
Pomperaug Watershed Management Plan

For

The Pomperaug River Watershed and Aquifer

Sponsored By:

The Pomperaug River Watershed Coalition, Inc.

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I. Acknowledgements

This Watershed Management Plan represents the joint effort of the Pomperaug River Watershed Coalition (the Coalition), the Connecticut Department of Environmental Protection (CT DEP), the United States Geological Survey (USGS), the University of Massachusetts (UMass) Instream Habitat Program (formerly at Cornell University) and the University of Connecticut's Geography Department. The plan could not have been produced without generous financial support from the State of Connecticut; The US Environmental Protection Agency- Region One; the towns of Woodbury, Southbury and Oxford; the Heritage Water Company; the Watertown Fire District Water Company; the Southbury Community Trust Fund; and the Coalition's Board, donors and members. The Coalition also recognizes the Connecticut Community Foundation's Nonprofit Assistance Initiative and the Greater Bridgeport Area Foundation. The Calpine Corporation has provided ongoing funding for two of the USGS gauging stations in the Pomperaug basin and granted funding for early studies leading to this plan. Several experts, more numerous than can be conveniently mentioned here, have reviewed portions of the plan and have helped guide our efforts.

II. Executive Summary

The Coalition is a 501(c)(3) nonprofit organization founded in 1999 with the mission to protect the quantity and quality of water within the Pomperaug River Watershed and Aquifer. Through the development and implementation of this scientifically based Watershed Management Plan (WMP), the Coalition will recommend management strategies that will assist local and state government agencies, water utilities and landowners with managing allocation and preventing pollution of the finite watershed in the watershed. The goal is to insure ample drinking water and irrigation, the assimilation of wastewater and the ecological integrity of the river for aquatic life, recreation and aesthetics.

The flowchart in **Figure 1** shows the process used by the Coalition to prepare this WMP. The process began with the identification and collection of existing information and ongoing research describing the physical conditions in and concerns about the Pomperaug Watershed. Fortunately, a wealth of information is available on the geology of the watershed and on its historic climate conditions, surface and groundwater flows, and land and water use because of years of research conducted by the USGS, CT DEP, the University of Connecticut (UConn), Yale University and others.

Additional information is needed to understand the surface and groundwater movement throughout the watershed and to quantify the impacts of existing and future water withdrawals on streamflows and on the ecological health of the watershed and aquifer. To address that need, the Coalition is collaborating with state agencies, universities and watershed professionals to analyze, research, and develop computer models that will help manage this finite resource among the many demands placed on it. To understand how water enters, moves through, and leaves the watershed and its aquifer, the Coalition has partnered with the USGS (*for details, see Section IV.B.1*). To help understand the relationship between streamflows and the availability of fish habitat (or habitat potential), the Coalition retained Research Associate Professor Dr. Piotr

Parasiewicz of the UMass Instream Habitat Program (*see Section IV.B.4*). Additionally, Associate Professor Dr. Melinda Daniels of the UConn Geography Department conducted a preliminary study of the sediment dynamics of the Pomperaug River (*see Section IV.B.2*).

As research results have become available and as other local and regulatory water issues and concerns have been identified in the watershed, the Coalition's staff, in consultation with the researchers and its oversight committee (*see Appendix II*) has evaluated the findings and reported to the Coalition's Board (*see Appendix I*). Working together, they have developed a list of "Action Items" (*see section IV, E*), which takes into consideration funding, staffing, and community support. Action Items will be evaluated regularly to insure their continued effectiveness and will be updated when necessary.

This WMP is intended to be a LIVING document. To insure this, as more research results and other local and regulatory water issues arise, the Coalition will continue to go through the process described above and illustrated in **Figure 1**. This iterative process will let the Coalition identify the most appropriate, cost effective and politically achievable management strategies to insure that the watershed's water quantity and quality goals are met now and in the future.

The Coalition provides a non-regulatory forum for all stakeholders to actively understand, discuss and participate in watershed management. Its 26-member Board is diverse and representative to ensure attention to a comprehensive range of water-use, municipal, regional and environmental concerns. Through its educational, training, and outreach programs, a robust website and publications, the Coalition will share research information with the local communities and with state and national water management agencies and organizations.

The Pomperaug WMP process and outcomes have been designated by the Connecticut Water Planning Council as a model for Connecticut's water-resource user community (*State of Connecticut Water Planning Council Annual Report to the General Assembly and Work Plan for 2004*; January 26, 2004).

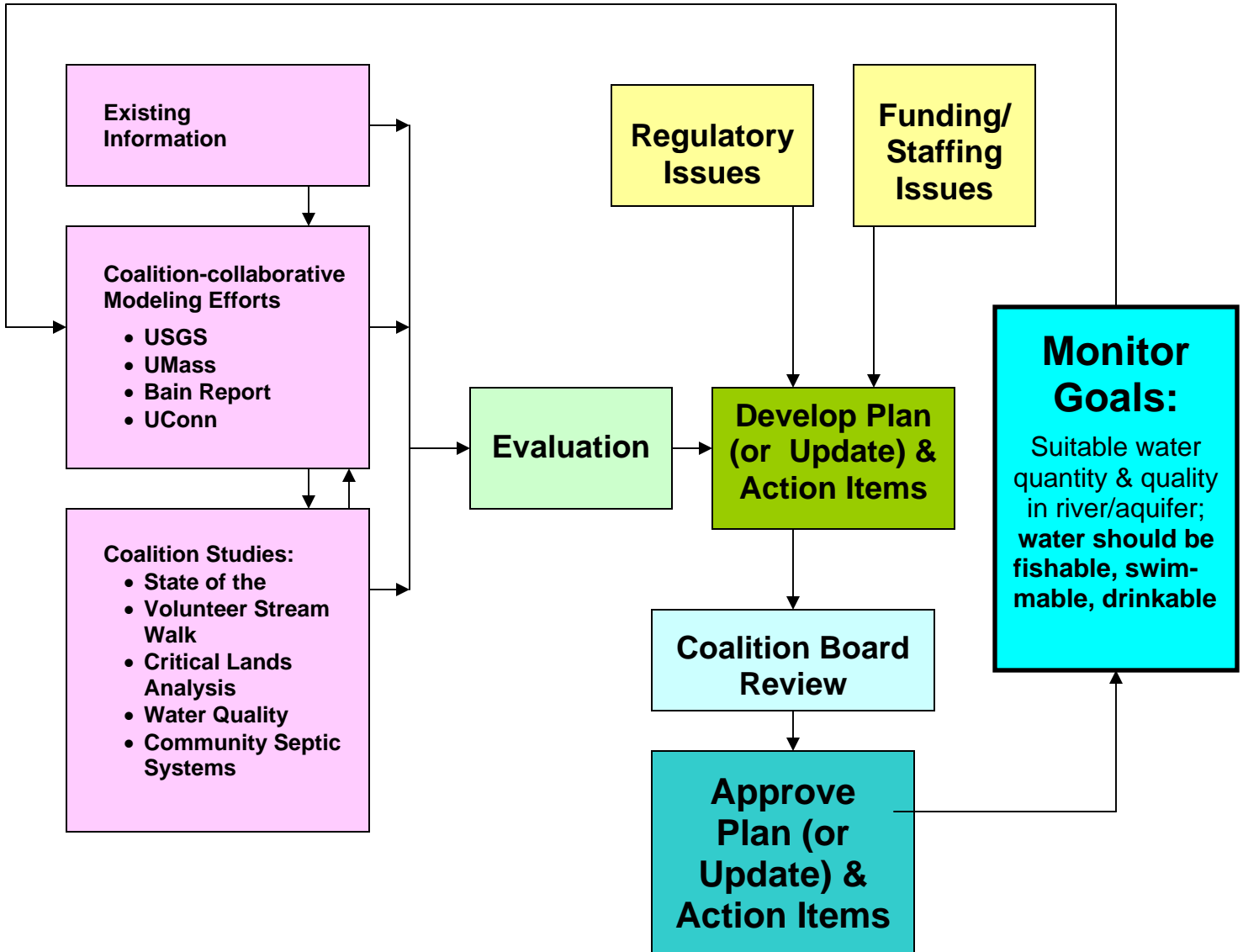


Figure 1. The Coalition's Watershed Management Plan Process

III. Goals

The Pomperaug River Watershed (**Figure 2**) covers 90 square miles within the eight Connecticut towns of Bethlehem, Woodbury, Southbury, Washington, Roxbury, Watertown, Middlebury, and Morris. The Coalition is a 501(c)(3) nonprofit organization founded in 1999 whose mission is to protect the quantity and quality of water within the Pomperaug River Watershed so that it meets the three goals of the 1972 Federal Clean Water Act: that the surface water be **fishable, swimmable, and drinkable** and that the groundwater be of **adequate quantity and quality**.



