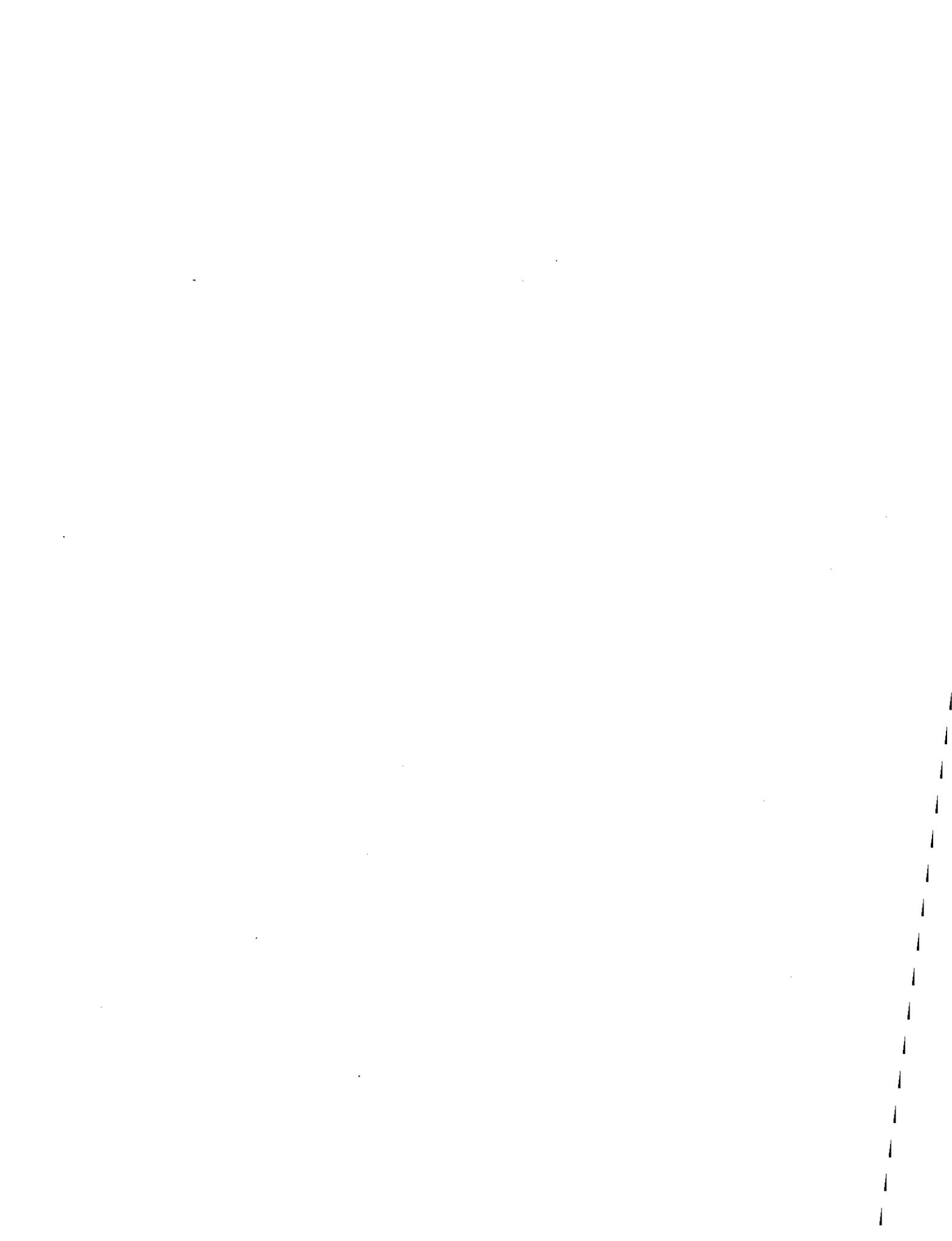


## **AGENDA**

Mansfield Conservation Commission  
Wednesday, April 20, 2011  
Audrey P. Beck Building  
CONFERENCE ROOM B  
7:30 PM

- 1. Call to Order**
- 2. Roll Call**
- 3. Opportunity for Public Comment**
- 4. Minutes**
  - a. March 16, 2011
- 5. New Business**
  - a. IWA Referrals: W1474-Plimpton Subdivision Gurleyville/Wormwood Hill Rd  
(Public Hearing Scheduled for 5/2/11)
  - b. March 2011 Draft UConn Water Supply Plan (Memo from Director of Planning)
  - c. Planning and Zoning Commission Referral: Proposed Zoning Regulation Revisions  
(5/16/11 Public Hearing)
  - d. Zoning Permit Application: Storrs Center Parking Garage/Intermodal Center (May 4,  
2011 Public Hearing to be conducted by Mansfield Downtown Partnership)  
(memo from Director of Planning)
  - e. Other
- 6. Continuing Business**
  - a. Protecting Dark Skies in the Last Green Valley
  - b. Water Source Study for the Four Corners Area (available on Mansfield's website)
  - c. Swan Lake Discharge Mirror Lake Dredging and other UConn Drainage Issues
  - d. UConn Agronomy Farm Irrigation Project
  - e. Eagleville Brook Impervious Surface TMDL Project (April 2011 CLEAR Report)
  - f. UConn Hazardous Waste Transfer Station (to be discussed at future Town/University  
Relations Committee meeting)
  - g. Ponde Place Student Housing Project (additional well testing planned)
  - h. CL&P "Interstate Reliability Project" (application expected to be submitted in 2011)
  - i. Other
- 7. Communications**
  - a. Minutes
    - Open Space (3/15/11) • PZC (4/4/11) • IWA (4/4/11)
  - b. Inland Wetlands Agent Monthly Activity Report
  - c. Invitation to 4/29/11 9am reception in Chaplin, Re: Natchaug River Basin Conservation Compact
  - d. March/April 2011 CT Wildlife
  - e. Spring 2011 Joshua's Trust Newsletter
  - f. Other
- 8. Other**
- 9. Future Agendas**
- 10. Adjournment**



Town of Mansfield  
**CONSERVATION COMMISSION**  
Meeting of 16 March 2011  
Conference B, Audrey P. Beck Building  
**(draft) MINUTES**

*Members present:* Peter Drzewiecki, Neil Facchinetti (Alt.), Quentin Kessel, Scott Lehmann, John Silander, Frank Trainor. *Members absent:* Joan Buck (Alt.), Robert Dahn. *Others present:* Grant Meitzler (Wetlands Agent).

1. The meeting was **called to order** at 7:36p by Chair Quentin Kessel.
2. The draft **minutes of the 16 February 2011 meeting**, with revisions of items 5 and 7c, were approved.
3. **IWA referrals.**

a. **W1474 (Plimpton, Wormwood Hill & Gurleyville Rds)** The applicant proposes to split 43 interior acres into 3 back lots: Lot 2 (5.3 acres) and Lot 3 (4.8 acres) would be accessed by a common driveway from Gurleyville Road passing between 3 existing houses, Lot 4 (32.9 acres) by a long driveway from Wormwood Hill Road passing between 2 existing houses. The yield plan secures the required frontage by replacing the common driveway with a road that extends to a cul de sac on the edge of Lot 4; actual frontage for the proposed subdivision, however, would be only the sum of the widths of the two narrow driveway corridors. A large wetland 80 vertical ft. below and some distance from the house site on Lot 4 is included in a 19-acre conservation easement. The end of the common driveway and Lot 2's house are about 70 ft from the southwest end of a wetland that may be a vernal pool.

After some discussion, the Commission unanimously agreed on the following comment (**motion:** Silander, Trainor):

The Commission suggests (1) that the house on Lot 2 be moved farther from the wetland lying to the northeast and (2) that the conservation easement on Lot 4 be enlarged by moving its eastern boundary farther up the slope to increase protection of the large wetland below from logging and other activities.

The Commission observes (a) that the common driveway provision of the subdivision regulations is again being used to enable development at less expense to the developer with no off-setting environmental gain from clustering, (b) that some stone walls will apparently be disturbed by construction, and (c) that no open space calculation has been provided. It hopes that disturbed stone walls will be rebuilt as required and that the open space calculation, when done, will take account of previous lots carved out of the Plimpton property.

{Lehmann visited this site on the 02/15 IWA Field Trip; his report is attached.}

b. **W1469 (Town of Mansfield, Statutory Regulation Revision).** No action necessary (cf. Commission minutes for 01/19/11, item 3b).

4. Kessel reported on various meetings, presentations, and hearings.

a. Kessel attended a recent meeting of the Town's **Open Space Acquisition Committee**, which oversees acquisition of Town open-space land and considers requests from other parties – such as the White Oak Condominium Association – to purchase, lease, or exchange parcels. He urged the Committee to use some of the Town's \$1M open-space bonding authority to purchase of conservation easements on large tracts of interior forest (cf. Commission minutes for 11/17/10, item 7). He reported that the Downtown Partnership plans to deed the significant open space component of the Storrs Center development to the Town; this may enable a trail to be routed, largely on preserved land, from the Center to the Nipmuck Trail along the Fenton River.

b. Having attended a Green Valley Institute presentation on 02/28/11 concerning **light pollution**, Kessel suggested that the Commission might approach the University of Connecticut about improving lighting to lessen its impact on the night sky.

c. On behalf of the Naubesatuck Watershed Council, Kessel testified at a hearing before the Legislature's Commerce Committee on a bill that would vitiate the DEP's proposed **streamflow regulations**, which are designed to avoid the sort of drawdowns that left the Fenton River dry several summers ago. Unfortunately, the bill was passed out of committee by a lopsided vote.

5. **Natchaug River Basin Conservation Compact.** The Town Council will take this up at its 3/28/11 meeting. Kessel will attend and urge that Mansfield sign on (see Commission minutes for 02/16/11, item 4).

6. **Swan Lake diversion.** On 02/28/11, the DEP notified UConn that the MOA will be amended to avoid diverting runoff to the Fenton River via Swan Lake, provided the University can sufficiently reduce the TMDL in Eagleville Brook in other ways (primarily by reducing runoff, through installation of green roofs, porous pavement, etc.).

7. **Ponde Place.** The developers plan to pump-test a new well to see if enough water is available to permit the now scaled-down project to be enlarged; a monitoring well has been drilled to assess the impact of drawdown on nearby wells.

8. **Adjourned at 8:51p.**

Scott Lehmann, Secretary, 18 March 2011

**Attachment:** Report on 03/15/11 IWA Field Trip.

IWA 1474 (Plimpton, Wormwood Hill & Gurleyville Roads). A 3-lot subdivision is proposed for 43 interior acres off Wormwood Hill and Gurleyville Roads.

A 32.9 acre backlot (numbered 4) would be accessed by a long driveway ascending from Wormwood Hill Road (between two existing houses) along the path of an old woods road. We did not walk to the house site. This lot does not appear to raise wetland issues: house & septic system would be located at considerable distance from, and about 80 vertical ft above, a large wetland, which would be protected by a 19-acre conservation easement.

The remaining two backlots (numbered 2 and 3 – 5.3 and 4.8 acres respectively) would be accessed by a common driveway (running between three existing houses) off Gurleyville Road. The interior end of this common driveway is close – around 60 ft – to a wetland that may be a vernal pool. (It did not have a particularly vernal aspect when we saw it, being still partially ice-covered.) The house proposed for Lot 2 is also about 60 ft from this wetland. A minimum distance to wetlands of 100 ft is recommended for vernal pools; both the driveway and this house could be moved to honor this recommendation. There is also a small area near Gurleyville Road and about 70 ft from the proposed driveway entrance that was submerged when we visited -- probably runoff dammed by the next driveway to the east. Development proposed for Lot 3 is not as close to wetlands as the house on Lot 2.

Logging on Lots 2 and 3 this past fall removed every tree of value from the area; only spindly specimens remain. Apparently these lots will be marketed to people who prefer acres of lawn.

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**TOWN OF MANSFIELD**  
**OFFICE OF PLANNING AND DEVELOPMENT**

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GREGORY J. PADICK, DIRECTOR OF PLANNING

Memo to: Mansfield Planning and Zoning Commission  
Conservation Commission  
From: Gregory Padick, Director of Planning  
Date: April 14, 2011  
Re: May 2011 Draft University of Connecticut Water Supply Plan



This memo supplements the attached 3/23/11 memo. The period for submitting Town review comments has been extended until April 26<sup>th</sup>. This extension will facilitate the submittal of consolidated comments from the Planning and Zoning Commission, Conservation Commission and Town Council. In keeping with previous Town actions, the objective is to finalize Town comments on April 26<sup>th</sup> following the April 25<sup>th</sup> Town Council meeting.

Mansfield staff members, primarily the Town Manager, the Director of Public Works and the Director of Planning, have participated in UConn's water supply planning activities for over five (5) years. A jointly funded Water and Wastewater Master Plan was completed in 2007 and subsequently, numerous meetings have been held to share information and coordinate planning efforts. The May 2011 draft Water Supply Plan comprehensively documents the significant amount of time and resources that have been spent in the last few years to upgrade the existing system and plan for meeting future water needs.

The following review comments are considered particularly important:

1. UConn's current Water Supply Plan was prepared in 2004, revised in 2006 and approved by the Connecticut Department of Public Health in 2006. The Plan covers the main campus and the depot campus. The May 2011 draft Water Supply Plan and associated Water Conservation Plan, Wellfield Management Plan and Emergency Contingency Plan (not publicly distributed for security reasons) provide detailed information on all physical components and operational elements of the water supply system. The draft reports are well organized and presented in a clear and useful manner.
2. Currently all of UConn's water supply is obtained from wells located in stratified drift aquifer areas along the Willimantic and Fenton Rivers. The Willimantic River wellfield, which is located west of Route 32 between Route 44 and Merrow Road, consists of four wells with a combined wellfield registration of 2.3077 million gallons per day (MGD). The Fenton River wellfield, which is located west of the Fenton River north of Gurleyville Road, consists of 4 wells with a wellfield registration of .8443 MGD. UConn's total wellfield registration is 3.152 MGD. The system has over eight (8) million gallons of storage capacity. In 2010, the average daily demand for the system was 1.29 million gallons per day. The draft plan indicates an interim safe yield of 1.48 million gallons per day and recommends a safe yield pumping test which may increase the safe yield calculation.
3. Over the last few years, over 14.6 million dollars have been spent improving the water supply system (see table 2-4 for a listing of projects).
4. Since 2006 UConn's water supply system has been operated by the Connecticut Water Company through its subsidiary New England Water Utility Services.

5. The Wellfield Management Plan incorporates into a consolidated management program, recommendations from the 2006 Fenton River Aquatic Habitat study and the 2010 Willimantic River study. Previous water supply plans did not include a detailed wellfield management plan.
6. The Connecticut Department of Public Health and Connecticut Department of Public Utilities recommend a margin of safety of 1.15. Margin of safety is “The unitless ratio of supply over demand and it is conservatively calculated particularly with respect to supply. The draft water supply plan documents that in 2010 UConn’s system significantly exceeded the recommended margin of safety in ten months but fell below the recommended level in September and October 2010. The plan states that during this two month period the system retained significant storage to address short term deficits. The report also specifies that “The University is committed to bolstering its available water supply and restoring monthly margins of safety to levels greater than 1 in the short term and greater than 1.15 in long term.”
7. The plan reports that a portion of UConn’s water supply (roughly 15/%) is considered “unaccounted for water usage.” The plan includes recommendations to address this issue.
8. In addition to serving UConn facilities, the UConn water supply services numerous off-campus users such as Town of Mansfield and Regional School District 19 facilities, commercial uses adjacent to the Main Campus, the Bergin Correctional Facility and a variety of residential uses in areas proximate to the campus. The plan indicates an ongoing commitment to service all existing off-campus uses.
9. Section 6 of the plan analyzes existing and planned land use and estimates future demands. The plan retains as “Committed” projects, North Campus development, Storrs Center, North Eagleville/King Hill Roads and Depot Campus New Development. Other potential service areas, including the Four Corners area are identified but the plan indicates that these areas will have to be served by other sources of water.
10. Section 7 of the plan projects future margins of safety for 5, 20 and 50 year planning periods. The projections demonstrate that state recommended margins of safety will not be obtained without additional sources of water. The plan identifies the potential year round use of Fenton River Well D and the planed Reclaimed Water Project as the most feasible alternatives for meeting near term future water demands. Intermediate and long term water demands may be met by relocating Well A, using new interconnections with neighboring water providers or developing new sources of supply. The interconnection and new supply options are essentially the same as recently identified by the Town’s Four Corners Water Supply Study.
11. The plan states that the next increment of new supply (after relocating Well A and constructing the Reclaimed Water Facility) will need to be in progress as of 2015 in order to ensure that margins of safety remain above 1.15. Table 7-19 identifies a short term improvement schedule for 2011-2015 that includes pursuing interconnection and other new supply options. The draft plan indicates an estimated cost of \$500,000 for permitting and design of the interconnection options, \$75,000 for working with Mansfield regarding other potential water supplies and \$3 to \$7 million to begin construction of additional future supply.

### **Summary/Recommendation**

The University of Connecticut's May 2011 draft Water Supply Plan and associated Water Conservation and Wellfield Management Plans provide valuable information regarding the existing system and future water supply needs. The University has demonstrated a commitment to providing a safe and suitable water supply system for the foreseeable future. In addition to identifying a number of important system improvements, the draft plan emphasizes the importance of managing wellfield withdrawals and the need for obtaining additional sources of potable water. Securing additional sources of water is particularly important for the Town of Mansfield as a number of important recommendations in the Town's Plan of Conservation and Development are directly linked with a need for public water and sewer services. My staff review has not identified any plan inaccuracies or issues that have not been appropriately addressed. University officials should be commended for their work regarding water supply planning and a significantly improved Water Supply Plan. Mansfield officials should reiterate our pledge to continue to work with University officials to address our Town's water supply needs.

The following draft motion has been prepared for the Planning and Zoning Commission's consideration:

**That the Planning and Zoning Commission Chairman be authorized to co-endorse with the Mayor, consolidated Town comments on the University of Connecticut's May 2011 Draft Water Supply Plan. Review comments from the Director of Planning and the Conservation Commission shall be considered in formulating the consolidated letter.**

**Any review comments from the Conservation Commission need to be forwarded to the Town Council prior to its April 26<sup>th</sup> meeting.**

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**TOWN OF MANSFIELD**  
**OFFICE OF PLANNING AND DEVELOPMENT**

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GREGORY J. PADICK, DIRECTOR OF PLANNING

Memo to: Town Council  
Mansfield Planning and Zoning Commission  
Conservation Commission

From: Gregory Padick, Director of Planning  
Date: March 23, 2011  
Re: March 2011 Draft UConn Water Supply Plan



Please find attached the Table of Contents, Lists of Tables and selected pages from a March 2011 Draft UConn Water Supply Plan as prepared by Milone and MacBroom Inc. This draft plan would replace UConn's existing Water Supply Plan. I also have attached selected pages from associated "Water Conservation" and "Wellfield Management Plans". Complete copies of all three draft plans are available at: <http://www.facilities.uconn.edu/wtr-swr.html> Copies also are available at the Library and Town Clerk's Office.

The subject plans provide important information about UConn's existing water facilities, supply issues, existing and anticipated demands and recommended system improvements. The draft plans will be submitted to the State Department of Public Health in May 2011. Prior to this submission, University Officials will consider potential revisions based on public comments submitted on the draft plan. The deadline for submitting public comments is April 18, 2011.

Consistent with past Town practices, an effort will be made to forward consolidated Town comments prior to the April 18<sup>th</sup> public comments period deadline. Mansfield staff members are in the process of reviewing the March 2011 draft plans and it is anticipated that staff comments will be available prior to the Planning and Zoning Commission's April 4<sup>th</sup> meeting. Subsequently, Planning and Zoning Commissions comments and any comments then available from the Conservation Commission will be forwarded to the Town Council prior to the Council's April 11<sup>th</sup> meeting. It is noted that the Conservation Commission does not have a regularly scheduled meeting until April 20<sup>th</sup> and it may be appropriate for the Planning and Zoning Commission and the Town Council to authorize the PZC Chairman and Mayor to incorporate supplemental comments provided by the Conservation Commission.

It is understood that all comments received on the draft plan will be included in the submittal to the State Department of Public Health. University representatives also plan to include a description of any changes made to the plans in response to received comments. Comments on the draft plans should be sent in writing to Mr. Jason Coite, Environmental Compliance Analyst, UConn Office of Environmental Policy, 31 LeDoyt Road, Unit 2088, Storrs, CT 06269.

Please contact me at (860) 429-3329 or [padickgi@mansfieldct.org](mailto:padickgi@mansfieldct.org) if you have any questions regarding the water supply plan review process.

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# UNIVERSITY OF CONNECTICUT

## WATER SUPPLY PLAN

MAY 2011

MMI #1958-31

*Prepared for:*



University of Connecticut  
Facilities Management – Operations  
25 Ledoyt Road, Unit 3252  
Storrs, Connecticut 06269-3252  
(860) 486-0041

*Prepared by:*

Milone & MacBroom, Inc.  
99 Realty Drive  
Cheshire, Connecticut 06410  
(203) 271-1773  
[www.miloneandmacbroom.com](http://www.miloneandmacbroom.com)

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**SECTION 1.0  
INTRODUCTION**

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## 1.0 INTRODUCTION

The University of Connecticut currently provides potable water to the area of Storrs, Connecticut and portions of the surrounding Town of Mansfield. This water supply plan is an update of the University of Connecticut ("University") *Water Supply Plan* dated November 2004, revised January 2006, and approved by the Connecticut Department of Public Health (DPH) on May 23, 2006. The subject water supply plan addresses both the Main Campus water system (public water system #CT0780021) and the Depot Campus water system (public water system #CT0780011) that are identified separately by the DPH<sup>1</sup>. Figure 1-1 depicts the area served by the University of Connecticut.

Certain regulated water utilities in Connecticut must complete water supply plans in accordance with Section 25-32d of the Connecticut General Statutes, Section 25-32d of the Regulations of Connecticut State Agencies, and the updated Water Supply Plan regulations<sup>2</sup> adopted in the year 2005. The Water Supply Plan regulations and the supporting statutes recognize that planning is a critical management activity of all water utilities. The principal goals of water system planning as defined by the DPH are to: (1) ensure an adequate quantity of pure drinking water, now and in the future; (2) ensure orderly growth of the system; and (3) make efficient use of available resources.

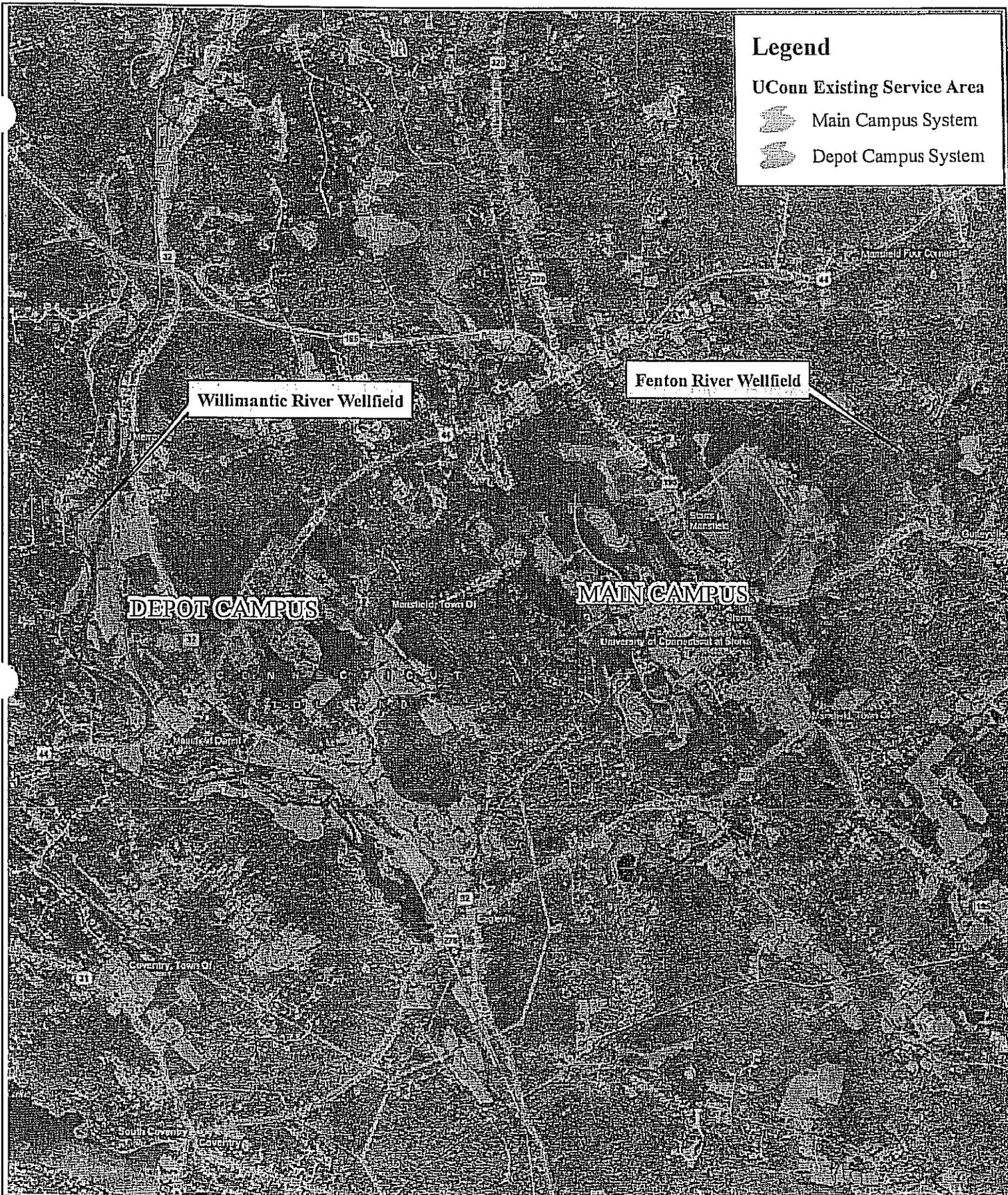
Although the University is not considered a "water company" as set forth in Connecticut General Statute (CGS) Section 25-32a, the University views the *Water Supply Plan* as an integral device in planning for a safe and adequate water supply system through the foreseeable future. Thus, this plan addresses (when possible) the requirements of CGS Section 25-32d and the University will distribute the plan to reviewing agencies and interested parties for review and comment.

# Legend

UConn Existing Service Area

 Main Campus System

 Depot Campus System



Willimantic River Wellfield

Fenton River Wellfield

DEPOT CAMPUS

MAIN CAMPUS

Engineering,  
Landscape Architecture  
and Environmental Science

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University Water System

MMI#: 1958-31  
MXD: H:\Figure1-1.mxd  
SOURCE: Microsoft

N  
↑

University of Connecticut  
Water Supply Plan

LOCATION:  
Mansfield, CT

Map By: SJB  
Date: 1/7/2011  
Scale: 1"=3,500'

SHEET:  
Figure 1-1

The University is fortunate to have access to high quality drinking water through its Fenton River and Willimantic River wellfields. These resources have served the University for decades and will continue to serve the University for years to come. The supply and distribution system also includes a water treatment facility at each wellfield, three booster pumping stations, six water storage tanks, and 23 miles of water transmission and distribution mains.

Currently, the University withdraws water from eight production wells, with four production wells located at each wellfield. Seven of the eight wells are gravel packed wells, and all eight wells are constructed as high-capacity wells in stratified drift. Recent environmental studies, namely the "Fenton River Study" of 2006<sup>3</sup> and the "Willimantic River Study" of 2010<sup>4</sup>, have demonstrated that operating the wells results in diminution of river flows. Under certain low river flow conditions, extended pumping may result in adverse environmental impacts. As such, both wellfields have been recently operated in accordance with individual management plans that are hereby consolidated in the *Wellfield Management Plan* developed in association with this Plan.

The University also has a considerable amount of water storage capacity with over eight million gallons (MG) available. This storage volume, in combination with the University's booster pump capacity and well production capacity, enables the University to accommodate all of its system demands, including peak day demands. The University could turn off its wellfields and be able to meet average day demand from storage alone for several days.

Average daily demand was 1.29 million gallons per day (mgd) in 2010. The construction and development of the "UConn 2000" and "21<sup>st</sup> Century UConn" initiatives have not adversely stressed the University's water system. In fact, the University is using less water today than it did back in the 1980s and early-to-mid 1990s. This is due to water conservation efforts and capital improvement programs aimed at reducing water leakage

and overall consumption. The University continues to be committed to conserving water and installing water efficient devices in new construction.

This Water Supply Plan evaluates various components of the University's water system for the 5-, 20-, and 50-year planning periods. The five-year planning period is projected from the year of the plan preparation (2010). The 20- and 50-year planning periods are projected from the most recent decennial census (2010). Accordingly, these planning periods correspond to the years 2015, 2030 and 2060.

This Plan assesses the ability of the University to meet the intended goals of the Statutes and Regulations of the DPH, and outlines capital improvements and operations necessary to meet those goals in the future. The information contained in this Plan was obtained from a variety of sources, including a review of University files and written and verbal information obtained from University staff. Additional information was obtained from a review of reports and records relative to the water supply system that were formulated since the previous Plan. Where appropriate, portions of these documents have been incorporated.

Budgetary estimates are referenced in this document. These are preliminary estimates and are intended to be used for planning purposes only. Opinions of probable capital and operational costs are based on best estimates. Actual costs may substantially vary from the costs reported in this planning document.

Special thanks is given to the following individuals from the University, the Town of Mansfield, and The Connecticut Water Company for their time, effort, and input throughout the preparation of this plan:

- Mr. Thomas Callahan, Vice President, University of Connecticut
- Mr. Eugene Roberts, Facilities Operators Director, University of Connecticut
- Mr. Michael Pacholski, University of Connecticut (retired)

- Mr. Rich Miller, University of Connecticut Office of Environmental Policy
- Mr. Tim Tussing, Facilities Manager, Water & Sewer, University of Connecticut
- Mr. Jason Coite, University of Connecticut Office of Environmental Policy
- Mr. Pete Puhlick, Utility Maintenance Engineer, University of Connecticut
- Mr. Stanley Nolan, Energy Engineer, University of Connecticut
- Mr. Lon Hultgren, Town of Mansfield Department of Public Works
- Mr. Greg Padick, Town of Mansfield Planning Department
- Mr. Pete Pezanko, Contract Operator, Connecticut Water Company
- Mr. Robert Wittenzellner, Contract Operator, Connecticut Water Company

**TABLE 2-4**  
**Recent Water Supply System Upgrades and Initiatives**

Description	Cost
Production meter cleaning and calibration <sup>1</sup>	\$5,605
Repair Depot water treatment meter and replace flow chart recorder	\$2,965
Troubleshoot Fenton well pacing	\$2,090
Install High Head level with chart recorder	\$4,650
Repair Willimantic transmission line	\$677,000
Complete distribution mapping	\$600
Replace pumps on Willimantic Wells 1 & 3	\$146,975
Install Willimantic pump controls / protection – Wells 1 & 3	\$1,520
Replace Fenton production meters	\$14,720
Flow test Fenton booster pumps	\$620
Repair Fenton chemical flow meter/pacing	\$15,250
Install temporary pump/motor Willimantic Well 3	\$8,065
Replace pump on Willimantic Well 4	\$78,265
Install Willimantic pump controls/protection – Well 4	\$2,265
Re-drill Well 3 – Screen collapse	\$48,100
Install Bone Mill Road tank level control	\$18,580
Horsebarn Hill leak detection	\$1,520
Install Willimantic wellfield radio controls	\$30,075
Replace Fenton caustic storage	\$90,500
Integrate Fenton controls	\$1,520
Repair Depot clay valve and replace control	\$2,840
Repair Fenton Well D	\$85,500
Install Towers tank controls	\$18,300
Repair 550 gpm Clearwater tank booster	\$62,230
Replace six-inch pipe to Central Utility Plant	\$110,000
Four-year sub-metering program	\$2,400,000
Fenton/Willimantic River USGS streamflow gages	\$22,000
South Campus express line modifications	\$360,000
New 16" water main – Towers to Glenbrook and North Eagleville Road	\$2,300,000
Replacement of two smaller Towers tanks with new 1 MG tank	\$2,500,000
New Well Water Treatment Facility – Willimantic River Wellfield	\$3,500,000
<b>Total Capital Upgrades:</b>	<b>\$12,511,755</b>
Fenton River Instream Flow study	\$564,000
Fenton River invertebrate study	\$87,000
Water Supply Master Planning	\$115,000
Water Conservation Study	\$78,000
Willimantic River Level A Study	\$9,700
Water System Hydraulic Study	\$45,000
Reclaimed Water Feasibility Study	\$25,000
Willimantic River Instream Flow Study	\$173,000
NEWUS Operation and Management (2006-2009)	\$667,000
Streamflow gauge operation (by USGS, per year)	\$30,000
Compliance and Sustainability	\$300,000
<b>Total Upgrades and Initiatives</b>	<b>\$14,575,455</b>

<sup>1</sup>Now performed annually under NEWUS contract.



