

# **APPENDIX B**

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Summary of Willow Brook Watershed Project  
**Willow Brook Watershed Project**  
Natural Resource Inventory and Conservation Plan  
Summary  
Warner, New Hampshire 1998

### Introduction and Background

The Town of Warner, a largely rural New Hampshire town situated on two corridors, the Warner River and Interstate 89, has experienced an increased rate of commercial and residential development in the past 20 years. In 1997 the Warner Conservation Commission, recognizing the need to plan for the protection of water resources and ecologically sensitive areas, developed a plan to identify and document key natural resources in the town of Warner.

A pilot project was designed which would yield a report with two components: a Natural Resource Inventory to document certain natural resources and features in a portion of the town, and a Conservation Plan to make recommendations for appropriate use of these resources. This project was conceived as a model for future projects in other watersheds in Warner and beyond.

The watershed of Willow Brook, a tributary of the Warner River, was chosen as the area to carry out the pilot project. This area was chosen because it is a tributary to the Warner River, it is close to the downtown area, has a documented abundance of wildlife, and is valuable for recreation.

Watersheds are geographically defined segments of the landscape which are based on a single outlet for the flow of all surface waters, and thus make convenient, practical and ecologically based units for study. This watershed, which covers nearly 3,000 acres is the drainage area for Willow Brook. It extends in a north to south direction with its headwaters in the town of Salisbury and its outflow confluence with the Warner River in the downtown area of Warner. The study area is most populated along the eastern and western peripheries and where it crosses the central village area. Portions of the watershed are already protected as conservation lands.

In early 1997 the Conservation Commission applied for and received a Local Incentive Grant from the New Hampshire Department of Environmental Services. The grant, which was matched by the Wharton Foundation and by in-kind donations from the Conservation Commission, supported the hiring of a project coordinator/data collector, as well as services and supplies related to the work, including computer mapping.

This report, which may be amended or updated in the future, will help to inform planning on a town-wide basis, including the town master plan. It is also an important step toward promoting voluntary natural resource conservation in the Town of Warner.

## **Willow Brook Watershed Project - Findings and Recommendations**

The overall goal of the Willow Brook Watershed Conservation Plan is protection of the area's natural resources for today and for the future. Such a broad goal, encompassing many facets both human and natural, will require the cooperation of a varied constituency within the town.

This section contains recommendations for conservation in the Willow Brook watershed which are directed to the Town of Warner, its Board of Selectmen, Planning Board and Conservation Commission. Some of these recommendations involve changes to Town ordinances, and would therefore effectively conserve natural resources town-wide. Other recommendations are aimed at landowners and involve the sustainable management of watershed resources.

### **WATER RESOURCES**

The Willow Brook watershed is drained by Willow Brook, one of many drainages which supply the Warner River. The Warner River flows into the Contoocook River, which in turn flows into the Merrimack River which empties into the Atlantic Ocean in Massachusetts. Willow Brook is classified as a second order stream.

The total Willow Brook watershed area is 2,946 acres. 2,343 acres are in Warner, with the remaining 613 acres in Salisbury. This amounts to 6.6% of the total area of the town of Warner. For the purposes of this report, references to the "watershed" shall mean the Warner portion of the Willow Brook watershed including the Children's Brook portion. Children's Brook is the name given to the lower portion of Willow Brook.

#### ***Streams and Ponds***

##### **Findings:**

The Willow Brook watershed contains more than 8 miles of streams. The streams of the watershed provide habitat, fishing, scenic enjoyment and groundwater recharge

The results of any human activities that adversely affect stream water quality, such as agricultural runoff, road salt and unwise forestry practices can potentially affect downstream areas, including the Warner River and its aquifer.

Maintaining shade along the stream corridor is important for clear, well oxygenated stream water. Keeping vegetation intact along stream corridors maintains shade, stabilizes sediments, promotes cool temperatures and helps to filter out pollutants.