Figure 2 – Pomperaug

The waters of the Pomperaug River and its primary tributaries (the Nonnewaug & Weekepeemee Rivers) are connected to the groundwater aquifers within the watershed. The underground aquifers seasonally sustain flows in the local rivers and streams and currently supply millions of gallons of drinking water daily to towns both in and out of the Pomperaug watershed. The volume of water that can be withdrawn from the river/aquifer system by issued CT DEP permits exceeds the USGS estimates of sustainable capacity. Fortunately, the water is not being withdrawn at the maximum permitted rate—but that will likely change. According to the Council of Governments of the Central Naugatuck Valley, the population within the Pomperaug watershed will increase by some 20 percent in the next 30 years. More importantly, population growth is accelerating in neighboring towns (Watertown, Middlebury, and Oxford) that are largely outside of the watershed but still draw water from the Pomperaug related aquifers that is never returned for local recharge.

If water use is not managed properly, public and private drinking water supplies in the watershed and neighboring towns could be significantly reduced over time. Overuse of the aquifer could also negatively impact stream levels causing seasonal low flows that stress fish populations and minimize recreational opportunities. It may also result in insufficient dilution of permitted wastewater discharges and non-point-source pollution. Additionally, underground petroleum products and chemical leaks and contaminated surface water run-off would eventually compromise the local groundwater quality.

The Coalition plans to carry out its mission of protecting the quantity and quality of the waters in the watershed by developing this comprehensive WMP; by providing a forum for stakeholders and the community to discuss issues in a non-regulatory environment; and by educating the public, government (local, state and federal) and business communities about the importance of a healthy river system and our collective role in its protection. The Coalition’s mission benefits

municipalities (selectmen, land use commissions and staff, public works and health departments); residents; land trusts; businesses; and water utilities in the watershed. In addition, the Coalition promotes the environmental goals of the state’s Water Planning Council, the CT DEP, the Connecticut Department of Public Health, and the Council of Governments Central Naugatuck Valley.

IV. Pomperaug Watershed Management Plan Process

In shaping this WMP, the Coalition has drawn upon advice and recommendations from the US Environmental Protection Agency Academy’s *Introduction to the Planning Process*. **Figure 3**

Developing a Management Plan

Stage 1: Challenges and Objectives

- Identify Concerns
- Identify Valued Features
- Seek and Analyze Data
- Prioritize Challenges and Opportunities
- Determine Critical Areas
- Document Challenges and Opportunities
- Gather Other Documentation
- Establish Objectives

Stage 2: Developing the Plan

- Select Management Alternatives
- Put Together an Action Plan
- Types of Action
 - Information/education
 - Technical Assistance
 - Funding
 - Regulatory

Stage 3: Implement and Evaluate

- Fund the Actions
- Prioritize Actions
- Measure and Report Progress
- Review the Plan
- Celebrate Success

Figure 3

gives the outline of the Academy’s guidelines, which provided a flexible framework for the Coalition’s decision-making. The Academy emphasizes that the process of making watershed management plan decisions seldom follows a set pattern. Citing a classic paper from the planning literature¹, it notes: “Multiple viewpoints come into play in planning and executing any action. Perhaps the best way to view modern-day watershed management planning is not as a cookbook with consistent recipes for success, but as a very flexible framework for hearing, evaluating, integrating, and building support from numerous viewpoints and proposals. The planning framework has a logical structure and steps, but its flexibility may be more important than taking every step literally and in sequence.”

For more specific guidance and detail on the processes involved in developing a watershed management plan, see the

Introduction to the Watershed Management Planning Process at <http://www.epa.gov/watertrain/planning/>.

The Coalition completed the first step in 2001 with the publication of the *State of the Watershed Report* (see Section C.1); the report is available on the Coalition’s website:

¹ Lindblom, Charles E. "The 'Science' of Muddling Through." *Public Policy: The Essential Readings*. Stella Theodoulou and Matthew Cahn, editors. Prentice Hall. 1995. Pp 113-127.

<http://www.pomperaug.org>. Building on this and in consultation with CT DEP, the USGS and University of Cornell researchers, the Coalition devised a workplan (coordinated by Mr. Raman Iyer, Coalition volunteer & Director of Environmental Remediation, Crompton Corporation) for the development of the WMP.

Early in the WMP process, the Coalition recognized that additional current research would be needed to understand the surface and groundwater movement throughout the watershed and to quantify the impact of water withdrawals on streamflows and on the ecological health of the watershed and aquifer. To address those issues, the Coalition is collaborating with state agencies, universities, and water-resource professionals to develop computer models for the management of the watershed.

- To understand how water enters, moves through, and leaves the watershed and its aquifer, the Coalition has partnered with the USGS (*for details, see Section IV.B.1*).
- To help understand the relationship between streamflows and the availability of fish habitat, it retained Research Associate Professor Dr. Piotr Parasiewicz of the UMass Instream Habitat Program (*see Section IV.B.4*).
- Associate Professor Dr. Melinda Daniels of the UConn Geography Department conducted a preliminary study of the sediment dynamics of the Pomperaug River (*see Section IV.B.2*).

As research results became available and as other local and regulatory water issues and concerns were identified, the Coalition's staff, in consultation with the researchers and its oversight committee (*See Appendix II*) evaluated the findings and reported to the Board (*see Appendix I*). Action Items were developed (*see Section E*) that take into consideration available funding, staffing, and community support. The Action Items will be evaluated regularly to insure their continued effectiveness.

As a living document, this WMP will be monitored, and will be updated as necessary. As more research results and other local and regulatory water issues arise, the Coalition will continue to go through the process described above and illustrated in **Figure 1**. The WMP will be available on the Coalition's website and will be updated online as appropriate (funding for updates has been provided in 2005 by CT DEP's 604B Program).

The Coalition provides a non-regulatory forum for all stakeholders to actively understand, discuss and participate in watershed management. Its 26-member Board is diverse and representative, insuring attention to a comprehensive range of municipal, regional, water-use and environmental concerns. This iterative WMP process allows the Coalition to identify the most appropriate, cost effective, and politically achievable watershed management strategies to insure that water quantity and quality goals are met now and in the future.

A. Inventory of Existing Information

The first step in the development of the WMP was to take an inventory of independent assessments of watershed resources. Numerous studies of value to the development of the WMP have also been used to support current USGS, UMass and UConn watershed modeling efforts. All the studies are available in the Coalition's resource library. Selected studies with relevant dates and any associated action items are summarized on the following pages.

1. RIVER FLOW DATA – Ongoing

The Pomperaug River gauge at Southbury, operated by the USGS, is collecting real-time data for discharge and gauge height. Seventy-three years of median daily streamflow records are available for this gauge.

Two additional stations, one on the Weekepeemee and the other on the Nonnewaug River, recorded data intermittently but had been discontinued because of lack of funding. The two stations were reactivated in summer 2000 through the collaborative efforts of the Coalition, the Town of Woodbury, the USGS and Towantic Energy, LLC. (*For locations of the gauges, see Figure 4*). The data can be accessed from the Coalition's website at: http://www.pomperaug.org/streamflow_data.htm. River gauge funding is assured through 2006; subsequent funding is unclear.

Action Item: The Coalition will work with the USGS to insure continued funding for the gauges.

