover types are listed in table 6.

The overall character of the river corridor is rural. Residential and commercial development occurs mostly along Routes 3 and 175 and River Road, and is usually set back off the river because of floodplain or steep slopes. Condominium complexes are sited on the river banks in Thornton, Campton and Ashland, and the greatest concentration of development occurs in the Plymouth town center. Industrial development in the corridor is limited: Campton Sand and Gravel, Bridgewater Power, and Rochester Shoe Tree in Ashland.

Active agricultural operations in the Pemigewasset River valley today are limited largely to growing hay, corn and christmas trees in the intervales. Dairy farms, which earlier in the century were found up and down the river valley, have since gone out of business with only two dairy operations remaining in New Hampton (beyond the study corridor) (Huckins, 1992; Schlesinger, 1992). Much of the abandoned farmland in the valley has reverted to forest. Recently abandoned operations have given rise to the hundreds of acres of idle land in the corridor.

The Pemigewasset River valley serves as a major regional north/south transportation corridor. From Franconia Notch to Bristol, Interstate 93, U.S. Route 3, state and town-owned roads and a rail line parallel and often bridge the river. Electrical transmission lines also follow the river valley. From the water, the sight and sounds of roads and bridges are often the most obvious signs of development.

Table 6
LAND COVER IN VALLEY SEGMENT

Cover type	Percent of corridor	Acreage
Forest	53.31%	6,827.4
Water bodies	7.58	971.1
Idle land	7.24	927.3
Transportation/utilities	7.21	922.5
Residential	6.86	878.1
Agricultural	5.88	753.9
Recreational	2.75	352.4
Gravel pits	2.43	311.1
High density residential	1.36	173.9
Commercial	1.17	149.9
Government/institutional	1.10	141.7
Wetlands	.93	118.9
Barren lands (beaches)	.87	111.7
Industrial	.67	86.1
Other urban	.42	53.9
Solid waste	.12	15.5
Sewage disposal	.08	10.7

Land ownership - The vast majority of the 12,800-acre corridor is in private ownership. Much of this land is owned in large lots of 15 to 100 acres and larger. The state owns 462 acres (3.6% of the corridor) in two state forests in Campton and three newly acquired parcels in Thornton, Campton and Holderness to be managed by the Division of Parks and Recreation and the Fish and Game Department. Town and Water and Sewer District lands in Plymouth, Holderness, Ashland and Bridgewater account for another 197 acres (1.5%). Approximately another 10% of the corridor is roads, railroads and right-of-ways owned by the state and towns.

Socioeconomics - According to 1990 Census figures, the seven towns through which the community study corridor is located have a combined total population of 15,704 year-round residents. This number is substantially augmented during the summer months by seasonal residents who maintain second homes in the area. All of the towns have populations of less than 2000 with two exceptions: Plymouth (pop. 5,811 - of which approximately 2,600 are college students) and Campton (pop. 2,377).

Settlement patterns are typical of early New England: small village centers every few miles interspersed with low-density development. The Town of Plymouth is a hub of

activity in the area due to its larger size, professional, financial and commercial base, and the presence of Plymouth State College.

Economically, the region is heavily based on seasonal recreation and tourism-related industries. Restaurants, motels, sporting goods stores, campgrounds, antique stores, and similar businesses cater to the visitors attracted each year by the area's proximity to the White Mountains and the Lakes Region. Other sectors of the economy include manufacturing, forest-related occupations, service industry jobs, professional positions, sand and gravel mining, and some residual farming. The construction industry contributed significantly to the Pemigewasset River valley's economy during the 1980's, but construction activity during the current recession has been all but non-existent.

CHAPTER 3: FREE-FLOWING CHARACTER

To be eligible for inclusion in the National Wild and Scenic Rivers System, a river or river segment must be free-flowing. Free-flowing, as defined by Section 16(b) of the Wild and Scenic Rivers Act, means:

> . . . existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures . . . shall not automatically bar its consideration for inclusion: *Provided*, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system.

The "Final Revised Guidelines for Eligibility, Classification and Management of River Areas" further states that river segments classified as "recreational" may have:

> Some existing impoundment or diversion. The existence of low dams, diversions or other modifications of the waterway is acceptable, provided the waterway remains generally natural and riverine in appearance.

FREE-FLOWING CHARACTER	
Franconia Notch segment:	Free-flowing
Valley segment:	Free-flowing

Both study segments were found to be free-flowing. There are no dams or major diversions or channelization within either segment, although both segments have minor channel modifications. In the Franconia Notch segment, these include bridge abutments and short sections of bank armoring. In the Valley segment, modifications include bridge abutments and piers, bank alteration, a water withdrawal pipe, and the remains of a log-crib dam at Livermore Falls. From Sawhegenit Falls to the downstream boundary of the study segment, river flow is affected by the Ayers Island impoundment. However, flow is evident and the river remains riverine in appearance.

CHAPTER 4: CLASSIFICATION

The Wild and Scenic Rivers Act specifies that eligible study segments should be classified as "Wild", "Scenic", or "Recreational", based on their level of development:

> Wild river areas are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
>
> Scenic river areas are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by road.
>
> Recreational river areas are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past.

The classification terms themselves tend to be misleading: river segments designated as "scenic" needn't be outstanding aesthetically nor be managed to retain scenic values; "recreational" rivers needn't offer any recreational value nor be managed to enhance recreation. Regardless of classification, river management should be geared toward protecting the river's outstanding values.

According to the Revised Guidelines, classification should be based upon four criteria: water resources development (development in the waterway), shoreline development (development in the study corridor), accessibility and water quality.

PROPOSED CLASSIFICATION

Breeding Pond to southern boundary of Franconia Notch State Park:	Scenic
Woodstock/Thornton town line to Thornton railroad bridge:	Scenic
Thornton railroad bridge to Bridgewater/Bristol town line:	Recreational

Franconia Notch segment - Outlet of Breeding Pond to southern park boundary (entire segment - 6 miles): SCENIC

Water Resources Development	The first 300 feet of the segment are channelized by concrete retaining walls and riprap. There are no other waterway modifications.
Shoreline Development	The corridor is largely pristine. Developments are limited to the Flume Visitor Center, several other recreation-related buildings, Lafayette campground, parking areas, and hiking and biking trails.
Accessibility	According to the 1982 Revised Federal Guidelines, classification determinations should be made based on four factors: waterway development, development within the study corridor, accessibility and water quality.The 2-lane I-93 parkway parallels the river, occassionally in close proximity, but is a limited-access road. Access to the river from roadside parking areas is provided at five locations. There are two covered bridges over the river for pedestrian traffic; one also accomodates park shuttle buses. Extensive trail access is available along the river.
Water Quality	Class B, suitable for primary contact recreation.

Valley segment - Woodstock/Thornton town line to Thornton railroad bridge (7 miles): SCENIC

Water Resources Development	The reach is free of impoundments. Small areas of bank riprap are evident.
Shoreline Development	Forest, idle fields and agricultural lands predominate. Houses are located along two roads travelling the length of the corridor, as well as a few areas of more concentrated development (small subdivisions, condominium developments) located closer to the river. Only a handful of houses and one condominium development are evident from the waterway.
Accessibility	Route 3 parallels the river at some distance, approaching the bank to provide public access at only one point. Other access is provided at two bridges: Merrill Access Road bridge and the railroad bridge at the southern end of the reach.
Water Quality	Class B, suitable for primary contact recreation.