Professional Office Zone 1 (PO-1, associated with a few properties in Storrs), Planned Business Zone 2 (PB-2, associated with a few additional properties in Storrs), and Planned Business Zone 4 (PB-4, located along King Hill Road/North Eagleville Road) are currently in the water service area, as are the I zone (the Main and Depot Campuses) and the RD/LI zone (North Campus). Of the residential zones, sections of the DMR, R-90, and RAR-90 zones overlap with the water system.

Future service areas described below in Section 6.2.6 are located in the PO-1 and PB-2 zones (Storrs Center); PB-4 zone (King Hill Road/North Eagleville Road), RD/LI zone (North Campus), and I (Depot Campus). All future committed developments to be served by the University's water system are believed to be appropriate for their zoning.

#### **6.2.5 General Discussion of Potential Future Service Areas**

The Town of Mansfield Water Supply Plan (Milone & MacBroom, Inc., 2002) summarized projected new water demands in the Town of Mansfield, including developable land as well as small public water systems that were considered candidates for an expanded University or municipal water supply. The discussion was broken into two categories: "Existing and/or Committed UConn Water Service" and "Not Served by UConn Water System."

The category "Existing and/or Committed UConn Water Service" in the Mansfield plan included the North Campus area, Storrs Center project area, additional new University housing, Holinko Apartments, the North Eagleville Road/King Hill Road planned business area, and the Depot Campus. All of these areas were denoted as Planned Development Areas in the previous Mansfield Plan of Conservation and Development, and some of them remain as such in the current Plan of Conservation and Development.

Much of the new University housing has been completed since 2002 (such as Hilltop Apartments, Charter Oak Apartments, and Charter Oak Suites), although the portion of

the new University housing that was predicted to be located at or west of Northwood Apartments is no longer proposed. The Storrs Center project, North Campus Development, and Depot Campus development are all pending with different timetables. Finally, current plans are not in place for redevelopment of the North Eagleville Road/King Hill Road planned business area, although redevelopment could occur at any time.

The category "Not Served by UConn Water System" included the following areas of interest: portions of Meadowood Road, Mansfield Four Corners inclusive of Rosal Apartments, Carriage House Apartments, Club House Apartments, Hunting Lodge Apartments, Jensen's Rolling Hills Mobile Home Park, and undeveloped parcels off Hunting Lodge Road, Separatist Road, and South Eagleville Road. All of these listed areas are relatively proximal to the University water system. To date, none of the areas listed above have been connected to the University water system. Some of the areas remain undeveloped; some continue to use community water systems; and some continue to rely on individual private wells.

Based on their inclusion in the Town of Mansfield Water Supply Plan, the above categories of future potential water demand were discussed in the University's Water and Wastewater Master Plan in 2007. The master plan included an additional category of future potential water demand based on a review of the Mansfield Plan of Conservation and Development. This review took an aggressive point of view relative to future water demands but did not attach timetables or likelihoods to the listed water demands:

- Orchard Acres Apartments off Separatist Road – Existing apartment complex with community water system;
- Parcels southwest of Knollwood Acres Apartments – Proposed medium- to high-density age-restricted residential use;
- A parcel north of Route 44 and west of Cedar Swamp Road – Proposed medium- to high-density age-restricted residential use;

- ❑ Parcels north of Jensen's Mobile Home Park adjacent to the Four Corners planned business area – Proposed medium- to high-density age-restricted residential use or medium- to high-density residential use;
- ❑ Parcels southwest of Hunting Lodge Apartments at Birch Road and Hunting Lodge Road – Proposed medium- to high-density residential use; and
- ❑ Parcel southeast of Hunting Lodge Apartments on Hunting Lodge Road – Proposed medium- to high-density residential use.

Projected water demands for these parcels were primarily based on discussions with the Town of Mansfield Planning Department to determine the potential number of units except for the following parcels, where alternate estimation methods were used: for the Orchard Acres apartment complex, population was reported in the DPH sanitary survey report; and for the small parcel located southwest of Hunting Lodge Apartments, zoning was used to estimate a nominal build-out of two housing units.

During the development of the master plan, the Town of Mansfield also indicated that adjustments need to be considered for existing housing complexes that may increase density if water and sewer became available. The following complexes in particular were cited as potential candidates for additional water demands equal to 50% of the current estimated demands: Orchard Acres, Club House, Hunting Lodge and Carriage House Apartments.

In total, the following future potential water demands were estimated in the Water and Wastewater Master Plan:

- ❑ Committed Service – 357,700 gpd
- ❑ Areas Identified in the Mansfield Water Supply Plan – 170,600 gpd
- ❑ Additional Areas – 118,900 gpd

Including all of the above demands and irrespective of timelines or actual likelihoods of development, the total future potential additional water demand for the University water system would be 647,200 gpd.

#### 6.2.6 Committed Future Service Areas

Subsequent to the completion of the Water and Wastewater Master Plan, the University has revisited its commitments for water service and currently has a firm understanding of future water demands that (1) are likely to occur and (2) will be served from the existing water system. These are known as "committed water demands" and are summarized in Table 6-3.

**TABLE 6-3  
Committed Water Demand Estimates**

Description	Committed Demand Estimate
North Campus Development	89,600 gpd
Storrs Center	169,300 gpd
North Eagleville Road/King Hill Road PBA	5,000 gpd
Depot Campus (New Development)	93,800 gpd
<i>Total</i>	<i>357,700 gpd</i>

A description of the estimate for each is provided below.

North Campus – This area has been the focus of several studies and planning efforts. An Environmental Impact Evaluation (EIE) was first completed in 1994. The Outlying Parcels Master Plan (2000) and North Campus Master Plan EIE (2001) first provided detailed estimates of water demands on the order of 90,000 gpd exclusive of the residential components of the project (which have been constructed as the Charter Oak Apartments). The figure was based on an estimate of 0.1 gpd per square foot of research, office, or retail. This multiplier is provided in the DPH design guidelines for estimating wastewater flows from non-residential buildings.

The current Draft Environmental Impact Statement (2007) has not directly revised water demands, although the total square footage has been modified very slightly from 900,000 square feet to 896,000 square feet. Applying the same 0.1 gpd/square foot multiplier, the current estimate for water demand is 89,600 gpd. Table 6-4 provides a breakdown of the parcels and their respective square footage and water demand.

**TABLE 6-4  
North Campus Water Demand Estimates**

Parcel	Building Square Footage	Average Day Water Demand Estimate
B	281,000	28,100 gpd
C	173,000	17,300 gpd
D	127,000	12,700 gpd
E	190,000	19,000 gpd
G	90,000	9,000 gpd
H	Charter Oaks Apartments	No new water demand
J	35,000	3,500 gpd
	<i>Total</i>	<i>89,600 gpd</i>

The University recognizes that applying a multiplier of 0.1 gpd/square foot is not the most ideal means of estimating water demands, as an analysis of actual building usage is typically preferred. However, until such time that plans are in place for any one of the North Campus parcels, the estimate of 89,600 gpd is a reasonable figure to use for planning purposes.

Storrs Center – The Storrs Center project has been in planning and development since 2001, and is currently expected to include approximately 200,000 square feet of retail/restaurant use and 700 residential units. Of the 700 units, 290 are anticipated to consist of upscale apartment homes with a mixture of studio, one-bedroom, two-bedroom and three-bedroom units. Scheduled to be completed in 2012 and 2013, respectively, the first two phases will include both commercial and residential components. Phase IA will include 125 residential rental units and 30,000 square feet of retail/ restaurant space, while Phase IB will include 150 residential rental units and 40,000 square feet of retail/restaurant space.

Water demand estimates for the Storrs Center project were previously estimated in the Mansfield Water Supply Plan (2002) and the University's Water and Wastewater Master Plan (2007), with the most recent estimate at 169,300.gpd.

Businesses at 1254 Storrs Road, 13 Dog Lane, 10 Dog Lane (sometimes known as Phil's building), and 4 Dog Lane will be affected by the construction of Storrs Center, as are the University of Connecticut Design Center, Print Shop, and former Publications building. The University has been relocating its facilities throughout campus. The businesses will be relocated to the project site. Specifically, Select Physical Therapy (13 Dog Lane), Tailoring by Tima (10 Dog Lane), Storrs Automotive (4 Dog Lane) and the businesses at 1254 Storrs Road (Wings, Travelplanners, Campus Cuts, Body Language, and Skoras barber shop) are current businesses that will be relocated to the new development.

The leasing process for Phase 1A began in 2009. Twelve tenants have signed letters of intent, including some existing businesses. These are Vanilla Bean Cafe, Cosimos, Insomnia Cookies, Moe's Southwest Grill, Storrs Automotive (to be relocated from 4 Dog Lane), and the following to be relocated from 1254 Storrs Road: Wings, Travelplanners, Campus Cuts, Body Language, Tailoring by Tima, Skoras and Select Physical Therapy. Negotiations are underway with other potential tenants.

This Storrs Center area is currently served by the University's water system. Phil's is a metered water customer with a demand of approximately 60 gpd to 100 gpd, whereas Storrs Automotive and the plaza at 1254 Storrs Road are non-metered water customers that are included in the 15% non-metered category discussed in Section 5.0. Phil's, Storrs Automotive, and the tenants of 1254 Storrs Road together utilize a nominal quantity of water that is included in the overall estimate for Storrs Center.

North Eagleville Road/King Hill Road – This area already contains some commercial establishments and is zoned for additional development. The area is already served by

the University water system already, and therefore has continued access to the water system. Additional demand would be only a few thousand gallons per day. A figure of 5,000 gpd has been utilized in previous planning documents such as the Town of Mansfield Water Supply Plan and the University's Water and Wastewater Master Plan, and is carried forward to this plan.

*Depot Campus (New Development)* – Additional development of this area was addressed in the Outlying Parcel Master Plan. A mixture of housing, offices, and classrooms has been proposed. Water demands were estimated in the Mansfield Water Supply Plan on a parcel-by-parcel basis, utilizing the previously-available notations of "Parcel 1" through "Parcel 7" and taking into account the square footage of existing buildings that will remain on-site, as well as square footage of proposed buildings that may be developed. Based on these estimates, a water demand of 95,300 gpd was calculated. Water demand was not estimated for existing occupied buildings (such as Parcels 3 and 5), because these already use water from the existing supply.

The Center for Clean Energy Engineering ("Enterprise Building") was constructed on Parcel 2 in 2001. This metered building had a water demand of approximately 1,500 gpd in 2010. Therefore the previous calculation for Parcel 2 has been revised downward by 1,500 gpd. Table 6-5 provides a breakdown of the parcels and their respective square footage and water demand.

**TABLE 6-5**  
**Depot Campus Water Demand Estimates**

Parcel	Building Square Footage	Average Day Water Demand Estimate
1	315,000	31,500 gpd
1B	48,800	4,900 gpd
2	135,000	13,500 gpd
2	Enterprise Building	-1,500 gpd
2C	23,300	2,300 gpd
3 & 3B	96,000	9,600 gpd
4 & 4B	255,000	25,500 gpd
5	Currently occupied	No new water demand
5B	80,000	8,000 gpd
	<i>Total</i>	<i>93,800 gpd</i>

As with the North Campus estimates, the University recognizes that applying a multiplier of 0.1 gpd/square foot is not the most ideal means of estimating water demands. However, until such time that plans are in place for any one of the Depot Campus parcels, the estimate of 93,800 gpd is the most reasonable figure to use for planning purposes.

### **6.3 POPULATION AND WATER DEMAND PROJECTIONS**

#### **6.3.1 Population Projections**

##### **University of Connecticut – Residential and Non-Residential Populations**

Although fluctuations will occur from year to year, the University's on-campus residential population is not projected to increase or decrease substantially throughout the five, 20, and 50-year planning horizons. Therefore, the associated water demands have been captured in the recent production and consumption figures.

On-campus transient and non-transient non-residential water demands will increase in the specific areas already targeted for growth, such as North Campus and additional

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**SECTION 7.0**  
**ASSESSMENT AND SELECTION OF ALTERNATIVES**

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## 7.0 ASSESSMENT AND SELECTION OF ALTERNATIVES

### 7.1 PROJECTED MARGINS OF SAFETY

Projected water demands are presented in Section 6.0 of this Plan. Projected margins of safety are discussed herein. Recall from Section 3.10 that monthly margins of safety dropped below 1.0 in September and October 2010 as water production ramped up to accommodate returning students combined with high water demands at the CUP. The University has met demands for the past few years by operating the Willimantic River Wellfield for 19 to 20 hours per day as needed, exceeding the safe yield of the supply but not exceeding the hydraulic capacity of the wellfield or its transmission system.

Tables 7-1, 7-2, 7-3, and 7-4 present the monthly margins of safety for the University for 2015, 2030, and 2060 without consideration of any potential future supplies.

**TABLE 7-1**  
**Projected Monthly Margins of Safety, 2015**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	1.29	1.48	0.84	1.80
February	1.75	1.48	0.84	1.33
March	1.40	1.48	0.84	1.66
April	1.68	1.48	0.84	1.38
May	1.14	1.48	0.84	2.03
June	1.17	1.48	0	1.27
July	1.24	1.48	0	1.19
August	1.26	1.48	0	1.17
September	1.79	1.48	0	0.82
October	1.66	1.48	0	0.89
November	1.46	1.48	0.84	1.59
December	1.38	1.48	0.84	1.68

**TABLE 7-2**  
**Projected Monthly Margins of Safety, 2030**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	1.51	1.48	0.84	1.53
February	2.07	1.48	0.84	1.12
March	1.65	1.48	0.84	1.41
April	1.99	1.48	0.84	1.17
May	1.31	1.48	0.84	1.77
June	1.34	1.48	0	1.10
July	1.42	1.48	0	1.04
August	1.44	1.48	0	1.02
September	2.11	1.48	0	0.70
October	1.96	1.48	0	0.76
November	1.71	1.48	0.84	1.36
December	1.62	1.48	0.84	1.44

**TABLE 7-3**  
**Projected Monthly Margins of Safety, 2060**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	1.53	1.48	0.84	1.51
February	2.09	1.48	0.84	1.11
March	1.67	1.48	0.84	1.39
April	2.01	1.48	0.84	1.15
May	1.33	1.48	0.84	1.75
June	1.35	1.48	0	1.09
July	1.43	1.48	0	1.03
August	1.46	1.48	0	1.01
September	2.13	1.48	0	0.69
October	1.98	1.48	0	0.75
November	1.73	1.48	0.84	1.34
December	1.64	1.48	0.84	1.42

Without new sources of water supply, margins of safety will decrease as committed water demands are realized in the system. By 2015, average monthly margins of safety are projected to drop below 1.0 in September and October. Peak day margins of safety are likewise lacking as new committed water demands are realized. Tables 7-4 through 7-6 present the peak day margins of safety for the years 2015, 2030, and 2060.

**TABLE 7-4**  
**Projected Peak Day Margins of Safety, 2015**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	2.00	1.97	0.84	1.40
February	2.24	1.97	0.84	1.25
March	2.39	1.97	0.84	1.18
April	2.23	1.97	0.84	1.26
May	1.89	1.97	0.84	1.49
June	2.01	1.97	0	0.98
July	2.04	1.97	0	0.97
August	2.45	1.97	0	0.80
September	2.32	1.97	0	0.85
October	2.21	1.97	0	0.89
November	2.32	1.97	0.84	1.21
December	2.16	1.97	0.84	1.30

**TABLE 7-5**  
**Projected Peak Day Margins of Safety, 2030**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	2.30	1.97	0.84	1.22
February	2.67	1.97	0.84	1.05
March	2.72	1.97	0.84	1.03
April	2.64	1.97	0.84	1.06
May	2.11	1.97	0.84	1.33
June	2.23	1.97	0	0.88
July	2.27	1.97	0	0.87
August	2.69	1.97	0	0.73
September	2.74	1.97	0	0.72
October	2.60	1.97	0	0.76
November	2.65	1.97	0.84	1.06
December	2.47	1.97	0.84	1.14

**TABLE 7-6**  
**Projected Peak Day Margins of Safety, 2060**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	2.33	1.97	0.84	1.21
February	2.71	1.97	0.84	1.04
March	2.75	1.97	0.84	1.02
April	2.68	1.97	0.84	1.05
May	2.13	1.97	0.84	1.32
June	2.25	1.97	0	0.87
July	2.29	1.97	0	0.86
August	2.71	1.97	0	0.73
September	2.78	1.97	0	0.71
October	2.64	1.97	0	0.75
November	2.68	1.97	0.84	1.05
December	2.50	1.97	0.84	1.13

The University of Connecticut has identified a number of pending and potential water supplies to address the projected margin of safety shortfalls. These are described in the next section.

## 7.2 ASSESSMENT OF ALTERNATIVE WATER SUPPLIES

The most feasible alternatives for meeting near-term future water demands include the use of Fenton Well D for potable water supply and the use of treated effluent to supply non-potable water needs at the CUP. Intermediate and long-term water demands may be met by relocating Fenton Well A to a site with lesser environmental impacts, using new interconnections with nearby water utilities, and/or development of new sources of supply. Each of these alternatives is described in the discussions that follow.

### 7.2.1 Fenton River Well D

As stated in Section 3.10, the University is committed to bolstering its available water supply and restoring monthly margins of safety to levels greater than 1.0 in the short term, and greater than 1.15 in the long term. The addition of Well D to the total available

supply in September and October of any given year will effectively restore average monthly margins of safety to levels greater than 1.0. Refer to Table 7-7 and Table 7-8 for the projected monthly and peak day margins in the year 2015, respectively.

**TABLE 7-7**  
**Projected Monthly Margins of Safety With Well D, 2015**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	1.29	1.48	0.84	1.80
February	1.75	1.48	0.84	1.33
March	1.40	1.48	0.84	1.66
April	1.68	1.48	0.84	1.38
May	1.14	1.48	0.84	2.03
June	1.17	1.48	0	1.27
July	1.24	1.48	0	1.19
August	1.26	1.48	0	1.17
September	1.79	1.48	0.35	1.02
October	1.66	1.48	0.35	1.10
November	1.46	1.48	0.84	1.59
December	1.38	1.48	0.84	1.68

**TABLE 7-8**  
**Projected Peak Day Margins of Safety With Well D, 2015**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	2.00	1.97	0.84	1.40
February	2.24	1.97	0.84	1.25
March	2.39	1.97	0.84	1.18
April	2.23	1.97	0.84	1.26
May	1.89	1.97	0.84	1.49
June	2.01	1.97	0	0.98
July	2.04	1.97	0	0.97
August	2.45	1.97	0	0.80
September	2.32	1.97	0.35	1.00
October	2.21	1.97	0.35	1.05
November	2.32	1.97	0.84	1.21
December	2.16	1.97	0.84	1.30

Thus, Well D will accomplish the goal of bolstering available supply in the short term. However, by the subsequent planning horizon, Well D will not be sufficient as the sole

future "new" supply to the University. Refer to Table 7-9 and Table 7-10 for the projected monthly and peak day margins in the year 2030, respectively.

**TABLE 7-9**  
**Projected Monthly Margins of Safety With Well D, 2030**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	1.51	1.48	0.84	1.53
February	2.07	1.48	0.84	1.12
March	1.65	1.48	0.84	1.41
April	1.99	1.48	0.84	1.17
May	1.31	1.48	0.84	1.77
June	1.34	1.48	0	1.10
July	1.42	1.48	0	1.04
August	1.44	1.48	0	1.02
September	2.11	1.48	0.35	0.87
October	1.96	1.48	0.35	0.93
November	1.71	1.48	0.84	1.36
December	1.62	1.48	0.84	1.44

**TABLE 7-10**  
**Projected Peak Day Margins of Safety With Well D, 2030**

Month	Projected Water Demand (mgd)	Available Supply from Willimantic River Wells (mgd)	Available Supply from Fenton River Wells (mgd)	Margin of Safety
January	2.30	1.97	0.84	1.22
February	2.67	1.97	0.84	1.05
March	2.72	1.97	0.84	1.03
April	2.64	1.97	0.84	1.06
May	2.11	1.97	0.84	1.33
June	2.23	1.97	0	0.88
July	2.27	1.97	0	0.87
August	2.69	1.97	0	0.73
September	2.74	1.97	0.35	0.85
October	2.60	1.97	0.35	0.89
November	2.65	1.97	0.84	1.06
December	2.47	1.97	0.84	1.14

Furthermore, the use of Well D is not intended to fuel development and expansion of the water system, including even those demands that have been committed and are viewed as

important to the University and the Town of Mansfield. Additional new sources are more appropriate for meeting committed demands.

### 7.2.2 Reclaimed Water Project

The 2004 Campus Sustainable Design Guidelines developed for the University proposed several water reuse strategies. The infrastructure conditions assessment performed for the University in 2006 recommended an expansion of the wastewater treatment plant to include a new water treatment system capable of providing up to 0.5 mgd of treated effluent for reuse on campus. The project was recommended as a means for reducing the demand of water on the Fenton River Wellfield and reducing the overall impact of the wastewater discharge to the Willimantic River.

As a result of the 2004 and 2006 studies and recommendations in the Water and Wastewater Master Plan in 2007, the University authorized a feasibility study to evaluate the use of highly treated effluent from the University's Water Pollution Control Facility (WPCF) to produce reclaimed water. If feasible, it was believed that reclaimed water could then be used to reduce the reliance on potable water for non-potable uses such as heating and cooling at the CUP. Since the CUP requires an average of 0.4 mgd during its peak month each year, a significant benefit to margin of safety could be realized through the use of reclaimed water.

The reclaimed water feasibility study was completed by the firm Hazen & Sawyer in 2008. Hazen & Sawyer was then retained to complete design and permitting of the facility from 2009 through 2010. Bids for construction of the reclaimed water facility (RWF) were received in mid-2010, and the project is planned for construction from 2011 through 2012. The facility will likely be completed prior to occupancy of Phase IA of the Storrs Center project, allowing for the University to begin serving the first of its committed water demands without development of a new source of supply.

Tables 7-11 and 7-12 provide monthly and peak day margins of safety for the year 2015 with the reclaimed water facility available to the University, in addition to Fenton Well D. In these tables, the water made available as a result of the reclaimed water facility is shown as a subtraction from future water demand rather than as a future supply. Because average annual committed water demands will remain relatively low at 0.11 mgd by the year 2015, the projected monthly margins of safety are all above 1.15 in 2015. With regard to the peak day analysis, projected margins of safety will likely drop below 1.15 in August and September, and may drop below 1.0 for brief periods of time in August. The University's 5.4 million gallon reservoir will easily provide the buffer needed to address peak days.

It is important to note that this peak day margin of safety analysis relies on average monthly requirements of the CUP instead of peak day requirements of the CUP. This is an approximate approach since it is well understood that peak demands at the CUP exceed the average month demands. For example, during the peak month at the CUP (July), the maximum amount of water needed on the day with maximum cooling tower demands exceeds 0.4 mgd. The reclaimed water facility is designed to have a peak capacity of 1.0 mgd, and in reality it will provide a subtraction of greater than 0.4 mgd when CUP demands are peaking.

**TABLE 7-11**  
**Projected Monthly Margins of Safety with Well D and RWF, 2015**

Month	Current Production (mgd)	Future Committed Demands (mgd)	Associated Unaccounted Water (mgd)	Future RWF Offset (mgd)	Total Future Demand (mgd)	Available Water Supply (mgd)			Margin of Safety
						Willimantic River Wells	Fenton River Wells	Total	
January	1.18	0.10	0.005	-0.20	1.09	1.48	0.84	2.32	2.14
February	1.59	0.15	0.007	-0.20	1.54	1.48	0.84	2.32	1.50
March	1.28	0.11	0.006	-0.19	1.21	1.48	0.84	2.32	1.92
April	1.53	0.14	0.007	-0.18	1.50	1.48	0.84	2.32	1.55
May	1.06	0.08	0.004	-0.34	0.81	1.48	0.84	2.32	2.88
June	1.09	0.08	0.004	-0.35	0.82	1.48	0	1.48	1.81
July	1.16	0.08	0.004	-0.40	0.84	1.48	0	1.48	1.75
August	1.17	0.08	0.004	-0.37	0.89	1.48	0	1.48	1.66
September	1.64	0.14	0.007	-0.27	1.53	1.48	0.35	1.83	1.20
October	1.52	0.13	0.007	-0.23	1.43	1.48	0.35	1.83	1.28
November	1.34	0.11	0.006	-0.25	1.21	1.48	0.84	2.32	1.92
December	1.27	0.11	0.005	-0.25	1.13	1.48	0.84	2.32	2.06

**TABLE 7-12**  
**Projected Peak Margins of Safety with Well D and RWF, 2015**

Month	Current Production (mgd)	Future Committed Demands (mgd)	Future RWF Offset (mgd)	Total Future Demand (mgd)	Available Water Supply (mgd)			Margin of Safety
					Willimantic River Wells	Fenton River Wells	Total	
January	1.86	0.14	-0.20	2.00	1.97	0.84	2.81	1.56
February	2.04	0.20	-0.20	2.24	1.97	0.84	2.81	1.38
March	2.23	0.16	-0.19	2.39	1.97	0.84	2.81	1.28
April	2.03	0.20	-0.18	2.23	1.97	0.84	2.81	1.37
May	1.78	0.11	-0.34	1.89	1.97	0.84	2.81	1.81
June	1.90	0.11	-0.35	2.01	1.97	0	1.97	1.19
July	1.93	0.11	-0.40	2.04	1.97	0	1.97	1.20
August	2.33	0.12	-0.37	2.45	1.97	0	1.97	0.95
September	2.12	0.20	-0.27	2.32	1.97	0.35	2.32	1.13
October	2.02	0.19	-0.23	2.21	1.97	0.35	2.32	1.17
November	2.16	0.16	-0.25	2.32	1.97	0.84	2.81	1.36
December	2.01	0.15	-0.25	2.16	1.97	0.84	2.81	1.47

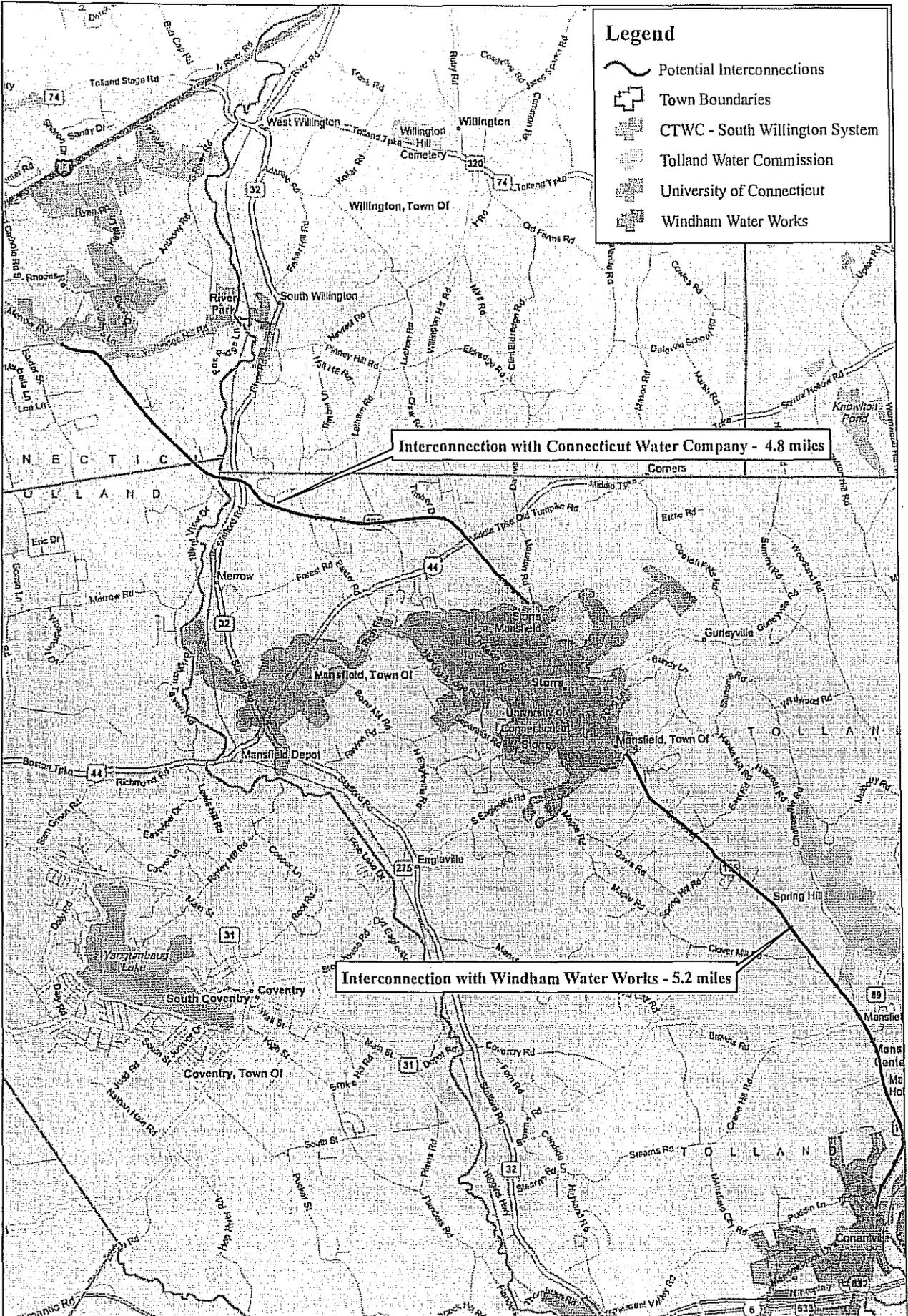
The University will continue to require additional water supplies beyond the offset provided by the RWF. Relocation of Fenton Well A, interconnections, and/or future groundwater supplies will need to supply the next increment of water demand. Refer to Figure 7-1 for an overview of potential interconnections. Refer to Figure 7-2 for an overview of potential groundwater supplies.

### 7.2.3 Relocation of Fenton Well A

Section 9.0 of the Fenton River Study report ("Testing of Selected Wellfield Management Scenarios") evaluated 11 different pumping scenarios comprised of different combinations of withdrawals from the four Fenton River wells. Scenarios 10 and 11 considered that Well A was relocated to a point 250 to the south or somewhat further to the south toward Well D, respectively. Both scenarios assumed that Well A was pumping for 14 hours at 300 gpm, or an equivalent of 252,000 gpd (0.25 mgd).

The study concluded that "it appears that the best management scenarios (Scenario 10 and 11) call for relocation of Well A by moving it either 250 feet in the South direction (i.e., without requiring a new permit) or approximately halfway between the original location of Well A and D (on university property)." Furthermore, "The new location of Well A was chosen under the premise that a well located in the parts of the aquifer where the Stratified Drift has greater thickness will have substantially reduced effects on the Fenton River stream flow [but] based on this preliminary analysis and with the caveat emptor statement above, the cost of relocating Well A beyond the 250 feet distance may not be justified as the decrease in  $\Delta Q$  is only minimal."

The University believes that further investigation is warranted to evaluate whether relocating and pumping Well A in accordance with Scenario 10 (within 250 feet of the current location) may prove to have lesser impacts to instream flow than the well currently is believed to cause.