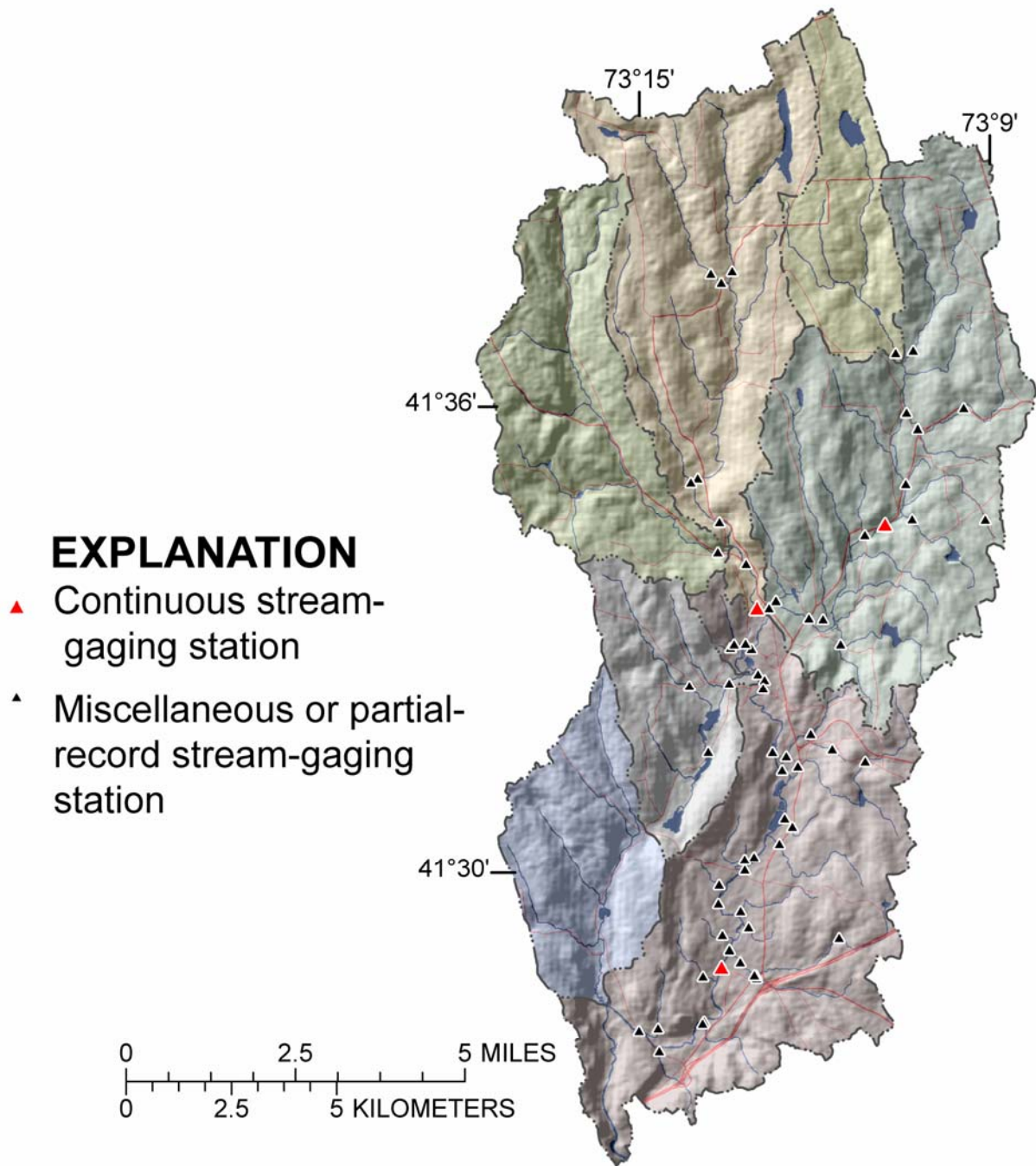
2. PRECIPITATION/CLIMATE DATA – Ongoing

National Weather Service data is available for the watershed. A new weather station has been purchased as part of the USGS surface and groundwater modeling studies (*see Section IV.B.1*) and was installed at the Weekepeemee gauge in Hotchkissville in May 2004. The station monitors wind speed, precipitation, temperature, relative humidity and solar radiation. The gauge is part of the Hydrometeorological Automated Data System, a real-time data acquisition and data distribution system operated by the Office of Hydrologic Development of the National Weather Service. Information from its site can be accessed at <http://dipper.nws.noaa.gov/hads/charts/CT.html> and through the Coalition's website.

3. REGISTERED/PERMITTED DIVERSIONS – Ongoing

For five years, from July 1997 to July 2002, CT DEP required the reporting of all water diversions over 50,000 gallons per day. Based on that data, and assuming a similar rate of water use for people using the public water supply or private wells, the USGS calculated that the total groundwater use for the basin in one year (2001) was 3.5 million gallons per day.

Figure 4. USGS Gauging Stations in the Pomperaug



Future Action Item: The Coalition will work with other river organizations in the state and with the Connecticut Water Planning Council to encourage legislative initiatives that would require the ongoing reporting of all water diversions over 50,000 gallons per day.

4. RESERVOIR DISCHARGE INFORMATION – *Ongoing*

The Watertown Fire District Water Company routinely releases water from their Lockwood-Bronson Reservoir to supplement flow in East Spring Hill Brook in order to sustain yields in their Nonnewaug well field. The exact quantities of the releases from this and other reservoirs in the watershed are currently unknown. Recording at the USGS gauge on the Nonnewaug River provides a measure of the amount of water released and the duration of releases. This provides the necessary flow data for the USGS modeling efforts (*see Section IV.B.4*).

Action Item: Discharge records for reservoir releases would be of use to the USGS modeling efforts. USGS has recommended the installation of a staff gauge¹ at the Lockwood-Bronson reservoir. The Coalition will discuss the feasibility of this installation with the Watertown Fire District.

5. SURFACE WATER MONITORING

USGS Precipitation Runoff Modeling System (PRMS) National Research Program – *Ongoing*

The USGS is using the PRMS to model surface water flows in the Pomperaug. The Pomperaug PRMS model was initially developed as part of a national PRMS evaluation conducted by the USGS National Research Program. Approximately 70 basins across the continental US are part of the study, including the Pomperaug and Salmon Rivers in Connecticut. Information derived from the study has also provided input to the UMass Instream Habitat Program modeling efforts (*see Section IV.B.4*).

6. GROUNDWATER MONITORING

USGS National Water Quality Assessment and Transport of Anthropogenic & Natural Contaminants – *Ongoing*

A national USGS water quality study of about 50 watersheds is under way. There are eight study basins in the continental US, including the Pomperaug—the only basin in the Northeast to be included in the study. The purpose of the study is to assess groundwater and contaminant movement in the watershed; delineate source areas for public drinking water supply wells, including septic system return; and provide information on aquifer yield and groundwater baseflow to streams.

¹ A **Staff gauge** (or staff gage) is a graduated scale used to indicate the height of the water surface in a stream channel, reservoir) lake, or other water body. NOTE: “Gage” is an accepted spelling used by the USGS.

As part of the national study, the USGS is using the Modular Finite-Difference Groundwater Flow (MODFLOW) to locate the contributing areas for public water supply wells. This MODFLOW model will be adapted for the more detailed research being conducted by the USGS in Connecticut for the Coalition. For example, the national MODFLOW model area includes the entire Pomperaug watershed upstream from the Southbury gauge excluding the Sprain Brook sub-watershed.

For more information on these studies, visit: <http://water.usgs.gov/nawqa/> and <http://webserver.cr.usgs.gov/nawqa/hpgw/activities/TANC.html>.

7. WATER QUALITY MONITORING – Ongoing

A variety of water quality data for the Pomperaug watershed has been collected regularly for many years by the Woodbury Conservation Commission, the CT DEP and the USGS. The Coalition has gathered much of this data as either electronic or printed reports for its modeling efforts and makes the reports available through its resource library.

The Coalition's Water Quality Committee, a sub-committee of the Board, is considering instituting a basic, ongoing surface and ground water monitoring program that crosses town boundaries and provides a consistent, ongoing measure of the environmental health of the Pomperaug (*see Section IV.C.4*).

Additional water quality studies in the watershed include:

UConn Prescription Drug Study: Analysis of drug metabolites in surface waters downstream of Heritage Village wastewater treatment plant discharges. For an article discussing this issue see the Fall 2006 issue of Natural Resources Defense Council's magazine, *OnEarth*, [click here](#).

CT DEP Studies – These include oversight of various ground water contaminant plumes resulting from leaking underground storage tanks. These releases are located in sand and gravel deposits and pose both short and long term threats to public water supply wells.

Action Item: The Coalition's Water Quality Committee is currently inactive. The Coalition board, however, is following the progress of these studies and will evaluate the significance of results as they become available.

8. GEOLOGIC INFORMATION

The USGS National Bedrock Regional Aquifer Systematic Study (BRASS): Geologic Mapping in the Pomperaug Basin – *November 2003 through 2006*.

The purpose of this national study is to achieve an in-depth understanding of the relationship between bedrock well-water yield and rock type. The geology of the Pomperaug basin is currently mapped on parts of four USGS maps that were developed at different times. As a part

of the national BRASS, the Pomperaug watershed is the focus of a single new map unit. A new 1:24,000-scale geologic map is planned for the [Pomperaug basin](#). This basin comprises part of the Pomperaug River watershed, an area with significant ground-water supply issues, and it was identified as the area in greatest need of new geologic mapping by the State Geologist of Connecticut. For more information on the study, visit: <http://geology.er.usgs.gov/eespteam/brass/states/ct/ct2.htm>.

The information obtained from BRASS may be useful in helping to evaluate the accuracy of the USGS Connecticut MODFLOW model results, especially in areas that may be influenced by groundwater flow in fractured or faulted bedrock.

9. SOURCE AREA MAPPING FOR PUBLIC WATER SUPPLY WELL

Detailed final aquifer protection area Level A mapping of the area of ground water that contributes to each public water supply well is required of water companies within the watershed under Connecticut's new Aquifer Protection Area Program by 2007 (*CT General Statutes Sections 22a-354a et sec*). The purpose of the program is to identify critical water supply aquifer areas and protect them from contamination by managing land uses in these areas.