Valley segment - Thornton railroad bridge to Bridgewater/Bristol town line (19.5 miles): RECREATIONAL

Water Resources Development	Several areas of riprap occur, with the largest and most obvious located at the Plymouth State College athletic fields. A large berm was constructed on the east river bank in Ashland to deflect flood waters from a golf course. Remnants of a breached log crib dam remain at Livermore Falls. There are effluent pipes at the Plymouth wastewater facility and at Bridgewater Power, and a water withdrawal pipe at Campton Sand and Gravel. From Sawhegenit Falls to the southern end of the segment, river flow is affected by the Ayers Island impoundment.
Shoreline Development	The corridor is forested with one large area of floodplain/wetland/agricultural fields. There is substantial evidence of human activity, including Interstate Highway 93 (which parallels the river, sometimes in close proximity, bridging it three times), the Plymouth Village center, commercial establishments located along main corridor roads, a few industrial facilities, condominium developments, campgrounds and scattered houses. Yet due to floodplains, steep slopes and riparian vegetation, the corridor as perceived from the waterway appears rural.
Accessibility	Several roads parallel the river, though only occassionally in close proximity. Routes 3 and 132 and River road briefly approach the river bank to provide public access in Campton, Plymouth and Bridgewater. Other access points include Livermore Falls state park, the Plymouth Village riverfront, Sawhegenit Falls town park in Bridgewater, road bridges at Blair road, Route 49 in Campton, and Route 3 in Ashland, and railroad bridges in Campton and

Ashland. There are a total of 9 road and railroad bridges in the reach.

Water Quality

Class B, suitable for primary contact recreation.

REFERENCES and BIBLIOGRAPHY

Billings, M.P. 1956. Geology of New Hampshire. New Hampshire State Planning and Development Commission; Concord, NH.

Bofinger, Paul. Society for the Protection of New Hampshire Forests. Telephone interview, August, 1992.

Carlson, Walter. New Hampshire Department of Environmental Services. Telephone interviews, July-August, 1992.

Clark, Ted. New Hampshire Department of Environmental Services. Telephone interviews, July, 1992.

Cote, Brian. Groundwater Technology Incorporated. Telephone interview, July, 1992.

Cotton, John. U.S. Geological Survey. Telephone and personal interviews, July-August, 1992.

Cutko, Andrew. New Hampshire Natural Heritage Inventory. Telephone interviews and written communication, April, August and October, 1992.

Doherty, P. 1988. "A Visitor's Guide to Franconia Notch." New Hampshire Division of Parks and Recreation and New Hampshire Department of Transportation; Concord, NH.

Dow, Dr. Maynard Weston. Professor of Geography, Plymouth State College. Telephone and personal interviews, July, 1992.

Environmental Protection Agency. 1979. "A Water Quality Success Story." (EPA WH-551).

Erler, Dave. Science Center of New Hampshire. Telephone interview, August, 1992.

Favour, P. 1969. Franconia Notch National Natural Landmark Eligibility Report. National Park Service.

Federal Energy Regulatory Commision. 1990. Livermore Falls Hydroelectric Project, Draft Environmental Impact Statement; Washington D.C.

Fenneman, N.M. 1938. Physiography of the Eastern United States. McGraw-Hill; New York, NY.

Flanders, Richard. New Hampshire Department of Environmental Services. Telephone interviews, July-August, 1992.

Foss, Carol. Audubon Society of New Hampshire. Telephone interview, July, 1992.

Gengras, J. and Bolian, C. 1991. "A Phase 1A Archaeological Survey of the Ayers Island Hydroelectric Project in the Towns of New Hampton, Ashland, Bristol, and Bridgewater - Belknap and Grafton Counties, New Hampshire." Public Service Company of New Hampshire; Manchester, NH.

Goldthwaite, J.W. 1925. The Geology of New Hampshire. Rumford Press; Concord, NH.

Greenwood, Jon. New Hampshire Department of Fish & Game. Telephone interviews, July-August, 1992.

Hounsell, Bill. Ashland Water and Sewer Department. Telephone interviews, September, 1992.

Huckins, Milt. Holderness Farmer. Telephone interview, August, 1992.

Hume, Gary. State Historic Preservation Officer, New Hampshire Division of Historic Resources. Telephone interview and written communication. September, 1992.

Hutchings, Tom. Appalachian Mountain Club. Telephone interview, July, 1992.

Hunt, Beverly. New Hampshire Department of Resources and Economic Development. Telephone interview, September, 1992.

Ireland, John. New Hampshire Department of Resources and Economic Development. Telephone interview, June, 1992.

Kostecke, D.M. 1983. Franconia Notch. Society for the Protection of New Hampshire Forests; Concord, NH.

Lane, Bill. Campton Sand and Gravel. Personal interview, August, 1992.

Lombardo, George. New Hampshire Department of Environmental Services. Telephone interviews, July - August, 1992.

Marancik, Jerry. U.S. Fish & Wildlife Service. Telephone interviews, July, 1992.

McLaughlin, Everett. U.S. Fish & Wildlife Service. Telephone interview, September, 1992.

McKeon, Joseph. U.S. Fish & Wildlife Service. Telephone interviews, July, 1992.

Merrill, P.S. et. al. 1977. A Small Gore of Land. New Hampton Bi-centennial Committee.

Middlekauff, Brian. Professor of Geography, Plymouth State College. Telephone and personal interviews, July, 1992.

Miller, Don. New Hampshire Department of Fish & Game. Telephone interviews, September, 1992.

Musgrove, R.W. 1976. History of the Town of Bristol. New Hampshire Publishing Company; Somersworth, NH.

New Hampshire Department of Environmental Services. 1990. "New Hampshire Water Quality Report to Congress 305 (b)." NHDES-WSPCD 90-7. Concord, NH.

New Hampshire Department of Public Works and Highways. 1979. "Franconia Notch NHDPW." Concord, NH.

New England Rivers Center. 1983. "New Hampshire River Protection and Energy Development Project". Boston, MA.

Nowack, Tim. New Hampshire Department of Environmental Services. Telephone interview, July, 1992.

Office of State Planning. 1989. Upper Merrimack River Corridor Plan, Vol. 1. Concord, NH.

Olsen, Fred. New Hampshire Fish and Game Department. Telephone interview, October, 1992.

Pemigewasset River Council. 1990. New Hampshire Rivers Management and Protection Program River Nomination for the Pemigewasset River.

Perry, Steve. New Hampshire Department of Fish & Game. Telephone interviews, September, 1992.

Phinney, Bill. New Hampshire Department of Fish & Game. Telephone interviews, September - October, 1992.

Rajala, Reuben. Appalachian Mountain Club. Telephone interview, July, 1992.

Reid, Harry. New Hampshire Department of Resources and Economic Development. Telephone interview, July, 1992.

Schlesinger, Patricia. Pemigewasset River Council. Personal interviews, July - August, 1992.

Schweiker, Roioli. 1989 River Guide, New Hampshire/Vermont. Appalachian Mountain Club. Boston, MA.

Schweiker, Roioli. 1991 River Guide, Maine. Appalachian Mountain Club. Boston, MA.

Schweiker, Roioli. 1991 River Guide, Massachusetts/Connecticut/Rhode Island. Appalachian Mountain Club. Boston, MA.

Stearns, E. 1906. History of Plymouth, New Hampshire. Vol. 1. University Press; Plymouth, MA.

Stolte, Larry. U.S. Fish & Wildlife Service. Telephone interviews, July-August, 1992.

Thoits, Charlie. New Hampshire Department of Fish & Game. Telephone interviews, July - August, 1992.

Toppen, Ken. U.S. Geological Survey. Telephone interviews, July - August, 1992.

Weldon, Ken. Franconia Notch State Park Interpretative Center, DRED. Telephone interviews, July, 1992.

Wilson, Linda. New Hampshire Division of Historic Resources. Telephone interview, October, 1992.