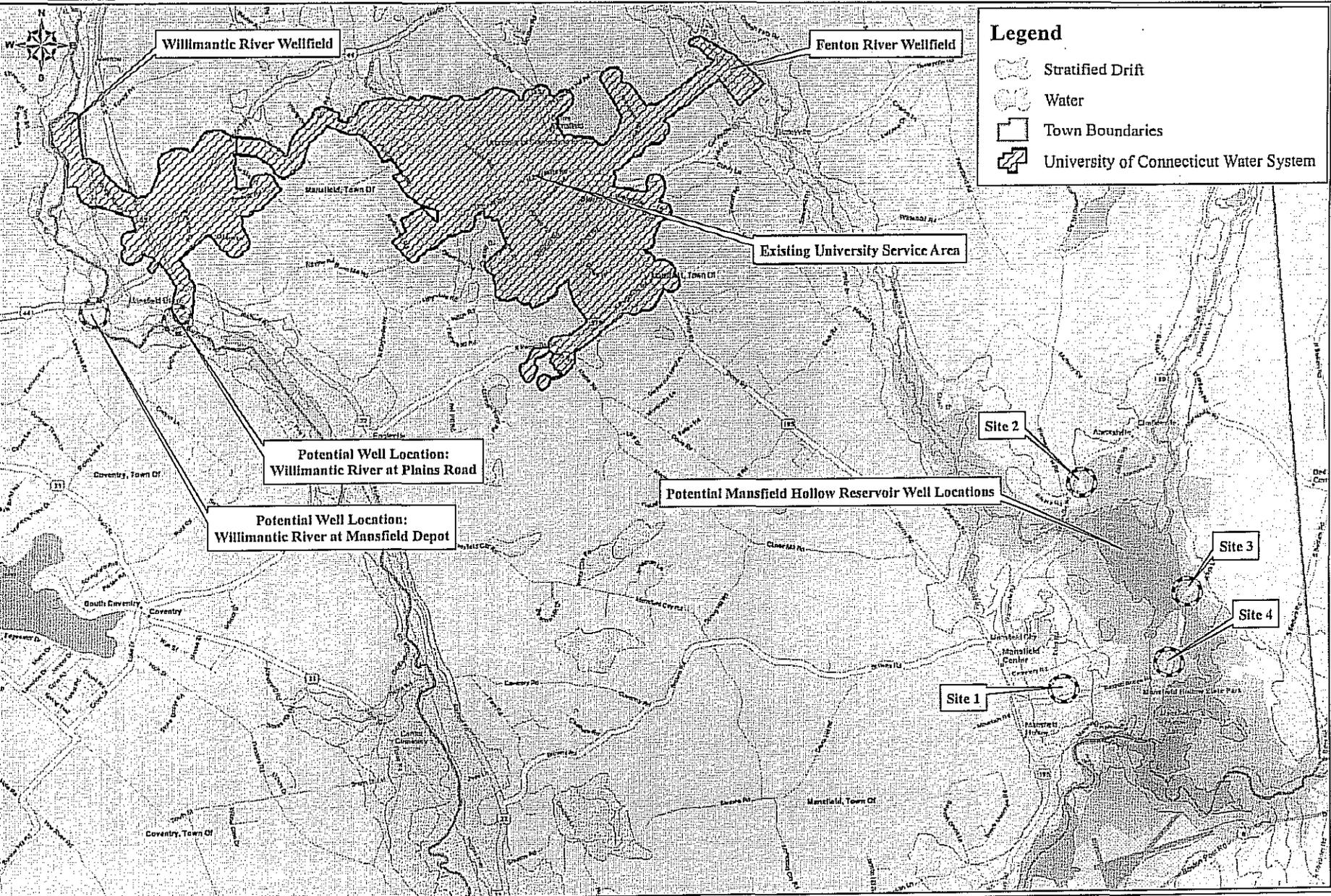
### Legend

- Potential Interconnections
- Town Boundaries
- CTWC - South Willington System
- Tolland Water Commission
- University of Connecticut
- Windham Water Works

Interconnection with Connecticut Water Company - 4.8 miles

Interconnection with Windham Water Works - 5.2 miles

<p>Engineering, Landscape Architecture &amp; Environmental Science</p> <p>99 Realty Drive Cheshire, Connecticut 06410 (203) 271-1773 Fax: (203) 272-9733 www.miloneandmacbroom.com</p>	<p align="center"><b>Overview of Potential Interconnections</b></p> <p>MMI#: 1958-31-1 MXD: H:\Figure7-1.mxd SOURCE: Microsoft</p> <p align="center">University of Connecticut Water Supply Plan</p>	<p><b>LOCATION:</b> Mansfield, CT</p> <p>Map By: SJB Date: 1/7/2011 Scale: 1"=4,000'</p>	<p><b>SHEET:</b> Figure 7-1</p>
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**Legend**

- Stratified Drift
- Water
- Town Boundaries
- University of Connecticut Water System

**OVERVIEW OF POTENTIAL GROUND WATER SUPPLIES**

**WATER SUPPLY PLAN**  
UNIVERSITY OF CONNECTICUT  
STORRS, CONNECTICUT

REV	DATE	BY
SCALE: 1" = 1,000'		
DATE: 12/20/11		
PROJECT: 1114-J1		
JOB NAME: 1114-J1-2-2.1.1.1		
FIGURE 2-2		

PREPARED BY: MHC & M  
 24 Lehigh Drive  
 Cheshire, Connecticut 06115  
 (860) 534-1111  
 www.mhconline.com

Because field investigations have not been conducted, it is impossible to know precisely what volumes of water could be available on a daily basis. However, at least 0.25 mgd may be assumed for planning purposes.

#### 7.2.4 Interconnection with Windham Water Works

Windham Water Works is a municipal department of the Town of Windham. Windham Water Works operates a public water system that serves the Willimantic and South Windham portions of Windham, and the southern portion of the Town of Mansfield.

The Windham Water Works water supply plan was prepared by Milone & MacBroom, Inc. for the Windham Water Commission and submitted to DPH in early 2009. The plan is currently under review. Table 7-13 presents the projected water demands and margins of safety of the Windham Water Works system.

**TABLE 7-13  
Windham Water Works Projected Margins of Safety**

Year	Average Day Demand/ Margin of Safety		Maximum Month Demand/ Margin of Safety		Peak Day Demand/ Margin of Safety	
	2007-2008	2.16 mgd	1.90	2.56 mgd	1.60	3.06 mgd
2013	2.16 mgd	1.90	2.44 mgd	1.68	3.13 mgd	1.31
2020	2.33 mgd	1.76	2.63 mgd	1.56	3.38 mgd	1.21
2050	2.43 mgd	1.69	2.75 mgd	1.49	3.52 mgd	1.16

Note: Available water = 4.1 mgd

The sole source of supply for Windham Water Works is the Willimantic Reservoir. The reservoir is a run-of-the river impoundment of the Natchaug River. The reservoir has a safe yield of 7.9 mgd, which is largely a function of the relatively stable regulated flows released to the Natchaug River from the upstream Mansfield Hollow Dam. However, the Windham Water Works filter plant capacity and diversion permit limitation is only 4.1 mgd.

For the purpose of this alternatives analysis, Windham Water Works provided recent water production records to Milone & MacBroom, Inc. Table 7-14 lists actual water demands and margins of safety for 2008, 2009, and 2010.

**TABLE 7-14**  
**Windham Water Works Water Demands, 2008-2010**

Year	Average Day Demand/ Margin of Safety		Maximum Month Demand/ Margin of Safety		Peak Day Demand/ Margin of Safety	
	2008	2.10 mgd	1.95	2.36 mgd	1.74	2.86 mgd
2009	2.12 mgd	1.93	2.31 mgd	1.77	2.81 mgd	1.46
2010	2.26 mgd	1.81	2.50 mgd	1.64	3.02 mgd	1.36

Note: Available water = 4.1 mgd

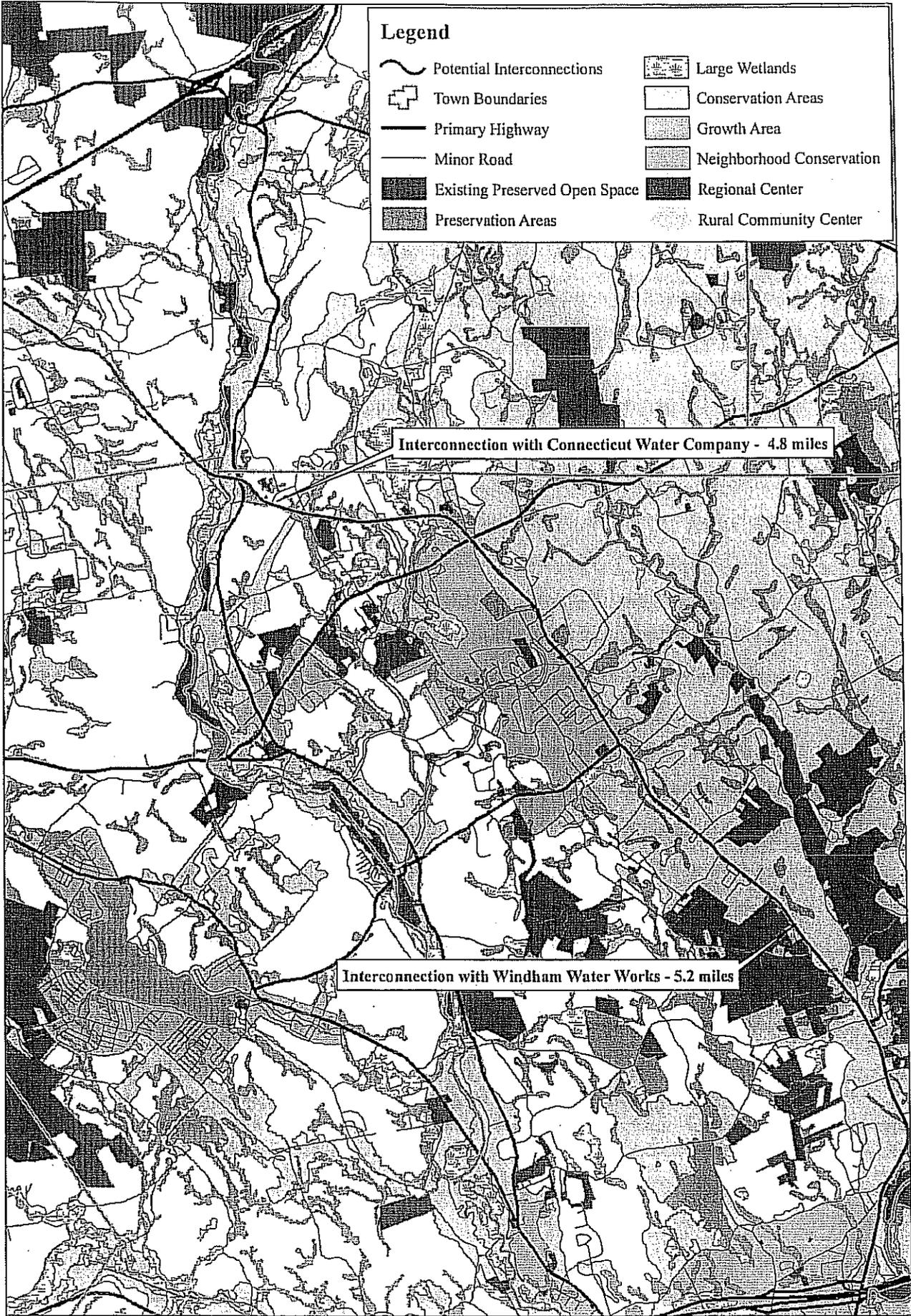
In general, Windham Water Works is producing average day, maximum month, and peak day volumes of water that are consistent with the projections. Because the available water is the same for an average day, maximum month average day, and a peak day, Windham Water Works is somewhat peak day limited. The system has approximately 0.5 mgd available as excess supply at the present time, but this increment will decrease as Windham's projections are realized. Much of Windham's projected increase in demand (on the order of 0.1 mgd) is located in southern Mansfield, although additional demand is projected within Windham as well.

According to the Windham Water Supply Plan, if any water were made available for use by the University of Connecticut, it would be necessary to increase the Windham Water Works treatment plant capacity and amend the diversion permit to allow a withdrawal that maintains the 15% margin of safety under average, maximum month, and peak day conditions. Based on the previous effort that was completed for the current diversion permit, any such additional withdrawal from the Willimantic Reservoir would be approved only if the Army Corps of Engineers were able to formally commit to operating Mansfield Hollow Lake for maintenance of instream flows in the Natchaug River.

If Windham Water Works were to provide water to the University of Connecticut, it may request that the University assist in the permit application process and any negotiations with the Army Corps of Engineers. Windham Water Works may also request that the University assist in the expansion of treatment plant capacity above 4.1 mgd. Such expansion would need to include all aspects of filter plant operations, including pumping, filtration, treatment, etc.

A pipeline installed along 5.2 miles of Route 195 between the Windham Water Works system and the University system would be needed for the interconnection. Because the elevation change from the water treatment plant to the University system is approximately 450 feet (from approximately 200 feet to 650 feet), a pumping station would be necessary. The expense associated with a pipeline of that length would include significant capital costs for the water main and a pumping station, and operational costs associated with operation of the pumping station. Capital costs have not been formally estimated, but would likely exceed \$4.5 million for the water main and pumping station.

In order to utilize University funds to upgrade Windham's water treatment plant, construct the pumping station, and install the water main, the project would be required to proceed through the Connecticut Environmental Policy Act (CEPA) review process and be evaluated in an Environmental Impact Evaluation (EIE). Because the pipeline would traverse Preservation and Conservation areas depicted in the Conservation and Development Policies Plan for Connecticut, 2005-2010 (also known as the State Plan of Conservation and Development), the EIE would be required to propose mitigation for induced development along the pipeline. Refer to Figure 7-3 for a copy of the state plan designations. Typically, mitigation for induced development can include amendments to a local Plan of Conservation and Development, zoning regulations, and/or other regulations.



**Legend**

-  Potential Interconnections
-  Town Boundaries
-  Primary Highway
-  Minor Road
-  Existing Preserved Open Space
-  Preservation Areas
-  Large Wetlands
-  Conservation Areas
-  Growth Area
-  Neighborhood Conservation
-  Regional Center
-  Rural Community Center

Interconnection with Connecticut Water Company - 4.8 miles

Interconnection with Windham Water Works - 5.2 miles

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**Overview of Potential Interconnections  
(State Plan of Conservation & Development Base)**

MM# 1958-31-1  
MXD: BAFigure7-1.mxd  
SOURCE: Microsoft, State of CT



University of Connecticut  
Water Supply Plan

**LOCATION:**  
Mansfield, CT

Map By: SJB  
Date: 1/7/2011  
Scale: 1"=4,000'

**SHEET:**  
Figure 7-3

Finally, in order to deliver water to the University system, the University and Windham Water Works would need to apply for and obtain a diversion permit from DEP and a sale of excess water permit from DPH. It is possible that the increased withdrawal from the Willimantic Reservoir and the interconnection with the University system could be authorized in a single diversion permit issued to Windham Water Works and the University, although this would need to be verified by DEP.

The above obstacles for interconnecting with the University of Connecticut will be challenging to overcome. Significant effort will be necessary to authorize additional withdrawals from the Willimantic Reservoir, expand the Windham Water Works treatment plant, and install a pipeline along Route 195. However, this alternative water supply is believed feasible.

#### **7.2.5 Interconnection With Tolland Water Department**

The Tolland Water Department manages a municipal water system in eastern Tolland. The system obtains water from two wells located along the Willimantic River. Tolland is currently operating with peak day margins of safety below 1.0 relative to its diversion permit limit of 0.22 mgd. A diversion permit application was submitted to DEP in 2008, requesting an increase to 0.41 mgd. The DEP denied the request for an increase in 2009. The same year, Tolland's water supply plan was completed and submitted to DPH for review. The water supply plan demonstrates a need for an increased diversion permit limit, and another diversion permit application was submitted in 2010.

Even when the Tolland system is authorized to withdraw greater than 0.22 mgd through a modified diversion permit, the supply will be completely allocated to meeting future demands in Tolland and South Willington. Excess supply will not be available to the University of Connecticut. This alternative is not feasible as an additional supply.

### 7.2.6 Interconnection With The Connecticut Water Company

CWC has expressed an interest in serving a portion of Mansfield from its Northern Region/Western System for at least ten years. The source of water to the University would be the Shenipsit Reservoir. Unlike Windham Water Works and Tolland, CWC currently has excess water supply in the Western System relative to its registered and permitted diversions.

However, similar to Windham Water Works, a treatment plant expansion would be necessary to facilitate additional withdrawals and filtration from Shenipsit Reservoir. Other project issues are similar to those that would be faced by Windham Water Works. A pipeline installed along Route 195 between the CWC and the University system would need to be 4.8 miles in length, although a portion of that distance would be overcome by utilizing the section of the Tolland system located in Route 195, which in turn requires a contract with the Town of Tolland.

Because the elevation change from the Coventry/Mansfield town line (along the Willimantic River) to the University system is approximately 300 feet, a pumping station in Mansfield would be necessary. The expenses associated with a pipeline would include significant capital costs for the water main and a pumping station in northwest Mansfield, and operational costs associated with operation of the pumping station. Capital costs have been estimated by CWC at \$6.5 million.

In order to utilize University funds to construct the pumping station and install the water main, the project would be required to proceed through the CEPA review process and be evaluated in an EIE. Because the pipeline would traverse mainly Rural areas and a few Conservation areas depicted in the State Plan of Conservation and Development, the EIE would be required to propose mitigation for induced development along the pipeline. Typically, mitigation for induced development can include amendments to a local Plan of Conservation and Development, zoning regulations, and/or other regulations. The

CEPA-related issues can be avoided if CWC funds the project, which is something that is not possible for a pipeline from Windham Water Works.

Finally, in order to deliver water to the University system, the University and CWC would need to apply for and obtain a diversion permit from DEP and a sale of excess water permit from DPH.

The CWC pipeline is believed feasible. Additionally, it has several advantages over a pipeline from Windham Water Works:

- CWC has adequate diversion permits and registrations for its Western System sources, whereas Windham Water Works would need to modify its diversion permit to allow increased withdrawals from its single source of supply;
- The CWC pipeline would be shorter than a Windham Water Works pipeline;
- The CWC pipeline would be mainly traversing Rural areas whereas the Windham Water Works pipeline would be mainly traversing Conservation areas depicted in the State Plan of Conservation and Development;
- As an investor-owned water utility, CWC can initiate treatment plant upgrades and a pipeline project more quickly than Windham Water Commission can;
- A pipeline from CWC can serve areas in need of a public water supply such as the Mansfield Four Corners area, areas that may benefit from a public water supply such as the Route 32/Route 195 intersection in Mansfield, and existing small public water systems located along Route 195;
- The Windham Water Works pipeline would not pass by any significant areas in need of a public water supply.

### 7.2.7 New Stratified Drift Ground Water Sources

It is possible that new sources of ground water supply could be developed in a number of locations in the Town of Mansfield. In order to develop a new ground water source under current regulatory requirements and sanitary criteria, the following conditions generally need to be met or addressed:

- ❑ The wellheads must be raised above flood elevations;
- ❑ The wells must not significantly draw down the water table in adjacent wetlands;
- ❑ Direct impacts to wetlands must be avoided and/or mitigated;
- ❑ The wells must not reduce instream flows in nearby streams to the extent that it is detrimental to fish habitat, water quality, competing water users, or other environmental receptors;
- ❑ The land within 200 feet of each well must be in the control of the water utility;
- ❑ The wells must not draw contaminants from septic systems, landfills, or other potentially contaminated sites; and
- ❑ Existing private and public water supply wells cannot be impacted.

Stratified drift aquifer ground water supplies are typically used for larger, regional water needs as opposed to small local or clustered demands. These types of wells tend to produce large flow rates; however, they are also more expensive to develop, maintain, and protect from contamination, making them better suited for large customer bases.

The Water and Wastewater Master Plan reviewed the following alternative ground water supplies: (1) additional withdrawals at the Willimantic River Wellfield, (2) development of the Willimantic River aquifer at Mansfield Depot, (3) development of the Willimantic River aquifer at Eagleville, (4) additional withdrawals at the Fenton River Wellfield, and (5) development of the Fenton River aquifer near Mansfield Hollow Reservoir.

Alternative number 1 was also evaluated as part of the Willimantic River Study completed and published in 2010. The alternative was ruled out as part of the Willimantic River Study because the incremental supply did not make sense in light of the instream flow constraints identified by the study. Alternatives 2 and 3 warrant additional consideration and are revisited below, except that they have been combined in favor of the Mansfield Depot location and a site that is intermediate between Mansfield Depot and Eagleville.

Relative to similar instream flow concerns, Alternative number 4 was one of the least prudent of the five discussed in the master plan. Relocation of a well such as Well A is unlikely to gain back the operational capacity that is needed to bolster margins of safety as the committed water demands are developed because the middle section of the Fenton River at the wellfield is most vulnerable to flow diminution. Instead, the use of Well D is the most appropriate means of restoring operational capacity of the Fenton River Wellfield. Alternative 5 warrants additional consideration and is revisited below.

#### *Willimantic River Aquifer*

The Town of Mansfield has previously indicated that a potential well site exists in the area of Mansfield Depot where Route 44 crosses the Willimantic River. The mapped surficial geology in this area appears to support this assumption. Several successful wellfields have been sited along the Willimantic River, including the Willimantic River Wellfield and the Tolland Water Department Wellfield. Additionally, a large parcel of land is located adjacent to the river near Route 44. The size of the parcel would permit the required 200-foot radius of control.

The USGS drilled a test hole just south of Route 44 in 1963. The hole encountered medium sand down to 34 feet, overlying compact sand and gravel (likely glacial till) from 34 to 51 feet. Bedrock was encountered at a depth of 51 feet. The static water level was only four feet below the ground surface, indicating a saturated thickness of 30 feet.

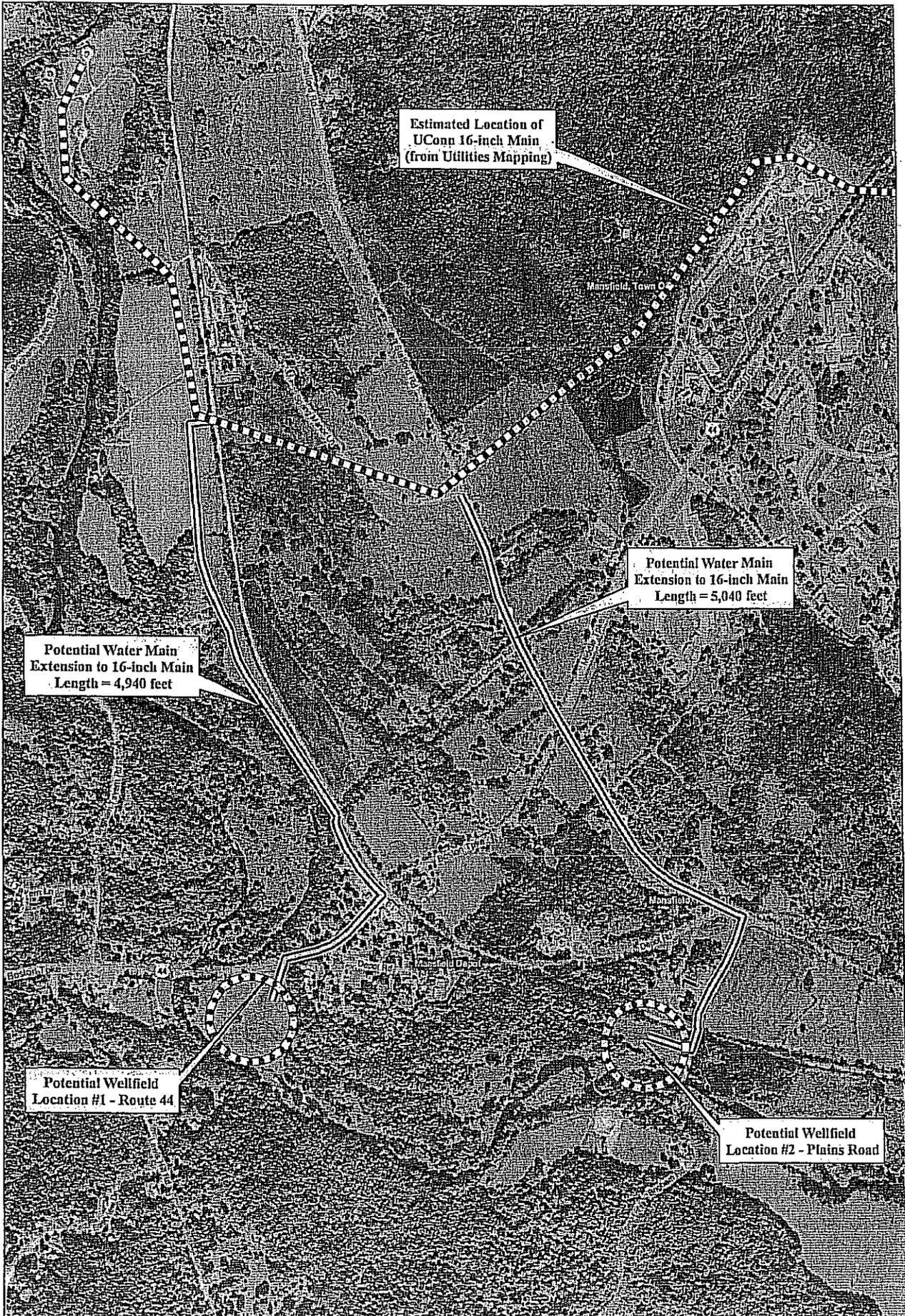
Although high-yield production wells are typically deeper, a saturated thickness of 30 feet would not prohibit development of a well. The surficial material (medium sand) most likely has a high hydraulic conductivity, such that a high well yield would be expected.

Site disturbance and associated direct wetland impact may be issues at the site, as it has not been developed. Although private water supply wells are located nearby, these wells are drilled into bedrock and would not likely be impacted by a stratified drift wellfield. The area is located in the SFHA along the river, such that the development of a new well would require filling to raise the new wellhead above the flood elevation.

Two natural diversity database polygons are located just east of the potential well site. The associated Species of Special Concern are located in upland wooded areas. Development of a well site may require evaluation of habitat impacts. Closed landfills/dumps are located north and southeast of Mansfield Depot, both within one-half mile of the potential well site. Therefore, potential ground water quality problems must be considered if siting a well at this location. Certainly, high-quality ground water may be available at this site, even with the landfills nearby.

To deliver water from the Mansfield Depot area to the University system, 4,900 feet of water transmission main would need to be installed from the new well site to the existing 16-inch main that delivers water from the Willimantic River Wellfield to the system. Refer to Figure 7-4 for a depiction of this potential route.

In the last two years, a nearby location has been discussed as well. Town-owned land is available off Plains Road, further downstream than Route 44. This location is intermediate in location between the original alternatives described in the master plan (the site in Mansfield Depot and the site in Eagleville) and is superior to any sites further downstream due to the increasing distances involved.



 <p><b>MILONE &amp; MACBROOM*</b>  <small>Engineering,      Landscape Architecture      and Environmental Science</small></p>	<p><b>Potential Willimantic River Wellfields &amp; Transmission Main Extensions</b></p>	<p><b>LOCATION:</b>          Mansfield, CT</p>	
<p>99 Realty Drive          Cheshire, Connecticut 06410          (203) 271-1773 Fax: (203) 272-9733          www.miltonandmacbroom.com</p>	<p>NMI#: 1958-31          MXD: II\Figure7-4.mxd          SOURCE: Microsoft, UConn</p>	<p><b>University of Connecticut          Water Supply Plan</b></p>	<p><b>Map By:</b> SJB  <b>Date:</b> 1/7/2011  <b>Scale:</b> 1"=600'  <b>SHEET:</b>          Figure 7-4</p>

This potential well site off Plains Road has similar issues as the site located near Route 44. For example, it is located in the SFHA and would require installation of a 5,000-foot water main to deliver water to the existing 16-inch transmission main. However, the Plains Road site is more favorable than the Route 44 site with respect to instream flows, as it is adjacent to the backwater of Eagleville Lake and therefore groundwater withdrawals will minimally impact fish habitats. Although the Depot Campus effluent discharge was historically located at the upstream end of Eagleville Lake, it has been discontinued. Therefore, no water quality concerns are related to sewage effluent.

One benefit of developing new ground water supplies along the Willimantic River is that the water withdrawn from the resource would ultimately be returned to the river via the treated wastewater effluent from the University WPCF. Development of ground water supplies in the Natchaug River basin (described below) would result in a transfer to the Willimantic River basin, although it is recognized that both rivers are part of the Shetucket drainage basin.

#### *Mansfield Hollow Reservoir and Lower Fenton River Aquifer*

The master plan included a planning-level evaluation of stratified drift along the lower Fenton River and Mansfield Hollow Reservoir. The stratified drift aquifers associated with the Fenton River, Mount Hope River, and Natchaug River meet at Mansfield Hollow Reservoir. Including the areas that are inundated by the existing impoundment, the aquifer is 1.5 miles wide and 2.6 miles long where the three rivers meet. According to the Water Resources Bulletin for the Shetucket River Basin (USGS, 1966), the saturated thickness of the aquifer ranges from less than 10 feet at its edges to more than 80 feet south of Echo Lake. Beneath the existing reservoir, the aquifer is approximately 40 feet thick, but the water column above the aquifer is at least 20 feet deep.

There are two blocks of glacial till in the interior of the aquifer, between Echo Lake and the reservoir, where the stratified drift aquifer is absent. The two glacial till blocks significantly limit the location of a wellfield on the west side of the reservoir.

Wetland systems adjacent to Echo Lake would likely limit the development of a wellfield in close proximity, as drawdown of the water table would be expected. Similar low-lying areas with potential wetlands also exist in Mansfield Hollow (on either side of Mansfield Hollow Road); along a watercourse that flows in a southerly direction in the vicinity of the landfill; perpendicular to Bassett Bridge Road; north of Mansfield Hollow Reservoir between the shore and Route 89; and along Bassett Bridge Road near the bridge over the reservoir.

To avoid unacceptable instream flow impacts, a wellfield would need to be distant from the main stems of the Fenton River and Mount Hope River, limiting the locations available to the northwest and northeast of Mansfield Hollow Reservoir. A well located near the lake would be expected to have negligible impacts to instream flows because the lake provides a significant control on ground water base level.

Private wells are located at every residential, institutional, and commercial property in the vicinity of the Mansfield Hollow Reservoir. Some dug wells operate in this area, and these would be susceptible to drawdown caused by pumping of a stratified drift wellfield. An aquifer pumping test would be necessary to evaluate possible dug well impacts in this area. Bedrock wells would not be expected to be susceptible to drawdown.

There are fewer potential environmental impacts and private well impacts east of the Mansfield Hollow Reservoir. However, areas east of the reservoir are likely too remote for development of a wellfield, especially as the distance from Bassett Bridge Road increases. Additionally, construction of a water main through large tracts of undeveloped land is undesirable.

Flood elevation constraints would be an important factor for siting a public water supply near the Mansfield Hollow Reservoir. A new wellfield here would need to be located above the spillway elevation of 257 feet in order to meet the flood elevation criteria. This requirement removes the entire reservoir fringe from consideration.

Natural diversity database polygons are located in the northern and central portions of the Mansfield Hollow Reservoir. The frosted elfin moth is associated with each polygon. Habitat impacts would need to be evaluated if these areas were selected for well development.

The active town landfill and compost area located off Route 89 severely limit the potential for wellfield development northwest of the reservoir near the Fenton River. The closed town landfill off Cemetery Road significantly limits the location of a wellfield on the west side of the Mansfield Hollow Reservoir. The necessary separation between the landfill and a wellfield would depend on the pumping rates of the wells, the natural ground water flow direction, and contaminants (if any) associated with the landfill.

With the limitations discussed above, there are very few potential well sites in the Mansfield Hollow stratified drift aquifer. The following sites are the only potentially feasible choices:

1. North or south of Bassett Bridge Road, 1,500 feet east of Route 195;
2. Immediately east of Route 89 at the intersection with Wormwood Hill Road;
3. Immediately adjacent to Bassett Bridge Road on the east side of the reservoir, above the spillway elevation; and
4. Immediately east of Bassett Bridge Road on the west side of the reservoir, where the road abruptly curves to the north, on a small "island" above the spillway elevation.