Information from Level A mapping will be useful in verifying the Coalition's watershed modeling results. Similarly, recharge information from watershed modeling efforts can save water companies significant time and money on Level A mapping efforts. Currently the only the Southbury Training School Level A mapping has been completed. Water companies have been sending representatives to the Coalition's meeting to learn how and if the USGS modeling can be of use in their Level A mapping efforts.

10. IMPERVIOUS SURFACE BUILD-OUT (ISB) ANALYSIS

An ISB analysis of the impact of population growth on water quality in the watershed was completed in 2003 by the Council of Governments of the Central Naugatuck Valley (COGCNV) in conjunction with the UConn Cooperative Extension System's Nonpoint Education for Municipal Officials Project. The results were submitted to the USGS for use in the watershed model. COGCNV and the Coalition have presented these maps to all watershed towns and have suggested regulatory updates.

11. LAND USE INFORMATION

Land use patterns in the watershed were mapped using GIS technology by COGCNV in 2003 and were submitted to the USGS for developing their watershed model. These computer-generated maps will be easy to update and link to other layers of digital information and should prove useful to municipal officials and town planners.

12. SECURITY ISSUES

COGCNV is working on a Disaster Mitigation Plan to identify possible public water security issues. The proposed target date for completion is 2006.

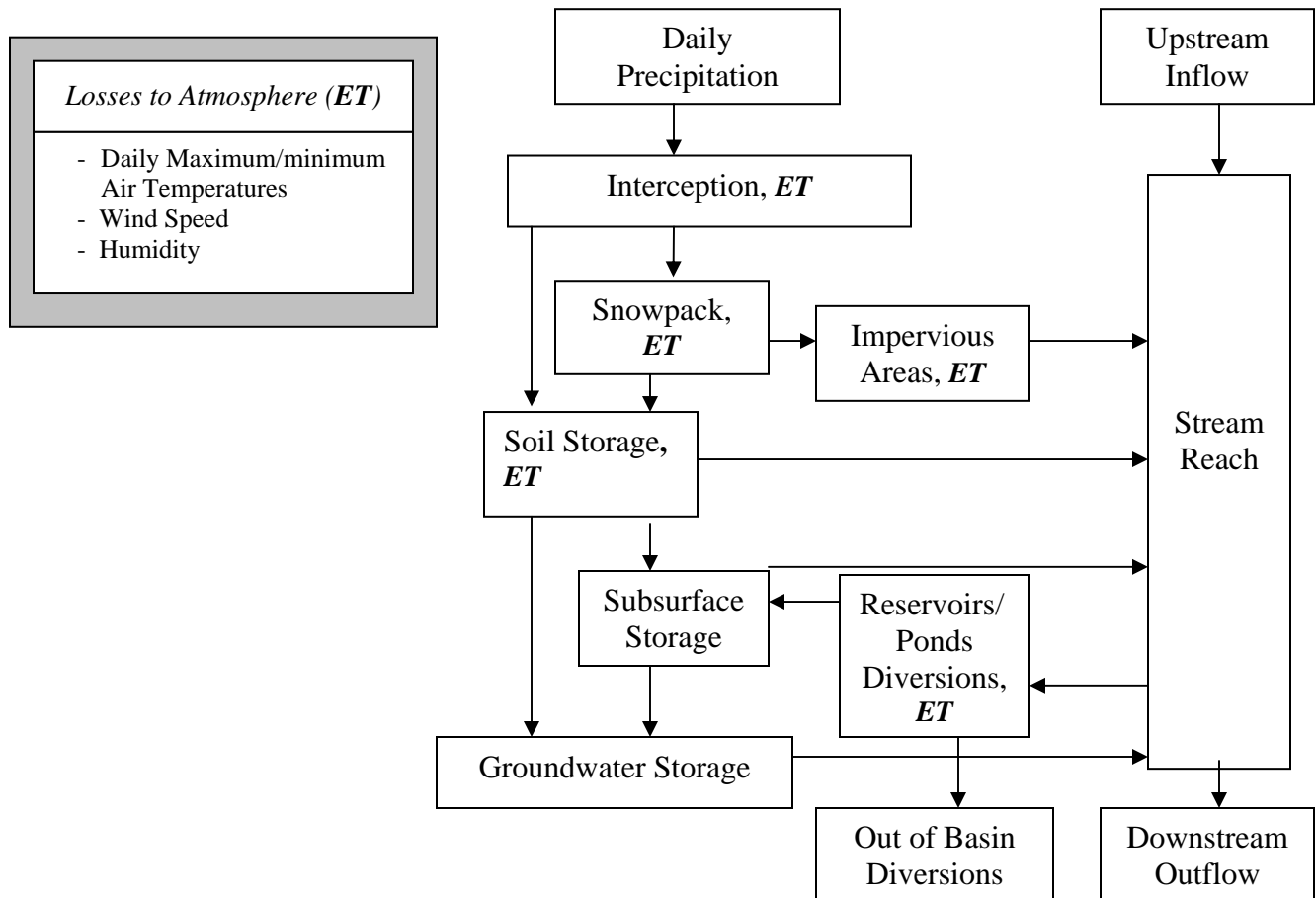
***Action items:** The Coalition will follow the progress of the plan and assist as necessary. Results will be incorporated into WMP updates as appropriate.*

B. The Coalition’s Collaborative Modeling Efforts

Modeling Overview

Watershed modeling, as illustrated in **Figure 5**, attempts to understand and quantify complex hydrologic cycle processes within a watershed. These models can be used to estimate how rainfall inputs can be accounted for as infiltration, surface runoff, stream flow, subsurface flow, and evapotranspiration (ET) losses throughout a watershed. Historical climate data (daily precipitation and daily maximum and minimum temperatures and precipitation), historical stream flow data and diversion data are needed for the calibration process of many models. Additionally, the watershed model should be able to account for the heterogeneity of vegetation, soils and land use characteristics in the watershed. The models developed for the Pomperaug watershed follow these general rules.

Figure 5. Conceptual Considerations for Watershed Modeling



1. USGS PRMS/MODFLOW MODELS

– Phase I & Phase II completed; Phase III is underway and to be completed 2006.

The overall goal of the modeling is to:

- Characterize and develop a comprehensive understanding of ground water and surface water processes in the watershed.
- Evaluate the effects of specific watershed management scenarios on streamflow in the Pomperaug River through the development and application of a simulation model.
- Provide spatial and temporal hydrologic data sets for use by water-resource managers in decision-making concerning stream habitat, land use, and water use; and as input to stream habitat, geomorphologic, and other hydrologic investigations.

Phases I and II of the Pomperaug watershed modeling effort concluded that the computer model programs PRMS and MODFLOW developed for the watershed will be useful in identifying the seasonal streamflows necessary to protect the chemical, physical, and biological integrity of the river while balancing the use of watershed resources for public drinking water, waste assimilation, and recreational, agricultural and industrial needs.

Phase I work demonstrated:

- The potential importance of groundwater recharge to the stratified drift aquifer in the Pomperaug valley from some upstream tributaries.
- The importance of water releases from the Lockwood-Bronson Reservoir in maintaining the high baseflows in East Spring Hill Brook that sustain well yields in the Nonnewaug well field operated by the Watertown Fire District Water Company.

Phase II work demonstrated:

- That ground water withdrawal (for public water supply) does impact stream flow in our watershed;
- That there is a relationship between the amount of coarse sediment (aquifer) in a watershed and the amount of water you can expect to get from the aquifer—information that can be used statewide;
- That the amount of effective impervious surfaces in a watershed impacts streamflow—again, information that can be used statewide, though more research is needed.

The last phase of the USGS modeling project will include the finalization and running of management scenarios outlined by the Coalition (**Figure 6 next page**) using the calibrated PRMS and MODFLOW models. The management scenario simulation runs generated by Phase III will be used by the Coalition and local town governments to evaluate the temporal and spatial hydrologic effects of different water and land use options, so as to facilitate scientifically based watershed management decisions. The information generated in Phase III will also provide hydrologic data sets, maps and reports that will be transferable to other areas in Connecticut.

The USGS will complete the Final Draft USGS Scientific Investigation Report (SIR) that will summarize and document the development and calibration of both runoff models and will also summarize the results of the various scenario simulations. This document will be submitted in

2007 for final USGS review and publication and make the data available for use by the Coalition. USGS has presented the Pomperaug Phase III preliminary study results, as a PowerPoint presentation, to the CT DEP and the Coalition.

Click here to view [Phase III](#) presentation.

Click here to view [Phase I](#) and [Phase II](#) presentations.