Comparative Analysis of Resident Fisheries in New Hampshire

River	Habitat quality	Diversity & value	Abundance	Natural reprod.	Size & & vigor	Aesthetic experience	Recreational importance	Access
3.0 MERRIMACK (Franklin to Manchester)	3	3.3	3	3	3	2.66	3	3
2.96 CONNECTICUT (Whole river)	3	3	3.06	2.56	3.2	3.06	3.06	2.81
2.88 ANDROSCOGGIN (Errol to Pontook)	3	2.8	2.8	2.2	3	3	3.4	3.2
2.77 PEMIGEWASSET (E. Branch to Sawhegenit Falls)	3	2.8	2.4	2.4	2.6	3.4	2.8	2.6
2.75 SACO (Main Stem)	3.3	3	2.3	2	2.66	3	3	2.66
2.75 AMMONOOSUC	2.75	2.75	2.5	2.25	3	3	3	3
2.68 PEMIGEWASSET, E. Br.	3.25	2.5	2.25	2.75	2	3	3	2.25
2.65 NEWFOUND	3	3	2.66	1.66	3	2.3	3.3	2.66
2.6 MERRIMACK (Manchester to MA line)	2.5	3.5	2.5	2.5	2.5	2	2.5	2
2.6 ANDROSCOGGIN (Pontook to Berlin)	2.4	2.4	2.6	2	2.6	2.8	3.4	2.8
2.57 PISCATAQUOG	3	3	2.5	2	2.5	2.5	2.5	2.5
2.54 CONTOOCOOK	2.5	2.75	2.5	1.75	2.75	2.5	3	2.75
2.5 PEMIGEWASSET (Sawhegenit Falls to Franklin)	2.25	2.5	2.5	2	2.75	2.75	2.75	2.5

River	Habitat quality	Diversity & value	Abundance	Natural reprod.	Size & & vigor	Aesthetic experience	Recreational importance	Access
2.46 BAKER	2.5	2.5	2.5	2.25	2.25	2.5	2.75	2.5
2.4 SMITH	2.5	2.5	2	1.66	2.75	2.75	2.75	2.75
2.4 MERRYMEETING	2	2.5	2.5	2	2.5	2	3.5	2.5
2.38 DEAD DIAMOND	2.3	2	2	2.66	2.3	3	2.3	1.3
2.36 SWIFT (Saco Basin)	2.5	2.5	2.5	1.5	2.5	2.5	2.5	2.5
2.35 PEMIGEWASSET (Profile Lake to E. Branch)	2.5	2.2	2	1.75	2	3.2	2.8	2.4
2.3 MAD	2.4	2.2	2	2	2.2	2.6	2.6	2.2
2.27 BEARCAMP	2.7	2.3	2.3	1.7	2.3	2.3	2.3	2.3
2.24 WINNIPESAUKEE	2.3	2.66	2.66	1.3	2.66	2	2	2
2.2 SOUCOOK	2	2	2.3	2	2.3	2.3	2.3	1.66
2.2 LAMPREY	2	3	2	2.3	2	2	2	2
2.2 GALE	2	2.3	2	2.5	2	3	1.66	1.3
2.2 EXETER/SQUAMSCOTT	2	2.5	2	2	2.5	2	2.5	2
2.1 ISINGLASS	2	2.3	2.66	2	2	2	2	1.66
2.0 SACO (E. BRANCH)	2	2	2	1.5	2	2.5	2	2.5
2.0 NORTH	2	2	2	2	2	2	2	2
2.0 ELLIS	2.5	2.5	2	1	2	2.5	2	2

River	Habitat quality	Diversity & value	Abundance	Natural reprod.	Size & vigor	Aesthetic experience	Recreational importance	Access
1.57 BELLAMY	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
1.57 COCKERMOUTH	1.5	2	1.5	1	2	1.5	1.5	2
<u>ONE RESPONSE</u>								
2.85 WONALANCET/ SWIFT	2	3	2	3	2	4	4	3
2.42 MASCOMA	3	3	2	1	3	3	3	3
2.0 HALL'S STREAM	2	2	2		2	2	2	1
2.0 JOHNS	2	2	2	2	2	2	2	2
2.0 INDIAN STREAM	2	2	2	2	2	2	2	2
2.0 CARROL STREAM	2	2	2	2	2	2	2	2
1.86 SWIFT DIAMOND	2	2	2	2	2	2	3	2
1.57 INDIAN RIVER	2	2	2	1	2	1	1	1
1.42 WILD	1	1	1	1	1	3	2	2
1.28 SACO (ROCKY)	1	1	1	1	1	2	2	1
<u>NO RESPONSE</u>								
BEAVER BROOK								
FOWLER								
ISRAEL								
LITTLE								
LOVELL								
PHILLIPS								
PINE								

RATING CRITERIA

Habitat quality: Presence, extent, and carrying capacity of spawning areas, rearing areas and adult habitat; areas with more and better habitat are ranked numerically higher.

Diversity and value of species: Number and variety of species present and the value of these species for fishing; greater diversity and species value ranks higher.

Abundance of fish present: Rivers with more fish rank higher.

Natural reproduction: Rivers with extensive natural reproduction rank higher than those supported mostly by stocking.

Size and vigor of fish: Rivers which produce large, vigorous fish rank higher than those where fish tend to be smaller and weaker.

Quality of aesthetic experience: The sights, sounds and smells attendant with the fishing experience; highly scenic, pristine rivers rank higher than visually monotonous, developed, malodorous or noisy rivers.

Recreational importance: Rivers which are either highly used by anglers or which offer an unusual recreational experience for the region rank higher.

Access: Availability of public or private access points, ease of use, and attendant facilities (parking, trails, etc.). This is a descriptive criterion, not one that will be used to assign value, because on some rivers poor access can be advantageous in limiting crowding.

Each criterion is to be ranked on the following scale:

(4) Highest value in the region
(3) One of only a few rivers having this level of significance in the region
(2) Typical in the region, one of numerous rivers with this level of significance
(1) Relatively insignificant or nonexistent value

Flatwater/Quickwater Boating on Relatively Undeveloped Rivers Passable at Medium or Lower Flows

River (NH, unless noted)	Season	Flow	Character	Scenery	Access	Level of use	Assoc. Opp.	Camping
3.34 ANDROSCOGGIN (Errol - Berlin)	3.6	3.8	3	3	3	3.4	3.25	3.4
3.17 ANDROSCOGGIN (Shelburne Dam - Bethel)	3	3.5	2	3	2.5	2.5	4	3.5
3.17 PEMIGEWASSET (175 Br.in Woodstock - Blair Br.	2.8	2.4	3.2	3.6	3	2.6	3.75	3.25
3.1 SACO (NH/ME) (N. Conway - Conway)	3.33	3.33	2.33	3.17	3.33	3.5	3	3.4
3.1 WHITE RIVER (VT) (Bethel - Sharon)	3.33	3.33	3	3.33	3.33	3	3.5	2
3.0 MERRIMACK (Franklin - Concord)	3.5	4	2.25	2.25	3.5	2.5	3	2
3.0 PEMIGEWASSET (Holderness Bridge - Rte. 104 Bridge in Bristol)	3	3	2.5	2.5	3	3	4	3
3.0 WEST (VT) (Townshend Dam - W. Dummerston)	3.2	3	3.2	3.2	3	3.4	2.75	2.76
2.92 BAKER (Wentworth to Plymouth)	2.75	2.75	3	3	3.75	2.5	3	3
2.92 PEMIGEWASSET (Smith River - Franklin)	2.8	2.4	3.2	3.6	3	2.6	3.75	3.25
2.9 BLACKWATER (W. Salisbury - fld. control dam)	2.5	2.75	2.75	3.75	3	2	3.66	2

River	Season	Flow	Character	Scenery	Access	Level of use	Assoc. Opp.	Camping
2.83 CONNECTICUT (Bellows Falls - Vernon Dam)	3	3.5	2	2.5	2	4	4	2
2.83 HOUSATONIC (CT/MA) (Great Barrington - Falls Village)	3.5	3.5	3	3	2	3	2	2
2.83 MERRIMACK (Concord - Hooksett Dam)	3.5	4	2.25	2.25	3.5	2.5	3	2
2.82 BATTENKILL (VT) (Manchester - Arlington)	3	2.25	3	3.25	3	3.5	2.66	2.75
2.8 CONTOOCOOK (Peterborough - Bennington)	3.4	3	2.6	3	2.6	2.2	2.8	2
2.75 BEARCAMP (Whittier - Ossipee Lake)	2.5	3	3	3	3	2	3	2
2.67 SUNCOOK (Short Falls - Suncook)	2.5	3	2	1.5	3	2	3	2
2.63 CONCORD (MA) (Concord - N. Billerica)	3.75	3.75	2.25	2.25	3.25	3.75	2.5	1.33
2.44 AMMONOOSUC (Lisbon - Woodsville)	2	2.66	2.3	2.66	3	2	3	2
2.36 PISCATAQUOG (N. Br.) (Everett - Goffstown)	1.33	2.5	2.66	2.66	3	1.66	3	2
2.33 WARNER (Warner - Contoocook R.)	2.33	2.66	2.66	2.33	2.5	1.66	2.5	1.5