The Town zoning ordinance currently requires a building setback of 75 feet from ponds greater than 10 acres, perennial waterways or streams, buildings or storage tanks and the maintenance of at least 50% of the existing natural vegetation within this buffer zone (Article IV, Provision J.). However, the "50% natural vegetation" clause is not specific enough to prevent excessive clearing within the 75 foot buffer zone.

A water quality survey of Willow Brook conducted by the NH Department of Environmental Services in 1997 found elevated levels of sedimentation in the brook, primarily caused by inadequate erosion controls on gravel roads adjacent to the brook.

There is currently no program in place for long-term water quality monitoring in the watershed.

Recommendations:

Board of Selectmen: Ensure landowner compliance with the 75 foot zoning setback.

Board of Selectmen: Take measures to control erosion from gravel road in the proximity of Willow Brook and its tributaries.

Planning Board: Propose an amendment for Town approval to Section J, Article IV, General Provisions of the zoning ordinance to read as follows (Bold text is new):

J. Warner River, bodies of water and waterways: Any lot bordering the Warner River shall have a minimum frontage of 100 feet. All buildings, including storage tanks, shall be set back a minimum of 75 feet from the Warner River, ponds greater than 10 acres and all perennial waterways and streams as shown on standard 7.5 minute USGS quadrangle maps. **In addition, where existing, a natural woodland buffer shall be maintained within 75 feet of the Warner River, all great ponds and perennial streams. Not more than 50 percent of the total number of trees, and not more than 50 percent of the total number of saplings shall be removed for any purpose in a 20 year period. A healthy, well-distributed stand of trees, saplings, shrubs and ground covers and their living, undamaged root systems shall be left in place. Replacement planting with native or naturalized species may be permitted to maintain the 50 percent level.**

In addition to these changes, add two new definitions to Article III, as follows:

AB. "Sapling" means any woody plant which normally grows to a mature height of greater than 20 feet and has a diameter less than 6 inches at a point 4.5 feet above the ground.

AC. "Tree" means any woody plant which normally grows to a mature height of greater than 20 feet and has a diameter of 6 inches or more at a point 4.5 feet above the ground.

Conservation Commission: Inform citizens about the importance of observing the existing 75 foot setback and vegetated buffer zoning restriction.

Conservation Commission: Develop a long term water testing program to monitor stream water quality using N.H.D.E.S. or other model.

Conservation Commission: Promote and actively seek private land conservation in key stream corridor areas, especially along Willow Brook.

## ***Aquifers***

### Findings:

The watershed contains 84 acres of the high-yield Warner River Aquifer, as well as other smaller aquifers. The Warner River Aquifer provides the water for the Town water supply. Other smaller aquifers are used as private water sources.

Human activities at the aquifers or their sources, such as street runoff of salt and automobile fluids or industrial chemical leakage have the potential to adversely affect the portion of the Warner River aquifer in the watershed.

Portions of two Wellhead Protection Zones are located in the watershed, one of which is for the town water supply.

The Town Subdivision Regulations prohibit the inclusion of land in areas necessary for the protection of aquifers and aquifer recharge areas toward the required minimum buildable lot size (Section IV, A., 1., b.).

No comprehensive aquifer protection regulations currently exist in the Warner Zoning Ordinance.

### Recommendations:

Planning Board: Establish aquifer protection overlay zoning districts for all high-yield aquifers in the watershed.

Planning Board: Adopt an Aquifer Protection Ordinance.

## ***Wetlands***

### Findings:

Nearly 140 acres of wetlands have been identified in the Warner portion of the watershed. Wetlands serve several important functions, including water quality maintenance and improvement, wildlife habitat, floodwater storage, ground water recharge/discharge, aesthetics and recreation.

The State of New Hampshire has jurisdiction over any activities that may directly impact a wetland, including dredging, filling, placement of structures and certain discharges. The U.S. Army Corps of Engineers and other agencies may also have jurisdiction over certain wetlands.

Wetlands are unsuitable for building or septic system installation.

Wetlands not categorized as ponds greater than 10 acres or as streams lack protection by any building setback or vegetation buffer in the Warner Zoning Ordinance.