Figure 6 - The Coalition's Modeling and Management Scenarios/Questions

Note: These Modeling/Management Scenarios have been refined through a series of on-going discussions with PRWC and USGS staff as well as through a joint meeting and input from the PRWC Board and members, CT DEP Water Resources Staff, and USGS researchers.

To evaluate the effects of land use on river flows, the following will be modeled by USGS:

- The river flow rates for extreme climate conditions (severe drought and high rainfall) after a complete build-out of the watershed (per current zoning). (COMPLETED)
- Seasonal (month by month) analysis of aquifer recharge areas in the watershed by surface water runoff, interflow and groundwater. (COMPLETED)
- The river flow rates for various climate conditions under a forested, non-agricultural land use (hypothetical pre-development baseline scenario for river flow in the watershed). COMPLETED

To evaluate the effects of diversions on river flows the following will be modeled by USGS:

- Current river flow rates for extreme climate conditions.
- River flow rates for extreme climate conditions with no registered or permitted diversions.
- River flow rates for extreme climate conditions with maximum registered and permitted diversions.
- River flow rates for extreme climate conditions with public water diversions only.

For future evaluation and analysis:

- What is the best time for releases from Bronson-Lockwood, for example? Is it possible to get a timing "plan" for the various wells in the watershed during low flows that would reduce impacts?
- Where in the watershed are the best places for new public water supply well fields?
- What are potential impacts to the river and aquifer from past and current anthropogenic contaminant zones? Is it possible to get suggestions on how to design a ground/surface water-monitoring program?
- What effects would excavations such as lagoons and quarries have on the river and aquifer?
- How would Best Management Practices (such as land use practices, stormwater management and water conservation/pumping affect river flow rates for various climate conditions?

2. UCONN EROSION/SEDIMENT RIVER HEALTH INDICATOR STUDY –

This preliminary study of the sediment dynamics of the Pomperaug River will allow the Coalition to relate potential changes in water flows in the watershed to changing conditions in river bottoms, bank erosion and sediment storage. These are all critical habitat elements for fish populations and can affect pollutant transport and storage.

The basic sediment budget, which attempts to quantify the movement of sediment in a river system, will complement the USGS and UMass modeling efforts.

The sediment budget can also provide a valuable basis for formulating watershed management strategies: by indicating the nature and location of the main sediment sources that may need to be controlled; by identifying sediment sinks or areas of sediment storage that may have sediment associated nutrients and contaminants; and by providing a means of assessing the likely impact of upstream control measures on the sediment yield at the watershed outlet. This investigation may also serve to help towns achieve compliance with CT DEP's Stormwater Phase II Program regulations.

Possible Future Tasks:

- Compare the modern condition of the channel to historical conditions.
- Produce a Geographic Information System (GIS) map of erosion and deposition zones within the watershed.
- Establish baseline data sets for future sediment monitoring work.
- Establish a baseline of substrate character (particle size) throughout the watershed.
- Present a map of erosion and deposition zones to all appropriate land use commissions and make the map available on the Coalition's website.
- Present map of erosion and deposition zones to town public works departments for discussion of planning road-sanding/vacuuming schedules. This task may also provide CT DEP Stormwater Phase II Management Program compliance opportunities.

Results to date:

- A Power Point presentation, fact sheet and report on historical conditions were delivered to the Coalition's Board in spring 2004.
- Field trip highlighting sediment process in the Pomperaug River held by Melinda Daniels, UConn on October 9, 2005

For summary report of work to date, [click here](#).

3. BAIN HABITAT REPORT – *Completed*

In 2000, Dr. Mark Bain of Cornell University and his research assistant, Ann Gallagher, were hired by the Coalition to conduct research that would aid in the evaluation of the ecological integrity of the system—its ability to support and maintain a balanced community of organisms appropriate to the natural habitat of the region of the Pomperaug River. Their research sought to characterize:

- the physical habitat quality of the stream;
- the chemical environment and general water quality of the stream;
- the native stream and riparian communities;
- spatial relations (stream connectivity);
- temporal patterns (annual flow regime).

The project:

- Organized existing data and identify existing data gaps;
- Established current biological status of fish populations throughout the Pomperaug River watershed and its tributaries;
- Collected new physical habitat data such as bankfull width, depth and cross-sectional area; substrate characterization; drainage area of each of the sub-drainage basins; amounts of forest cover and impervious surfaces in each sub-drainage basin; survey-level hydrologic simulation models (e.g. run-off, nutrient loads) using GIS data; and a hydrograph for the watershed;
- Collected flow data during high flows and base flows from each of the sample sites, covering a range of stream sizes through each of the seven regional drainage basins.

Deliverables received by the Coalition include cumulative size/frequency distributions of substrate particles from 16 study areas in the watershed, and population estimates of fish (number/kilometer of stream length) caught in 1991 and 2001 at 16 watershed sites, indicating species and, for some species, densities. The detailed report is available on the Coalition's library.

4. UMASS INSTREAM HABITAT PROGRAM MODEL – *Completed-2006*

To help understand the relationship between streamflows and the availability of fisheries habitat (habitat potential), the Coalition contracted with Dr. Piotr Parasiewicz of the University of Massachusetts (formerly of Cornell University) to develop a Meso* Habitat Simulator (MesoHABSIM) model for the river.

MesoHABSIM is a river habitat model that attempts to address the need for managing large-scale habitats and river systems. It models larger river reaches, or meso-habitats, such as riffles, runs, and pools. The physical characteristics of each meso-habitat are measured and compared to fish habitat preference curves to determine the amount of useable fish habitat at different river stages, or water levels. For a more complete discussion of this model go to www.neihp.org/mesohabsim/

As with other stream habitat models, the variation in the spatial distribution and amount of Meso-habitats can provide key information on habitat quality changes corresponding to alterations in streamflow, channel changes, and stream improvement measures. It provides a solid base for quantitative assessment and simulation of habitat conditions for the whole stream.

The objective of the Pomperaug habitat modeling effort was to develop instream and watershed scale information required for designing a management plan that best serves the needs of the aquatic resources of the watershed.

Tasks completed:

- Finished mapping representative sites.
- Defined habitat criteria for species and life stages different from those of the resident adult fish.
- Built a habitat model based on target fish community and physical and biological data.
- Simulated habitat baseline conditions.
- Conducted a time series analysis to investigate the level of habitat availability necessary at different seasons and set up seasonally variable flow targets. Created seasonal flow targets defining the band of minimum, critical and optimum conditions.
- Evaluated model predictions, taking into account fish observations.
- Defined prediction accuracy, deficits and needs for improvement.
- Made recommendations.

A final report and MesoHABSIM Training for all interested stakeholders will be completed in late 2006.

For a PowerPoint presentation of the summary of findings and recommendations for this study, **click here**.

⁵ **Meso:** Intermediate in size.

C. Additional Coalition Research

1. POMPERAUG RIVER STATE OF THE WATERSHED REPORT – *Completed in 2001*

This report provides an overview of current conditions and available information regarding the watershed. It gives a summary of the basic hydrogeological and biological principles behind watershed ecology; summarizes the quality and quantity of the Pomperaug's watersheds; and outlines potential problems in the watershed with regard to water supply. The report is available from the Coalition's website and in the libraries of all Pomperaug watershed towns.

2. STREAM COMMITTEE PROGRAMS

a. Volunteer Streamwalk Program – *Ongoing each spring & summer*

The Coalition began its Volunteer Streamwalk Program in 2000. The objectives are primarily to document the physical characteristics of the Pomperaug watershed and to involve the community in river conservation and the stewardship of watersheds. Additionally, the program will:

- assist conservation organizations and land use decision makers in obtaining restoration grants through the use of local up-to-date environmental data;
- provide regional and local planning initiatives with information that can help target both remediation and conservation efforts for watersheds;
- provide municipalities involved in the CT DEP Stormwater Phase II Management Program with information to help fulfill their reporting requirements;
- provide education and outreach programs based on the information and assist others (e.g., Audubon, local land trusts, high schools) in doing so.

Each spring, stream walk volunteers from all watershed towns are trained by The Coalition with assistance of organizations such as The Natural Resources Conservation Service and the Housatonic Valley Association at the Bent of the River Audubon Center in Southbury. As of June 2005, The Coalition has recruited and trained 99 VSWP volunteers representing all of our watershed towns.

The information collected by stream walk volunteers includes water depth and width, vegetation and land use types along the banks, stream bottom composition, and noticeable 'impairments' such as excessive algae growth, sedimentation, erosion, and the presence of stormwater pipes. Volunteers also document their findings with photographs. This information has been transferred to The Coalition's Geographic Information System (GIS).