River	Season	Flow	Character	Scenery	Access	Level of use	Assoc. Opp.	Camping
ONE RESPONSE/ INCOMPLETE RESPONSE								
2.83 DEERFIELD (MA) (Bardwell Bridge - Connecticut River)	3	2	3	3	3	3	3	3
2.75 LAMPREY (W. Epping - Wadleigh Falls)	2	3	3	3	3	2		
2.67 ASHUELOT (W. Swanzey - Ashuelot)	3	2	3	3	2	3	3	2
2.25 BEAVER BROOK (Rte. 128 Br. - Collinsville)	2	2	2	3	3	1		
2.0 NASHUA (MA) (Ayer - East Pepperell)	2	2	2	2				
NO RESPONSE								
ANDROSCOGGIN (Durham - Brunswick)								
FARMINGTON (CT) (Hogback Dam - Farmington)								
OSSIPEE (NH/ME) (Ossipee Lake - Kezar Falls)								
PINE (Granite Rd. - Ossipee Lake)								
QUABOAG (MA) (Quaboag Pond - Warren)								
WESTFIELD (MA) (Huntington - Connecticut R.)								

RATING CRITERIA

Length of season: Amount of time the river is runnable in canoes; longer seasons are rated higher: (4) Runnable 9 to 12 months/year; (3) runnable 3 to 8 months/year; (2) runnable 2 to 3 months/year (1) runnable less than 2 months/year

Flow: Consistency or reliability of flow during the runnable season; rivers with consistent flows and fewer periods of extreme fluctuation are rated higher: (4) extremely reliable or consistent flow; (3) generally reliable/consistent flow; (2) somewhat unpredictable flows; (1) erratic or often unrunnable flows

Character of run: Diversity of channel structure (braiding, islands, gorges, wide spots, etc.), river bed materials, and current/flow characteristics; level to which the run maintains interest and provides challenge to the boater; more diverse, interesting and challenging runs are rated higher: (4) Highly diverse river channel and current, challenging to the novice; (3) channel and/or current change frequently, with many interesting features and an element of challenge; (2) occasionally interesting character (1) monotonous

Scenery/naturalness: Scenic beauty and diversity; pristine quality; extent of undeveloped area; more scenic and undeveloped runs are rated higher: (4) highly scenic with little or no evidence of development; (3) frequent scenic views, occasional development noticeable; (2) occasional scenic views, with frequent signs of development; (1) scenery boring, development occurs with regularity

Access: Availability of public or private access points, ease of use, and attendant facilities (parking, boat ramps, trails, etc.). This is a descriptive criterion, not one that will be used to assign value, because on some rivers poor access can be advantageous in limiting crowding: (4) very easy access; (3) easy access; (2) moderately difficult; (1) very difficult

Level of recreational use: This is another descriptive criterion, since a little-used river should not by itself indicate a low value, and an intensively used river may indicate a diminished value due to overcrowding: (4) very heavily used; (3) moderately used; (2) lightly used; (1) rarely used

Associated opportunities: Number and frequency of opportunities encountered along the run for hiking, fishing, picnicking, swimming, wildlife viewing, and similar experiences); segments with greater opportunities for associated recreation are rated higher: (4) Many and varied opportunities throughout the segment; (3) frequent opportunities; (2) occasional opportunities; (1) rare or non-existent

Opportunity to camp: Number of places available on public or private land for camping, either existing now or likely to be developed in the near future; existing, high-quality camping areas are rated higher: (4) high quality camping experience available; (3) camping possible; (2) potential for campground to be provided in the future (1) no possibility of camping

APPENDIX D

TOWN RIVER CONSERVATION REGULATIONS

TOWN RIVER CONSERVATION REGULATIONS

Note: Most information from town zoning ordinances, subdivision and site plan review regulations, and floodplain ordinances

THORNTON

Riverfront zoning and allowable uses

General Residence - all riverfront land along the east bank

Permitted uses - Single and multi-family dwellings up to 10 units, greenhouses and nurseries, home occupations, roadside stands, golf courses, airstrips, cemetaries, mobile homes on individual lots, accessory uses, public parks, renting of rooms, commercial excavation operations, civic and institutional buildings.

Special exception - lodges, restaurants, and recreational buildings that are part of a residential subdivision development.

Commercial - all riverfront land along the west bank

Permitted uses - Above uses, plus grocery stores, outdoor theatres, markets, restaurants, service stations, auto sales and repair shops, parking lots, beauty shops, offices, lodging, trailer parks, retail trad serving the public with financial or personal services.

Industrial - much of the land west of the river between the railline and I-93.

Note: This zone is located near the river, but never directly abuts it.

Permitted uses - Above uses, plus manufacturing, warehousing, distribution, research, and retail and other accessory buildings and uses.

Prohibited uses - Manufacture or wholesale distribution of creosote, pesticides, poisons, petroleum products, lime and plaster, and paints; storage or disposal of nuclear waste.

Lot specifications

Lot size (near river) - 1 acre per dwelling unit. In Commercial Zone: No min. lot size for commercial buildings. In Industrial Zone: 2 sq. ft. of open space req. for each 1 sq. ft. of industrial plant space. For subdivisions: Floodplains, slopes greater than 35%, and poor soils (high water table, or slow perc rate) not included in min. lot size calculation; Multi-family buildings must be spaced min. 70' apart.

Building setback from river - None specified. (15' setback from boundary lines).

River frontage - 100'

Septic setback - No reference. State standard 75'.

Height - 35'

Clustering - Same overall density after deducting wetlands and slopes over 35%; dedicated open space; individual lots must have at least 1/2 the lot size and frontage of conventional lots; min. tract area = 10 acres.

Streambank and floodplain protection

Vegetative cutting - "Due regard" for preserving existing vegetation required by Subdivision regulations (also scenic points and other natural and historic resources within subdivision).

Lot coverage by impervious surfaces - No reference

Erosion control - No reference

Stormwater management - Storm drainage plan required for subdivisions; site must handle the 25-yr. flood; on-site retention basins shall be provided if receiving drainage system is inadequate.

Floodplain management - FEMA regulations. No encroachments in floodway that would increase flood levels (floodway not delineated).

Other

Water supply - Earth excavation can't "substantially damage" an aquifer.

Public open space requirements - No reference

Waterfront access lots: No reference

Recreational camping parks: No reference

Building setback and frontage along roads - Setback: 50' from road centerline. Min. road frontage: 100'.

Misc. - Junk yards prohibited. Min. 5' buffer required for commercial, industrial, or multi-family residential developments.

CAMPTON

Riverfront zoning and allowable uses

River Corridor Protection Zone - Pemigewasset River overlay zone - 500' from edge of normal channels of Pemi, Mad and Beebe Rivers, or all land within the 100-yr. floodplain, if wider. Excluded: land west of Route 3 and south of Route 49 at Campton Sand & Gravel.

Permitted uses (for all zones) - Agriculture, single and multiple-family dwellings, manufactured housing, home occupations, parks and golf courses for residents, and cemeteries (plus additional uses as noted below).

Prohibited uses (for all zones) - All others, unless permitted below.

Rural Residential - all riverfront land on the east bank, and some of the west bank

Additional permitted uses - Religious institutions, public schools, and buildings accessory to residential use.

Commercial - most riverfront land on the west bank, plus land north of Route 49 at Campton Sand & Gravel

Additional permitted uses - Retail business, lodging, shopping centers, other commercial.