Recommendations:

Planning Board: Amend the zoning ordinance to require a building setback and vegetated buffer of 75 feet from any wetland identified in the Willow Brook Watershed Natural Resource Inventory. This wording could be included in Section J, Article IV of the Zoning Ordinance (see page 33).

Planning Board: Amend Town site plan review and subdivision regulations to require that all wetlands within a proposed impact area be delineated and mapped by a Wetlands Professional as part of the application process.

Conservation Commission: Inform citizens about the importance of maintaining wetland buffers.

Conservation Commission: Encourage and actively seek private land conservation by the use of easements or other methods in key wetland areas, especially in the southern portion of the watershed.

## **BIOLOGICAL RESOURCES**

### ***Wildlife Habitat***

Findings:

A wide range of habitat for wildlife is located in the watershed, with especially high concentrations in the vicinity of Tory Hill Meadow and other wetlands. The watershed is known to support at least 118 species of animals for a portion of their life cycle.

Both game and non-game species of wildlife provide a significant recreational opportunity for residents and visitors, and help to support the local economy.

Fragmentation of open space by road construction and development decreases its value as wildlife habitat, and may extirpate certain species.

Protection of wildlife populations must concentrate on the protection of wildlife habitat to be effective. Wildlife does not recognize property or political boundaries when utilizing habitat.

Recommendations:

Conservation Commission: Promote and actively seek private land conservation in key wildlife habitat areas, including the Tory Hill Meadow area, softwood-dominated forestlands and stream corridors.

Conservation Commission: Inform citizens of the value and diversity of wildlife habitat in the watershed.

Conservation Commission: Encourage the enhancement or restoration of wildlife habitat by landowners.

### ***Forests***

#### **Findings:**

Forested lands constitute more than 82% of the land area of the watershed. Forests provide wildlife habitat, timber and firewood, water retention, erosion control, temperature control and scenic beauty.

Erosion of soils exposed by construction or careless timber harvesting can cause the loss of nutrients essential for productive forest growth.

#### **Recommendations:**

Conservation Commission: Inform and encourage landowners to use sustainable forest management practices on their forest lands, as outlined in Good Forestry in the Granite State.

Conservation Commission: Promote the benefits to landowners of developing and following a forest management plan, and of using the services of a qualified, certified forester.

## **PHYSICAL RESOURCES AND FEATURES**

### ***Soils***

#### **Findings:**

The erosion of soils diminish the productivity of forest and agricultural lands, and degrade surface water quality.

Soils with limitations for land use due to hydrology, including poorly drained and very poorly drained soils, floodplain soils and organic soils account for 8.3% of the watershed area.

The Town Subdivision Regulations encourage the use of practices which conserve soil during construction.

The Town Subdivision Regulations prohibit the inclusion of lands with ledge which is exposed or lying within 4 feet of the soil surface, or land covered by any soils listed by the NH Water Division as Groups 5 and 6 (hydric soils) toward the required minimum buildable lot size (Section IV, Provision A., 1., c & e..).

**Recommendations:**

Conservation Commission: Inform and encourage landowners to use practices which conserve soils by minimizing erosion and preventing contamination from the dumping or leaking of hazardous materials.

***Floodplains*****Findings:**

87 acres of floodplain areas have been mapped within the watershed. 84 of these acres are in the Warner River floodplain, and are classified zone □A□ as most likely to flood. Floodplains provide unique plant and wildlife habitat, as well as scenic enjoyment and recreation.

The Town of Warner recently adopted a Floodplain Development Ordinance, which addresses construction standards, water and sewer systems and development standards for construction in flood-prone areas as they appear on Town maps. This ordinance applies to portions of the Willow Brook watershed which are designated flood hazard areas, most notably the 87 acres in Zone “A” at the confluence with the Warner River.

The Town Subdivision Regulations prohibit the inclusion of lands designated as Flood Plain toward the required minimum buildable lot size (Section IV, Provision A., 1., a.).