The Coalition compiles and analyzes these data and reports on existing conditions, trends and trouble spots on the rivers. Maps generated by GIS as well as recommendations on how to use the information are included in a Stream Walk Report modeled after a similar program reports by Norwalk River Association and NRCS. An associated interactive mapping site was made available on the Coalition's website in 2005.

Results: As of the fall of 2006, 80% of the watershed has been covered by the Streamwalk Survey. The Coalition has identified 119 impairments and 50 erosion sites and erosion sites were ranked to support stream restoration programs, created a GIS database, and ranked erosion sites to help get funding to support stream restoration programs by [The Northwest Conservation District](#) and others. A summary of the survey data collected from 2000-2003 can be viewed through an interactive map or by reading our first summary report.

- View our [interactive Streamwalk Survey Map](#)
- [Read our first Streamwalk Survey Summary Report](#)

This program has been funded in part by [The Connecticut Community Foundation](#).

Future Plans: Once all basins have been surveyed by stream walk volunteers, the Coalition plans to update the survey every two years. Areas of concern in the basin may require more frequent monitoring, especially after significant storm/flooding events. Because the information collected is really a “snap shot” in time of the river system, areas of concern may require more in depth assessment by professionals and/or frequent monitoring especially after significant storm/flooding events.

b. Macroinvertebrate Study

The CT DEP is encouraging volunteer groups to assist in monitoring the State’s many streams and rivers and to report their findings to DEP’s Ambient Water Quality Monitoring and Assessment Program. Monitoring that is performed to accepted standards supports activities of the DEP is used in assessing surface water quality conditions and trends.

A daylong training/data collection workshop was held for the Coalition at the Bent of the River by Mike Beauchene, Volunteer Monitoring Coordinator for the CT DEP, in the fall of 2006. Volunteers conducted rapid bioassays of macroinvertebrates in the Pomperaug, the Nonnewaug and the Weekepeemee. Data from the workshop were submitted to the CT DEP for incorporation into DEP’s annual water quality assessment report.

Action Item: Participate annually in the CT DEP Water Quality Monitoring and Assessment Program.

c. Groundwater Monitoring Program

Monitoring of groundwater levels at several monitoring wells in the watershed has been taken over by the Stream Committee volunteers. This information is useful for the calibration and verification of the USGS MODFLOW and PRMS models and for management of the watershed, especially during periods of drought. The data is recorded and maintained by the Coalition.

3. CRITICAL LANDS ANALYSIS – Targeted for completion in 2006.

The Coalition's Land Use Committee (LUC) has developed an analysis of lands that are *critical to the health of the Pomperaug Watershed*. The LUC understands that as land use becomes more intense, water can become degraded. For example, converting an “open area” (one that is forested or in agriculture) to a residential area prevents rainfall from sinking into the ground (replenishing our aquifer) and instead directs it to wetlands, streams and rivers. Along the way this rainfall (also known as stormwater) travels over rooftops, roads, and parking lots – typically picking up pollutants not associated with “open areas”. A goal of the LUC, then, is to understand the location and level of protection of the “open areas” in the watershed.

The first step in the process was to identify on a map of the watershed those areas that are critical to its hydrology (surface and ground water processes). These areas include: wetlands, flood plains, the surface water bodies (rivers & streams) themselves and the Pomperaug Aquifer (underground water sources) especially areas within public water supply aquifer protection areas. In addition, the Coalition has been working with the [US Geological Survey](#) on a surface and ground water model, which has allowed the identification of 29 local watersheds that are most important for infiltration or aquifer recharge.

The next step in the process was to determine the “vulnerability” of the parcels of land which contain or are adjacent to those hydrologically critical areas. The LUC determined that “vulnerability” for the purposes of this analysis will indicate that the parcel can be converted to a more intense land use (therefore less protective of water). Consequently, the LUC felt comfortable excluding from their consideration those parcels that:

- Are already protected in perpetuity (federal, state, town open space, land trust lands, conservation easements, cemeteries, water company land class I and II);
- Already contain an intense land use (residential, commercial or industrial);
- Or contain development constraints such as wetlands or steep slopes.

Not surprisingly perhaps, most of the lands further assessed are in agriculture or are forested. Agricultural land was identified as some of the most important land remaining available in large tracts, especially with water access, adjacent to surface water or above water supply aquifers. Much of the farmland in the Pomperaug Watershed is located in flood plain areas so activities on those lands have the potential for significant impacts on our water resources. The [Council of Governments for the Central Naugatuck Valley](#) (COGCNV) developed a series of geographic information system (computerized mapping or GIS) maps of land in agricultural use in 2000 (base map is from 2000 aerials and updated to 2003 by towns), the prime and important agricultural soils, and land assessed under PA 490. These maps were studied by the LUC during a series of intense meetings and “vulnerable” agricultural lands were identified. The LUC, with generous financial and technical support from the COGCNV, developed an accompanying paper, [*The Role of Agricultural Land in the Preservation of the Pomperaug Watershed.*](#)

The LUC had discussions in 2005 with Adam Moore, Executive Director of [CT Forest & Park](#), Larry Rousseau, of the [CT Department of Environmental Protection](#), and others to develop a set of criteria to identify those forested areas which would be most critical to water protection.

The COGCNV prepared another similar series of GIS analyses for the LUC targeting forested lands.

- “Vulnerable” forested lands which contain or are adjacent to hydrologically critical areas become even more important when they also meet one or more of the following criteria:
- Are adjacent to committed (in perpetuity) open land;
- Parcels over 25 acres (minimum for PA 490 protection) in size that can be converted to a more intense use (with an owner currently interested in stewardship);
- Contain slopes too steep for forestry management without erosion problems;
- Contain endangered species;

With the Critical Lands Analysis completed, the LUC will focus on conducting an associated educational outreach program with generous financial assistance from the Southbury Community Trust Fund. You can look at the LUC’s maps by clicking on these links:

[Agricultural Lands](#)

[Forested Lands](#)

The LUC will provide the finalized maps and accompanying publications to selected landowners, watershed land use commissioners, land trusts and others who can help the Coalition protect these areas, and will also host workshops for them upon their request. The maps and publications will also become available in watershed town’s libraries.

Results

The LUC’s Critical Lands Analysis has already been successfully utilized by the Southbury Land Trust (SLT). The SLT used the Coalition’s scientific analysis to educate landowners about the importance of preserving their property. The SLT also motivated and continues to motivate their community to support the land trust in protecting land for aesthetic, recreational and water protection reasons. The SLT successfully obtained grant funding using the Coalition’s scientific analysis and maps to purchase 2 significant properties in 2004-2005. Additionally, maps and reports will be made available through workshops with targeted users and on the Coalition’s website and/or in watershed town libraries.

4. WATER QUALITY MONITORING – *Targeted for development by 2006 Currently inactive.*

The Coalition will be working with representatives from watershed towns, the CT DEP and the USGS to develop a cost effective surface and groundwater monitoring protocol that will help signal septic system failures, chemical spills, and other contamination in the river and aquifer. The monitoring program will also provide a baseline for knowing when changes have occurred.

The Coalition is also following the ongoing CT DEP investigations into gasoline components (MTBE and BTEX) that have contaminated groundwater along parts of Route 6 in Woodbury.

Action Item: *Establish an active water quality monitoring committee.*

5. COMMUNITY SEPTIC SYSTEM INVENTORY – *No activity at this time*

There are 14 community septic systems in Woodbury and eight in Southbury. The Coalition has created a database of community septic system managers and has organized an informational meeting between the CT DEP and these managers. The Towns have been encouraged to establish funds to cover the possible failure impacts and expensive repairs of these septic systems. The Coalition considers this potential source of contamination to be a significant long-term risk to the watershed.

Action Item: *Follow up with the CT DEP to determine whether the towns established such funds.*

D. Action Items

Action Items will be evaluated regularly to insure their effectiveness and will be updated when necessary. The evaluation process is repeated and appropriate updates are made whenever new research results become available.

TYPES OF ACTIONS

According to the US EPA Watershed Academy, there are four main types of action that most watershed partnerships consider:

Conducting information/education programs

Few people will make changes without understanding why changes are needed, how to make the changes and how the changes will affect them.

Rendering technical assistance

Many people need more than just information about necessary change. They also require some type of assistance, possibly including one-on-one discussion, demonstrations, drawings and plans, implementation instruction and/or oversight.

Taking regulatory action

Occasionally local ordinances, zoning or other types of regulation are necessary. But partnerships are strongly encouraged to explore other options first. Regulatory action isn't usually a positive step for all stakeholders, and can make consensus very difficult to reach. (The Coalition is non-regulatory; it may, however, engage in the research and drafting of model regulations, ordinances and such.)

Helping obtain funding

In some cases change will cause an economic hardship, which is why many partnerships include cost-sharing and other forms of financial assistance in action plans.