Lot specifications

Lot size - 1 acre or more per dwelling unit, depending on soils and slopes. Wetlands, slopes greater than 35%, and poor soils not included in calculation. In Commercial Zone: Min. lot size for commercial buildings determined by state subdivision septic requirements. Residential density can exceed 3/acre with a special exception. For subdivisions, min. lot size for commercial purposes is 1 acre.

Building setback from river - 50' from edge of normal river channel; 100' for commercial buildings where allowed.

River frontage - 200' per dwelling unit.

Septic setback - 125' from edge of normal river channel.

Height - 35'. Non-residential structures may exceed by special exception.

Clustering - Same overall density, dedicated open space required. Min. frontage requirements. Contiguous acres owned outside RCP Zone cannot be used to increase density within RCP Zone.

Streambank and floodplain protection

Vegetative cutting - Within RCP Zone, cutting limited to 50% of basal area in a 10-year period, except for conversion to a more intensive use. Stability and character of riverbank must be maintained.

Lot coverage by impervious surfaces - Max. 75% for commercial buildings in the commercial zone.

Erosion control - Addressed for commercial/industrial construction during Site Plan Review. Earth excavation is prohibited in RCP Zone. See also "channel alteration".

Stormwater management - no reference

Floodplain management - FEMA regulations. Subdivision cannot obstruct the floodway. No terrain alteration that would obstruct or change the floodplain.

Other

Channel alteration - No terrain alterations that would alter river flow or channel location or degrade bank stability. No dams, docks, moorings, or similar structures. Land disturbed for commercial development within 100' of river must be landscaped to maintain bank stability and character.

Water quality - No use allowed in RCP Zone which would temporarily or permanently degrade water quality.

Roads - 100' road setback from river, except new crossings approved by Planning Board.

Public open space requirements - no reference

Waterfront access lots - no reference

Recreational camping parks - 100' setback from river and public roads, 180 day max. stay, 25' landscaped buffer (100' from roads), 250' setback for retail sales facility, stability and character of riverbank must be maintained.

Building setback and frontage along roads - Setback from roads: 50'. Min. road frontage: 200'.

Misc. - No junk yards in RCP zone.

PLYMOUTH

Riverfront zoning and allowable uses

Environmentally Sensitive Zone - Pemigewasset River overlay zone - 500' from edge of normal channel of the Pemi and Baker Rivers.

Commercial Highway - riverfront land north of town center

Permitted uses - Residential institutions, public safety buildings, service stations, vehicle sales and repair, banks, services, lodging, recreation, offices, publishing, restaurants, retail trade, truck terminals, wholesale business, churches, home occupations.

Special exception - Residential, most civic uses, fuel storage, funeral homes, junkyards, lumber yards, bakeries, truck terminals, warehouses, most institutional uses, agriculture and forestry, industry.

Commercial Village - town center riverfront

Permitted uses and special exceptions - Similar to above, except: Most types of residential and civic uses are permitted; Additional special exceptions include residential institution, publishing, vehicle sales and repair, wholesale business.

Agriculture - riverfront land south of town center

Permitted uses - Manufactured housing, 1&2 family housing, cluster housing, most civic uses, service stations, vehicle sales and repair, banks, services, lodging, recreation, offices, restaurants, retail trade, truck terminals, wholesale business, churches, agriculture and forestry, home occupations.

Special exception - Multi-family housing, rooming/student residences, residential institutions, libraries, fuel storage, funerals, junkyards, lumber yards, publishing, truck terminals, warehouses, wholesale business, most institutional uses, industry.

Lot specifications

Lot size - For the three underlying zones: With community sewerage - 1/2 ac., 0 ac., and 1/2 ac. per dwelling unit for the first two. With on-site sewage - 1 ac., 0 ac., and 1 ac. per dwelling unit for the first two. Table of slightly graduated min. lot size for buildings with 3 - 6 dwelling units. Poor soils (only) not included in calculation. For subdivision: 1 acre min. or larger (varies with soils and slopes.)

Building setback from river - 75'

River frontage - 150' per dwelling unit; For multi-family buildings of 3 or more dwelling units, 75' per dwelling.

Septic setback - None specified. State standard 75'.

Height - 35'

Clustering - Same overall density, however "undevelopable land" (wetlands, slopes greater than 25%, and land in the 75' setback) cannot be included in density calculation; Max. density on developable land = 4 dwellings units per acre; Min. lot = 25% of conventional lot; 10 ac. min.; Min. 25% of area must be dedicated open space. 50' buffer required around development, natural vegetation encouraged.

Streambank and floodplain protection

Vegetative cutting - No reference, except for erosion control measures.

Lot coverage by impervious surfaces - For the three underlying zones: 75%, 100% and 75%.

Erosion control - Subdivision measures specified: expose smallest area for shortest time, use temporary vegetation or mulching or structures, use sediment basins, install permanent vegetation and structures as soon as practical, fit development to topography, retain and protect natural vegetation when feasible. No placement of fill allowed within the Environmentally Sensitive Zone, except for a building, parking, normal landscaping, agricultural or silvicultural activities. Fill slope must be graded and stabilized. Earth excavation prohibited in Environmentally Sensitive Zone, if state Earth Excavation permit is required; Town excavation regulations apply elsewhere. Construction permitted on steep slopes on existing lots of record For subdivisions, min. lot size on slopes greater than 25% is 5 acres.

Stormwater management - Accomodate increased runoff during and after construction.

Floodplain management - FEMA regulations. No encroachments in floodway that would increase flood levels (regulatory floodway delineated).

Other

Public open space requirements - Planning Board may require open space in subdivisions.

Waterfront access lots - no reference

Recreational camping parks - no reference

Building setback and frontage along roads - Building setback: 30', 15', 30'. Min. road frontage: For community sewerage - 100', 50', 100'. On-site septic - 150', 50', 150'.

Misc. - Land use permits req. for any construction, paving, use change, or 1000 gal.+ fuel tank installation. No building code nor inspector.

HOLDERNESS

Riverfront zoning and allowable uses

River Corridor Zone - Pemigewasset River overlay zone - 500' from mean high water level, or 1000' in floodplains.

Permitted uses - General agriculture, wildlife refuges, parks, and uses permitted in underlying districts which can comply with overlay restrictions.

General Residential - half the riverfront land

Permitted uses - 1&2 family dwellings, multi-family dwellings (8-unit max.), cluster residential development, manufactured housing, general agriculture, home business, lodging, churches, schools and municipal buildings, accessory buildings.

Special exception - Marinas, offices, small retail, day care, banks, restaurants, private clubs, nursing homes, funeral homes, recreational campgrounds, civic recreation and public safety facilities.

Commercial - half the riverfront land

Permitted uses - 1&2 family dwellings, multi-family dwellings (8-unit max.), manufactured housing, accessory buildings, home business, commercial storage facilities, retail stores, restaurants, offices, banks, gas stations, lodging, institutional buildings, marinas, private clubs.

Special exception - Light industry

Lot specifications

Lot size (near river) - 2 acres or more depending on soils and slopes. Wetlands not included in calculation (except "poorly drained soils" may fulfill 25% of min. lot size, when not a subdivision). No construction on slopes >25% (soils table). For duplexes, lot size increases 50% from size given in soils table.

Building setback from river - 200'.

River frontage - 200' for the first dwelling unit; 20' for each additional.

Septic setback - 125'.

Height - 35'

Clustering - Overall density must remain the same, dedicated open space required. Planning Board sets min. lot sizes.

Streambank and floodplain protection

Vegetative cutting - Natural Woodlands Buffer within 50' of the river in which not more than 50% of basal area and 50% of the saplings can be cut every 15 years. Natural vegetation to be retained, protected, and supplemented whenever practical. Retention of den and nest trees encouraged.

Lot coverage by impervious surfaces - Max. 35% in general residential zone, 50% in commercial zone.