Of these four locations, development of a water supply would be difficult at locations 1, 2, or 3 because the parcels are small, and several would need to be acquired to obtain the

physical space and setbacks needed and/or deeded control of the land. Option 4 is contained wholly within the Mansfield Hollow State Park, lending itself to land-use control but requiring permission from the State of Connecticut and the federal government, as well.

In light of the environmental concerns, and without large tracts of available, contiguous land, it is unlikely that development of a community ground water supply in the vicinity of Mansfield Hollow Reservoir or the lower Fenton River would be feasible under the current regulatory climate.

#### 7.2.8 Prioritization of Future Supplies

Well D from the Fenton River Wellfield is already in place and used along with the other Fenton River wells when instream flows in the river are sufficient. Given its immediate availability, Well D is the first logical increment of "new" supply for the University.

The RWF project is scheduled to begin construction in 2011 and be completed in 2012, serving as the second increment of new supply to the University. The project will ensure that margins of safety are as high as possible as committed water demands begin to materialize.

However, the next increment of new supply will need to be in progress as of 2015 in order to ensure that margins of safety remain above 1.15. Of the potential options discussed above, the following should be pursued on parallel tracks:

- Relocation of Fenton Well A
- CWC interconnection
- Windham Water Works interconnection
- New ground water supply along the Willimantic River

A new ground water supply near the lower Fenton River or Mansfield Hollow Reservoir is too distant and has too many associated uncertainties to justify its pursuit.

Discussions with CWC have focused on the provision of 0.5 mgd to the University. The same quantity, 0.5 mgd, is the upper limit of how much water could reasonably be supplied by Windham Water Works (in the short-term only) without a diversion permit modification or treatment plant upgrade. Because these quantities likely exceed the availability associated with a relocated Fenton Well A, they are used here for planning purposes.

Tables 7-15 and 7-16 provide margins of safety for projected monthly and peak day demands in 2030, and Tables 7-17 and 7-18 provide margins of safety for projected monthly and peak day demands in 2060. These projections assume that 0.5 mgd is available as needed, but particularly in late summer and early fall.

As shown on the tables, the additional increment of 0.5 mgd will provide margins of safety above 1.15 for all projected monthly demands. Peak day margins of safety will also be above 1.15 for all projected peak day demands, except occasionally in the month of August when the margin of safety will be above 1.0. The University anticipates that slightly more than 0.5 mgd can be supplied by the new source of supply during these isolated instances, or storage can be used to buffer the peak days.

**TABLE 7-15**  
**Projected Monthly Margins of Safety with Well D, RWF, and Additional 0.5 mgd, 2030**

Month	Current Production (mgd)	Future Committed Demands (mgd)	Associated Unaccounted Water (mgd)	Future RWF Offset (mgd)	Total Future Demand (mgd)	Available Water Supply (mgd)				Margin of Safety
						Willimantic River Wells	Fenton River Wells	Additional Supply	Total	
January	1.18	0.32	0.016	-0.20	1.31	1.48	0.84	--	2.32	1.77
February	1.59	0.45	0.023	-0.20	1.86	1.48	0.84	--	2.32	1.25
March	1.28	0.35	0.018	-0.19	1.46	1.48	0.84	--	2.32	1.59
April	1.53	0.44	0.022	-0.18	1.81	1.48	0.84	--	2.32	1.29
May	1.06	0.24	0.012	-0.34	0.97	1.48	0.84	--	2.32	2.38
June	1.09	0.24	0.012	-0.35	0.99	1.48	0	--	1.48	1.50
July	1.16	0.25	0.012	-0.40	1.02	1.48	0	--	1.48	1.45
August	1.17	0.26	0.013	-0.37	1.08	1.48	0	--	1.48	1.37
September	1.64	0.44	0.022	-0.27	1.84	1.48	0.35	0.5	2.33	1.26
October	1.52	0.42	0.021	-0.23	1.73	1.48	0.35	0.5	2.33	1.35
November	1.34	0.35	0.018	-0.25	1.46	1.48	0.84	--	2.32	1.59
December	1.27	0.33	0.016	-0.25	1.36	1.48	0.84	--	2.32	1.70

**TABLE 7-16**  
**Projected Peak Margins of Safety with Well D, RWF, and Additional 0.5 mgd, 2030**

Month	Current Production (mgd)	Future Committed Demands (mgd)	Future RWF Offset (mgd)	Total Future Demand (mgd)	Available Water Supply (mgd)				Margin of Safety
					Willimantic River Wells	Fenton River Wells	Additional Supply	Total	
January	1.86	0.44	-0.20	2.10	1.97	0.84	--	2.81	1.34
February	2.04	0.63	-0.20	2.46	1.97	0.84	--	2.81	1.14
March	2.23	0.49	-0.19	2.53	1.97	0.84	--	2.81	1.11
April	2.03	0.61	-0.18	2.46	1.97	0.84	--	2.81	1.14
May	1.78	0.33	-0.34	1.77	1.97	0.84	--	2.81	1.59
June	1.90	0.33	-0.35	1.88	1.97	0	0.5	2.47	1.31
July	1.93	0.34	-0.40	1.87	1.97	0	0.5	1.97	1.32
August	2.33	0.36	-0.37	2.33	1.97	0	0.5	2.47	1.06
September	2.12	0.62	-0.27	2.48	1.97	0.35	0.5	2.82	1.14
October	2.02	0.58	-0.23	2.37	1.97	0.35	0.5	2.82	1.19
November	2.16	0.49	-0.25	2.40	1.97	0.84	--	2.81	1.17
December	2.01	0.46	-0.25	2.22	1.97	0.84	--	2.81	1.27

**TABLE 7-17**  
**Projected Monthly Margins of Safety with Well D, RWF, and Additional 0.5 mgd, 2060**

Month	Current Production (mgd)	Future Committed Demands (mgd)	Associated Unaccounted Water (mgd)	Future RWF Offset (mgd)	Total Future Demand (mgd)	Available Water Supply (mgd)				Margin of Safety
						Willimantic River Wells	Fenton River Wells	Additional Supply	Total	
January	1.18	0.34	0.017	-0.20	1.33	1.48	0.84	--	2.32	1.74
February	1.59	0.48	0.024	-0.20	1.89	1.48	0.84	--	2.32	1.23
March	1.28	0.37	0.019	-0.19	1.48	1.48	0.84	--	2.32	1.57
April	1.53	0.46	0.023	-0.18	1.83	1.48	0.84	--	2.32	1.27
May	1.06	0.25	0.012	-0.34	0.99	1.48	0.84	--	2.32	2.35
June	1.09	0.25	0.013	-0.35	1.00	1.48	0	--	1.48	1.47
July	1.16	0.26	0.013	-0.40	1.03	1.48	0	--	1.48	1.43
August	1.17	0.28	0.014	-0.37	1.09	1.48	0	--	1.48	1.35
September	1.64	0.47	0.024	-0.27	1.87	1.48	0.35	0.5	2.33	1.25
October	1.52	0.44	0.022	-0.23	1.75	1.48	0.35	0.5	2.33	1.33
November	1.34	0.37	0.019	-0.25	1.48	1.48	0.84	--	2.32	1.57
December	1.27	0.35	0.017	-0.25	1.38	1.48	0.84	--	2.32	1.68

**TABLE 7-18**  
**Projected Peak Margins of Safety with Well D, RWF, and Additional 0.5 mgd, 2060**

Month	Current Production (mgd)	Future Committed Demands (mgd)	Future RWF Offset (mgd)	Total Future Demand (mgd)	Available Water Supply (mgd)				Margin of Safety
					Willimantic River Wells	Fenton River Wells	Additional Supply	Total	
January	1.86	0.47	-0.20	2.13	1.97	0.84	--	2.81	1.32
February	2.04	0.67	-0.20	2.50	1.97	0.84	--	2.81	1.12
March	2.23	0.52	-0.19	2.56	1.97	0.84	--	2.81	1.10
April	2.03	0.65	-0.18	2.49	1.97	0.84	--	2.81	1.13
May	1.78	0.35	-0.34	1.79	1.97	0.84	--	2.81	1.57
June	1.90	0.35	-0.35	1.90	1.97	0	0.5	2.47	1.30
July	1.93	0.36	-0.40	1.89	1.97	0	0.5	1.97	1.31
August	2.33	0.38	-0.37	2.35	1.97	0	0.5	2.47	1.05
September	2.12	0.66	-0.27	2.51	1.97	0.35	0.5	2.82	1.12
October	2.02	0.62	-0.23	2.41	1.97	0.35	0.5	2.82	1.17
November	2.16	0.52	-0.25	2.43	1.97	0.84	--	2.81	1.16
December	2.01	0.49	-0.25	2.24	1.97	0.84	--	2.81	1.25

As shown on the tables, the additional increment of 0.5 mgd will provide margins of safety above 1.15 for all projected monthly demands. Peak day margins of safety will also be above 1.15 for all projected peak day demands, except occasionally in the month of August when the margin of safety will be above 1.0. The University anticipates that slightly more than 0.5 mgd can be supplied by the new source of supply during these isolated instances, or storage can be used to buffer the peak days.

In summary, the RWF plus an additional source of supply of up to 0.5 mgd is needed to meet all committed future water demands. The RWF will address the earlier components of the committed future water demands from 2012 through 2015, whereas the additional supply will address subsequent components of committed future demands.

### 7.3 SYSTEM IMPROVEMENTS AND MAINTENANCE ACTIVITIES

Source and system improvements have been identified and described in detail throughout this Plan. The improvement schedules summarized in Tables 7-19, 7-20, and 7-21 relate these recommended improvements to the time frame in which they are believed to be necessary. The Short, Intermediate, and Long Term Improvement Schedules correspond to the five, 20, and 50-year planning periods. Cost estimates, financing sources, and the year in which each is anticipated to occur are also listed.

**TABLE 7-19**  
**Short Term Improvement Schedule, 2011 - 2015**

Item	Estimated Cost	Year	Funding Source
Proceed with construction of reclaimed water facility	\$25,000,000	2011-2012	CI
Continue metering of service connections and groups of buildings	\$100,000	2011-2012	OB
Safe yield pumping test of Willimantic River Wellfield	\$25,000	2011-2012	OB
Replace Hillside Road water main	\$200,000	2011-2012	OB
Permitting and design of interconnections with The Connecticut Water Company and/or Windham Water Works	\$500,000	2012-2015	OS & OB
Work with Town of Mansfield regarding other potential water supplies such as new wells along the Willimantic River	\$75,000	2012-2015	OS & OB

**TABLE 7-19 (Continued)**  
**Short Term Improvement Schedule, 2011 - 2015**

Item	Estimated Cost	Year	Funding Source
Investigate feasibility of relocating Fenton Well A	\$75,000	2012-2013	OB
Additional hydraulic model calibration and expansion as needed	\$25,000	2012-2015	OB
System extension and installations for Storrs Center Phase IA	\$150,000	2011-2012	OS
Additional system installations for Storrs Center Phase IB	\$150,000	2012-2013	OS
Extend system into North Campus area	\$250,000	2012-2013	CI
Repair main breaks as needed	\$2,000/yr	As Needed	OB
Repair leaking services as needed	\$2,000/yr	As Needed	OB
Meter testing/calibration/replacement program	\$5,000/yr	Annually	OB
Annual water balance and conservation programs	NA	Annually	OB
Update water supply plan	\$50,000	2015	OB
Begin construction of additional future supply such as interconnection or new wells along the Willimantic River	\$3M to \$7M	2014-2015	OS & CI

Note: Cost estimates are for planning purposes only. Where an estimated cost "NA" is shown, this work is intended to be conducted by in-house staff, or paid for by other departments.

CI = Capital Improvement funds

OB = Operating Budget

OS = Outside Sources

**TABLE 7-20**  
**Intermediate Term Improvement Schedule, 2016 - 2030**

Item	Estimated Cost	Year	Funding Source
Complete construction of additional future supply such as interconnection or new wells along the Willimantic River	\$3M to \$7M	2016	OS & CI
Relocate Fenton Well A if feasible and prudent	\$100,000	2016	OB
More fully interconnect the Depot Campus sub-system with the Main Campus sub-system such that the Fenton River Wellfield could provide water during emergencies	\$700,000	By 2030	CI
Redevelop wells as needed	\$20,000-\$50,000	Various	OB
Repair main breaks as needed	\$2,000/yr	As Needed	OB
Repair leaking services as needed	\$2,000/yr	As Needed	OB
Meter testing/calibration/replacement program	\$5,000/yr	Annually	OB
Annual water balance and conservation programs	NA	Annually	OB
Inspect and maintain storage facilities	\$50,000	Various	OB
Update water supply plan	\$50,000	2022, 2030	OB

**TABLE 7-21**  
**Long Term Improvement Schedule, 2031 - 2060**

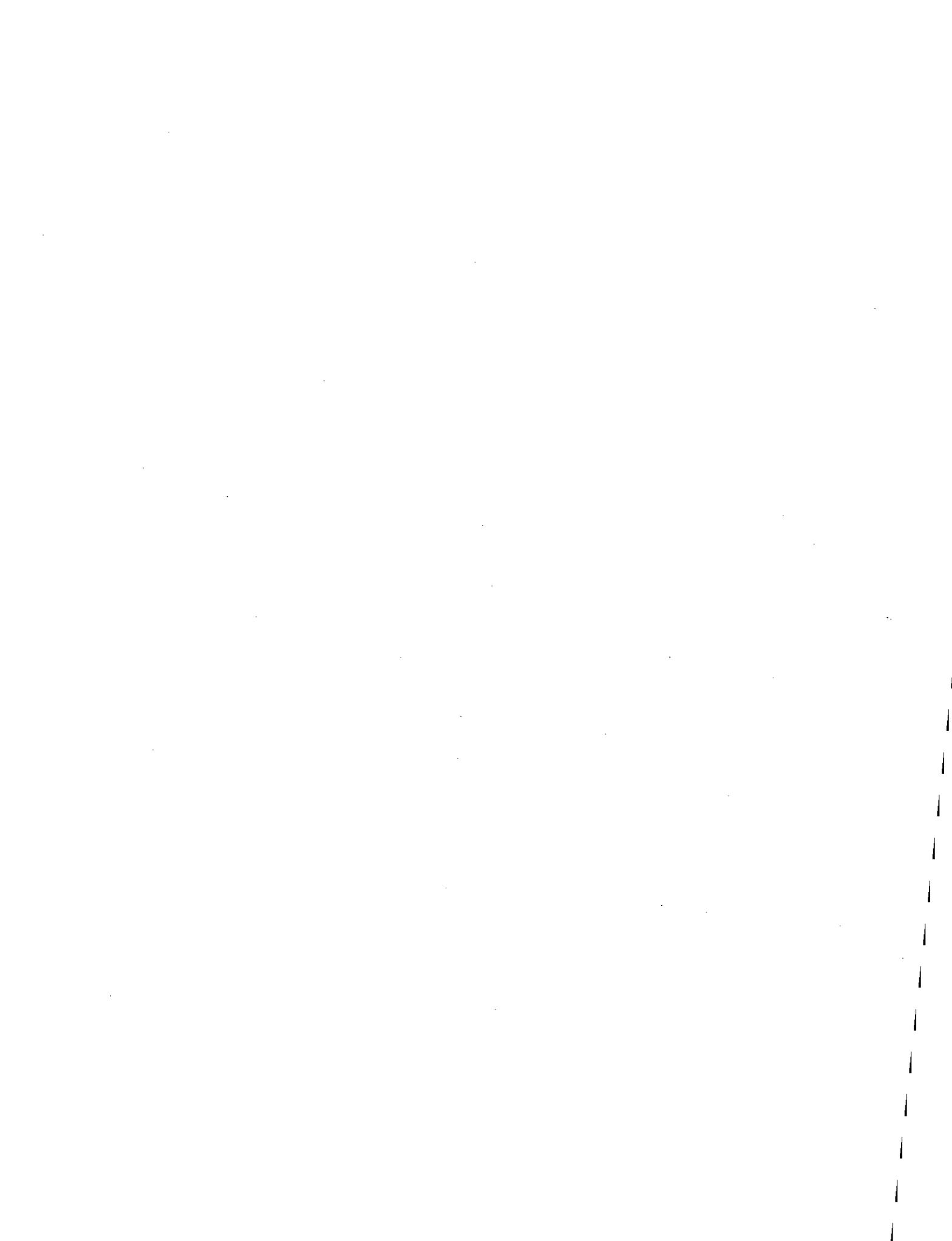
Item	Estimated Cost	Year	Funding Source
Redevelop wells as needed	\$20,000-\$50,000	Various	OB
Repair main breaks as needed	\$2,000/yr	As Needed	OB
Repair leaking services as needed	\$2,000/yr	As Needed	OB
Meter testing/calibration/replacement program	\$5,000/yr	Annually	OB
Annual water balance and conservation programs	NA	Annually	OB
Inspect and maintain storage facilities	\$50,000	Various	OB
Update water supply plan	\$50,000	2038, 2046, 2054	OB

**7.4 FINANCING OF PROPOSED IMPROVEMENTS AND PROGRAMS**

Three types of financing are planned for the above improvements. Operating budget expenses such as metering, meter testing, main breaks, and routine repairs are paid from the annual budget of the Facilities Department. Revenue from water rates is the main contributor to this budget.

Capital improvement funds are necessary for significant projects like the RWF, which otherwise could not be constructed using funds from annual budgets and water ratepayers. Capital improvement funds may also be used for interconnections, depending on the contributions of other parties. The Connecticut Water Company will likely contribute a significant percentage of the total funds needed for an interconnection from its Western System, whereas Windham Water Works would contribute little if anything toward an interconnection with the University.

The Connecticut Water Company is an example of the third category of funding. Outside sources will be necessary for some of the projects listed in the improvement tables, such as the Storrs Center water system infrastructure. Without these outside sources, some of the University's projects would be difficult to fund using annual budgets and State funds.



# UNIVERSITY OF CONNECTICUT WATER CONSERVATION PLAN

MAY 2011

MMI #1958-31

*Prepared for:*



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## 1.0 BACKGROUND AND PURPOSE

### 1.1 GENERAL

This Water Conservation Plan has been prepared for the University of Connecticut ("University") to promote long term water conservation and to ensure an adequate supply of water to meet essential needs.

This Plan has been prepared in accordance with existing statutes and regulations currently in effect. The State guidelines for water conservation planning, prepared by the Connecticut Department of Public Health (DPH), Department of Public Utility Control (DPUC), Department of Environmental Protection (DEP), the Office of Policy and Management (OPM), and Office of Consumer Counsel (December 1990) have also been consulted and utilized, where appropriate. These guidelines, as well as "Conserving Water - Plan On It" (1987), have been used in the preparation of this plan.

### 1.2 REGULATORY OVERVIEW

Although the University is not considered a "water company" as set forth in Connecticut General Statute (CGS) Section 25-32a, the University views its Water Supply Plan as an integral device in planning for a safe and adequate water supply system through the foreseeable future. Thus, the University's Water Supply Plan addresses (when possible) the requirements of CGS Section 25-32d and the University distributes the plan to reviewing agencies and interested parties for review and comment.

Section 19-13-B102(s) of the Connecticut Public Health Code requires conservation practices, including a program to reduce the amount of water that cannot be accounted for. This plan is consistent with the Public Health Code requirements.

The University developed its initial Water Conservation Plan in 2000 as part of the revisions to its 1999 Water Supply Plan. That initial plan was revised in 2001 and again in 2004 concurrent with the previous Water Supply Plan update. This plan is a revision and update of the 2004 Water Conservation Plan.

### **1.3 GOALS & OBJECTIVES**

It is the objective of the State of Connecticut and of the University in developing this plan to manage and conserve the University's water resources through the following goals and policies:

- ❑ To make water resource conservation a priority in policy setting and in practice;
- ❑ To conserve water resources through technology, methods, and procedures designed to promote efficient use of water and to eliminate the waste of water;
- ❑ To balance competing and conflicting needs for water equitably at a reasonable cost to all;
- ❑ To reduce or eliminate the waste of water through water supply management practices; and
- ❑ To prevent contamination of water supply sources or reduction in the availability of future water supplies.

These goals and objectives are reflected in the strategies and practices set forth in this document.

### **1.4 OVERVIEW OF THE SYSTEM**

Table 1-1 is a system fact sheet for the University water supply system.

**TABLE 1-1  
System Fact Sheet**

Are you currently under agency order or consent agreement? If yes, describe No

Number of service connections: 330 Estimated population in service area<sup>1</sup>: 15,000

Number of new service connections added over the last year: <5

Annual demand: 470.8 MG (2010) Annual average day demand: 1.29 mgd (2010)

Max. month average day demand: 1.64 mgd (9/2010) Max. one day (peak) demand: 2.23 mgd (3/2010)

Max. month-to-average-day ratio: 1.27 (2010) Peak day-to-average-day ratio: 1.72 (2010)

System safe yield and available supply or treatment capacity: Varies by month; treatment capacity exceeds supply

Estimate non-metered water for each of the last five years:

	Year: '07-'09	Year: 2006	Year: 2005	Year: 2004	Year: 2003
Non-Metered:	194,146 gpd	N/A	N/A	N/A	N/A
Percentage:	15%	N/A	N/A	N/A	N/A

2007-2009	On Campus Res.	On Campus Non-Res.	Off-Campus Res. Homes	Off-Campus Res. Complex	Off-Campus Com.	Off-Campus Inst.	Non-metered	Total
Average day demand (gpd)	413,143	484,732	15,646	47,273	30,575	78,005	194,146	1,263,520
% of total water use	33%	38%	1%	4%	2%	6%	15%	100% <sup>2</sup>
No. of service connections	17	170	115	7	17	4	N/A	330
No. of connections metered	17	45	98	7	15	4	N/A	186

1. Estimated service population including resident, non-transient, and transient classifications.
2. Totals do not sum to 100% exactly due to rounding.

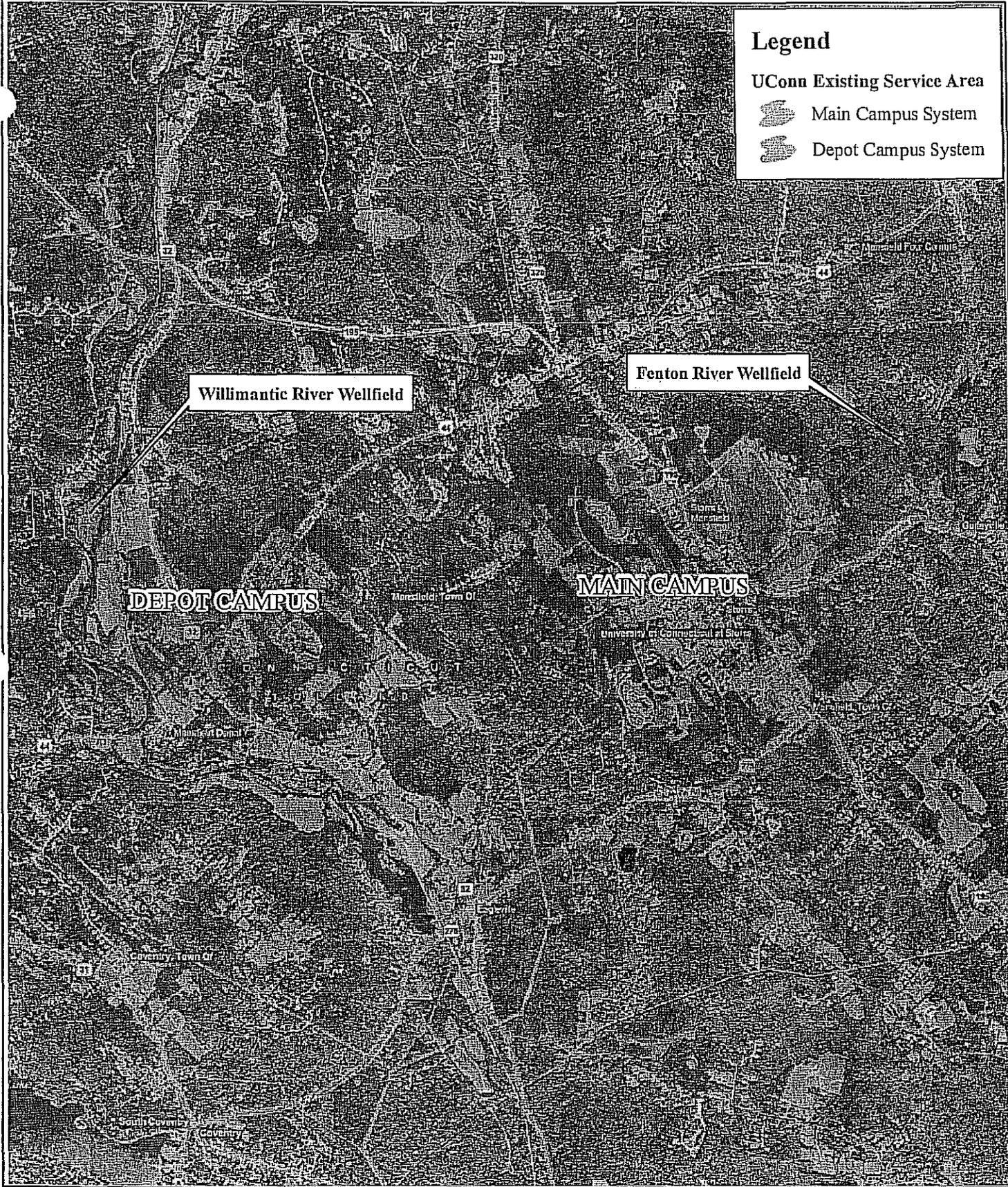
Water is supplied to the University system from eight wells located in two wellfields (Wells A, B, C, and D in the Fenton River Wellfield and Wells 1, 2, 3, and 4 in the Willimantic River Wellfield). Refer to Figure 1-1 for the locations of key system features. Figure 1-2 presents a schematic plan of the system.

# Legend

UConn Existing Service Area

 Main Campus System

 Depot Campus System



Engineering,  
Landscape Architecture  
and Environmental Science



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**University Water System**

MMI#: 1958-31  
MXD: H:\Figure1-1.mxd  
SOURCE: Microsoft

N  


**University of Connecticut  
Water Supply Plan**

LOCATION:  
**Mansfield, CT**

Map By: SJB  
Date: 1/7/2011  
Scale: 1"=3,500'

SHEET:  
**Figure 1-1**



Other water system components include five distribution storage tanks, one transmission storage tank, four booster pumping stations, three treatment facilities, and 23 miles of water transmission and distribution mains. The University has no interconnections with outside water utilities, although the Main Campus System and the Depot Campus system are considered interconnected with one another for regulatory purposes.

## 1.5 EVALUATION OF PRESENT AND FUTURE WATER DEMANDS

Based on an examination of consumption data, the breakdown of water use by user category for the last three years was presented in Table 1-1. The average daily water production from the wells was 1,263,520 gpd in for the period 2007 to 2009. On-campus demands accounted for 71% of the overall usage during this period, with 15% of demands (including unmetered users and lost water) remaining unmetered.

Future water demands have been estimated in the Water Supply Plan. The University has committed to service an additional 357,700 gpd to proposed developments on its campus (North Campus and Depot Campus) and developments adjacent to its system in Mansfield (Storrs Center and North Eagleville Road / King Hill Road). Out of these demands; 106,555 gpd will be realized by 2015, and 340,100 gpd will be realized by 2030.

The above demands do not account for seasonality or peaking factors. Any future water consumption near the University will exhibit seasonality similar to that already experienced by the University's water system. These water use patterns essentially require a monthly basis for analysis.

Table 1-2 presents a summary of recent and projected monthly water demands. The 20-year and 50-year planning periods are excluded from this discussion as this document will be updated again before such planning periods are realized. The projections suggest that monthly water demands will average around 1.7 mgd in February, April, September,

and October, with a noticeable drop-off in demand for the remaining months. These peaks equate to the return of students (February and September) from semester break as well as higher water needs at the Central Utility Plant (CUP). The September and -October months are also two of the months when available supply is restricted due to environmental concerns.

**TABLE 1-2  
Projected Monthly Water Demands, 2015**

Month	Maximum Monthly Production, 2008-2010* (mgd)	New Committed Water Demand by 2015 (0.11 mgd average)	Additional 5% as Unaccounted Water Associated with New Water Demand (mgd)	Total Water Demand by 2015 (mgd)
January	1.18	0.10	0.005	1.29
February	1.59	0.15	0.007	1.75
March	1.28	0.12	0.006	1.40
April	1.53	0.14	0.007	1.68
May	1.06	0.08	0.004	1.14
June	1.09	0.08	0.004	1.17
July	1.16	0.08	0.004	1.25
August	1.17	0.09	0.004	1.26
September	1.64	0.14	0.007	1.79
October	1.52	0.14	0.007	1.66
November	1.34	0.11	0.005	1.46
December	1.27	0.10	0.005	1.38

*\*Includes current non-metered and unaccounted water demands; these are projected to remain stable although the University will continue to work toward more comprehensive metering.*

## 1.6 SYSTEM MARGIN OF SAFETY

Table 1-3 presents the margins of safety under existing conditions and for the 5-year planning horizon with existing supplies. Margins of safety would drop below 1.15 for average day demands in the months of September and October within the 5-year planning period. However, the availability of Well D in September and October along with the construction of the proposed Reclaimed Water Facility (RWF) will ensure that margins of safety will remain above 1.15.

**TABLE 1-3**  
**Current Demands and 2015 Margins of Safety for Monthly Average Day Demands**

Month	Current Water Demand (mgd)	2015 Water Demand (mgd) with RFW Offset	Margin of Safety with Well D and RWF Available
January	1.18	1.09	2.14
February	1.59	1.54	1.50
March	1.28	1.21	1.92
April	1.53	1.50	1.55
May	1.06	0.81	2.88
June	1.09	0.82	1.81
July	1.16	0.84	1.75
August	1.17	0.89	1.66
September	1.64	1.53	1.20
October	1.52	1.43	1.28
November	1.34	1.21	1.92
December	1.27	1.13	2.06

However, even with the Reclaimed Water Facility, the margin of safety on peak days will drop below 1.15 in August and September and below 1.0 in August by 2015 as summarized in Table 1-4. However, the University will be able to handle peak days through water in its storage facilities (7.6 MG of useable storage), or by pumping the Willimantic River Wellfield for greater than 18 hours per day.

**TABLE 1-4**  
**Projected Peak Day Margins of Safety, 2015**

Month	Projected Water Demand (mgd)	Margin of Safety with Well D and RWF Available
January	2.00	1.56
February	2.24	1.38
March	2.39	1.28
April	2.23	1.37
May	1.89	1.81
June	2.01	1.19
July	2.04	1.20
August	2.45	0.95
September	2.32	1.13
October	2.21	1.17
November	2.32	1.36
December	2.16	1.47

The University understands that operating below a margin of safety of 1.15 is not an ideal operating scenario, particularly in regards to operating wells for periods longer than 18-hours per day. As such, the Water Supply Plan evaluates several alternative sources of supply.

**UNIVERSITY OF CONNECTICUT**  
**WELLFIELD MANAGEMENT PLAN**

MAY 2011

MMI #1958-31

*Prepared for:*



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**SECTION 1.0  
INTRODUCTION**

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## 1.0 INTRODUCTION

### 1.1 BACKGROUND

The University of Connecticut (the University) withdraws water from two stratified drift wellfields in the town of Mansfield, Connecticut. These are known as the Fenton River Wellfield located to the east of campus along the Fenton River, and the Willimantic River Wellfield located to the west of campus along the Willimantic River. The four Fenton River wells are registered with the Connecticut Department of Environmental Protection (DEP) for a maximum withdrawal rate of 0.8443 million gallons per day (mgd). The four Willimantic River Wellfield wells are registered with the DEP for a maximum withdrawal rate of 2.3077 mgd. Both wellfields are integral sources of supply for the University of Connecticut, which also provides water to portions of the town of Mansfield.

As a result of ongoing concern about the environmental impacts of withdrawing water from the Fenton River Wellfield and in conjunction with the Environmental Impact Evaluation of the North Campus Master Plan, the Fenton River and its stratified drift aquifer have been extensively studied. The University's "Fenton River Study" was published in March 2006 with the formal name *Long-Term Impact Analysis of the University of Connecticut's Fenton River Water Supply Wells on the Habitat of the Fenton River*. The study was conducted to determine whether and how water withdrawals from the Fenton River Wellfield affect the fisheries habitat of the Fenton River adjacent to the wellfield.