CURRENT ACTION ITEMS

1. OUTREACH PLAN AND OUTREACH DIRECTOR

Over the past seven years, the Coalition has gathered a significant amount of environmental data. The Coalition and its USGS and UMASS partners are nearing the completion of a three-year computer modeling project and anticipate that the models will be available for use by December 2006. This information can be used to educate local stakeholders and to encourage them to take actions voluntarily to protect and preserve the Pomperaug River, its tributaries, and its aquifer.

Toward that goal, the Coalition proposes to hire a part time **Outreach Director**. The Outreach Director, in concert with the Executive Director, the Board, our consultants, volunteers and other partners, will review, revise and implement a detailed **Outreach Plan** to help disseminate the

findings of the various hydrologic studies conducted in the watershed. This Plan, expected to be in place by the end of 2006, will include a full year schedule of meetings with all appropriate stakeholder groups including municipal land use boards, land trusts, water companies, local civic and environmental organizations within the watershed.

2. LAND TRUST OUTREACH INITIATIVE

As a first step in the Outreach Program, the Coalition will work closely with two local land trusts to develop new watershed management tools which will assist land trusts in selecting those lands for acquisition and protection which are vital to the protection and preservation of the quality and quantity of water in the watershed.

3. LAND USE BOARDS OUTREACH INITIATIVE

Using the knowledge gained from the watershed tools developed for the land trusts, the Coalition will then expand the outreach to include development of new watershed management tools for all land use boards in the eight watershed towns, customizing the tools for the needs of each different type of land use board. These boards will include conservation commissions, planning and zoning boards, as well as inland wetland and aquifer protection agencies.

4. WATER UTILITIES OUTREACH INITIATIVE

The Coalition will work along with local water companies in the watershed to take the new scientific data available from the USGS and UMass watershed computer models and employ this data to assist the water utilities in making water management decisions that are best practices for protecting the watershed.

5. COALITION MODELING COMMITTEE

The Coalition has formed a new Modeling Committee which has the responsibility of taking the new USGS and UMass watershed computer models and making them understandable and useable as everyday management tools for local organizations involved in decisions which affect the quality and quantity of water in the watershed.

6. STREAM COMMITTEE

The Coalition's Stream Committee will continue to run the Streamwalk and Macroinvertebrate programs to seek opportunities to improve stream conditions and water quality in the watershed.

7. THE COALITION'S SPEAKERS BUREAU

In the fall of 2006, the Coalition reactivated its speakers bureau to educate local service clubs and organizations on the work of the Coalition and the need for local residents to become involved with the Coalition to protect the watershed.

8. THE COALITION'S GEOGRAPHIC INFORMATION SYSTEM & RESOURCE LIBRARY

The Coalition maintains a Geographic Information System (GIS), a computerized mapping/database that contains geographic and environmental information for the watershed towns. GIS has been used, for example, to prepare maps for the Southbury Land Trust. One of those maps identified a corridor of prime and important agricultural soils coincident with a property of interest that helped the Land Trust describe the importance of the property and successfully acquire grant funds to purchase and protect it. The Coalition also maintains an extensive resource library of regulatory, technical, natural history, cultural, and recreational information and maps.

9. FACILITATION OF CT DEP STORMWATER PHASE II MANAGEMENT PROGRAM - *Currently Inactive*

Woodbury, Southbury and are required to participate in the CT DEP Stormwater Phase II Management program. Management practices for dealing with nonpoint source pollution are part of the WMP; these practices fulfill part of the management program's requirements. The Coalition is working closely with the staff of the towns to provide coordination and perform various critical tasks associated with the program.

In Woodbury, which contains 50 percent of the watershed, the Coalition has:

- Prepared and updated the required stormwater management program document with associated narrative using CT DEP forms.
- Researched and prepared the public notice.
- Researched and prepared a draft plan that contains outreach options and associated costs.

The Coalition's 2005-2006 tasks include:

- Review of zoning, planning and wetlands regulations for stormwater management options. Preparation and presentation of associated reports.
- Collaboration with Audubon Connecticut at the Bent of the River Center to introduce into the Pomperaug High School curriculum watershed information on the crucial issue of nonpoint source pollution and its management.
- Collaboration with the NW Conservation District or another appropriate organization to deliver to the general public a fall 2005 program on stormwater. This is intended to become an annual event.
- Prepare a flyer for all libraries on nonpoint source pollution and its management. Put the flyer information on the Coalition's website.
- Work with the USGS to develop a hydrologic model that can assess potential impacts on the watershed from new development and from surface water and groundwater withdrawal (anticipated completion date winter 2006). The town of Woodbury will work

with the Coalition and the USGS to incorporate elements of the model into new development design/restoration efforts where appropriate. Woodbury will continue to assess and incorporate any feasible model applications through the life of the Coalition/USGS project.

- Provide training for commissions and for design, engineering and construction professionals. Woodbury will begin planning for this training in collaboration with the Coalition in fall 2005, with the first program to be delivered in the fall of 2006 and annually thereafter.

In Southbury, the Coalition is a member of the Town's Stormwater Management Committee, where it continues to fulfill many of its education and outreach responsibilities.

10. RIVER GAUGE FUNDING

Funding of the existing river gauges within the Pomperaug watershed has been assured through the end of 2006. The data obtained from these gauges is vital to the ongoing research conducted by the Coalition, the USGS and other groups. It is crucial to enter into talks with the Connecticut office of the USGS to determine how to ensure the continued operation and funding of these gauges. The Coalition has been actively engaged with Calpine² and the Connecticut Siting Council to ensure continued funding of the gauges.

11. AQUIFER PROTECTION AREAS – *ongoing*

As part of the Aquifer Protection Area Program, the CT DEP requires water companies to map the critical portions of the aquifers that provide water to the companies' well fields. The companies have completed preliminary, or Level B, mapping for all their well fields, providing a general estimate of the critical supply areas. They will refine this preliminary mapping by using extensive, site-specific data and ground-water modeling to determine the final, Aquifer Protection Area mapping area. The final mapping will define the boundaries for new specific land use regulations. For more information, visit:

<http://dep.state.ct.us/wtr/aquiferprotection/index.htm>.

The Coalition will actively follow the progress of the Program implementation in the watershed and will offer advice and assistance to local aquifer protection committees.

12. LEGISLATIVE SUPPORT - *currently inactive*

Ongoing water-discharge information for all diversions over 50,000 gallons per day are necessary for studies in the basin and for the development of water allocation management plans for the basin. The Coalition should work with other river organizations in the state and with the

² Calpine, an independent power producer, is interested in developing a combined cycle power plant in Oxford, CT that would use water from the Pomperaug River. As a condition for siting approval of Calpine's power project by the Connecticut Siting Council, Calpine has been required to fund gauges in the watershed.

Connecticut Water Planning Council to encourage legislative initiatives requiring the ongoing reporting of such water diversions.

V. Plan Revisions and Updates

The Coalition's Board agreed to **annual revision** of this WMP. Updates are provided throughout the year as needed and added to the website but not included in the Plan until the annual revision. Updates may occur at any time throughout the year. The same process will be followed for review and approval. Staff will present suggested revisions to the Board each April for review and approval allowing time to incorporate items into the annual budget. The Board review will include an evaluation of how changing technical information, funding, staffing and regulatory issues have affected both the plan and its action items. The Coalition will also consider the effectiveness of the plan and track progress toward the objectives.

Questions that will be asked during this review process include:

- Do we still need to do this? Why?
- What else can we do?
- Has our vision changed?
- Do we have new or additional information that will change the objectives or selected alternatives?
- What has been successful? Why?
- What could have been improved? How?

Once the revisions are accepted by the Board, the revision date on this document will be changed and the website will be updated.

Appendix I

Coalition Board Members

Officers

Marc J. Taylor, M.D. - Chairman

Official Representative, Town of Southbury; Vice President, Housatonic Valley Association; Vice President, Rivers Alliance of Connecticut; Trustee, Southbury Land Trust

J. Lawrence Pond - Vice Chairman

Official Representative, Town of Woodbury; Former First Selectman, Town of Woodbury; Member, Woodbury Conservation Commission

Joseph Eisenberg - Vice Chairman

Retired Executive Vice President, Crompton Corporation

Joyce Hornbecker - Secretary

Former Town Clerk, Southbury; Former Chairman, Lake Zoar Authority

Lucinda Hunt-Stowell - Treasurer

Trustee, Flanders Nature Center; Trustee, Southbury Land Trust

Directors

DeLoris Curtis

Planning Administrator, Town of Southbury

Ingrid Davis

Chairman, Coalition's Macroinvertebrate Committee, created the Coalition's library

Ed Edelson

Owner and Innkeeper, Cornucopia Bed & Breakfast, Woodbury
Former Senior Planning Advisor, ExxonMobil.