Erosion control and stormwater management - Pre-construction Soil Erosion and Sediment Control Plan required for all development which will disturb soil within 100' of river or on 15% slope; plan must specify provisions to control erosion and contain the increased runoff and sediment due to development, such as sediment basins, stormwater retantion basins, etc. Erosion control devices must be in place

before on-any site grading. Temporary vegetation may be required. Earth removals within 100' of a stream or road must be stabilized.

Floodplain management - FEMA regulations. No encroachments in floodway that would increase flood levels (regulatory floodway delineated).

Other

Public open space requirements - Subdivisions larger than 25 acres must reserve at least 5% of land for recreation purposes.

Waterfront access lots: Min. frontage = 200 for first 10 units and 20' for each additional.

Recreational camping parks: 5 ac. min; Landscaped buffer req. 100' from public streets and 25' from property boundaries.

Building setback and frontage along roads - 35' from R/W.; Min. frontage: 150' in general residential zone and 100' in commercial.

Misc. - Septic inspection required for conversion from seasonal to permanent use. Dumps cannot leach into river. Building in a wetland on the Town Inventory requires approval of the Conservation Commission.

ASHLAND

Riverfront zoning and allowable uses

River Overlay District - Pemigewasset River overlay zone - 500' from high water line, or 1000' in floodplains (defined as the floodplain soil areas in SCS soil survey).

Prohibited uses - structures on slopes exceeding 15%, mobile home parks, mobile homes w/o foundations, excavation requiring a state permit.

Rural Residential - most of the riverfront land

Permitted uses - 1&2 family dwellings, multi-family dwellings (6-unit max.), cluster residential development, mobile homes on individual lots, agriculture and forestry, home occupations, and accessory uses (outbuildings, etc.)

Special exception - anything upon ZBA approval

Prohibited uses - none listed

Industrial - short piece of frontage south of the Route 3 bridge

Permitted uses - Manufacturing, railroad and trucking uses, research facilities, storage yards, accessory uses.

Special exception - anything upon ZBA approval

Prohibited uses - none listed

Lot specifications

Lot size (near river) - 2 acres or more depending on soils and slopes. Lots with 3 or more dwelling units or mobile homes need 60,000 sq. ft. per unit. Wetlands and slopes steeper than 25% not included in calculation. Lots in subdivisions must have depth not exceeding 4 times frontage.

Building setback from river - 200'; 50' in Industrial zone by Special Exception.

River frontage - 200'

Septic setback - 125'. Superintendent of Sanitary Dept. must approve system. Must hook up to public sewer when available.

Height - 35'

Clustering - Overall density must remain the same, dedicated open space required. Cluster dev. encouraged. Planning Board sets min. lot sizes. Special exception required for riverside proposals? (Note: 4 references in zoning ordinance; 2 apparently conflict re: clustered multi-family dwelling lot sizes.)

Streambank and floodplain protection

Vegetative cutting - Due regard shall be given by subdivider to preservation of trees (subdivision regs.)

Lot coverage by impervious surfaces - not specified in overlay

Erosion control - Development should conform to topography; minimize alteration of drainage patterns; sediment basins shall be installed befor any on-site grading. Earth excavation requiring a state permit prohibited in overlay zone. Removals within 100' of a road must be stabilized.

Stormwater management - no reference

Floodplain management - FEMA regulations. No encroachments in floodway that would increase flood levels (floodway not delineated).

Other

Public open space requirements - Planning Board can require subdivisions with a potential of 15 or more lots to reserve recreational land.

Waterfront access lots: Min. lot size = 800 sq. ft. per dwelling/lodging/campsite (with granted rights of access?). Min. frontage = 200 for first 10 units and 20' for each additional.

Recreational camping parks: In Overlay: 5 ac. min; 75' landscaped buffer along river, 35' on all other sides, dense vegetation 6' high with no parking or paving.

Building setback and frontage along roads - 35' from R/W.; 150' min. frontage.

Misc. - Non-residential uses shall be screened from residential uses, all seasons (Site Plan Review regs.). Building Regulations; Building and Fire codes adopted by reference; permit needed for alterations costing more than $600.

BRIDGEWATER

Riverfront zoning and allowable uses

General Residential - most of the riverfront land

Permitted uses - 1&2 family dwellings, multi-family dwellings (6-unit max.), home businesses, mobile homes, agriculture, accessory buildings and uses.

Special exception - none listed

Prohibited uses - none listed

Commercial/Industrial - northernmost 1/2 mile

Permitted uses - Same as above, plus commercial and industrial uses.

Special exception - none listed

Prohibited uses - none listed

Lot specifications

Lot size - 1 acre or more, depending on state standards for soils and slopes. Wetland soils and slopes steeper than 15% not included in calculation (in court?). Depth of any lot can't exceed 4 times its frontage. Planning Board sets min. lot sizes for multi-family housing.

Building setback from river - 50'

River frontage - 150', measured in a straight line (subdivision regs.)

Septic setback - No reference. State standard 75'.

Height - 35'

Clustering - Overall density must remain the same, dedicated open space req. Planning Board sets min. lot sizes. Special exception req. for riverside proposals?

Streambank and floodplain protection

Vegetative cutting - no reference

Lot coverage by impervious surfaces - max. 40%

Erosion control - General direction for construction operations to be controlled so erosion debris doesn't wash into drainage courses. Earth excavation within 100' of roads must be stabilized.

Stormwater management - no reference

Floodplain management - FEMA regulations. No new development along watercourse unless anticipated cumulative effect of all community development increases base flood by less than 1 foot. (No delineated floodway). Subdivision cannot obstruct floodway or water course.

Other

Public open space requirements - For subdivisions over 20 acres or 20 lots, at least 5% recreation land may be required.

Waterfront access lots - Min. lot size = 1 acre or 800 ft. per unit served. Min. frontage = 15' plus 8' for each additional dwelling unit over 12.

Recreational camping parks - Min. 5 acres, 50' landscaped buffer on all sides.

Building setback and frontage along roads - 35' from r/w and min. 150' frontage.

NEW HAMPTON

Riverfront zoning and allowable uses

Flood Hazard Zone - Areas designated as special flood hazard areas on 1986 FIRM.

Permitted uses - Recreation, agriculture and residential accessory uses, provided no structures, fill, or material/equipment storage.

Special exception - Transient amusement facilities, earth and gravel extraction, placement of fill, marinas and docks, roads and utilities, and accessory structures to these uses and the permitted open space uses.

Prohibited - Structures used for human habitation.

Pemigewasset Overlay District - Pemigewasset River overlay zone - 500' from high water line, or 1000' in floodplains (defined as floodplain soil areas in SCS soil survey).

Permitted - Residential

Prohibited - Mobile home parks, junkyards.

General Residential, Agricultural, and Rural - all riverfront land

Permitted uses - Single-family dwelling, home occupations, professional offices accessory to a dwelling, manufactured homes, agriculture, and accessory buildings.

Special exception - Commercial and light industrial uses, churches, hospitals, nursing homes, 2-family dwellings, multi-family dwellings, cluster developments and mobile homes on foundations, recreational camping parks, junk yards.

Lot specifications

Lot size - 2 acres or more depending on soils and slopes. Areas subject to flooding or with impermeable layer less than 40" from surface not included in calculation.

Building setback from river - 200'; 500' for industrial parks, where allowed.

River frontage - 200' for first unit, 20' for each additional unit.

Septic setback - 125'

Height - 35'

Clustering - Same overall density, dedicated open space; Planning Board sets individual lot sizes within cluster; 10 acre min. for a cluster development; max. of 6 units, attached or detached, per cluster; 10,000 sq.ft. min. area per unit in a cluster.

Streambank and floodplain protection

Vegetative cutting - Min. 75' naturally vegetated buffer strip (retained or established) required along all surface waters and wetlands larger than 1 acre; 25' strip around wetlands 1/4 acre - 1 acre; Whenever practical, natural vegetation shall be retained, protected, and supplemented; at least 50% of site must remain as vegetated green space.