**Recommendations:**

Conservation Commission: Familiarize landowners with the specific areas which are designated as flood plains on Town maps, especially those areas in high-density and high-use parts of town, such as the downtown area.

Conservation Commission: Inform landowners of the practical and ecological reasons for avoiding development and certain incompatible uses in flood plains.

***Slopes*****Findings:**

The watershed landscape has a variable topography with 3.8% of the area exceeding a 25% grade slope. Areas with steep slopes, especially those over 25%, pose problems for forest management, and are unsuitable for road or building construction, due to their inaccessibility to equipment the high potential for soil erosion.

The Town subdivision regulations prohibit the inclusion of land with slopes in excess of 25% toward the required minimum buildable lot size (Section IV, Provision A., 1., c.).

Recommendations:

Conservation Commission: Inform landowners of the practical, legal and ecological reasons for avoiding construction and road building on slopes greater than 25% grade.

## **PRIORITY AREAS FOR CONSERVATION**

The Natural Resource Inventory identified four areas within the watershed which were judged to be in special need of conservation, and were thus designated as Priority Areas.

***Tory Hill Meadow Area:*** (including wetlands and 300 ft. surrounding upland border) High diversity of wetland types; less common wetland types; vernal pools; Heron rookery and other wildlife habitat; within floodplain area; soils with limitations; high scenic value.

***Willow Brook above Tory Hill Meadow:*** (including an upland border extending 100 ft. from each stream bank) Diverse wildlife and fish habitat; limiting soils; tributary to Warner River and Tory Hill Meadow.

***Southeast Wetland Complex:*** (including an upland border extending 100 ft. from each wetland boundary) Forested and wet meadow wetland; high visibility and proximity to roadway; direct connection to Willow Brook; soils with limitations.

***Southwest Wetland Complex:*** (including an upland border extending 100 ft. from each wetland boundary) Unusual suite of forested wetlands; special wildlife habitat; partially within floodplain area.

Recommendations:

The Conservation Commission should focus its efforts to:

Identify land parcels within the Priority Areas which are key to their protection.

Approach landowners in the Priority Areas and encourage and assist them in preparing management plans for their properties which would protect the sensitive resources there.

Identify an existing demonstration project which has applied sustainable land management practices to a property. Introduce Priority Area landowners to the Project and encourage them to adopt sustainable practices on their own land.

Determine if all eligible parcels in the Priority Areas are under Current Use assessment. Encourage the owners of any parcels that have not been so placed to consider reassessment.

Initiate a program to inform landowners in the Priority Areas of the benefits and techniques of formal land protection.

Work with landowners in the Priority Areas for the donation or bargain sale of property or conservation easements to protect these areas.

**Other Areas of Concern:** Uncommon Forest Types

These two relatively uncommon forest types which have special value for wildlife habitat and/or resource protection were also identified by the Natural Resource Inventory.

***Mature Mixed Hardwood Forest Stands:*** Uncommon forest type for watershed; high wildlife value, including black bear and wild turkey

***Hemlock-dominated Forest Stands:*** Relatively uncommon forest type for watershed; high value as wildlife habitat; maintains shade, coolness and oxygenation of streams.

Recommendations:

The Conservation Commission should focus its efforts to:

Identify landowners whose property supports these forest types and inform them of the special resource on their property.

Provide information to the landowners of the importance of these resources and of ways that they can help to preserve them, such as the use of sustainable forestry practices or granting of conservation easements.

**CONCLUSION**

The Willow Brook Watershed Project has been the most comprehensive study of natural resources in the Town's history. It was conceived as a pilot, the design of which could be applied to the other watersheds in Warner. Several of the conservation recommendations in this report should be applicable not only to the Willow Brook watershed, but to other areas throughout the town as well.

This report can also serve as an educational resource. The results may be of interest to landowners in the area, or to students of conservation. The report findings, as well as the numerous maps will be made available to the public for their use.

The results of this Conservation Plan will be considered for inclusion in the updated Master Plan for the Town of Warner. As a planning tool the report will play a central part in shaping the future of natural resource conservation in Warner.

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