Kenneth Faroni

Planning & Permitting Coordinator/Environmental Manager, O & G Industries

Karen Huber

Executive Director, Southbury Land Trust

Sister Emmanuelle Hutchinson

Environmental Director, The Abbey of Regina Laudis, Bethlehem

Thomas Keilty

Trustee, Bethlehem Land Trust; Vice-Chairman, Bethlehem Inland Wetlands Agency

Sam Klausner

Chairman, Heritage Village Civic Association Environmental Committee

Benton Leach

Board of Directors, Pomperaug Health District; Former Director of Environmental Affairs, Uniroyal, Inc.

Frederick R. Leavenworth

Official Representative, Town of Woodbury; Vice-Chairman, Litchfield County Conservation District;
Chairman, Woodbury Conservation Commission

Donna Lesch

Chairman, Coalition's Stream Committee, Hydrologist

Virginia Mason

Chairman, the Coalition's Land Use Committee; Assistant Director, Council of Governments-Central Naugatuck Valley

Vincent McDermott

Official Representative, Town of Bethlehem; Vice President, Milone and MacBroom

Dr. Mark Schocken

Crompton Corporation, public representative
Chair of the Coalition's Water Quality Committee.

Mieke Schuyler

Chairman, Bethlehem Longmeadow Lake Management Committee
Member of the Coalition's Marketing Task Force

Arthur Milnor

Executive Director, Flanders Nature Center & Land Trust

Kevin Moran

Vice President, United Water Company

Curtis Read

President, Lablite, LLC; Chairman, Litchfield County Conservation District; President, CT Assn. of Conservation Districts; Bridgewater Conservation & Inland Wetlands Commission member

Keith Sorensen

President and CEO, Heritage Development Group, Heritage Water Company

Lynn Werner

Executive Director, Housatonic Valley Association;
Member, Rivers Advisory Committee; Trustee, Rivers Alliance of Connecticut

Christopher Wood

Town Planner, Town of Woodbury

APPENDIX II

Pomperaug Watershed Management Project

OVERSIGHT COMMITTEE

Ralph Abele	Region 1, U.S. Environmental Protection Agency
Chris Allan	Senior Analyst, Land-Tech Consultants, Inc.
Kevin Case	Northeast Conservation Manager, Land Trust Alliance; former President, Rivers Alliance of Connecticut; former Executive Director, Farmington River Watershed Association
Mark Cooper	First Selectman, Southbury, CT; former Director, Newtown Health Department
Richard Crane	First Selectman, Woodbury, CT
Jelle De Boer, PhD	Chairman, Department of Earth & Environmental Sciences, Wesleyan University
Virginia De Lima	District Chief, Connecticut, United States Geological Survey
Gerald Iwan, PhD	Director, Division of Environmental Health, Water Supply Section, Connecticut Department of Public Health
Rick Jacobson	Assistant Director, Inland Fisheries, Connecticut Department of Environmental Protection
Kathy Johnson	Project Coordinator, USDA National Resources Conservation Service
Mike Kenney	Former Commissioner, Connecticut Dept. of Public Utility Control; former First Selectman, Southbury, CT
Dan Kenny	Former President, Naugatuck/Pomperaug Chapter, Trout Unlimited; member, Trout Unlimited Connecticut State Council
Vernon Lang	U.S. Fish And Wildlife Service
Jeffrey Lennox	Vice President, Legette Brashears & Graham, Inc.
Neal Lustig	Director, Pomperaug Health District
James MacBroom	Principal, Milone and MacBroom, Inc.
James McInerney	Former CEO, Aquarion Water Company; former President, Connecticut Water Works Association
John Monroe	Director, Connecticut Projects, Rivers & Trails, National Park Service
Susan Peterson	Housatonic Watershed Coordinator, Connecticut Department of Environmental Protection
David Radka	Manager of Watersheds & Planning, Connecticut Water Company
Denise Ruzicka	Director, Inland Watersheds Division, Connecticut Department of Environmental Protection
Martha Smith	Director, Center for Coastal and Watershed Systems, Yale University
Walter Smith	Water Quality Coordinator, USDA Natural Resources Conservation Service
Harry Traver	First Selectman, Town of Bethlehem, CT
Todd Walter	Senior Research Associate, Cornell University
Glenn Warner, PhD	Director, Connecticut Institute of Watersheds
Laura Wildman	Associate Director, American Rivers
Steve Winnett, PhD	Region 1, U.S. Environmental Protection Agency
Bob Zimmerman	Executive Director, Charles River Watershed Association

APPENDIX III

Pomperaug River Watershed Coalition – Strategic Plan 2005-2010

THE COALITION'S MISSION

The Pomperaug River Watershed Coalition will work to protect the quality and quantity of the Pomperaug River's surface and subsurface waters as well as the plants and wildlife that contribute to its natural beauty. This will be done by providing a partnership of local governments and businesses, private interests, environmental organizations and concerned citizens that will interact with the appropriate regional, state and federal agencies. PRWC shall periodically report on the status of our efforts to the public and actively seek its views.

THE COALITION'S GOALS AND OBJECTIVES

- I. **Science** – Develop state-of-the-art scientific data on the rivers and aquifer of the Pomperaug Watershed.
- II. **Outreach** – Create a collaborative atmosphere between all stakeholders in the Pomperaug Watershed leading to a genuine desire by all stakeholders to voluntarily cooperate with each other in taking the actions which protect and preserve the watershed while providing a reasonable balance between the environmental and development needs of the towns in the watershed.
- III. **Partnership** – Act as a facilitator to provide strong partnerships between all organizations, private and non-profit, who have a stake in the health of the watershed.
- IV. **Environmental Support** – Act as a community resource to assist stakeholders solve local environmental problems.
- V. **Organizational Development** – Take all actions necessary to assure that the Coalition has the internal structure and strength to be self-sustaining and to continue in existence, in perpetuity, to protect and preserve the watershed.

THE COALITION'S STRATEGIES

- I. **Science** –
 1. Develop computer watershed models for precipitation, subsurface flow, groundwater and fish habitat.
 2. Conduct annual streamwalks to study stream morphology, biology, and hydrology.
 3. Conduct annual benthic macroinvertebrate bioassessments to study stream biology and to assess water quality.
 4. Conduct scientific study in all areas affecting water quality – including the presence of pharmaceutical drugs in stream waters.
 5. In partnership with other watershed organizations and local universities, create a Watershed Research Institute in the Pomperaug Valley. Seek suitable grants from the US EPA, the National Science Foundation, and other sources to fund such an Institute.

6. Form necessary volunteer committees to ensure accomplishment of Science strategies, such as the Science Committee and Computer Modeling Committee.

II. **Outreach –**

1. Convert scientific data into simplified understandable information and tools which can be used by local stakeholders in making real life, everyday decisions which protect the health of the watershed.
2. Develop training programs to be used by the Coalition to educate local residents/organizations about how to protect the watershed and to motivate residents and organizations to take actions needed for the health of the watershed.
3. Create close alliances with local land use boards so that the Coalition and the boards will work closely together to make those changes in local regulations needed to protect the watershed.
4. Develop programs for local youth organizations to help create environmental values of tomorrow.

III. **Partnership –**

1. Create opportunities for private and non-profit organizations (including residents, CT DEP, water utilities, land use boards, CT DPH, etc.) to work together in a non-confrontational manner to solve watershed problems.

IV. **Environmental Support –**

1. Provide the resources to assist residents and local organizations to protect the watershed while still meeting the development needs of the communities.
2. Assist developers and contractors with best practices and environmentally designed projects.
3. Assist stakeholders with information on potential pollution, erosion and sediment issues.
4. Assist in the impact assessment of new diversion requests.
5. Create an Environmental Committee to ensure that the Coalition has the resources to provide environmental support.

V. **Organizational Development –**

1. Fundraising:
 - i. Increase membership to size sufficient to fund a significant portion of operating expenses.
 - ii. Conduct a highly effective annual appeal, bringing in sufficient income to fund a significant portion of operating expenses.
 - iii. Implement a successful annual major gifts program.
 - iv. Implement a successful annual corporate sponsorship program.
 - v. Implement a successful planned giving program.

- vi. By use of the above strategies, reduce the Coalition's dependency on grants for annual income.
- vii. Expand the Coalition's base of local community foundations willing to support the Coalition.
- viii. Solicit selective large government grants needed to fund major science projects for the Coalition.

2. Staffing:

- i. Achieve excellence and stability in staff, board and volunteer leadership.
- ii. Significantly increase the volunteer base of the Coalition, including the creation of active volunteer committees for all critical functions for the Coalition.
- iii. As funding permits, add an Outreach Director with strong river science and outreach skills.
- iv. As funding permits, add a Development Director and an Education Programs Director.