Lot coverage by impervious surfaces - 50%? (by inference)

Erosion control - No construction allowed on slopes over 15% in Pemi Overlay District. Fill placed in Flood Hazard Zone must be protected from erosion. Erosion and sediment control plan required: Must minimize time bare soil is exposed to heavy rain or snowmelt and maximize time available for seeding to germinate; must

emplace sediment basins, storm diversion channels, and other erosion control devices (hay bales and fences are not adequate) before clearing of large areas or steep slopes; and natural vegetation shall be retained, protected and supplemented where practical. No earth excavation in Pemi Overlay District, if a state permit would be required. Town earth excavation regulations?

Stormwater management - Storm drainage plan required; must be no increase in off-site flow in a 50-year 24-hr. storm.

Floodplain management - Very restrictive zoning district, plus FEMA regulations; No encroachments in floodway that would increase flood levels (floodway not delineated). Within the Flood Hazard Zone, the long axis of new structures must be aligned with flood flows.

Other

Diversions - None allowed within the Pemi Overlay District.

Public open space requirements - No reference

Waterfront access lots - Waterfront held in common must have 150' of frontage for first unit with access and 50' for each additional unit.

Recreational camping parks - Min. size = 5 acres; 75' landscaped buffer along river.

Building setback and frontage along roads - Setback: 35' from R/W. Min. road frontage: 150'.

Misc. - For subdivisions where lots are 10 acres or less, lot depth must be less than 4 times frontage, with a 150' min. depth. Septic systems cant be sized any bigger than lot's maximum capacity, assuming 4 BR houses. Screen non-residential uses from residential uses with a 50' vegetative buffer, all seasons.

APPENDIX E

SURVEYS

Summary of Independent Tabulation of

PEMI RIVERFRONT LANDOWNERS QUESTIONNAIRE RESPONSES

December 2, 1992

1. How do people use the Pemigewasset River for recreation in your town? (Circle as many as apply.)

42%	a.	bird watching or wildlife observation
35%	b.	camping
77%	c.	canoeing or kayaking
76%	d.	fishing
25%	e.	hunting or trapping
7%	f.	jet skiing
47%	g.	picnicking
18%	h.	power boating
35%	i.	snowmobiling
76%	j.	swimming
61%	k.	walking or hiking

2. Do people use or cross your land for any of these activities?

21%	yes, with permission
51%	yes, without permission
29%	no

3. Have you experienced any problems related to such recreational uses?

yes 38% no 54%

4. How do you feel about existing public recreational access to the Pemigewasset River?

	not enough	enough	too much
Designated access sites	24%	48%	9%
Picnic areas	31%	42%	8%
Canoe-access camp sites	22%	52%	8%
Parking for river access	26%	44%	8%

5. How do you feel about each of the following possible uses for the Pemigewasset River and its adjacent lands?

	E*	NE*	DK*
a. Agriculture	47%	11%	19%
b. Commercial Development	16%	65%	2%
c. Forestry	62%	13%	5%
d. Hydropower Development	27%	46%	12%
e. Industrial Development	7%	68%	5%
f. Open Space/Wildlife Habitat	73%	5%	7%
g. Recreational Uses, Instream (swimming, boating; etc.)	59%	15%	6%
h. Recreational Uses, Riverside (walking, camping, etc.)	60%	15%	2%
i. Sand and Gravel Extraction	13%	59%	15%
j.. Water Withdrawal for Agriculture	32%	34%	18%
m. Water Withdrawal for Municipal Water Supply	27%	41%	13%
n. Water Withdrawal for Industrial Uses	11%	71%	5%
o. Waste Water Discharge (municipal and industrial)	3%	75%	7%

* E = should be encouraged
NE = should not be encouraged
DK = don't know

6. How important do you feel it is to protect each of these river related resources along the Pemi?

	I*	NI*	DK*
a. Fisheries	68%	4%	6%
b. Floodplains	65%	7%	7%
c. Geologic Formations	59%	12%	7%
d. Historic Resources	57%	12%	11%
e. Prime Agricultural Land	63%	8%	11%
f. Rare or Endangered Species	58%	12%	6%
g. Recreation	67%	8%	3%
i. Scenery	71%	4%	5%
j. Water Quality	78%	1%	2%
k. Water Quantity	69%	5%	4%
l. Wetlands	62%	7%	12%
m. Wildlife	76%	1%	2%

* I = Important to Protect
NI = Not Important to Protect
DK = Don't Know

7. What has been your experience dealing with any of the following types of land or water use controls with regard to your Pemi riverfront property?

	P*	O*	N*	X*
Local Regulations				
a. site plan review	14%	8%	6%	57%
b. subdivision regulations	15%	9%	8%	54%
c. zoning	14%	12%	12%	51%
State Regulations				
e. dredge and fill permits	3%	2%	7%	73%
f. pesticide permits	2%	2%	4%	77%
g. sewage disposal laws	5%	8%	6%	65%
h. terrain alteration permits	3%	0	6%	76%
i. timber harvest controls	6%	1%	5%	74%
j. water quality laws	6%	4%	6%	67%
Federal Regulations				
l. Clean Water Act Regulations	11%	1%	8%	67%
m. Flood Insurance Program	9%	5%	5%	66%

* P = Positive Experience
O = Neutral Experience
N = Negative Experience
X = No Experience

8. In which of these towns do you own property along the Pemigewasset River?

Total number of surveys tabulated = 95

9. Do you live at your Pemi riverfront property?

39% yes, it is my primary residence
19% yes, it is my seasonal residence
28% no
9% other

10. How long have you or your family owned this riverfront property?

44% of families have owned for over 10 years

11. Did the presence of the river play a role in your decision to purchase this property?

yes 53% no 29%

13. What are the principal uses of your property?

38%	a.	primary residence	5%	g.	business
26%	b.	seasonal residence	1%	h.	industry
18%	c.	agriculture/farming	17%	i.	open space
4%	d.	campground	29%	j.	recreation
18%	e.	forestry			
1%	f.	public/institution			

14. Has your riverfront land been affected in any way by land or water uses, practices or activities upstream from you?

yes 21% no 56%

15. What plans do you have for your riverfront property?

72%	a.	continue in present use
38%	b.	keep in family
4%	c.	build residential structure
3%	d.	subdivide
12%	e.	sell
2%	f.	new commercial/industrial use
8%	g.	don't know

16. Which of the following tax reduction and land protection techniques are you using or are you interested in for your property?

	would consider	in use
Current use tax status	17%	28%
Conservation easement	26%	2%
Deed restrictions	11%	1%
Land donation or bargain sale	6%	0

Summary of Independent Tabulation

PEMIGEWASSET RIVER VALLEY

GENERAL PUBLIC OPINION SURVEY

December 10, 1992

1. Where do you reside?
2. In the Pemi Valley I am a: (please check one)

116	permanent resident of Pemi Valley town
18	seasonal or weekend resident
6	visitor
140	total

3. Did the presence of the river play a role in your decision to live in or visit this area?

	yes	no
residents	37%	59%
seasonal/weekend	67%	33%
visitors	50%	50%
total	41%	55%

4. How do (or have) you used the Pemigewasset River for recreation ?

	R	S/W	V	T
a. bird watching or wildlife observation	29%	78%	17%	35%
b. camping	14%	17%	0	14%
c. canoeing or kayaking	57%	50%	0	54%
d. fishing	41%	56%	33%	42%
e. hunting or trapping	8%	0	0	6%
f. jet skiing	0	0	0	0
g. picnicking	36%	61%	17%	39%
h. powerboating	1%	0	0	0
i. snowmobiling	1%	0	0	0
j. swimming	49%	78%	33%	52%
k. walking or hiking	3%	61%	33%	12%

5. How do you feel about existing public recreational access to the Pemigewasset River?

RESIDENTS	not enough	enough	too much
Canoe-access camp sites	**40%**	**38%**	**6%**
Designated access sites	**46%**	**37%**	**3%**
Parking for river access	**44%**	**41%**	**4%**
Picnic Areas	**43%**	**41%**	**4%**