The Fenton River Study found that fisheries habitat became perceptibly reduced when the upstream flow in the Fenton River was flowing at less than 7.0 cubic feet per second (cfs) and the Fenton River Wellfield was operating. The amount of available habitat became significantly reduced by the pumping of the wellfield when the upstream flow was at 3.0 cfs. Thus, the primary recommendation of the Fenton River Study was to institute a series of successive reductions in the daily volume of pumping when the upstream flow in the

Fenton River dropped from 6.0 cfs to 3.0 cfs, with the wellfield being shut down when upstream flows dropped below 3.0 cfs.

With a better understanding of the aquifer processes in the Fenton River and the impacts of ground water withdrawals, attention then turned to the Willimantic River aquifer and associated wellfield. The University's "Willimantic River Study" was published in June 2010 with the formal name *Report of the Willimantic River Study: An Analysis of the Impact of the University of Connecticut Water Supply Wells on the Fisheries Habitat of the Willimantic River*. Similar to the Fenton River Study, the Willimantic River Study was conducted to determine whether and how water withdrawals from the Willimantic River Wellfield affect the fisheries habitat of the Willimantic River adjacent to the wellfield.

The Willimantic River Study found that the amount of available fisheries habitat in the Willimantic River is much greater than that in the Fenton River. For this reason, and the fact that the Willimantic River Wellfield is the University's only remaining source of supply after the Fenton River is shut off during low-flow periods, the Willimantic River Study recommended a progression of voluntary and mandatory water conservation measures as upstream flows in the Willimantic River dropped from approximately 19 cfs to approximately 8.0 cfs. The ability of the University to enact these water conservation measures was tested immediately following the completion of the study, as dry conditions prevailed in summer 2010 and low river flows occurred.

One of the primary recommendations of the Willimantic River Study was to develop the subject comprehensive Wellfield Management Plan to conjunctively manage the University's water supplies at the Fenton River Wellfield and the Willimantic River Wellfield. This plan would then enable the University to formally incorporate the results of the Fenton River Study and the Willimantic River Study into its various plans and procedures for operating the University water system.

## 1.2 PURPOSE

As discussed above, the primary purpose of this document (the University's initial *Wellfield Management Plan*) is to allow the University to formally incorporate the results of the Fenton River Study and the Willimantic River Study into the overall management of the University's water system. This document includes a review of both the Fenton River Study and the Willimantic River Study, a review of system operational history, and protocols for operating both wellfields throughout the year. As suggested by the Willimantic River Study, this document further includes:

- A determination for how the University will monitor USGS-measured upstream discharges at each wellfield and correlate pumping rates to the habitat threshold triggers determined in both the Fenton River Study and the Willimantic River Study.
- A formal update to the Drought Response Plan, including response timing and recovery guidelines.
- Recommendations for limited use of the Fenton Well D when the Fenton River Wellfield would otherwise be shut down. This may allow for brief decreases in pumping at the Willimantic River Wellfield to provide short periods of relief to the fish species in the Willimantic River, while also restoring the system margin of safety.

## 1.3 RELATIONSHIP TO WATER AND WASTEWATER MASTER PLAN

On September 26, 2005, the Connecticut Department of Public Health issued a consent order to the University of Connecticut to address what it characterized as deficiencies in the operation and management of its water supply system. As part of the consent order, the University agreed to develop a Water System Master Plan to identify and evaluate viable options for meeting the University's future drinking water needs. Additionally, the University voluntarily expanded this charge to include evaluation of its wastewater collection and treatment needs as well.

The Water and Wastewater Master Plan was published in June 2007. The document was designed to convey an understanding of the extent and condition of water and wastewater infrastructure owned and operated by the University of Connecticut; evaluate the capacity of the system to meet current and future water demands and wastewater treatment needs; estimate the value of water and wastewater assets owned by the University; assess management and ownership options for the water and wastewater systems; and develop recommendations relative to future management and operation of the water and wastewater systems.

Most of the recommendations of the Water and Wastewater Master Plan are more directly applicable to the Individual Water Supply Plan than to this Wellfield Management Plan. With regard to the two wellfields, the Water and Wastewater Master Plan recommended the following:

- Perform, as planned, the Willimantic River Study (completed in 2010);
- Continue to operate the Fenton River as outlined in the Fenton River Study (ongoing);
- Relocate Fenton Well A further from the river but within the distance available [250 feet] for a diversion permit exemption (pending additional study); and
- Provide emergency power to Well #2 and Well #4 at the Willimantic River Wellfield (completed in 2011).

As this document recommends a monthly-based operating strategy derived from the current understanding of the characteristics of the two wellfields and the associated rivers, this Wellfield Management Plan supersedes the hypothetical operating scenarios presented in the Water and Wastewater Master Plan.

#### **1.4 RELATIONSHIP TO OTHER WATER SYSTEM PLANNING DOCUMENTS**

This Wellfield Management Plan presents a review of historical operational procedures as well as a review of the recent environmental studies that presented recommendations for reducing or curtailing withdrawals during periods of low streamflow. In addition, this plan provides guidelines for the incorporation of wellfield management procedures into a variety of other University documents, including the Water Supply Plan, the draft Drought Response Plan, the Emergency Contingency Plan, and the Water Conservation Plan. As such, a large portion of this initial Wellfield Management Plan provides background information above and beyond the scope of a typical operational reference document. It is envisioned that future versions of this Wellfield Management Plan will be more streamlined to be used as operational reference guides.

##### **1.4.1 Relationship to the Individual Water Supply Plan**

Whereas the Individual Water Supply Plan is the University's comprehensive water system planning document, this Wellfield Management Plan is intended toward incorporating the operational recommendations of the two recent environmental studies into a comprehensive operations document. As such, this document is designed to be included as part of the Water Supply Plan but can also serve as a stand-alone document.

The monthly margin of safety projections prepared for the Water Supply Plan are influenced by the recommendations of this Wellfield Management Plan, particularly regarding the proposed operation of Well D during low-flow periods. It is envisioned that the University may choose to update or amend the Wellfield Management Plan concurrent with the Water Supply Plan in the future.

#### 1.4.2 Relationship to the Drought Response Plan

Several months prior to the extreme dry period in 2007, the University prepared a draft "Drought Response Plan" to augment to the pre-existing Emergency Contingency Plan. A copy of this plan (revised through August 22, 2008) is included in Appendix A. Designed to serve as a set of protocols more than as a plan document, the Drought Response Plan establishes trigger levels, describes responses, lists conservation measures, and describes recovery from "emergency." The levels of response in the plan are denoted as follows:

- ❑ Stage IA – Water Conservation Alert
- ❑ Stage IB – Water Supply/Drought Advisory
- ❑ Stage II – Water Supply/Drought Watch
- ❑ Stage III – Water Supply/Drought Warning
- ❑ Stage IV – Water Supply/Drought Emergency

The University's protocols begin with an Alert stage, which is not specifically called for in the Connecticut Drought Preparedness and Response Plan published in August 2003. However, the terms Advisory, Watch, Warning, and Emergency are consistent with the Connecticut Drought Preparedness and Response Plan.

The University's draft Drought Response Plan links the projected available supply (including the available supply from the Fenton River Wellfield in accordance with the recommendations of the Fenton River Study) and High Head Reservoir levels to the trigger levels. An itemized list of response protocols was presented in the plan for each of the stages listed above to enable the University to respond according to each particular trigger level.

The Connecticut DPH reviewed the draft Drought Response Plan and offered the following comments by memorandum on September 9, 2008. Considerations related to

these comments have been incorporated, where appropriate, into the Emergency Contingency Plan and this Wellfield Management Plan:

- *Initial Trigger Level:* Issue Stage IA when the flow in the Fenton River reaches 4.0 or 5.0 cfs instead of 3.0 cfs to allow additional time to prepare for implementing conservation measures.
- *Source-Based Trigger Levels:* It may be more appropriate to base trigger levels for Stage IB, Stage II, Stage III, and Stage IV on groundwater levels rather than levels in the High Head storage facility.
- *Water Audits:* Water audits of the system's largest users should be performed when demand reductions are not met at each response stage. Such water audits should be part of the water system's normal business practice.
- *System Recovery:* Recovery triggers should be based on groundwater levels and streamflows in addition to the High Head storage facility levels.
- *Term Clarification:* Clarification was recommended for what constitutes a projected available supply being "significantly less" than projected water usage, and what constitutes an "overall decrease in tank storage." These statements could be quantified in units or percentages.
- *Emergency Sources:* The plan should identify all potential sources of water supply within a reasonable proximity to its distribution system that could potentially be tapped during a Stage IV emergency. This would necessitate an emergency order that is unlike the one outlined in prior stages, would require water boiling and possibly other public health precautions contingent on the quality of the emergency source.

The draft Drought Response Plan was considered during the Willimantic River Study to correlate its protocols to those recommended when the Willimantic River falls below the threshold streamflow triggers outlined in its environmental study. The protocols suggested in the Willimantic River study report were then followed during the dry summer of 2010.

This Wellfield Management Plan fully incorporates the University's Drought Response Plan. Because a dry spell or moderate drought is not necessarily a water supply emergency and therefore should not always be treated as such, this Wellfield Management Plan instead uses the guidelines from the two river studies to revise the five stages of water conservation triggers.

#### 1.4.3 Relationship to the Emergency Contingency Plan

The purpose of the Emergency Contingency Plan is to outline protocols to follow when actual emergencies occur, such as failing wells, water main breaks, tank levels falling rapidly, contamination of water, or other disasters. It is understood that such events can curtail the University's ability to provide potable water, which may result in a threat to public health.

This Wellfield Management Plan does not consider the impact of such emergencies, but rather considers day-to-day operation of the wellfields under normal operating conditions and during periods of low river flows when wellfield operation could cause adverse environmental stress to the habitat of the rivers adjacent to each wellfield. Seasonal low streamflows are not considered an emergency situation for the University, but instead a situation that advises conservation and results in the utilization of response protocols.

On the other hand, it is understood that a sustained drought such as the drought of record in the 1960s could result in low groundwater levels that could in turn cause wells to go dry. This situation would be considered an emergency.

Currently, the draft Drought Response Plan offers reasonable response protocols for instituting water conservation measures when available supply is limited due to declines in available storage. These response protocols have been folded into the Emergency Contingency Plan as appropriate for the Water Supply Plan. Low groundwater levels were also added to the Emergency Contingency Plan as this scenario would represent an

emergency situation. These modifications were necessary to provide a clear, workable set of emergency response protocols for the University and differentiate emergency response from typical drought response for the majority of low-flow events.

#### 1.4.4 Relationship to the Water Conservation Plan

The purpose of the Water Conservation Plan is to describe *how* to accomplish University-wide water conservation measures both in the long-term and in the short-term when triggered by the Drought Response Plan, the Emergency Contingency Plan, or this Wellfield Management Plan. The protocols for water conservation are similar between the three documents, although the timing of water conservation initiatives may need to be expedited during emergency situations.

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**TOWN OF MANSFIELD**  
**OFFICE OF PLANNING AND DEVELOPMENT**

---

GREGORY J. PADICK, DIRECTOR OF PLANNING

Memo to: Town Council, Zoning Board of Appeals, Conservation Commission,  
Open Space Preservation Committee, Eastern Highlands Health District,  
Assistant Town Engineer, Fire Marshal, Zoning Agent  
From: Gregory Padick, Director of Planning   
Date: April 12, 2011  
Re: Proposed Revisions to the Mansfield Zoning Regulations-  
May 16, 2011 Public Hearing

The Planning and Zoning Commission has scheduled a Public Hearing for Monday, May 16, 2011 at 7:30 p.m. to hear comments on the attached Commission proposed 3/30/11 draft revisions to Mansfield's Zoning Regulations. For inclusion in the Commission's pre-meeting packet, comments must be received in the Planning Office by Wednesday, May 11, 2011. Except for technical information from staff, no comments can be received after the close of the public hearing.

It is noted that explanatory notes are provided within the draft to help explain the proposed revisions. The draft revisions include:

1. Incorporation of a new intent section and new Design Criteria for the Planned Business-3 zone (Four Corners Area).
2. Incorporation of revised application and approval criteria designed to protect historic resources and add new zoning permit, site plan and special permit approval criteria that would apply to exterior construction in Plan of Conservation and Development designated historic village areas.
3. Incorporation of new reference revisions to existing Architectural and Design Standards and specific revisions and additions to these standards.
4. Incorporation of new setback provisions for outdoor recreational facilities.
5. Incorporation of revised site plan and special permit submission and approval criteria for lighting improvements.
6. Incorporation of revised provisions for sidewalk, bikeway, trail and other pedestrian and bicycle improvements and construction details for recreational improvements.
7. Incorporation of revised notification provisions.
8. Incorporation of revised standards for refuse areas.

For more information, please contact the Planning Office at 860-429-3329.

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## March 30, 2011 Draft

### Proposed Zoning Regulation Revisions Re: Planned Business-3 Area (Four Corners)

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

1. In Article VII, Section N; revise the title of this section to insert "Four Corners" between "44" and "Area"

N. Uses Permitted In The Planned Business 3 Zone (Route 195/Route 44 Four Corners Area)

2. Add a new Section N.1. to read as follows:

1. Intent

The Planned Business-3 zone is situated in the "Four Corners" area of Town at or near the intersection of State Routes 44 and 195. This historically important crossroads area has provided in part commercial services to Mansfield residents and visitors for over 200 years. Due in part to the lack of public sewer and water services, many properties in this area have deteriorated over the past few decades and a number of businesses have closed. Consistent with Mansfield's Plan of Conservation and Development, it is the Town's objective to revitalize the Four Corners area and Town officials are working to address existing infrastructure needs.

Due to current infrastructure deficiencies, the current listing of permitted uses in the Planned Business zone is limited. However, upon approval of commitments to provide public sewer and water services to this area, it is the intent of the Planning and Zoning Commission to review and, as appropriate, modify zone classifications and zone boundaries; the listing of permitted uses maximum height and coverage requirements and all other associated land use regulations. In the interim, the Commission has established in Article X, Section A, initial design criteria that will help establish a design framework for the planned revitalization and growth of this area.

3. Renumber Article VII Section N.1. as N.2 and revised and reformat existing provisions to read as follows:

2. General

The uses listed or referenced below in Section N.2 in separate categories and associated site improvements are permitted in the Planned Business 3 zones provided:

- a. Any special requirements associated with a particular use are met;
- b. [provided] Applicable provisions of Article X, Section A are met; and
- c. [provided] Special Permit approval is obtained in accordance with the provisions of Article V, Section B for any of the activities delineated in Article VII, Section A.2.

Article VII, Sections A.3, A.4 and A.5 also include or reference provisions authorizing the Zoning Agent to approve changes in the use of existing structures or lots and authorizing the PZC Chairman and Zoning Agent to approve minor modifications of existing or approved site improvements.

4. Add a new Article X, Section A.11 to read as follows:

11. Special Provisions for the Planned Business-3 Zone (Four Corners Area-Route 195/44)

**Four Corners Design Criteria**

To facilitate the coordinated development or redevelopment of properties in the Four Corners area, the following design criteria have been established. In addition to addressing the Architectural and Design standards contained in Article X, Section R, all proposed development in the Four Corners area shall comply with the following design criteria:

- a. Developments along Routes 44 and 195 and along North Hillside Road shall incorporate a prominent pedestrian oriented and extensively landscaped streetscape. The streetscape area shall include a walkway/bikeway, street trees and other landscape enhancements and, as deemed appropriate by the Commission, pedestrian sitting areas, bicycle racks, bus stops and bus shelters. The required streetscape area shall be a minimum width of fifty (50) feet (from edge of street) unless specifically reduced by the Commission based on site characteristics and the site specific development plan.
- b. To enhance vehicular and pedestrian safety, site layouts shall be designed with the primary goals of minimizing curb cuts along public roadways and providing or facilitating interior connections between adjacent properties.
- c. Except where specifically waived by the Commission based on site characteristics and the site specific development plan, new buildings and associated landscape areas shall be located immediately adjacent to streetscape areas to further enhance roadside aesthetics and a significant pedestrian orientation.
- d. Except where specifically waived by the Commission based on site characteristics and the site specific development plan, parking, loading, waste disposal and storage areas shall be located to the rear or side of buildings and screened from adjacent roadways and walkway/bikeways.
- e. All parking areas shall be designed to provide clearly defined pedestrian pathways within the parking area and to and from building entries.
- f. New buildings shall be designed to minimize mass by utilizing smaller visual components through the use of projections, recesses, varied façade treatments, varied roof lines and pitches, and where appropriate, variations in building materials and colors;
- g. Site specific landscape and lighting plans shall be designed by qualified professionals and implemented to reduce visual impact, minimize light spill (undesirable light that falls outside the area of intended illumination) and promote compatibility with neighboring agricultural and residential uses.
- h. Developments consisting of more than one structure shall exhibit a high degree of coordination in site planning, architectural design, site design and site detailing. All physical components shall be designed to complement an overall plan.
- i. Building materials are a significant factor in defining the appearance of a building and coordinating development within an area. Traditional high quality building materials, such as brick and wood siding, that reflect Mansfield's architectural tradition shall be used in the Four Corners area. Modern materials, such as fiber cement siding that have the same visual characteristics as wood, may be used but the following materials are examples of materials that

are not considered acceptable in the Four Corners area: highly reflective metal or plastic siding or panels, brushed aluminum, bronzed glass, concrete siding, unfinished concrete block and corrugated fiberglass.

- j. National franchise uses shall utilize building designs and building materials that reflect Mansfield's architectural traditions in their form, detailing and material.

Explanatory Note:

*The proposed revisions incorporate a new intent section for the PB-3 zone (Four Corners Area) and a number of specific design standards that would apply to new development in this zone. The proposed design criteria include provisions that address streetscape improvements, vehicular and pedestrian improvements, interconnections between adjacent properties, building locations, landscaping, lighting, building designs and building materials.*

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## March 30, 2011 Draft

### Proposed Zoning Regulation Revisions Re: Historic Preservation criteria/Historic Village Areas

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

- 1) In Article V, Section A.3.d.15 incorporate the following revisions:

Existing and proposed fencing, walls, screening, buffer and landscaped areas, including the location, size and type of significant existing vegetation and unique or special landscape elements; historic features including but not limited to old foundations, dams, sluiceways, mill races, rip-rapping, wells and other utility features, walks, paths, hitching posts and former gardens, arbors or enclosed areas; and the location, size and type of proposed trees and/or shrubs. Plants identified in the current State Department of Environmental Protection Agency listing of invasive species shall not be used.

[Areas to remain as natural or undisturbed and areas to be protected through the use of conservation easements shall be identified on the site plan.]

- 2) In Article V, Section A.5.d incorporate the following revisions:

- d. The proposal has made safe and suitable provisions for water supply, waste disposal, flood control, fire and police protection, the protection of the natural environment, including air quality and surface and groundwater quality and the protection of existing aquifers and existing and potential public water supplies, cemeteries, historic structures and other features of historic value[;].

For all properties within one of the ten (10) historic village areas identified in Article X, Section J, the special historic village area review criteria contained in Article X, Section J.2 also shall be complied with;

- 3) In Article V, Section A.5.j add “or other historic features” after “stonewalls” and replace “specimen” with “significant”.
- 4) In Article VIII, Section A, (Schedule of Dimensional Requirements Chart), add a new footnote 21 for the minimum front, side and rear setback line columns. The new footnote 21 shall read as follows:

21. The Planning and Zoning Commission shall have the right to reduce or increase front, side and/or rear setback line requirements for properties within one of the ten (10) historic village areas identified in Article X, Section J. Setback reductions or increases shall only be approved or required where the reduction or increase in setback is considered necessary to address the special historic village area review criteria contained in Article X, Section J.2.

5) In Article X, delete existing Section J (Special Provisions for multi-family housing without sewers) in its entirety and replace it with a new Article X, Section J to read as follows:

J. Special Provisions for Plan of Conservation and Development designated Historic Village Areas

1. Intent

Mansfield's Plan of Conservation and Development emphasizes the importance of preserving historic structures, historic neighborhoods and other historic and/or archaeological resources. Although seventeen (17) separate historic village areas are identified in Mansfield's Master Plan, ten (10) of these areas have retained common characteristics that warrant special protective measures. To help preserve and enhance the character of these remaining village areas, the following special provisions have been adopted. These provisions shall apply to the following historic village areas as specifically identified on Map 5 of Mansfield's Plan of Conservation and Development: Eagleville, Gurleyville, Hanks Hill, Mansfield Center, Mansfield Depot, Mansfield Four Corners, Mansfield Hollow, Mount Hope, Spring Hill and Wormwood Hill.

2. Special Historic Village Area Review Criteria

All exterior construction within the ten (10) historic village areas noted above in Section 1, including but not limited to new primary or accessory structures, building additions, swimming pools, signs and site work or site improvements, that require site plan or special permit approval pursuant to Article V, Sections A or B of these regulations and/or Zoning Permit approval pursuant to Article XI, Section C of these regulations shall comply with the following provisions:

- a. New buildings and site improvements shall be designed to fit the individual characteristics of their particular site and village neighborhood. Careful consideration shall be given to promoting compatibility in architectural form, massing, detail and materials. Compatible designs do not require uniformity in building styles.
- b. All structural elements shall be in scale with and proportionate to adjacent buildings and other visual structures.
- c. Overall spacing between roadside structures within the village area shall be maintained.
- d. Setbacks from roadways and property lines shall be consistent with neighboring structures within the village areas.
- e. The height of new building shall be consistent with neighboring structures within the village area. One and one-half to two and one-half story structures are typical in Mansfield's historic village areas. Through the use of variations in building height, roof line and grade definition, the perceived high of buildings can be influenced.
- f. Building and site improvements shall be designed to avoid impacts on significant trees, stone walls, scenic views and vistas and other features that contribute to a historic village area.
- g. Traditional building materials, such as wood siding and brick that reflect Mansfield's architectural tradition shall be used. Modern materials, such as fiber cement siding, that have the same visual characteristics as wood are considered acceptable.

6) In Article X, Section R.2.b. add the following to the end of the existing section:

(see Article X, Section J. 2 for special historic village area review criteria)

7) In Article XI, Section C.1 (Zoning Permit Applicability) add a new section C.1.7. to read as follows:

7. The erection, placement or enlargement of any structure, sign, fence, wall or similar site improvement for properties within one of the ten (10) historic village areas identified in Article X, Section J.

8) In Article XI, Section C.3 (Approval Considerations for Zoning Permits) add a new Section C.3.j. to read as follows:

j. For all properties within one of Mansfield's designated "Historic Districts" and/or one of the ten (10) historic village areas identified in Article X, Section J, no zoning permit shall be issued until:

1. Any required "Certificate of Appropriateness" has been granted by Mansfield's Historic District Commission;
2. The Planning and Zoning Commission has reviewed the proposed development and determined compliance with the special historic village area review criteria contained in Article X, Section J.2.

Explanatory Note:

*The proposed revisions clarify and strengthen existing application submission requirements and approval criteria regarding the protection of historic features. The draft revisions propose new zoning permit, site plan and special permit approval criteria and special setback provisions that would apply to new exterior construction, including signs, on properties within ten (10) of Mansfield's historic village areas as identified in the Town's Plan of Conservation and Development. The ten (10) historic village areas identified in the draft regulation have retained common characteristics that warrant special protective measures.*

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## March 30, 2011 Draft

### Proposed Zoning Regulation Revisions Re: Architectural and Design Standards

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

1. Revise Article V, Section A.1 to incorporate the following revision:

As required in other sections of these Zoning Regulations, the approval of a site plan [application] may be necessary for new construction, including expansion; site modifications; new uses and changes in use. The following site plan requirements are designed to ensure the appropriate and orderly use and development of land within Mansfield's assorted Zoning Districts; to minimize any detrimental effects on neighborhood character, the natural environment and property values; and to protect and promote Mansfield's health, welfare and safety.

For all projects involving new construction, the Architectural and Design Standards contained in Article X, Section R shall be utilized as determinants to organize a site layout and to develop the composition and character of new buildings and site improvements. The use of these standards will facilitate Mansfield's application review and approval processes.

2. Revise Article V, Section B.1 to incorporate the following revision:

It is recognized that there are certain uses that would only be appropriate in Town if controlled as to area, location, or relation to the neighborhood so as to promote the public health, safety and general welfare. As provided for elsewhere in these regulations, such uses shall be treated as special permit uses and provided procedures, standards and conditions set forth or referenced herein are complied with, these uses may be permitted in their respective zoning districts. All such uses are considered to have special characteristics and accordingly each application must be carefully reviewed on a case-by-case basis.

For all projects involving new construction, the Architectural and Design Standards contained in Article X, Section R shall be utilized as determinants to organize a site layout and to develop the composition and character of new buildings and site improvements. The use of these standards will facilitate Mansfield's application review and approval processes.

3. Revise Article X, Section R (Architectural and Design Standards) to incorporate the following revisions:

A. Revise Section 2.f. to read as follows:

- f. Vehicular and pedestrian safety and accessibility shall be addressed in a comprehensive and intermodal manner. Design site entrances and, where appropriate, building entrances, to be clearly visible and identifiable from public accessways or any other primary vantage points. [Vehicular and pedestrian safety issues need to be addressed.] Provide safe and attractive walkway/bikeways and, where appropriate, public transit amenities and interconnected

development that promotes walking and cycling to, and within, the area and enhanced public transit opportunity.

B. Revise Section 3.g. to read as follows:

g. [Consider n]Natural materials, or modern materials with the same visual characteristics, in their traditional applications (e.g., wood, stone, brick, glass, metal, etc.) should be used as primary building materials. [Limit t]The number of different materials on the exterior building elevation should be limited and attention shall be given to detail at corners, trim, openings and wherever there are abutting materials. Long term maintenance shall be an important consideration in the selection of building materials.

C. Add a new Section 3.h. to read as follows:

h. National franchise uses shall utilize building designs and building materials that reflect Mansfield's architectural traditions in their form, materials and details.

D. Add a new Section 3.i. to read as follows:

i. Secondary rear or side building facades that are visible from public spaces or adjacent properties shall be designed to complement the architectural treatment of primary facades.

E. Add a new Section 3.j. to read as follows:

j. The design of signage, lighting fixtures, accessory structures, fences, storage enclosures, bicycle racks, benches, trash baskets and other site improvements shall be coordinated with primary buildings in form, materials and details.

F. Add a new Section 3.k. to read as follows:

k. Buildings shall be sited and designed to promote energy conservation. Consideration should be given to solar orientation, insulation, lighting, plumbing, landscaping and other energy efficient design elements.

G. Revise Section 4.c. to read as follows:

c. Utilize landscape buffers, berms, fencing, etc to screen parking areas and waste storage areas from adjacent streets, walkways, bikeways, other public spaces, and, as appropriate, neighboring properties.

Explanatory Note:

*The proposed revisions provide more specific site plan and special permit references to the Architectural and Design Standards contained in Article X, Section R and incorporate new and revised standards regarding vehicular and pedestrian traffic and public transit opportunities, building designs, building materials and accessory improvements.*

## March 30, 2011 Draft

### Proposed Zoning Regulation Revisions Re: Setbacks for Outdoor Recreational Facilities

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

- A. In Article VIII, Section A, revise the heading of the Schedule of Dimensional Requirements Chart to read as follows:

Unless specific exceptions are noted in other sections of these regulations, (particularly Article VIII, Section B, Article VII and Article X), this schedule of dimensional requirements shall apply to all lots, buildings, structures and site improvements, including parking, loading, outdoor recreational facilities such as tennis, volleyball or basketball courts that are distinct from driveway /parking areas or lawns, and outside storage areas. See other side of this page for notes included in this Schedule.

- B. In Article VIII, revise Section A to read as follows:

Unless specific exceptions are noted in other sections of these regulations, all lots, buildings, structures and site improvements, including parking, loading outdoor recreational facilities such as tennis, volleyball or basketball courts that are distinct from driveway /parking areas or lawns, and outside storage areas erected or altered after the enactment of these Zoning Regulations, shall conform to the dimensional requirements for the subject zone in which the building, lot, structure or improvement is located as specified in the Schedule of Dimensional Requirements which is included in these Regulations.

#### Explanatory Note:

*The proposed revisions would require outdoor recreational improvements, including certain tennis, volleyball and basketball courts, to meet standard setback requirements. Current provisions do not require these improvements to be setback from property lines.*

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March 30, 2011 Draft

Proposed Zoning Regulation Revisions  
Re: Lighting Requirements

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

A. In Section A.3.d.17 incorporate the following revisions:

Existing and proposed outdoor illumination, including method and intensity of proposed lighting and manufacturer's installation charts. Comprehensive lighting plans with foot candle details can be required as determined by the Commission.

B. In Section A.5.g. incorporate the following revisions:

The proposal has adequately considered all potential nuisances such as noise and outdoor lighting. Except where specifically authorized by these Regulations, all lighting shall be the minimum necessary to address safety and security needs taking into account manufacturer's installation charts and spacing recommendations for the proposed lighting. All lighting fixtures shall be designed to prevent undesirable illumination or glare above the site or beyond the site's property lines. All lighting fixtures shall be shielded and aimed downward unless it can be demonstrated that alternative designs will not result in spill light (undesirable light that falls outside the area of intended illumination).

Explanatory Note:

*The proposed regulations provide more specific lighting submission requirements for site plan and special permit applications and refine lighting approval criteria.*

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## March 30, 2011 Draft

### Proposed Zoning Regulation Revisions Re: Recreational and Pedestrian Improvements

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

A. In Article V, Section A.3.d.13, replace “pedestrian ways” with “sidewalks, bikeways, paths and trails”.

B. In Article V, Section A.3.d.18 incorporate the following revisions:

Location of existing and proposed recreational facilities including appropriate construction details for trails, ball fields, playgrounds, swimming pools, tennis, volleyball or basketball courts or other recreational improvements.

C. In Article V, Section A.5.e. incorporate the following revisions:

Vehicular and pedestrian access to the property and egress from the property and internal vehicular and pedestrian traffic patterns are safe and suitable and have been designed to maximize safety and avoid hazards and congestion. Adequate provisions have been made to address accessibility problems of handicapped individuals. All curb cuts shall have adequate sightlines and adjacent streets shall have adequate capacity to safely accommodate the traffic flows associated with the proposed use(s). As deemed necessary, offsite road and drainage improvements may be required by the Commission;

Sidewalks, bikeways, trails and/or other improvements designed to encourage and enhance safe pedestrian and bicycle use shall be required, unless specifically waived by a three-quarter (3/4) vote of the entire Commission (7 votes), for all sites within or proximate to Plan of Conservation and Development designated “Planned Development Areas; proximate to schools, playgrounds, parks and other public facilities; or proximate to existing or planned walkway, bicycle or trail routes. In evaluating any waiver request, the Commission shall consider the size and the location of the proposed development, its relationship to existing or planning development, school sites, playground areas and other public areas and the location and nature of existing or planned sidewalk, bikeway or trail improvements.

#### Explanatory Note:

*The proposed revisions clarify site plan and special permit submission provisions for pedestrian and recreational improvements. In addition, the draft regulations specify that pedestrian/bicycle improvements are required for all site plan and special permit uses on sites within Plan of Conservation and Development designated “Planned Development Areas” or on sites proximate to schools, parks and other public facilities unless waived by a ¾ vote of the Commission.*

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## March 30, 2011 Draft

### Proposed Zoning Regulation Revisions Re: a. Notification Requirements, b. Refuse Areas, c. Other

(New provisions are underlined or otherwise indicated)

(Deletions are bracketed or otherwise indicated)

(*Explanatory Notes* are provided to assist with an understanding of the proposed revisions. These notes are not part of the proposed zoning revisions.)

#### A. Notification Requirements

1. In Article V, Section A.3.c. delete “return receipt” in line 6;
2. In Article V, Section B.3.c. insert “and” between “owners” and “a listing” in line 9 and delete “and return receipts from certified mailings” in lines 9 and 10.

#### B. Refuse Areas:

1. In Article V, Section A.3.d.14. incorporate the following revisions:

Existing and proposed off-street parking and loading areas, fire access lanes, outside storage and refuse areas, and underground and aboveground fuel and chemical storage tanks. All required parking spaces, loading areas, fire lanes, etc. shall be clearly delineated with pavement markings or other suitable measures. All refuse areas shall be adequately sized for both refuse and materials to be recycled and shall be screened to minimize visual impact.

#### C. Other:

1. In Article V, Sections A.2 and A.3 replace “Town Planner” with “Director of Planning”

#### Explanatory Note:

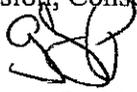
*The proposed revisions incorporate current statutory requirements for notifications, clarify refuse area requirements and update a staff reference.*

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**TOWN OF MANSFIELD  
OFFICE OF PLANNING AND DEVELOPMENT**

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GREGORY J. PADICK, DIRECTOR OF PLANNING

Memo to: Mansfield Planning and Zoning Commission, Conservation Commission  
From: Gregory Padick, Director of Planning   
Date: Thursday, April 14, 2011  
Re: Zoning Permit Review: Storrs Center Project Parking Garage/Intermodal Center

In 2007, the Planning and Zoning Commission (PZC) unanimously approved the Storrs Center Special Design District (SC-SDD) zone and associated Zoning Regulations establishing a specific review and approval process for all development in the SC-SDD. The approved zoning permit review and approval process is designed to ensure compliance with all applicable zoning approval criteria including a determination by the Director of Planning that the proposed development is “reasonably consistent” with the PZC approved preliminary master plan mapping, the Storrs Center Design Guidelines, the master parking study, the master traffic study and the master drainage study. The Zoning Regulations define “reasonably consistent” as “some variation or deviation from specific provisions is acceptable, provided that the overall intent of the provision is achieved with respect to health, safety, environmental and other land use considerations”.

Although the SC-SDD Zoning Permit review process is administrative, provisions are included for public participation. A public hearing conducted by the Mansfield Downtown Partnership Inc, Mansfield’s officially designated Municipal Development Authority for the Storrs Center project, is required, and all public comments will be considered before a decision is made on a zoning permit application. Furthermore, all zoning permits in the SC-SDD will be thoroughly reviewed by Mansfield staff members and it will be confirmed that submitted plans remain acceptable to the State and Federal review agencies, including the State Department of Environmental Protection, the State Traffic Commission and the Army Corp of Engineers.

The planned Storrs Center garage/intermodal center is a Town of Mansfield project. Over the past few months, consultants hired by the Town have developed plans and discussed the project with staff members and the Downtown Partnership Planning and Design Committee. An official Zoning Permit application is expected to be submitted prior to the PZC’s April 19<sup>th</sup> meeting and the Conservation Commission’s April 20<sup>th</sup> meeting. Portions of the submittal will be distributed at the meeting. Plans for a new village street connecting Dog Lane and the Post Office Road are under design and will be subject to a subsequent Zoning Permit Application. Zoning Permit approval also will be required for Town Square improvements.

The Downtown Partnership has scheduled a public hearing on this Zoning Permit application on May 4, 2011 at 7p.m. in the Buchanan Center/Library on Warrenville Road. Following the completion of the public hearing process, the Downtown Partnership Inc. will forward comments and a recommendation for consideration by the Director of Planning. This issue will be included on the PZC’s May 2<sup>nd</sup> agenda for review and potential comment. Any comments from the Conservation Commission should be agreed upon and/or authorized on April 20<sup>th</sup> or a special meeting before May 4<sup>th</sup>.

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April 8, 2011

Town Council  
Town of Mansfield, CT  
Audrey P. Beck Municipal Building  
4 South Eagleville Road  
Mansfield, CT 06268

Dear Council Members,

As you most likely are aware, Eagleville Brook in Mansfield has been identified by CT DEP as an "impaired stream," due to a number of water quality and quantity issues related to urban runoff. As a result, a Total Maximum Daily Load (TMDL) analysis was initiated to reduce impacts to aquatic life in the stream, which drains much of the UConn campus and is part of the Willimantic River system.

For the past two years, the University of Connecticut Center for Land Use Education and Research (CLEAR) has been working in collaboration with CTDEP, various departments of the University, and your Town staff on a project to improve the health of the watershed. Much of the focus of the project is on the highly urbanized core campus area, and involves identifying and implementing opportunities to install "Low Impact Development" (LID) practices that reduce the impacts of stormwater on the Brook.

However, Mansfield is also a key part of the solution, so over the past year educators from CLEAR have been working with Greg Padick on how to integrate these same LID concepts into various Town documents and standards. Specifically, we reviewed subdivision regulations, the Plan of Conservation and Development, and Engineering Plans and Specifications. Additionally, Mr. Padick reviewed and commented on the Watershed Management Plan that has been drafted for Eagleville Brook. The attached document contains a summary of these recommendations, and the relevant section from the draft Watershed Management Plan.

We have enjoyed working with Mr. Padick, Mr. Hultgren and others from the Town of Mansfield, and we look forward to continuing this relationship into the future. We hope that the Council and the land use boards of Mansfield will support the recommendations of the project, and stand ready to help if further assistance is needed. Finally, we would be glad to hold an informational meeting for the Council, the commissions and the public in which we describe the study, our progress to date, future plans, and the critical role that the Town can play in protecting Eagleville Brook. Please contact Mike Dietz (860-345-5225) with any questions, or to discuss such a meeting.

Sincerely,

Handwritten signature of Michael Dietz in black ink.

Michael Dietz  
Department of Extension  
UConn Center for Land Use Education and Research

Handwritten signature of Bruce Hyde in black ink.

Bruce Hyde

Handwritten signature of Chester Arnold in black ink.

Chester Arnold

*cc: Greg Padick, Lon Hultgren, Planning and Zoning Commission, Inland Wetland Agency, Conservation Commission, Town of Mansfield; Eric Thomas, CT DEP*

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# **Town of Mansfield, CT**

**April 2011**

## **Recommendations for Modifications to Include Low Impact Development Practices**

**Prepared By:  
Center of Land Use Education and Research  
University of Connecticut Extension**

**Bruce Hyde  
Michael Dietz  
Chester Arnold, Jr.**

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## Recommendations for Modifications to Planning and Engineering Documents

### *Plan of Conservation and Development Recommendations*

While a number of recommendations in the POCD under Policy Goal #2, Objective a (shown below in bold) generally support the concept of Low Impact Development (LID), a specific LID recommendation should be included at the time of the next POCD revision or amendment. This will reinforce Mansfield's commitment to LID as well as provide a foundation for inclusion of LID requirements in the regulations.

**Policy Goal #2- To conserve and preserve Mansfield's natural, historic, agricultural and scenic resources with emphasis on protecting surface and groundwater quality, important greenways, agricultural and interior forest areas, undeveloped hilltops and ridges, scenic roadways and historic village areas.**

#### **a. Objective**

**To protect natural resources, including water resources, geologic/topographic resources and important wildlife habitats and plant communities, by refining the Zoning Map, land use regulations and construction standards, considering new municipal ordinances and capital expenditures, and considering other actions**

Consider including language similar to the following as a Recommendation under this objective: Revise the Zoning Regulations, Subdivision Regulations and Engineering Standards and Specifications to support and encourage the use of Low Impact Development practices and design strategies to preserve a site's predevelopment hydrology, to the maximum extent practicable. These revisions should include a system by which developers will be required to employ LID practices or demonstrate why specific practices are not feasible.

### *Zoning Regulations Recommendations*

The addition of a Low Impact Development Checklist to be completed by a developer is recommended for inclusion in the Zoning Regulations. The checklist will provide applicants, site designers and regulatory boards and agencies with guidance in the application of LID practices to development projects. An applicant seeking land development approval from a regulatory board should be

required to identify LID practices that have been incorporated into the project's design. If an applicant contends that it is not feasible to incorporate any of these practices into the projects design, particularly for engineering, environmental or safety reasons, the applicant should be required to provide a justification for that contention.

Definitions-The following definitions of should be added:

Predevelopment Hydrology- The water balance between runoff, infiltration, storage, groundwater recharge, and evapotranspiration prior to the development of a site.

Low Impact Development: The integration of site ecological and environmental goals and requirements into all phases of urban planning and design that ranges in size from the individual residential lot to an entire watershed.

Article Six, Section B (4), Performance Standards, in bold below, could be modified to include references to LID in the following sections (suggestions are underlined):

#### ***4. Performance Standards***

**m. Aquifer Areas - To prevent or minimize detrimental effects on the groundwater quality within aquifer areas, which are existing or potential sources of significant quantities of potable water, land use activities on or within 500 feet of identified aquifer areas must be carefully reviewed and appropriately regulated.**

**Accordingly the following requirements shall apply to all land use activities on or within 500 feet of aquifer areas as identified in Mansfield's Plan of Conservation and Development, Mansfield's Water Supply Plan, an October, 1979 map entitled GROUNDWATER RECHARGE AREAS, prepared by the Connecticut Areawide Waste Treatment Management Planning Board, sheets 40, 41, 55 and 56, (on file in the Mansfield Planning Office and the Town Clerk's Office), and any additional information obtained from the State Department of Environmental Protection, federal agencies or on-site investigation.**

**5. All commercial, industrial or multi-family developments and other land uses with cumulatively**

more than 1/2 acre of impervious surface shall incorporate best management practices for storm water controls in accordance with the Low Impact Development (LID) principles as outlined in the checklist shown in Appendix XX of these regulations, as well as the State Department of Environmental Protection Best Management Guidelines as set forth in the 2004 Connecticut Stormwater Quality Manual, and shall prohibit or restrict the use of salts and chemicals for ice removal in order to minimize the risks of ground water contamination. A storm water management plan and a LID Checklist detailing efforts to reduce the amount of storm water runoff and minimize its impacts shall be submitted for Commission approval.

p. Road and Drainage Standards - All road and drainage improvements, including private roads, driveways and parking and loading areas, must be designed and constructed to promote vehicular and pedestrian safety and the proper discharge of storm water runoff. Appropriate separation of pedestrian and vehicular traffic and adequate sightlines for all intersections, including those within a private parking or loading areas, must be incorporated into development plans. All road and drainage improvements, with the possible exception of roadway width, should conform with the standards and specifications of the Mansfield Public Works Department (available in the Mansfield Engineering Office) and, to the maximum extent practicable, conform with LID principles. As appropriate, peak storm water discharges should be retained on site to minimize or prevent downstream impacts.

r. Site Development Principles

1. Intent - Through the establishment of specific site development principles, this section will serve to protect, maintain, and enhance public health, safety environment, and general welfare by encouraging a more sustainable approach to development. Requirements and procedures established in this section reduce damages from soil erosion and sedimentation, reduce downstream flooding and, in general, ensure proper storm drainage management in a

manner consistent with Low Impact Development (LID) principles, where appropriate. It is the intent of these regulations that, to the maximum extent practicable, there will be no onsite or offsite impacts from changes in storm water that result from development activities. In addition to the site development principles below, applicants for projects that will disturb more than XXX square feet are required to complete the LID Site Planning and Design checklist attached as Appendix X to these regulations. This checklist will insure that the applicant has considered LID strategies in the design of the development. (Also see Article VI, Section B.4.s. - Erosion and Sediment Control Plans)

2. Site Development Principles - Earth-moving, grading or land-disturbing activities including the removal of trees and other vegetative cover, the development of haul roads and logging decks for forestry operations, and all cut and fill activities shall (as applicable to the specific site and development) comply with the following site development principles:

g. To the extent practicable, the predevelopment hydrology of the site, with respect both to peak flow rates and total volume of runoff, shall be preserved. Where the predevelopment hydrology of the site is not maintained, drainage provisions shall be made to effectively regulate any increased runoff caused by changed soil and surface conditions during and after development. Stormwater runoff shall be minimized and retained on site wherever possible to help prevent downstream flooding and erosion problems. Wherever possible, erosion control or storm water management measures shall be used to prevent water from entering and running over disturbed areas. Drainage easements shall be obtained whenever necessary. Where runoff computations are necessary for proper review of existing and proposed drainage facilities, said computations shall be in accordance with Chapter 9 of the Connecticut Guidelines for Soil Erosion and

**Sediment Control, 1985, as amended, unless an alternative is approved by the Town Engineer or his designee.**

Besides the recommendations above, there are likely to be other changes needed in the body of the regulations for the sake of consistency.

### ***Subdivision Regulation Recommendations***

Section 3.0 Definitions- The following definitions of should be added:

Predevelopment Hydrology- The water balance between runoff, infiltration, storage, groundwater recharge, and evapotranspiration prior to the development of a site.

Low Impact Development: The integration of site ecological and environmental goals and requirements into all phases of urban planning and design that ranges in size from the individual residential lot to an entire watershed.

Section 4.0 General Provisions: add, Low Impact Development (LID)- The applicant shall demonstrate to the satisfaction of the Planning and Zoning Commission that he/she has considered, in designing the submitted subdivision plan, the use of LID practices which preserves, to the extent practicable, a site's predevelopment hydrology.

Section 5.2 Suggested Information: add a section recommending a description of potential LID practices to be utilized.

Section 6.8 Construction and Public Improvement Plans: add a reference to LID requirements in the Zoning Regulations.

Section 7.10 Common Driveways: Encourage common driveways as part of LID practices, etc.

Section 8.1 Street Planning: Include a reference to LID practices in the planning of streets.

Section 10.0 Drainage: Include references to LID and methods to reduce stormwater runoff.

As with the Zoning Regulations, there are likely to be several areas where modifications will be needed for continuity purposes or which will strengthen the LID requirements.

### ***Engineering Standards and Specifications Recommendations***

Note: Sections of the existing Engineering Standards and Specifications are shown in **Bold** below.

#### **Page 5 Section II- Reference to Related Codes, etc.**

Recommendation: Include a reference to the CT Stormwater Quality Manual which can be found at <http://ct.gov/dep/cwp/view.asp?a=2721&q=325704>.

#### **Section IV-Town Roads and New Subdivision Construction**

##### **Page 8 #5. Width of Surfacing, Shoulder and Roadway**

Recommendation: Consider modifying the residential standards for roadway width to 20'-24'. A simple rule of thumb regarding traffic volume is the fewer vehicles, the narrower the road may be. Research shows that 20 to 24 foot widths (two 10 to 12 foot travel lanes are adequate for most local roads.

Source: 2004 CT Stormwater Manual.

Make modifications, as appropriate, to the detail sheets shown on pp. 39 and 40.

##### **Page 10 #7. Curbing**

Recommendation: Consider modifying this section to allow for curbless streets. We recommend that curbs be used only where needed, such as steep slopes or to protect downhill properties. Curbless street design will allow open drainage through sheet flow off the street to grass drainage channels or dry swales.

##### **# 8. Required Intersection and Cul-de-sac Geometry**

Recommendation: Add a statement that encourages the use of a vegetated island as part of the as part of the cul-de-sac design. The vegetated island would be used as a bioretention area, with the ability to accept road runoff.

This would entail curbless design, with the landscaped area being lower than the surrounding road.

#### **Page 15 Section VI- Drainage Requirements**

Recommendation: Include a reference to the CT Stormwater Manual.

**A. Basis of Design--**It is suggested that a reference to LID be made in this section. For example, Appendix A of the LID manual (referenced in the preamble of checklist, but available here: <http://www.epa.gov/owow/NPS/lidnatl.pdf>) can be referenced here, as it has an example hydrologic calculation adapting LID practices in a new development, using standard TR-55 calculations. It may also be helpful to state in here that all efforts should be made to AVOID concentrating flow in the first place, such as encouraging sheet flow from impervious surfaces to pervious areas. This also relates to the curbing issue referenced earlier.

#### **Page 18 Section VIII-Property Transfers and Easements**

Recommendation: There may be a need to add some language relative to drainage easements if the LID practice will result in drainage being directed to other than town owned property. The Town's attorney should be consulted relative to the easement question. It is possible that the existing language will be sufficient to protect the Town.

#### **Page 32 Section IX- Highway Permits**

##### **Q. Driveways**

Recommendation: Add language to this section that will encourage, to the extent practicable, the construction of driveways using LID practices such as minimizing and disconnecting impervious surfaces. There are a number of provisions in this section that may require modification to incorporate LID and still allow for construction under the existing specifications. Also consider reducing the maximum driveway width for residential to something much less than 40'.

**General Comment-** Consider allowing the use of permeable pavements (paver blocks, porous asphalt, porous concrete, etc.) if the applicant can demonstrate appropriate use of the treatment. Consider allowing porous paving materials on sidewalks, or mandating that they drain to pervious areas such as lawns.

## Guidance Document for Low Impact Development Best Management Practices

Similar to many towns in Connecticut, Mansfield has seen increased interest in balancing community growth and environmental conservation. When an undeveloped site is converted into residential housing or commercial areas, roads, roofs, parking lots and driveways replace the native vegetation and soils that were on the site. As would be expected, much more water runs off developed sites in response to rain storms. Pollutants, such as oil from vehicles, bacteria, nitrogen and phosphorus collect on the impervious surfaces and are washed off during precipitation events. Typical development approaches do not provide adequate treatment for this stormwater, and receiving waters suffer a variety of impairments due to these human induced changes in the landscape. Stormwater runoff has been identified as one of the biggest causes of stream quality degradation.

Low impact development (LID) is an approach that will help to minimize the impacts of traditional development, while still allowing for growth. Pioneered in Maryland<sup>1</sup>, this approach is being successfully utilized throughout the country. LID has also been adopted as the preferred method of site design in the 2004 Connecticut Stormwater Quality Manual<sup>2</sup>. In addition to protecting ecosystems and receiving waters, the LID approach can often result in cost savings on projects<sup>3</sup>.

The following areas of focus will help guide planning for your project:

1. *Assessment of natural resources.* Ideally, LID is considered early in the site planning process. The objective is to allow for development of the property, while maintaining the essential hydrologic functions of the site. A thorough assessment of the existing natural resources on the site needs to be performed, so that essential features can be preserved, and suitable sites for development can be identified.
2. *Preservation of open space.* Cluster subdivision design can complement the LID approach. Cluster subdivisions provide a key way to protect natural resources while still providing landowners with the ability to develop their property. In most cases, the number of residential units allowed in a cluster subdivision equals the number allowed under conventional subdivision regulations.
3. *Minimization of land disturbance.* Once the development envelope is defined, the goal is to minimize the amount of land that needs to be disturbed. Undisturbed

forest, meadow, and wetland areas have an enormous ability to infiltrate and process rainfall, providing baseflow to local streams and groundwater recharge. Construction equipment causes severe compaction of soils, so after development, even areas that are thought to be pervious such as grass, can be quite impervious to rainfall.

4. *Reduce and disconnect impervious cover.* With careful planning, the overall percentage of impervious cover in a proposed project can be minimized. Roads, driveways, sidewalks, parking lots, and building footprints can be minimized to reduce impacts, but still provide functionality. Additionally, not all impervious surfaces have the same impact on local waterways. With proper planning, runoff from impervious surfaces can be directed to pervious areas such as grass or forest, or to LID treatment practices. It should be noted that every project is unique, and not every LID practice will be appropriate. For example, sidewalks or bike paths may be an asset to a new subdivision, if there is some connection to existing pedestrian travel routes. However, sidewalks may not be needed in other settings, and would add unnecessary costs and impervious cover. The objective is to evaluate each site individually and determine the most appropriate management techniques to reduce impacts to waterways.

5. *LID practices installed.* There are a variety of practices that can be used to maintain the pre-development hydrologic function of a site. For more detail on the following practices, see the references below:

- Bioretention areas or rain gardens are depressed areas in the landscape that collect and infiltrate stormwater.

- Vegetated swales can be used to convey runoff instead of the typical curb and gutter system, and they can also infiltrate and filter stormwater.

- Water harvesting techniques can be employed, so that stormwater can be a resource rather than a waste product.

- Pervious pavements allow rainfall to pass through them, and can be installed instead of traditional asphalt or concrete.

- Green roofs can reduce stormwater runoff through evaporation and transpiration through plants, and they also can help save on heating/cooling costs.

LID represents a change from typical design approaches. Proper installation and maintenance of LID practices is critical to their performance. Therefore, installation should be performed by someone with LID experience to avoid costly mistakes.

With proper design and installation, LID can provide multiple benefits including decreased construction costs, reduced impacts to receiving waters, increased habitat for wildlife, beautiful landscape features, and increased property values.

## References

- <sup>1</sup>Prince George's County, Maryland. 1999. Low-Impact Development Design Strategies: An Integrated Design Approach. MD Department of Environmental Resources, Programs and Planning Division.
- <sup>2</sup>CT DEP. 2004. Connecticut Stormwater Quality Manual. Department of Environmental Protection. 79 Elm St., Hartford CT. Available at Mansfield Town Hall, or online at [http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325704&depNav\\_GID=1654](http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325704&depNav_GID=1654)
- <sup>3</sup>US EPA. 2007. Reducing Stormwater Costs through Low Impact Development (LID), Strategies and Practices. EPA Publication number 841-F07-006.

## Low Impact Development (LID) Site Planning and Design Checklist

Items listed below need to be considered by developers when submitting plans for subdivisions. Due to individual site differences, not all items will apply to each individual property. Check items that have been applied, or explain why the items have not been used. For more information on LID practices and how to implement them please refer to the 2004 Connecticut Stormwater Quality Manual.

### 1. Assessment of Natural Resources

- Natural resources and constraints have been indicated and are identified on the plans (wetlands, rivers, streams, flood hazard zones, meadows, agricultural land, tree lines, slopes [identified with 2 foot contours], soil types, exposed ledge & stone walls.
- Is the property shown on the latest copy of CT DEP State and Federal Listed Species and Significant Natural Communities Map as listed in the Natural Diversity Data Base (NDDDB)? If so, provide a copy of the CT DEP NDDDB request form and CT DEP reply letter.
- Development is designed to avoid critical water courses, wetlands, and steep slopes.
- Soils suitable for septic & stormwater infiltration have been identified on plans.
- Soil infiltration rate/permeability has been measured and listed on plan:  
**See sheet#** \_\_\_\_\_
- Onsite soils have been assessed to determine suitability for stormwater infiltration.
- Natural existing drainage patterns have been delineated on the plan and are proposed to be preserved or impacts minimized.

*For items not checked, please use the space below to explain why that item was not appropriate or possible for your project, or any other pertinent information:*

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**2. Preservation of Open Space**

- Percent of natural open space calculation has been performed.

Percent= \_\_\_\_\_

- An open space or cluster subdivision design has been used.
- Open space/common areas are delineated.
- Open space is retained in a natural condition.
- Reduced setbacks, frontages, and right-of-way widths have been used where practicable.
- For items not checked, please use the space below to explain why that item was not appropriate or possible for your project, or any other pertinent information:*

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**3. Minimization of Land Disturbance**

- The proposed building(s) is/are located where development can occur with the least environmental impact.
- Disturbance areas have been delineated to avoid unnecessary clearing or grading.
- Native vegetation outside the immediate construction areas remains undisturbed or will be restored.
- Plan includes detail on construction methods and sequencing to minimize compaction of natural and future stormwater areas.
- For items not checked, please use the space below to explain why that item was not appropriate or possible for your project, or any other pertinent information:*

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#### 4. Reduce and Disconnect Impervious Cover

- Impervious surfaces have been kept to the minimum extent practicable, using the following methods (check which methods were used):
  - Minimized road widths
  - Minimized driveway area
  - Minimized sidewalk area
  - Minimized cul-de-sacs
  - Minimized building footprint
  - Minimized parking lot area
- Impervious surfaces have been disconnected from the stormwater system, and directed to appropriate pervious areas, where practicable. Pervious areas may be LID practices, or uncompacted turf areas.

*For items not checked, please use the space below to explain why that item was not appropriate or possible for your project, or any other pertinent information:*

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#### 5. LID Practices Installed

- Sheet flow is used to the maximum extent possible to avoid concentrating runoff.
- Vegetated swales have been installed adjacent to driveways and/or roads in lieu of a curb and gutter stormwater collection system.
- Rooftop drainage is discharged to bioretention/rain gardens.
- Rooftop drainage is discharged to drywell or infiltration trench.
- Rain water harvesting methods such as rain barrels or cisterns have been installed to manage roof drainage.
- Driveway, roadway, and/or parking lot drainage is directed to bioretention/rain gardens.
- Cul-de-sacs include a landscaped bioretention island.
- Vegetated roof systems have been installed, if appropriate.
- Pervious pavements have been installed, if appropriate.

*For items not checked, please use the space below to explain why that item was not appropriate or possible for your project, or any other pertinent information:*

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**DRAFT MINUTES**  
MANSFIELD PLANNING AND ZONING COMMISSION  
Regular Meeting  
Monday, April 4, 2011  
Council Chamber, Audrey P. Beck Municipal Building

Members present: R. Favretti (Chairman), J. Goodwin, R. Hall, K. Holt G. Lewis, P. Plante,  
B. Pociask,  
Members absent: M. Beal, B. Ryan  
Alternates present: F. Loxsom, K. Rawn,  
Alternates absent: V. Ward  
Staff Present: Gregory J. Padick, Director of Planning, Curt Hirsch, Zoning Agent

Chairman Favretti called the meeting to order at 7:27 p.m. Chairman Favretti appointed alternates Loxsom and Rawn to act in the absence of Beal and Ryan.

**Minutes:**

03-21-11- Plante MOVED, Hall seconded, to approve the 3/21/11 minutes as written. MOTION PASSED with Loxsom and Holt disqualified. Pociask noted he had listened to the recording of the meeting.

**Zoning Agent's Report:**

Hirsch related that his monthly activity report would be distributed in the next meeting packet. He also informed the Commission that he and chairman Favretti had approved a site modification request for Mansfield Supply on Storrs Road for a storage building addition and related site improvements.

**Old Business:**

**1. Application to Amend the Zoning Map, Rezone a 10.4 acre parcel from R-20 to PB-1, K. Tubridy o/a. File #1297 (M.A.D. 5/6/11)**

Holt disqualified herself.

Hall MOVED, Plante seconded, to approve the application of K. Tubridy (File #1297) to rezone approximately 10 acres of land, owned by the applicant, from Residence 20 to Planned Business-1, as shown on a map dated 12/2/10 and located on the northerly side N. Frontage Road, and as heard at a Public Hearing on March 21, 2011.

This zone change shall become effective as of May 1, 2011, or upon Planning Office receipt of a legal boundary description. Approval is granted for the following reasons:

1. The subject re-zoning is consistent with mapping and text specified goals, objectives, and recommendations contained in Mansfield's 2006 Plan of Conservation and Development. The subject site is classified as "Planned Business/Mixed Use" in Mansfield's Plan. The proposed re-zoning also is considered consistent with mapping and text recommendations contained in the 2010 Windham Region Land use Plan and the 2005-2010 Conservation and Development Policies Plan for Connecticut.
2. The subject site is proximate to existing commercial and multi-family housing uses and is within the service area of the Town of Windham's sewer and water systems. The site can physically support commercial and mixed use development. Adjacent land to the east is already zoned Planned Business-2 and this re-zoning essentially extends the existing zone.
3. The proposed re-zoning is considered to be consistent with approval considerations contained in Articles I and XIII of Mansfield's Zoning Regulations and Section 8-2 of the State Statutes.

4. Based on site and neighborhood characteristics, it is expected that any potential impacts from a Planned Business zone use can be appropriately addressed by existing Special Permit application review and approval processes. The Special Permit process requires specific approval of all uses and site work. Special Permit approvals require determinations that land use factors, including but not limited to: water supply, septic disposal, driveway access, drainage, traffic safety, building design, landscaping, buffering and neighborhood impacts, have been addressed suitably.

Pursuant to regulatory provisions, the applicant must file with the Planning Office a legal boundary description for this zone change to become effective.

MOTION PASSED with all in favor except Holt who disqualified herself.

2. **4-Lot Subdivision Application, (3 New Lots) Wormwood Hill & Gurleyville Roads, S. Plimpton o/a, PZC File #1298**

Noting that the Inland Wetlands Agency had decided to hold a public hearing on the Plimpton subdivision, Pociask MOVED, Plante seconded, that the Planning and Zoning Commission schedule a public hearing for May 2<sup>nd</sup> for the Plimpton subdivision, File # 1298. MOTION PASSED UNANIMOUSLY.

Padick related that reports from the Director of Planning, Assistant Town Engineer, EHHD, Fire Marshal, Open Space Preservation Committee and Conservation Commission would be referenced into the public hearing record on May 2<sup>nd</sup>. In addition, abutter-notification will be needed before the hearing.

3. **3-Lot Subdivision Application, (2 New Lots) 64 Puddin Lane, R. Hellstrom-applicant/Sterling Trust Company, owner, PZC File #1299**

Padick reported that the applicant had informed the Planning Office earlier today that abutter notice requirements had not been met but would be addressed within the next few days. It was agreed to postpone any consideration of the pending subdivision until the notice provisions had been met. Reports from the Director of Planning, Assistant Town Engineer and EHHD were received by the commission but not discussed. The application was tabled until the April 19<sup>th</sup> meeting.

4. **Request to review and revise Plan of Conservation and Development regarding Hunting Lodge Road area**

Favretti related that the subject request was received at the last meeting and that members desired more time to consider the proposal. Plante MOVED, Hall seconded, that the request be referred to the PZC's Regulatory Review Committee for its consideration and recommendation. Discussion followed. It was noted that in addition to considering the expressed neighborhood concerns, there are procedural issues that need to be reviewed. MOTION PASSED UNANIMOUSLY.

5. **Approval Request: Revised Plans for exhibit building Paideia Greek Theater Project, 28 Dog Lane, File #1049-7**

Padick related that information regarding this pending request was mailed out to neighboring property owners last week. The item was tabled until the April 19<sup>th</sup> meeting.

**New Business:**

1. **Request to stop collecting bond escrow funds for Freedom Green Phase 4C**

Padick reported that the subject request was being reviewed by staff and that notice of the request had been provided to the Villages of Freedom Green Condominium Association. The item was tabled until the April 19<sup>th</sup> meeting.

2. **Regulatory Review Committee recommended revisions to the Zoning Regulations**

Favretti referenced a March 31<sup>st</sup> report from Director of Planning which included copies of draft regulations that had been reviewed and found ready for public hearing by the Regulatory Review Committee. He noted that explanatory notes still needed to be added, but that these notes, which are not part of the proposed regulation revisions, can be incorporated before referrals are sent out. Hall MOVED, Holt seconded, that a public hearing be scheduled for May 16<sup>th</sup>, 2011 to hear comments on the attached 3/30/11 draft revisions to the Zoning Regulations. The draft regulations shall be specifically referred to the Town Attorney, WINCOG Regional Planning Commission, adjacent municipalities, Town Council, Zoning Board of Appeals, Conservation Commission, Eastern Highlands Health District, Open

Space Preservation Committee, Four Corners Water and Sewer Advisory Committee and Design Review Panel. MOTION PASSED UNANIMOUSLY.

3. **March Draft: UConn Water Supply Plan update**

3/31 and 3/23 reports from Director of Planning were received with excerpts from the draft Water Supply Plan. Padick related that a requested extension of the comment period had been authorized and that staff reviews of the draft plans would be available prior to the next PZC meeting. He noted that the goal is to have one set of town comments that would be approved before the current 4/26 deadline. This will require PZC action at its 4/19 meeting. He requested that any questions from PZC members be forwarded to him as soon as possible.

4. **Verbal Update from Director of Planning on Storrs Center Garage/Intermodal Center**

Padick updated the members on the pending downtown projects and planned mid-April submittal of the next zoning permit for the Town's Parking Garage/Intermodal center. He related that the Downtown Partnership Planning and Design Committee would be meeting on this project on Tuesday April 5<sup>th</sup> at 5 p.m. in the Partnership Office.

**Reports from Officers and Committees:**

Chairman Favretti noted a Regulatory Review Committee meeting is scheduled for 4/13/11 at 1:15 p.m. in Conference Room B.

**Communications:**

Communications listed on the agenda were noted. Members commented on the importance of the recent court case regarding the role of alternates.

**Adjournment:**

Chairman Favretti declared the meeting adjourned at 8:17 p.m.

Respectfully submitted,

Katherine Holt, Secretary

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**DRAFT MINUTES**  
MANSFIELD INLAND WETLANDS AGENCY  
Regular Meeting  
Monday, April 4, 2011  
Council Chambers, Audrey P. Beck Municipal Building

Members present: R. Favretti (Chairman), J. Goodwin, R. Hall, K. Holt G. Lewis, P. Plante,  
B. Pociask,  
Members absent: M. Beal, B. Ryan  
Alternates present: F. Loxsom, K. Rawn,  
Alternates absent: V. Ward  
Staff present: G. Meitzler (Wetlands Agent)

Chairman Favretti called the meeting to order at 7:00 p.m. Alternates Loxsom and Rawn were appointed to act in the absence of Beal and Ryan.