SEASONAL/WEEKEND	not enough	enough	too much
Canoe-access camp sites	**39%**	**44%**	**0**
Designated access sites	**39%**	**44%**	**6%**
Parking for river access	**44%**	**44%**	**6%**
Picnic Areas	**28%**	**67%**	**0**

VISITORS	not enough	enough	too much
Canoe-access camp sites	**17%**	**67%**	**0**
Designated access sites	**33%**	**67%**	**0**
Parking for river access	**17%**	**83%**	**0**
Picnic Areas	**17%**	**83%**	**0**

TOTAL	not enough	enough	too much
Canoe-access camp sites	**50%**	**40%**	**5%**
Designated access sites	**44%**	**39%**	**4%**
Parking for river access	**43%**	**43%**	**4%**
Picnic areas	**40%**	**46%**	**0**

6. How important do you feel it is to protect each of these river related resources along the Pemi?

RESIDENTS	Important To Protect	Not Important To Protect	Don't Know
a. Fisheries	73%	14%	6%
b. Floodplains	73%	15%	5%
c. Geologic Formations	66%	21%	7%
d. Historic Resources	66%	16%	10%
e. Prime Agricultural Land	70%	15%	9%
f. Rare or Endangered Species	68%	18%	6%
g. Recreation	74%	16%	3%
h. Riverside Vegetation	67%	16%	8%
i. Scenery	84%	13%	1%
j. Water Quality	84%	9%	1%
k. Water Quantity	75%	13%	5%
l. Wetlands	75%	15%	3%
m. Wildlife	70%	10%	3%
n. Other (specify)			

SEASONAL/WEEKEND	Important To Protect	Not Important To Protect	Don't Know
a. Fisheries	94%	0	6%
b. Floodplains	78%	0	17%
c. Geologic Formations	72%	6%	17%
d. Historic Resources	72%	6%	17%
e. Prime Agricultural Land	50%	11%	33%
f. Rare or Endangered Species	100%	0	0
g. Recreation	17%	11%	11%
h. Riverside Vegetation	94%	0	0
i. Scenery	100%	0	0
j. Water Quality	94%	0	0
k. Water Quantity	89%	0	17%
l. Wetlands	94%	0	0
m. Wildlife	100%	0	0
n. Other (specify)			

VISITORS	Important To Protect	Not Important To Protect	Don't Know
a. Fisheries	50%	50%	0
b. Floodplains	50%	50%	0
c. Geologic Formations	50%	50%	0
d. Historic Resources	50%	33%	17%
e. Prime Agricultural Land	50%	50%	0
f. Rare or Endangered Species	50%	50%	0
g. Recreation	67%	33%	0
h. Riverside Vegetation	50%	50%	0
i. Scenery	50%	50%	0
j. Water Quality	50%	50%	0
k. Water Quantity	50%	50%	0
l. Wetlands	50%	50%	0
m. Wildlife	50%	50%	0
n. Other (specify)			

TOTAL	Important To Protect	Not Important To Protect	Don't Know
a. Fisheries	75%	14%	6%
b. Floodplains	72%	14%	6%
c. Geologic Formations	66%	20%	8%
d. Historic Resources	66%	15%	11%
e. Prime Agricultural Land	66%	16%	11%
f. Rare or Endangered Species	71%	17%	5%
g. Recreation	74%	16%	4%
h. Riverside Vegetation	70%	15%	6%
i. Scenery	84%	13%	0
j. Water Quality	84%	10%	0
k. Water Quantity	76%	13%	6%
l. Wetlands	76%	14%	3%
m. Wildlife	72%	11%	2%
n. Other (specify)			

7. How do you feel about each of the following possible uses for the Pemigewasset River and its adjacent lands:

RESIDENTS	should be encouraged	should not be encouraged	don't know
a. Agriculture	67%	11%	16%
b. Commercial Development	18%	74%	4%
c. Forestry	77%	9%	12%
d. Hydropower Development	30%	53%	15%
e. Industrial Development	13%	75%	7%
f. Open Space/Wildlife Habitat	83%	11%	2%
g. Recreational Uses, Instream (swimming, boating, etc.)	82%	13%	2%
h. Recreational Uses, Riverside (walking, camping, etc.)	82%	10%	5%
i. Sand and Gravel Extraction	12%	70%	11%
j. Water Withdrawel for Municipal Water Supply	26%	41%	28%
k. Water Withdrawel for Industrial Uses	12%	69%	16%
m. Waste Water Discharge (municipal and industrial)	14%	74%	8%

SEASONAL/WEEKEND	should be encouraged	should not be encouraged	don't know
a. Agriculture	50%	11%	22%
b. Commercial Development	6%	89%	0%
c. Forestry	50%	33%	17%
d. Hydropower Development	11%	72%	11%
e. Industrial Development	0%	89%	6%
f. Open Space/Wildlife Habitat	100%	0%	0%
g. Recreational Uses, Instream (swimming, boating, etc.)	78%	11%	11%
h. Recreational Uses, Riverside (walking, camping, etc.)	89%	6%	6%
i. Sand and Gravel Extraction	6%	72%	17
j. Water Withdrawel for Municipal Water Supply	17%	44%	33%
k. Water Withdrawel for Industrial Uses	11%	61%	22%
m. Waste Water Discharge (municipal and industrial)	11%	78%	0%

VISITORS		should be encouraged	should not be encouraged	don't know
a.	Agriculture	67%	33%	0%
b.	Commercial Development	50%	50%	0%
c.	Forestry	67%	33%	0%
d.	Hydropower Development	50%	33%	17%
e.	Industrial Development	50%	50%	0%
f.	Open Space/Wildlife Habitat	50%	50%	0%
g.	Recreational Uses, Instream (swimming, boating, etc.)	100%	0%	0%
h.	Recreational Uses, Riverside (walking, camping, etc.)	50%	50%	0%
i.	Sand and Gravel Extraction	50%	50%	0%
j.	Water Withdrawel for Municipal Water Supply	67%	33%	0%
k.	Water Withdrawel for Industrial Uses	50%	50%	0%
m.	Waste Water Discharge (municipal and industrial)	33%	50%	17%

TOTAL		should be encouraged	should not be encouraged	don't know
a.	Agriculture	65%	12%	16%
b.	Commercial Development	18%	75%	4%
c.	Forestry	73%	13%	12%
d.	Hydropower Development	29%	54%	14%
e.	Industrial Development	13%	76%	6%
f.	Open Space/Wildlife Habitat	84%	11%	1%
g.	Recreational Uses, Instream (swimming, boating, et)	82%	12%	3%
h.	Recreational Uses, Riverside (walking, camping, etc.)	81%	11%	5%
i.	Sand and Gravel Extraction	24%	69%	11%
j.	Water Withdrawel for Municipal Water Supply	26%	41%	27%
k.	Water Withdrawel for Industrial Uses	14%	67%	16%
m.	Waste Water Discharge (municipal and industrial)	14%	74%	7%

PEMIGEWASSET WILD AND SCENIC RIVER STUDY
Franconia Notch State Park

The Pemigewasset River from Profile Lake to the southern boundary of Franconia Notch State Park is being considered for designation as a National Wild and Scenic River. The National Wild and Scenic Rivers System is comprised of a select group of about 150 free-flowing rivers with outstanding natural, cultural or recreational resource values. These rivers are afforded protection from federal involvement in any water resource projects (dams, diversions, channelization) that would harm the river's free flow or outstanding values. If designated, management of the river and the lands alongside it would remain the responsibility of the State of New Hampshire.

A study is currently being conducted by the National Park Service to determine whether to recommend the river for inclusion in the national system. The Park Service's recommendation is dependant upon whether the State of New Hampshire supports the designation. Towards this end, the Division of Parks and Recreation would like to know how the users of Franconia Notch State Park feel about this issue.

Please indicate your opinion below:

I _____ support
_____ do not support

designation of the Pemigewasset River through Franconia Notch State Park as a National Wild and Scenic River.