**Minutes:**

3-7-11 – Hall MOVED, Plante seconded, to approve the 3-7-11 minutes as written. MOTION PASSED with all in favor except Loxsom who disqualified himself. Pociask noted that he had listened to the recording of the meeting.

3-15-11 Field Trip- Holt MOVED, Favretti seconded, to approve the 3-15-11 minutes as written. MOTION PASSED with Favretti, Holt and Rawn in favor and all others disqualified.

**Communications:**

The 3-22-11 Wetlands Agent's Monthly Business report and the 3-16-11 Conservation Commission Draft minutes were noted.

**Public Hearing:**

W1469 - Town of Mansfield - statutory regulation revisions from 2010

Chairman Favretti opened the Public Hearing at 7:18. Members present were R. Favretti, J. Goodwin, R. Hall, K. Holt G. Lewis, P. Plante, B. Pociask and alternates F. Loxsom and K. Rawn. Alternates Loxsom and Rawn were appointed to act in the absence of Beal and Ryan. Meitzler read the legal notice as it appeared in the Willimantic Chronicle on 3-22-11 and 3-30-11 and noted the following communications: a 3-31-11 report from D. O'Brien, Town Attorney; a 3-17-11 report from S. Tessitore, CT DEP; and a 2-1-11 report from G. Meitzler, Wetlands Agent. He briefly reviewed the proposed revisions and noted they were needed to address a change in state statutes.

After determining that there were no comments from the public or Agency members, Hall MOVED, Plante seconded, to close the Public Hearing at 7:24. MOTION PASSED UNANIMOUSLY.

After agreeing to consider action, Meitzler distributed a motion he prepared for the Agency's consideration. Goodwin MOVED, Holt seconded, that the Mansfield Inland Wetlands Agency adopt the attached Mansfield Inland Wetlands Regulation revisions, pursuant to the Connecticut General Statutes and State regulations, revising Section 7.10 C., Section 10.9, and Section 10.10, as presented to the Agency in a staff memorandum dated February 1, 2011 and which revisions were presented at the Agency's 4/04/2011 Public Hearing, and are to become effective May 1, 2011.

The proposed regulation revisions have been referred to the Commissioner of the Department of Environmental Protection, the Mansfield Town Council, the Mansfield Conservation Commission, and Dennis O'Brien, Town Attorney.

Staff is further instructed to forward a copy of the adopted regulations to the Commissioner of Environmental Protection. MOTION PASSED UNANIMOUSLY.

**Old Business:**

**W1474 - Plimpton - Wormwood Hill/Gurleyville Rds - 3 lot subdivision**

After a brief discussion, Holt MOVED, Pociask seconded, to set a public hearing on 5/2/11 to receive comments from the public, staff and committees on the application received at the 3/7/11 IWA meeting by Scott Plimpton (IWA File #1474) for a 4-lot subdivision at 627 Wormwood Hill Road, owned by the applicant and as shown on a map dated January 2011, revised through February 9, 2011, and as described in other application submissions. This action is deemed necessary because there is a chance that the proposed activity may have significant impact the adjacent wetlands.

The applicant shall consult with Wetlands Agent Meitzler to find out how much the fee is to be increased for a Public Hearing application. MOTION PASSED UNANIMOUSLY.

**New Business:**

**W1420 - Modification request: White Oak Condominiums - footing drains**

Project engineer, M. Peterson, briefly explained the proposed modification request and the need to construct an additional footing drain system for Building #7. He related that they would like to start the two footing drain projects in April.

After discussion, Holt MOVED, Pociask seconded, to modify the earlier approval for wetlands file W1420 for installation of building drains, yard grading, and outlet flow protection for Building #4, White Oak Condominiums, as outlined in application submissions including a map dated March 31, 2010 and revised through February 8, 2011, and also for installation of building drains, yard grading, and outlet flow protection for Building #7, as detailed on plans dated March 11, 2011.

This action is based on a finding of no significant impact, and is conditioned on the following provisions being met:

1. All erosion and sediment controls (as shown on the plans) shall be in place prior to construction, maintained during construction, and removed when disturbed areas are completely stabilized.
2. Work is to be done between the dates of April 15 and October 15.

This modification is valid for the original period of five years approved for File W1420 (until January 20, 2014), unless additional time is requested by the applicant and granted by the Inland Wetlands Agency. The applicant shall notify the Wetlands Agent before any work begins, and all work shall be completed within one year. Any extension of the activity period shall come before this Agency for further review and comment. MOTION PASSED UNANIMOUSLY.

**Reports of Officers and Committees:**

None.

**Other Communications and Bills:**

The agenda-listed communications were noted. Meitzler was asked to forward the D'Amato email communication to the State Dept of Health and the Ponde Place developer. It was agreed that notice of this communication forwarding action should be sent to J. D'Amato

**Adjournment:**

Favretti declared the meeting adjourned at 7:25 p.m.

Respectfully submitted,

Katherine Holt, Secretary

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## MINUTES

MANSFIELD INLAND WETLAND AGENCY/PLANNING AND ZONING COMMISSION  
FIELD TRIP  
Special Meeting  
Tuesday, March 15, 2011

Members present: R. Favretti, M. Beal, K. Rawn, K. Holt, B. Ryan,  
Staff present: G. Meitzler (Wetlands Agent, Assistant Town Engineer),  
C. Hirsch, (Zoning Agent)  
Conservation Commission: S. Lehmann

The field trip began at 1:30 p.m.

1. Sterling Trust Company, 3-Lot Subdivision, 64 Puddin Lane. PZC file # 1299  
Members were met on site by owner S. Stein and R. Hellstrom, surveyor.  
Members observed the site noting the existing conditions and areas of  
proposed house development. No decisions were made.
2. Plimpton Property, 4-Lot Subdivision, PZC File # 1298, IWA File # W1474  
Members were met on site by surveyor D. Bonoff. Members observed site  
characteristics with respect to proposed house, driveway and septic locations.  
Existing wetland areas near the proposed activity were also observed. No  
decisions were made.

Memorandum:

March 22, 2011

To: Inland Wetland Agency  
From: Grant Meitzler, Inland Wetland Agent  
Re: Monthly Business

**W1419 - Chernushek - hearing on Order**

- 3.10.09: The hearing on the Order remains open and should continue until the permit application under consideration is acted upon.  
(The Order was dropped on approval of the application required in the Order.)
- 4.30.09: Former rye grass seeding is beginning to show green. I spoke with Mr. Chernushek this afternoon who indicated health problems that delayed his starting but indicated he will be working this weekend. I will update on this Monday evening.
- 5.26.09: A light cover of grass growth has come in. Mr. Chernushek indicates health problems and two related deaths have delayed his start of work since the permit approval was granted. It appears that some light work has started. He has further indicated that he will start a vacation on June 22, 2009 to finish the work.
- 6.13.09: Work is underway.
- 6.21.09: Bulldozer work has been completed - finish work remains. The additional silt fencing has been placed along the northerly wetlands crossing, and the additional pipe under the southerly crossing has been installed. Remaining work includes finish grading along edges, spreading stockpiled topsoil, and establishing grass growth.
- 7.01.09: I spoke with Mr. Chernushek who indicated he expects work to be completed by September 1, 2009. (Site photo attached).
- 9.03.09: Mr. Chernushek has been working on levelling and grading. The formerly seeded areas have become fairly thick growth surrounding the central wet areas. He has further indicated that with the combination of weather and the slower moving of earth with the payloader compared to the earlier rented bulldozer has led him to contact contractors for earth moving estimates which have not yet been received. The site is not yet finished but has remained quite stable.
- 9.12.09: I met with Mr. Chernushek today and discussed again what his plans are for stabilizing this work site.
- 10.01.09: Mr. Chernushek indicated he has not heard back from the contractor he had spoken with about removing material, and is in progress of contacting others. In discussion is removal of material from the site either within the 100 cubic yard limit or obtaining a permit for such removal.
- 10.28.09: Mr. Chernushek has indicated he has made arrangements with DeSiato Sand & Gravel to remove 750 cubic yards of material. Staff is in the process of clarifying permit requirements.

**W1445 - Chernushek - application for gravel removal from site**

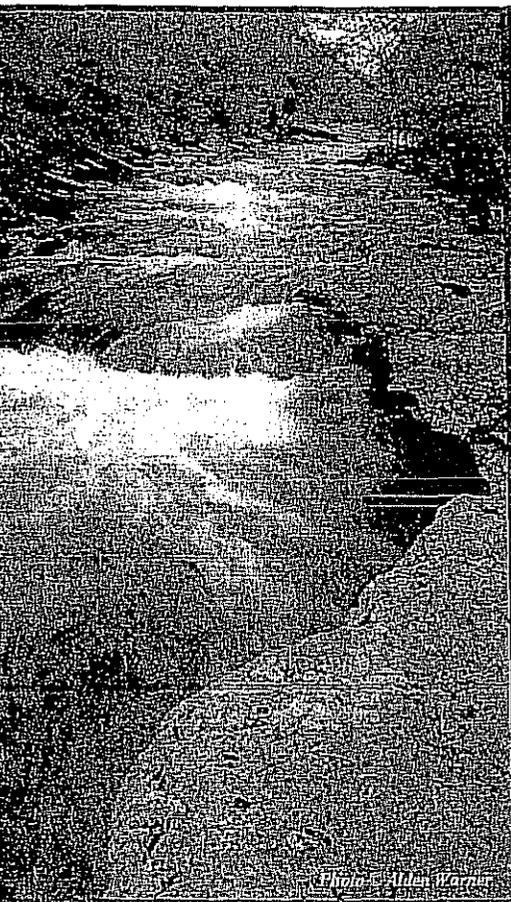
- 11.30.09: Packet of information representing submissions by Mr. Chernushek, Mr. DeSiato and myself is in this agenda packet as Mr. Chernushek's request for modification.
- 12.29.09: Preparation of required information for PZC special permit application is in progress. Tabling any action until the February 1, 2010 meeting is recommended.
- 1.12.10: 65 day extension of time received.

- 2.18.10: No new information has been received.
- 2.25.10: This application has been **withdrawn**.
- 6.30.10: As viewed from the adjacent property, the upstream and downstream areas have grown to a decent protected surface. I did not see indication of sediment movement.
- 10.26.10: A sale of the East portion of the Chernushek property has been in negotiation.
- 12.27.10: The property exchange has been completed. The owner is now the neighboring property owner Bernie Brodin. He has indicated his intention to stabilize the area as weather permits.

**Mansfield Auto Parts - Route 32**

- 2.18.10: Same - they are in the process of rebuilding the engine on the payloader.
- 3.30.10: Same - Mr. Bednarczyk indicates a continuing problem finding engine parts.
- 4.13.10: Owner indicates the payloader is operating again.
- 4.15.10: Owner indicates he will have the cars moved this week.
- 4.23.10: No vehicles are within 25' of wetlands.**
- 5.17.10: Inspection - no vehicles are within 25' of wetlands.
- 6.02.10: Inspection - no vehicles are within 25' of wetlands.
- 6.23.10: Inspection - no vehicles are within 25' of wetlands.
- 7.15.10: Inspection - no vehicles are within 25' of wetlands.
- 9.01.10: Inspection - no vehicles are within 25' of wetlands.  
Mr. Bednarczyk has started removing tires from the westerly part of his site using roll-off containers. With this arrangement a moderately steady rate of removal of the tires should be possible to maintain until the tires are completely removed.
- 9.28.10: Inspection - no vehicles are within 25' of wetlands.  
Tire removal is continuing with 1 to 2 roll-off containers being removed per month.
- 10.07.10: Inspection - no vehicles are within 25' of wetlands.  
Tire removal has been continuing.
- 11.29.10: Inspection - no vehicles are within 25' of wetlands.  
Owner has been trucking cars for crushing with 6 tires per vehicle. He indicates 3 cars per day or 18 tires per day. The actual number is probably lower than 18.
- 12.23.10: Inspection - no vehicles are within 25' of wetlands.
- 1.07.11: Inspection - no vehicles are within 25' of wetlands.
- 1.20.11: Vehicle storage areas are snowed in and inaccessible.
- 1.26.11: Snows remain, although some clearing has been done I could not count on being able to get out.
- 2.24.11: Inspection - no vehicles are within 25' of wetlands.
- 3.09.11: Inspection - no vehicles are within 25' of wetlands.
- 3.22.11: Inspection - no vehicles are within 25' of wetlands.

# NATCHAUG RIVER BASIN



*Ashford, Chaplin, Eastford, Mansfield, Union, Willington, Windham, Woodstock*

Please join the  
Natchaug River Basin Steering Committee  
For the Signing Ceremony of the

## Natchaug River Basin Conservation Compact

*Friday, April 29, 2011*

*9:00—10:30 AM*

*Reception to follow*

*Parking and Reception at*

### Chaplin Fire House

*106 Phoenixville Rd. (Route 198)*

*Chaplin, CT*

*RSVP To: [HDrinkuth@tnc.org](mailto:HDrinkuth@tnc.org)*

*(860)774-9600 x 19*

*By April 23, 2011*

*Photo: Allen Warner*

PAGE  
BREAK

# Connecticut Wildlife

CONNECTICUT DEPARTMENT OF  
BUREAU OF NATURAL RESOURCES DIVISIONS OF

ENVIRONMENTAL  
AND INLAND



## From the Director's Desk



As wildlife professionals, and stewards of Connecticut's Public Trust resources, we take management actions every day, either by 'improving' habitats, removing individual or groups of animals, or taking no action. Taking no action is still a conscious decision that has consequences that will affect the future of wildlife populations, locally and regionally. That said, we often find ourselves in the difficult position of taking actions that will benefit one group to the detriment of another, and by extension will be subject to criticism. One such example is our recent decision to remove deer from Charles Island off the coast of Milford to preserve a nesting colony for several rare bird species.

In this instance, there are several factors at play. First and foremost is the relationship between deer, vegetation, and heron and egret nesting sites. We've been monitoring the island's deer population for the past few years and have found it to be unstable, with wild fluctuations in the number of deer over time. For instance, 23 deer were counted on the island in December 2009, equating to more than 1,000 deer per square mile, some 50 times the number of deer recommended for maintaining a healthy forest ecosystem. A short four months later, in April 2010, staff returned to the island looking for deer carcasses. Four of the 11 carcasses found during the survey were of the 23 live deer of the previous count. Examination of bone marrow samples indicated that the deer died of severe malnutrition (e.g., starvation). Additional dead deer were observed throughout 2010.

In terms of the vegetative community, there were several disturbing observations. Deer browsing has eliminated all native plants in the understory. Virtually all understory growth has been replaced with invasive, non-native Japanese barberry, a thorny shrub that deer find unpalatable. Overbrowsing by deer also has created gaps in vegetation, allowing other invasive, non-native plants to become established. In just two years, this has led to the loss of mid-story nesting habitat, and birds, such as the glossy ibis, were forced to abandon the island for nesting in 2010. Most of the canopy trees on the island have become cloaked in non-native oriental bittersweet, which adds tremendous weight to the overstory and greatly increases the surface area in the upper reaches of the trees, magnifying the effects of winter winds much like the sail of a boat. These combined effects have caused several of the canopy trees forming the rookery to topple. With the elimination of the understory, there are no young trees to replace the canopy trees lost to winter storms. Exacerbating all of this is the presence of a soil fungus that attacks the roots of canopy trees, further destabilizing island ecology.

Relocating deer to another location is fraught with complications. For one, deer populations throughout the state are doing extremely well; too well in some instances. We constantly receive requests for more aggressive approaches to reducing deer densities in New Haven and Fairfield Counties as the number of deer in these areas exceeds both their biological and cultural carrying capacities. As such, there is no place to relocate these animals without exacerbating deer overabundance and creating new problems in other neighborhoods. Under the best of circumstances, post-release survival of relocated deer is low. The prognosis for survival is dire when deer health is compromised by malnutrition. Given these constraints, relocation is not a viable option.

Recognizing all of these complicating factors, the Department developed a management plan that involves removal of deer and non-native invasive plants, re-planting of native vegetation (primarily trees), erecting enclosures around newly-planted stock, and annual monitoring, management, and maintenance. This plan to restore the island ecosystem will take several years, but in the end we're confident the nesting colony will be restored.

Understandably, many people struggle with the notion of euthanizing deer. But as resource managers, we are faced with needing to take an action — either allow the rookery of state-threatened herons and egrets and a designated Natural Area Preserve to be lost or remove the deer and restore the island ecosystem. In this case, we believe the choice is clear.

Rick Jacobson, Director — Wildlife Division

**Cover:** A great horned owl sits on its nest. See the article on page 12 to learn more about Connecticut's largest owl

Photo courtesy of Paul J. Fusco

# Connecticut Wildlife

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The Federal Aid in Wildlife Restoration Program was initiated by sportsmen and conservationists to provide states with funding for wildlife management and research programs, habitat acquisition, wildlife management area development, and hunter education programs. Connecticut Wildlife contains articles reporting on Wildlife Division projects funded entirely or in part with federal aid monies.

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# Study Shows Rehabilitated Fawns Have Poor Survival

Written by Andrew LaBonte, DEP Wildlife Division

At the same time that white-tailed deer are giving birth in early summer, the Wildlife Division is receiving phone calls about “injured or orphaned” fawns. However, very few of these fawns are actually in trouble. Fawns are nearly odorless when they are born. To protect her young and not leave a scent, a white-tail doe will leave the fawn alone during the first three weeks of its life, only to return to nurse it periodically throughout the day. People who find fawns are encouraged to leave them alone and not touch them.

On occasion, fawns that are picked up as “orphaned or injured” have been raised by state-licensed rehabilitators and released back into the wild at the end of summer. Over the years, many fawns have been raised and released with little known about their tendency for dispersal or their survival after release.

In conjunction with the Connecticut Agricultural Experiment Station and with cooperation from three fawn rehabilitators, the Wildlife Division initiated a research project during summer 2010 to assess tameness, survival, and movements of rehabilitated fawns exposed to two different release techniques.

When fawns were ready for release, seven were subjected to a “soft release” (pen door remained open to allow fawns to use food and water) and 12 fawns were subjected to a “hard release” (relocated to a large forested tract of state forest with no food or water provided). All fawns were ear-tagged, weighed, radio-collared, and evaluated for tameness prior to release. Tameness was evaluated again at 24 hours, one week, and three weeks post release. Fawns were monitored daily for 60 days and then two or three times per week thereafter. If the mortality sensor on a fawn’s radio collar was activated, the animal was located and the cause of death was determined.

Weight of fawns ranged from 19 to 65 pounds at the time of release and had little effect on survival rates. All fawns at the hard release site died within 36 days (average = 14.4 days), while all



In conjunction with the Connecticut Agricultural Experiment Station and with cooperation from three fawn rehabilitators, the Wildlife Division initiated a research project during summer 2010 to assess tameness, survival, and movements of rehabilitated fawns exposed to two different release techniques.

fawns at the soft release site died within 85 days (average = 45.8 days). Sources of mortality included coyote (8), pneumonia (2), motor vehicle (2), bobcat (1), hunter harvested (1), illegally killed (1), and undetermined (4). Fawns at the hard release site had unknowingly contracted pneumonia prior to being released, which increased their vulnerability to predation by coyotes. Additionally, few of the animals showed any fear of humans and tameness indices changed little over time.

Regardless of release technique, animals exhibited high fidelity to release sites. Average distance deer were found from the soft release site was 209 yards, while average distance from the hard release site was 367 yards. Distance found from the release site did increase over time, indicating that if fawns had survived for a longer period of time they might have dispersed greater distances.

Based on these preliminary results, weight, tameness, and release technique had little effect on survival of rehabilitated fawns. This project is expected to continue through the 2011 fawning season.



Wildlife Division Michael Gregonis holds one of the rehabilitated fawns before it was released back in the wild. Note the yellow ear tag and radio collar.

A. LABONTE, DEER MANAGEMENT PROGRAM (2)



# Mixed Results for First Year of Forest Interior Bird Studies

Written by Geoffrey Krukar, DEP Wildlife Division

The Wildlife Division initiated a study in 2010 aimed at gathering much needed information about forest interior bird species in Connecticut (see the May/June 2010 issue of *Connecticut Wildlife*). The major objectives of this study were to determine the current distribution and abundance of forest interior birds, and to measure productivity of each species relative to habitat and landscape conditions. This suite of birds requires large tracts of contiguous forest and many of these species have suffered severe declines regionally as forests are being slowly fragmented by development.

Managing for forest interior birds is difficult because, despite previous survey attempts, their status and distribution have remained unclear in Connecticut. Forest interior birds are often missed by large scale monitoring programs, like the Breeding Bird Survey, that do not typically sample in the middle of large forests. To complicate matters further, little is known about specific habitat preferences and how they influence the productivity of these species.

The study focused on four target species: the cerulean, black-throated blue, black-throated-green, and worm-eating warblers. They were selected as focal species because the results of an analysis

indicated that all four would be prevalent enough that changes in occupancy could be determined with only 80 survey points. In addition, the cerulean and worm-eating warblers were selected because they both require large patches of forest and are extremely unlikely to occur in smaller sites. The intention was to have them serve as "indicator" species. Essentially, if the forest was large enough and healthy enough to have either of these two species, then it should be able to support the other forest interior bird species as well.

## Data Collection

Repeat surveys were conducted between mid-May and late June along 20 survey routes that were randomly distributed statewide in large forests. Each survey route was made up of four survey points. Approximately half of the 80 survey points were located along organized trails, while the other half were located in the middle of the forest. DEP staff and volunteers conducting the surveys were asked to record information about all bird species detected. Two additional visits were made to each site in July when the juvenile birds were off the nest. Surveyors walked line transects that overlapped the four survey points. Any observations of juvenile birds were

recorded. Habitat measurements were collected around each point after all the bird surveys were completed.

## Results

All four of the target species were found during the point count surveys. Black-throated warblers were found across the state and occurred on the most survey routes (8 for black-throated blue and 11 for black-throated green). Worm-eating warblers were found along six survey routes, but the bird was noticeably absent from all the routes in northern Connecticut. Only one site, located in northwestern Connecticut, had any cerulean warblers.

Most of the bird species, including all four target species, did not show any significant difference in abundance between points along trails and those not along trails. Interestingly, the four species that did exhibit a significant difference (blue jay, hairy woodpecker, pine warbler, and tufted titmouse) were actually more abundant along trails where human disturbance is presumed to be higher.

Productivity sampling was successful, yielding 65 broods of juvenile birds. These data will be used to generate an index of productivity to allow for comparisons between sites. Coupled with the habitat measurements that were collected, this information can be used to provide meaningful recommendations to forest managers.

## Future Work

Another year of surveys is planned for 2011. Changes to the survey design are being considered to increase the detections for the four target species, especially the cerulean warbler. Other potential changes may be to focus on more common forest bird species, increasing the number of survey routes, and mist-netting for juvenile birds.

If you have considerable experience identifying forest bird species and would like to get involved with this project, please contact Geoffrey Krukar at 860-675-8130 or by E-mail to [geoffrey.krukar@ct.gov](mailto:geoffrey.krukar@ct.gov). A mandatory training session for volunteers will be held in April.



P. J. FUSCO

The black-throated blue warbler requires large tracts of uninterrupted forest to successfully rear young. It is one of four forest interior birds being studied to determine current distribution and abundance, along with the productivity of each species relative to habitat and landscape conditions.



# Outlook Good for Spring Turkey Hunting Season

The spring wild turkey hunting season has always been popular with Connecticut hunters. This year is no exception as anticipation runs high for another successful season. Several changes were implemented last year to provide additional hunting opportunities, which were well received by sportsmen.

The 2011 season will start on April 27 and end on May 28. Private land hunters will be able to harvest three birds, while state land hunters can harvest two birds. Regulation changes increased the spring season by one week and now allow hunters to purchase both private and state land permits. Hunting licenses and turkey permits can be purchased on the DEP's Web site ([www.ct.gov/dep/sportsmen-licensing](http://www.ct.gov/dep/sportsmen-licensing)) and at most town clerks, some sporting goods stores, and DEP offices. Hunters are required to have a 2011 firearms hunting license or a small game and deer archery permit to apply for a spring turkey permit. (See page 7 to learn about receiving a credit toward the purchase of a 2011 license if you paid a higher price for a 2010 license and permits between October 1, 2009, and April 14, 2010.)

## Season Outlook

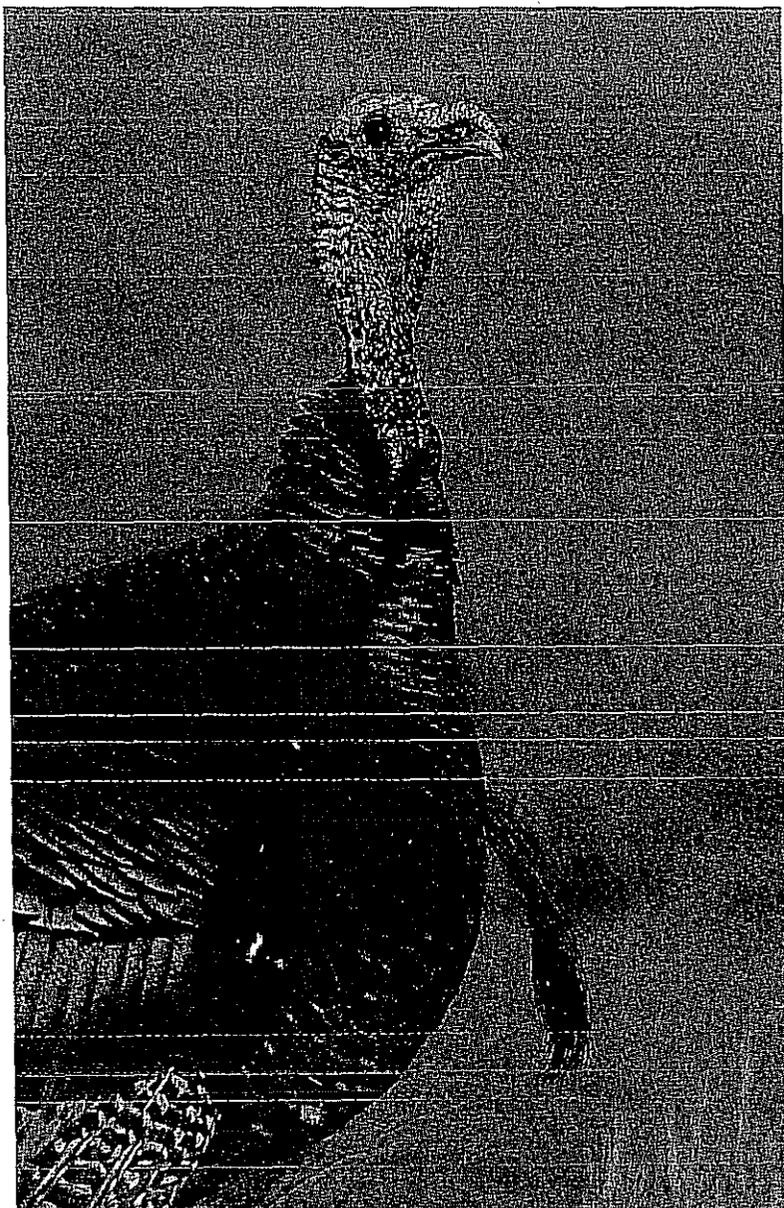
Hunters should expect to see a good number of jakes (males less than one year old) during the 2011 season because last summer's turkey brood survey indicated higher productivity. Connecticut had experienced lower productivity in previous years, causing some declines in the overall statewide wild turkey population and making the spring hunt more challenging during those years.

## Safety Comes First

With the upcoming arrival of the spring turkey season, now is the perfect time to practice and prepare. Spring turkey hunting requires a great deal of skill to be successful, and the best way to acquire these skills is to heed the advice of seasoned turkey hunters and to practice. Hunters also should make sure every field adventure is safe and enjoyable.

One way to prepare is to attend a turkey hunting safety seminar in early spring. The Wildlife Division's Conservation Education/Firearms Safety (CE/FS) Program, as well as several local sportsmen's clubs, sponsor training seminars every year, which cover hunting techniques, but also stress safety and ethical hunting. To find out about any upcoming turkey hunting seminars sponsored by the CE/FS Program, check the Calendar of Events section on the DEP Web site ([www.ct.gov/dep/calendar](http://www.ct.gov/dep/calendar)).

**Sign up for a Conservation Education/ Firearms Safety class today! Check the DEP Web site ([www.ct.gov/dep/calendar](http://www.ct.gov/dep/calendar)) to view the list of available classes. Classes fill up quickly! You can also contact the Wildlife Division at 860-642-7239 or 860-675-8130.**



R. J. FUSCO

## Spring Turkey Junior Hunter Days, April 16 & 23

Spring turkey junior hunter training days provide junior hunters with an opportunity to learn safe and effective hunting practices from experienced hunters. Licensed junior hunters may hunt for turkeys when accompanied by a licensed adult hunter 18 years of age and older. The adult mentor may not carry a firearm. The junior hunter must have a valid spring turkey season permit for state or private land. Those hunting on private land also must have written consent from the landowner. The adult mentor may assist in calling turkeys. Hunting hours for Junior Hunter Training Days only are one-half hour before sunrise to 5:00 PM. Harvested turkeys must be tagged and reported. Consult [www.ct.gov/dep/hunting](http://www.ct.gov/dep/hunting) to learn more about tagging and reporting requirements.

*Hunting can be a safe and enjoyable activity. Thinking before you react will keep it that way. Remember, once the trigger is pulled, there is no calling back the shot.*

# From Hatchery to Stream: Trout Stocking for Opening Day

Written by Brian Eltz, DEP Inland Fisheries Division; Photos provided by DEP Inland Fisheries Division

**O**pening Day! To non-anglers, it's just the third Saturday in April. But to trout anglers, it is Christmas, New Year's Eve, and the Fourth of July all rolled into one! Opening Day of Connecticut's 2011 trout season begins at 6:00 AM on April 16. Nearly 100,000 anxious anglers will hit the water, eagerly anticipating the catch of the day or maybe even the catch of their lives.

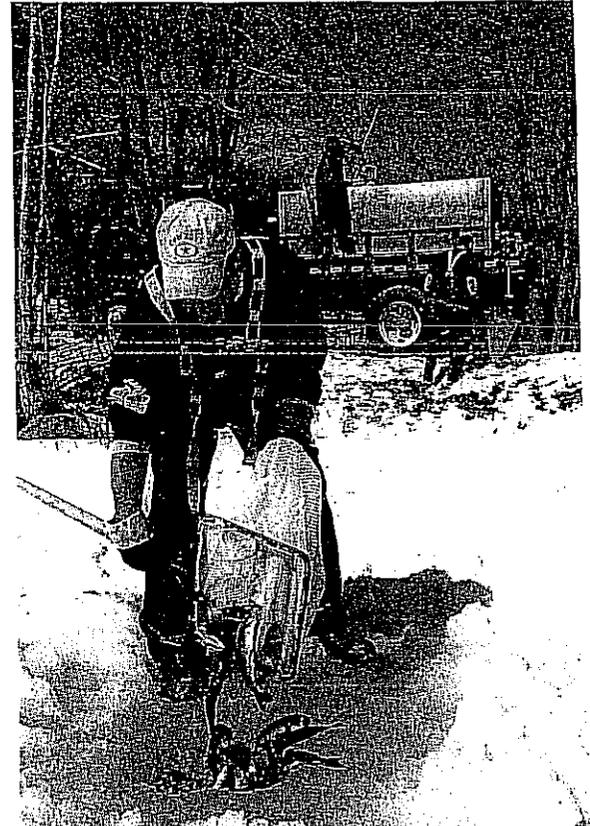
The first day of trout season is not for those seeking solitude and respite in the far-off corners of nature. Local tackle stores are usually chock-full of last minute shoppers purchasing supplies the night before. In the morning, anglers can be seen standing shoulder-to-shoulder along a streambank or lake shore before the sun even peeks above the horizon.

For many, Opening Day is steeped in tradition. Some anglers will fish in popular fishing derbies. Some will attend fisherman's breakfasts to fuel-up for the day's "work" that lies ahead. Still others meet for an annual rendezvous with family and friends on the water. Many will stake claim to the exact Opening Day spot that they've fished for decades, much like salmon returning to their natal waters.

## Trout Stocking

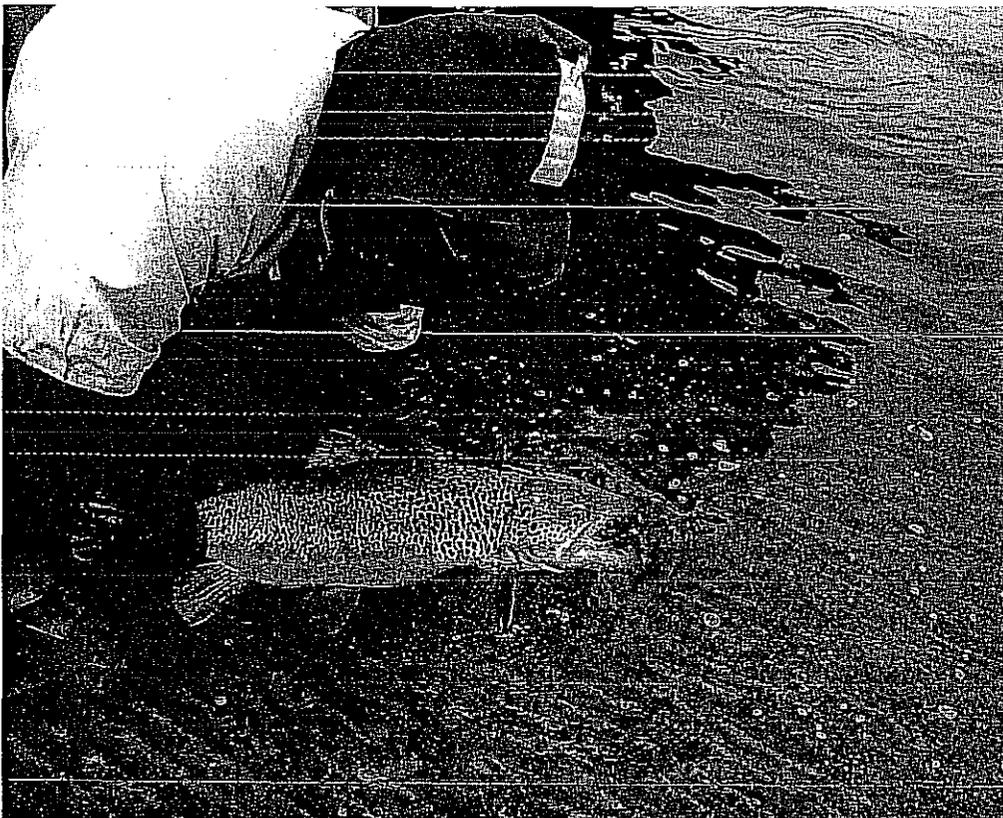
In preparation for this hugely-anticipated occasion, Inland Fisheries Division employees will stock 400,000 trout before Opening Day. Brook, brown, rainbow, and tiger trout (a brook trout x brown trout hybrid) will be swimming in waters across the state. Ten percent will be "trophy trout," with many measuring 14 inches long. Even better than that, an additional 2,000 will be broodstock, with many weighing more than 10 pounds! Catching any of these fine trout is satisfying, but successfully landing a trophy or broodstock may convey bragging rights for years to come!

Connecticut's trout are raised from eggs at three hatcheries located in Central Village, Burlington, and Kensington. Once the



(Above) Stocking trout through the ice prior to Opening Day.

(Left) A broodstock brown trout being released into one of Connecticut's lakes.



trout are about 18 months old (although broodstock trout may be over 4 years old), they are netted from hatchery ponds, loaded by hand into tanks on trucks, and then driven to far reaches of the state. The fish will be distributed into 100 lakes and ponds and 200 rivers and streams. In all, over 200 truckloads of trout will be distributed throughout Connecticut by both hatchery and fish management staff prior to Opening Day.

Once a hatchery truck reaches a stocking location on a stream or lake, trout are scooped out with large nets from tanks that can hold as many as 40 fish. In a few places, where the stocking truck can get right next to the water, trout slide down tubes right into the lake or pond. However, most of the time, heavy nets full of thrashing trout have to be carried down to the water and released quickly. Often this occurs through ice and snow or is hampered by

rain and muddy roads. Scrambling down and climbing back up steep streambanks makes for some very tired workers by the end of the stocking run! But their dedication results in lots of fine trout awaiting you at your favorite waters on Opening Day.

### *Something for Everyone*

From the most avid purists who pursue their quarry with hand-tied flies, to the beginners who are learning the art of fishing with bait, there is something for everyone when it comes to Opening Day in Connecticut. The Inland Fisheries Division is proud to offer a wide variety of angling options. While most waters have the general five-trout-per-day creel limit, there also are many specialized areas to fish, too.

"Trout Parks" are family-oriented waters. They receive frequent additions of new trout and have a reduced creel limit of two trout per day. These areas often have amenities like restrooms and picnic tables available.

"Trophy Trout Streams" are rivers stocked with a higher proportion of large trout over 12 inches long.

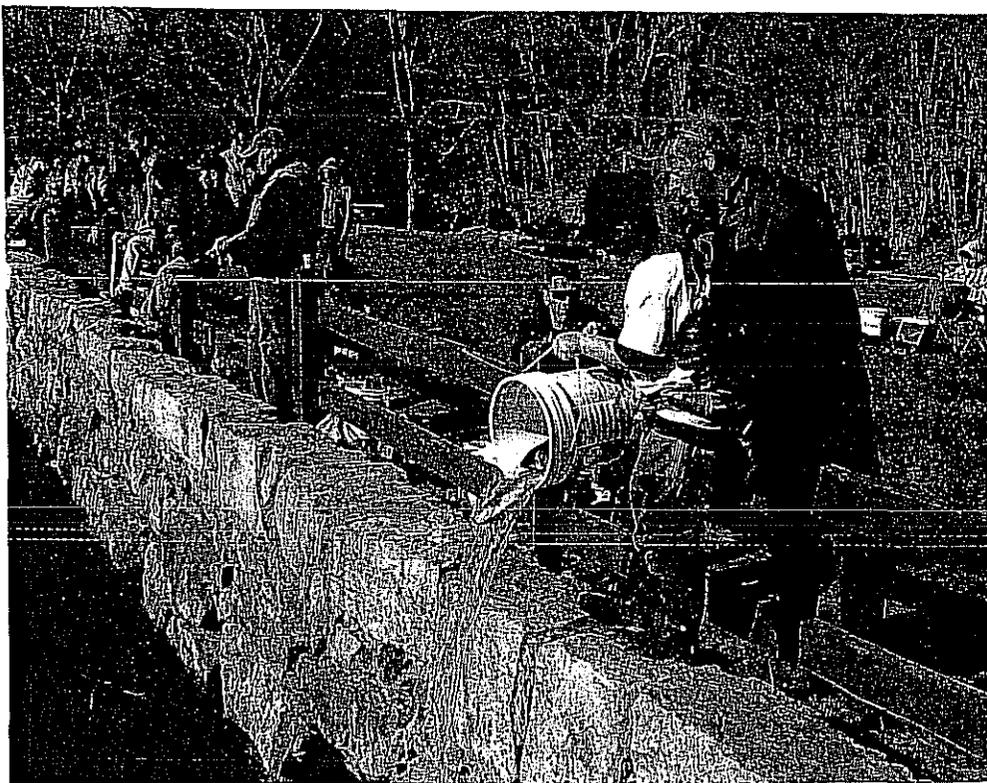
"Trout Management Lakes" have special regulations that protect some sizes of trout through special length regulations. This enables more anglers to do battle with these larger fish.

"Fishing in Neighborhoods" ponds are found in city parks. They receive frequent stockings, so there always is plenty of trout available. These ponds provide great fishing opportunities that are close to home for many people.

Trout anglers looking for an early start to their season might want to try one of the state's 16 "Trout Management Areas" or any of nine "Class I Wild Trout Management Areas." All of these allow catch-and-release fishing prior to Opening Day. These waters have special seasons and regulations, with some even offering year-round fishing! Similarly, portions of six designated "Sea-run Trout Streams" are open year-round with a two trout per day and 15-inch minimum length rules.

### *Get Ready for Opening Day*

Opening Day marks the turn of seasons in Connecticut. It will be here sooner than you think! Be sure to buy your 2011 fishing license, inspect your fishing gear, and consult the 2011 Connecticut Anglers Guide. To view the guide on-line, enter "Angler's Guide" in the search box



Opening day stocking and fishing at Southford Falls Pond Trout Park, located in Southford Falls State Park, Southbury.

at [www.ct.gov/dep](http://www.ct.gov/dep). While you're on the DEP homepage, check the "In the News" section on the left side of the screen for recent press releases. One release will include details of trout stocking sites where you can join the Inland Fisheries

Division on April 16 and actually stock some trout yourself! Take advantage of Connecticut's Trout Stocking Program, which is one of the best in the Northeast! Good luck on Opening Day!

## *Fees and Credits for Fishing and Hunting Licenses, Permits, and Tags*

Legislation was approved and signed into law in April during the 2010 session of the Connecticut General Assembly reducing many of the fees for sportsmen's licenses and permits. This was followed in June by legislation authorizing a credit to be applied against the fee for any 2011 sportsmen's license, permit, or tag when purchase of a license, permit, or tag had been made at the higher prices in place between October 1, 2009, and April 14, 2010. The credit amount will be the difference between the higher amount paid during that time period and the amount set by the new fee structure established on April 14, 2010.

Credit redemption is not available from town clerks, retail vendors, or through DEP's Online Sportsmen Licensing System. You must purchase your 2011 license, permit, or tag by mail or in person at one of the following DEP facilities to obtain a credit:

- Marine Headquarters, 333 Ferry Road, Old Lyme; 860-434-6043; Mon.-Fri. 8:00 AM-4:00 PM
- Eastern District Headquarters, 209 Hebron Road (Route 66), Marlborough; 860-295-9523; Mon.-Fri. 8:30 AM-4:00 PM
- Western District Headquarters, 230 Plymouth Road, Harwinton, 860-485-0226; Mon.-Fri. 8:30 AM-4:00 PM
- Franklin WMA, 391 Route 32, Franklin, 860-642-7239; Mon.-Fri. 8:30 AM-4:00 PM
- Sessions Woods WMA, 341 Milford Street (Route 69), Burlington, 860-675-8130; Mon.-Fri. 8:30 AM-4:00 PM
- DEP Main Office, 79 Elm St., Hartford, License & Revenue Office, 860-424-3105; Mon-Fri 9:00 AM-4:00 PM and the DEP Store, 860-424-3555; Mon.-Fri. 9:00 AM-3:30 PM

Mail-in Option: A form to purchase your license, permit, or tags by mail when redeeming a credit is available on-line at [www.ct.gov/dep/sportsmensfeereduction](http://www.ct.gov/dep/sportsmensfeereduction).

# Restoring River Herring Runs in Connecticut

Written by Steve Gephard, DEP Inland Fisheries Division

We often mark the advent of spring with observations of robins, pussy willows, or daffodils. Annual milestones occur in our streams, too. A sure sign of the approaching spring is the run of alewives. The alewife (*Alosa pseudoharengus*) is an anadromous member of the herring family. Most herring live in the ocean but a handful have adopted anadromy – hatching in freshwater, then emigrating as juveniles to the ocean to mature. When they are ready to spawn, between two and four years, they migrate back to the same freshwater body in which they originated. In Connecticut, that annual migration begins in March (and usually is over by early June). But the show is not over! Another similar species, the blueback herring, typically enters the streams in May and continues to run well into June. Collectively, the alewife and blueback herring (*Alosa aestivalis*) are referred to as ‘river herring’ and both average between 10 and 12 inches long as adults.

The two species look remarkably alike. Both are laterally flattened fish with dazzlingly silver scales, a deeply forked tail, and large eyes. Both species travel in schools – you rarely see one or two alone. If the fish are “in,” you are more likely to see 100 to 200, or 1,000.

The spectacle of a strong river herring run is a sight to behold and ranks as one of our state’s notable animal migrations. One day, there are no fish, and the next day, the stream may be packed with a dense school of swirling, splashing, surging silvery fish, so enthusiastic that they may literally swim right out of the water and onto dry land. The fact that they are typically chased by striped bass from below and osprey and herring gulls from above only adds to the excitement.

Alewives seek quiet areas like back coves of large rivers (e.g., Keeney Cove off the Connecticut River), lakes (e.g., Bride Lake in East Lyme), or old millponds behind dams (e.g., Moulson Pond in Lyme). Blueback herring, on the other hand, spawn in streams with moderate flows, like the Naugatuck, Quinnipiac, and Salmon Rivers. Often, both species spawn in the same streams, but use different areas. In the Connecticut River, alewives stop before reaching Massachusetts, but blueback herring accompany American shad, another anadromous

species, all the way to Bellows Falls, Vermont, about 174 miles from Long Island Sound.

River herring are edible, but they are full of bones and generally considered too small to bother eating. Colonists used them to fertilize their fields and lobstermen and anglers have long used them for bait. Right up into the end of the twentieth century, some Connecticut residents caught these fish and pickled them for

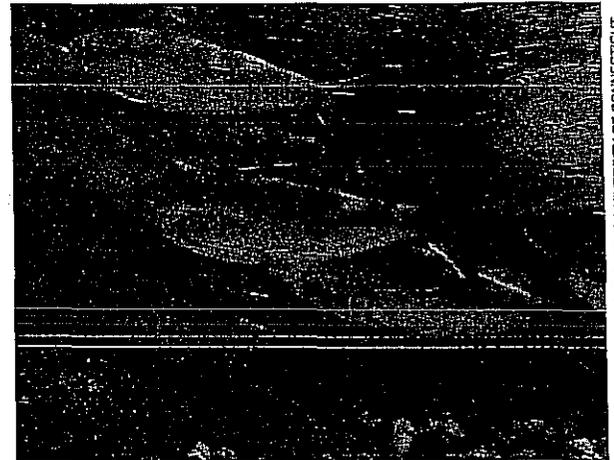
food. In the 1700s and 1800s, New England states exported huge numbers of salted river herring in barrels to sugar cane plantations in the South for the slaves to eat. Those

same states then imported molasses from the plantations to be used for distilling rum. River herring were netted from the beach in many rivers, but nowhere was the harvest greater than at Rocky Hill and Wethersfield on the Connecticut River, where the fishery persisted right up to the 1960s.

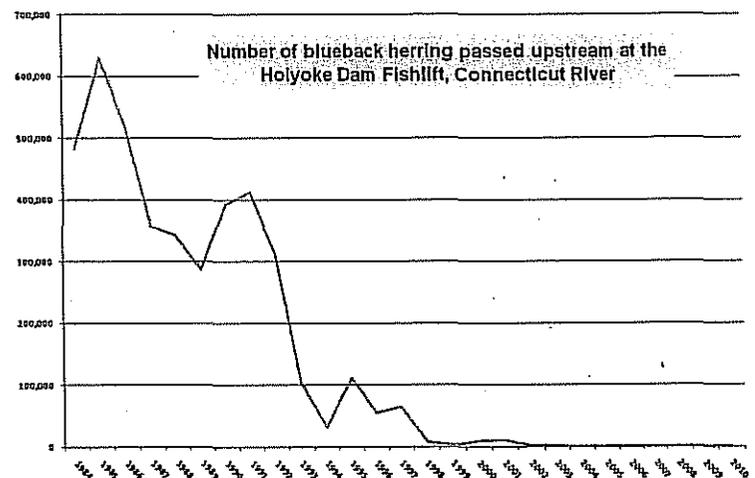
## A Decline in Herring Populations

The main reason for the demise of river herring, however, was the construction of thousands of dams in the 1700s and 1800s to power mills. These dams blocked the fish from reaching their ancestral spawning grounds and the runs were decimated. Severe water pollution between 1920 and 1970 exacerbated the problem and, by the time the DEP was created in 1972, the river herring runs were already a fraction of their former size.

Runs began to rebuild through the



Alewives moving up a rapidly-flowing freshwater stream to spawn.



1970s and 1980s, and places like the mouth of the Farmington River, the Housatonic River below Derby Dam, and Whitford Brook in Mystic once again turned black with river herring. However, a new decline began in the late 1980s, and it became so severe that by 2002, the Department implemented an emergency closure of all river herring fisheries in the state. It now is illegal to take either herring species by any means. The cause of the recent decline is unclear, but it appears to be happening in the ocean because river herring runs along the entire East Coast are affected, not just from one or two rivers. It is known that recovered stocks of striped bass are eating more river herring than in past years, but there also is some evidence that river herring are being incidentally taken at sea by other fisheries. More research is needed to identify the causes and reverse the trend.

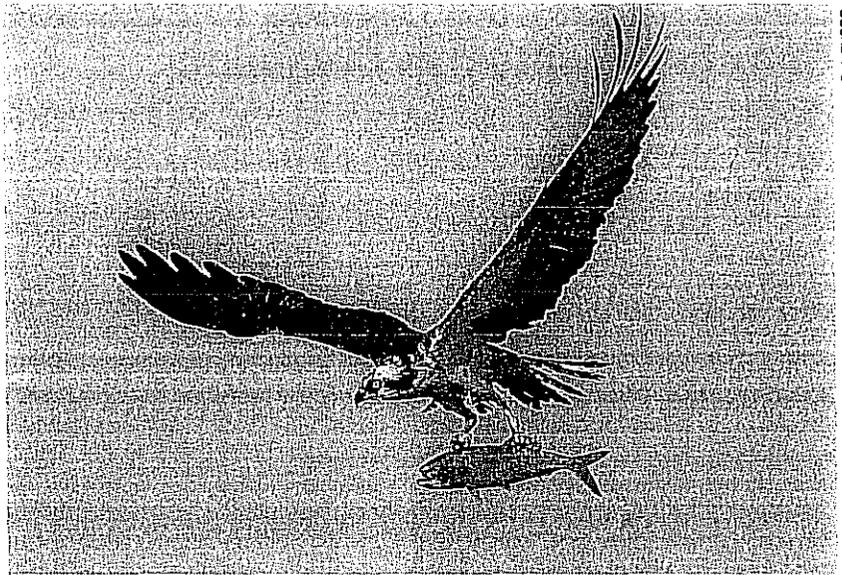
## Want to Witness River Herring Runs?

It's not as easy as it used to be to observe river herring runs, and many occur at night. Following are a few suggestions of where to see the fish run in Connecticut (if you go during the day, be sure to bring along polarized sunglasses):

- Mianus Pond Fishway - in April and May. Contact the Greenwich Conservation Commission about any public tours.
- Sasco Brook - in May, mostly at night. Located below the Boston Post Road Bridge (boundary between Westport and Fairfield). Try not to frighten the black-crowned night herons stalking the fish!
- Pequonnock River, Bridgeport - in April and May. Located between Glenwood Park and the Bunnells Pond Dam (by the Ice Palace.)
- Farmington River, Windsor - in May. Located near the Route 159 bridge and "Bart's."
- Salmon River, East Haddam - in May. Located below the Leesville Dam off Powerhouse Road.
- Latimer Brook Fishway, East Lyme - in April. Located between Flanders Four Corners and Interstate 95 to the east. Look right below the fishway.
- Poquetanuck Brook, Preston - in April and May. Located above the Route 2A bridge by the Brookside Restaurant.

Remember—look but don't touch! You are not allowed to harvest any herring. The runs are under observation and any illegal take will be reported to the EnCon Police.

If humans no longer eat herring, who should care about them? Everyone should—herring are among the most important forage species in our coastal ecosystems, both saltwater and freshwater. Everything eats them: stripers, bluefish, ospreys, eagles, largemouth bass, smallmouth bass, otter, mink, seals, porpoises—the list goes on. If these fish crash, so do the populations of the many species that depend on them for food.



P. J. FUSCO

Although this osprey appears to have nabbed a menhaden for dinner, the similar-appearing river herring is an important prey item for this fish hawk

### Restoring Runs with Fishways

But the news is not all bad. Many groups throughout Connecticut are partnering with the Inland Fisheries Division to restore runs of river herring in their communities by sponsoring projects to tear out dams or build fishways around dams. River herring are once again regaining access to their ancestral spawning grounds and populations are rebounding. In Greenwich, the Mianus Pond Fishway allowed a run of alewives to go from "dozens" to 90,000. In just four years, the annual run in Queach Brook in Branford went from 700 to 30,000, thanks to a fishway built by the Branford Land Trust and partners. Connecticut now has over 50 fishways built by land trusts, municipalities, watershed groups,

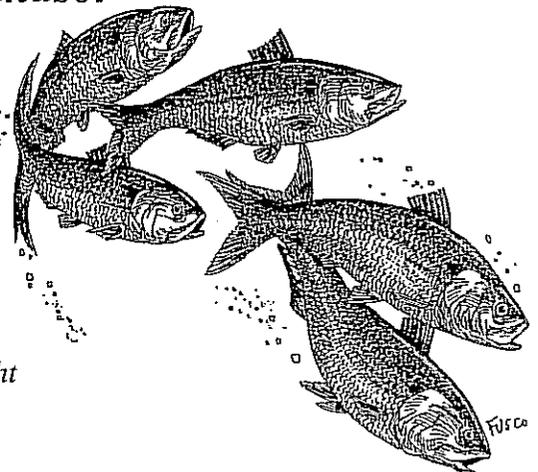
fishing groups (e.g., Trout Unlimited), conservation groups (e.g., The Nature Conservancy and Save the Sound), private individuals, and—oh yes—the DEP. In December 2010, former Governor M. Jodi Rell and DEP Commissioner Amey Marrella announced a series of grants to fund projects that will soon allow river herring to get around 11 more dams. Further assistance is being provided by the Inland Fisheries Division, which transplants river herring from healthy runs to streams under restoration (where fishways are about to be built) to re-start runs that have died out.

Problems in the ocean still need to be sorted out to help restore river herring to their glory, but these fish passage projects are helping maintain that wonderful spring tradition of "bucky runs" to Connecticut's streams.



## Open House at Rainbow Dam Fishway in Windsor

An Open House is planned at the Rainbow Dam Fishway, in Windsor, on June 4, 2011, from 10:00 AM-3:30 PM. Visit the largest fishway in Connecticut, a concrete structure that circumvents a 59-foot high hydroelectric dam and allows migratory fish to continue up the Farmington River to spawn. This is the one day during the year the public is allowed inside the gates, down the stairs, and into the counting house to watch migrating fish through the viewing window. If you're lucky, you'll see shad, trout, suckers, bass, sea lamprey, and maybe even an adult salmon! Take I-91 to exit 40; go west on Rt. 20 to the Hamilton Road South exit; turn left, then right onto Rainbow Road; the area is 1/4-mile on the left (look for signs).



# Cooperation from Canada to Ecuador to Determine Why Chimney Swifts Are Declining

Written by Shannon Kearney-McGee, DEP Wildlife Division

Connecticut's chimney swifts have been the focus of increased research and monitoring for the past five years. These birds have had a rate of decline of approximately seven percent range-wide since 2002. This decline rivals many of Connecticut's state-listed birds. This rate of decline, along with a lack of information, earned the chimney swift a new spot on the International Union for the Conservation of Nature (IUCN) Bird Life International Red List as "near threatened." The IUCN Red List of threatened species is widely considered to be the most objective and authoritative system for classifying species in terms of the risk of extinction. Information on a species' population size, population trends, and range size are used to determine its Red List category. Although chimney swifts are often observed in Connecticut, where they prefer to nest remains unanswered and more birds continue to disappear each year.

The potential reasons for the decline of chimney swifts include: 1) reduction in nesting and roosting opportunities as a result of new building practices; 2) reduction of suitable flying insects for food; 3) stress from major weather events, such as hurricanes, during migration; and 4) unknown threats on their wintering grounds in South America. Monitoring and research has begun to address the first two causes of decline.

## Adopt a Chimney!

*Are you interested in helping the Wildlife Division understand what is happening to chimney swifts while they spend the summer in Connecticut? Volunteers are needed to monitor active nests and roosting sites from April through August. Each volunteer will be assigned a historically active chimney site at which to count birds at least once a week during the half hour surrounding sunset or sunrise.*

*If you would like to assist with this project or know of any chimneys with nesting or roosting swifts, please contact Shannon Kearney ([shannon.kearney@ct.gov](mailto:shannon.kearney@ct.gov); 860-675-8130) at the Sessions Woods Wildlife Management Area.*

Regionally organized surveys in the eastern United States from 2008 to 2010 were designed to understand whether suitable nesting locations in chimneys were limiting birds. Results from these surveys in Connecticut indicated nesting was a relatively rare phenomenon across the entire landscape despite a myriad of seemingly suitable nesting opportunities. Random survey locations in Connecticut indicated that at least 25% of the chimneys appeared to be available for nesting swifts. In these same locations, however, chimneys are becoming unavailable due to chimney capping at a rate of 16% over the past two years.

These surveys and public reports indicated that birds were not evenly distributed across the state, but were being observed mostly in urban locales along river corridors. Results from surveys focusing on places where chimney swifts are often observed indicated that, even in known hotspots, only zero to four percent of chimneys were occupied by nesting swifts. These low rates were surprising because 86% of survey sites had swifts flying in the general vicinity. In addition, analysis of observations indicated that surrounding habitat did not influence nesting status, although swifts were more likely to be observed flying in urban locations. So, the question remains as to why swifts are observed flying, but not nesting.

## Which Chimneys Are Preferred?

There could be some aspect of the maintenance, use, or structure of chimneys, or maybe even the placement that makes some chimneys less desirable for nesting. This past fall, staff and volunteers began an intensive effort in one location where chimney swifts are known to occur to determine which chimneys had birds in them. This effort should shed light on the required characteristics of chimneys, thus helping researchers refine estimates of how many chimneys are truly available for nesting birds.

## International Cooperation

This past year was the first season of monitoring to investigate what the birds might be eating. This research is being done in cooperation with biolo-

*Although chimney swifts are observed in Connecticut, where they prefer to nest remains unanswered and more birds continue to disappear each year.*

gists in Canada. Canadian researchers at the University of Trent have determined that the onset of the population crash for chimney swifts was associated with a major reduction in the amount of beetle and bug prey and an increased reliance on fly prey. To understand whether or not swifts in Connecticut are consuming beetles and bugs or less nutritious flies, researchers enlisted homeowners with swifts in their chimneys to collect guano during the 2010 nesting season. These samples are being analyzed to determine what the birds were eating while nesting. If the birds are consuming more flies than beetles, nesting adults may be less able to raise their young successfully, indicating that the food supply in Connecticut may be contributing to the decline of swifts.

If nesting habitat and food are not driving the chimney swift decline, other possible causes, like conditions at the wintering grounds and weather, are more difficult to monitor and manage. Roost and nest monitoring may be used as an index of population decline in relation to weather events, but specific monitoring plans have not been finalized. However, because of online educational information, researchers were made aware of a large roosting colony of about 1,000 swifts in Ecuador this past fall. Interestingly, the observer was concerned for the safety of chimney swifts in Ecuador because of the potential threat from vampire bat eradication efforts! There has been an active eradication program of vampire bats in coastal Ecuador, and there is the potential for farmers to misidentify the swifts as bats. There is no quantitative information on how this activity may be threatening chimney swifts, but identifying the threat is the first step towards understanding its effect and possibly using education to lessen its impact.



# Mast Was Plentiful for Wildlife in 2010

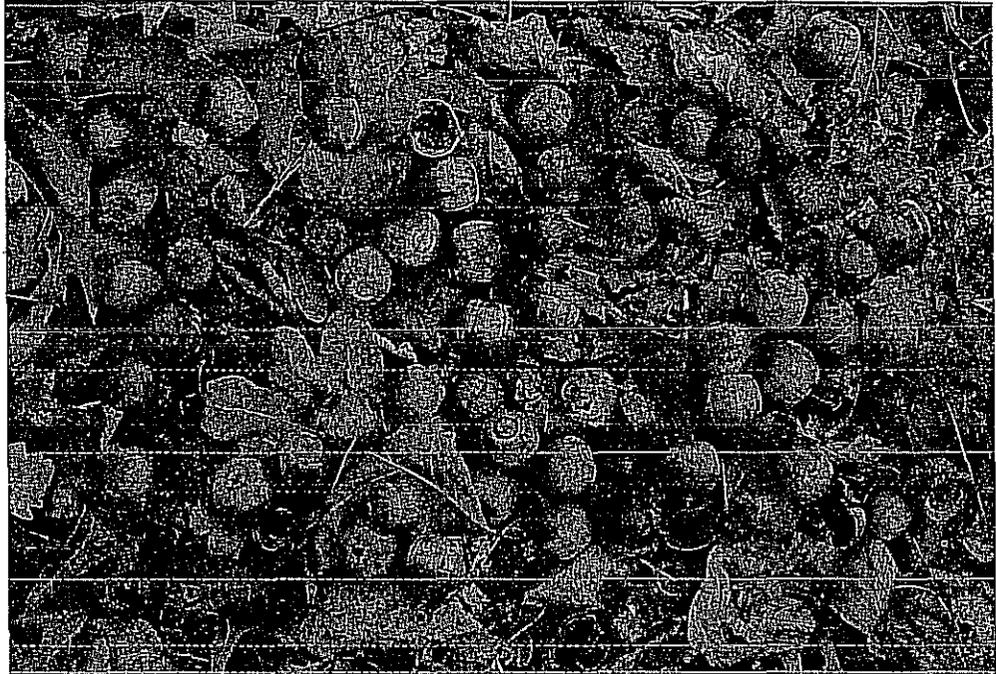
Written by Michael Gregonis, DEP Wildlife Division

Every year, established survey plots on various state properties are visited by Wildlife Division staff to assess the production of mast, mainly acorns, in forest areas. Mast is the dry fruit from woody plants. Examples include samara from maple, elm and ash; various pine seeds; and nuts from oak, hickory, beech, witch hazel and black walnut. Mast is the primary fall and winter food for many forest wildlife species. In some areas, acorns may comprise more than 50% of the fall diets of white-tailed deer and wild turkey.

Information from mast surveys is used to predict productivity in some wildlife populations, as well as the potential deer harvest. Past research has shown that in years with high acorn abundance, survival and the production of young increase for some wildlife species (e.g., tree squirrels). Information reported on annual deer hunter surveys indicates that in years of high acorn abundance, the deer harvest generally decreases. This reduction in the harvest can be attributed to deer moving less frequently from feeding areas to bedding areas and foraging for shorter periods of time, making them less likely to be harvested. Acorn mast is important to many wildlife species, often causing populations to fluctuate and impacting their vulnerability to hunting pressure.

*Mast is the primary fall and winter food for many forest wildlife species. In some areas, acorns may comprise more than 50% of the fall diets of deer and wild turkey.*

At 11 of the 12 survey sites, 25 trees from the white oak group (e.g., white, chestnut, and swamp oak) and 25 trees from the red oak group (e.g., red, black, pin, and scarlet oak) were selected for sampling. At one site, only 25 trees were selected from the red oak group because an insufficient number of white oaks were available for sampling. All survey trees are numbered, and the white oak group is marked with white paint, while the red oak group is marked with red paint. Marking the trees with paint and a metal numbered tag assists with locating



Acorn mast is important to many wildlife species, often causing populations to fluctuate and impacting their vulnerability to hunting pressure.

each tree on an annual basis.

Surveys are conducted from August 15 through September 1. The crown of each marked tree is scanned for 30 seconds with binoculars to detect the presence or absence of acorns. All trees are assessed to determine the proportion of sample trees that have mast, providing an index of productivity (see table). A productivity scale of 0 (scarce) to 6 (abundant) was used to rank mast abundance at both the regional (management zone)

and statewide level. The statewide index for the 2010 field mast survey was 4.4, whereas during 2008 and 2009 the index was 2.4 and 3.2, respectively. 2010's index indicates that statewide acorn abundance was moderate to abundant. On a regional basis, acorn abundance ranged from a high of 6.0 in Deer and Turkey Management Zone 3, to a low of 2.8 in zone 9. The remainder of the management zones had mast indices that fell into the moderate to abundant category.

## Connecticut Hard Mast Survey, 2010

Zone	Site Location	Percent Acorn Abundance		Total Percent Acorn Abundance	Research Mast Index
		White	Red		
1	Housatonic WMA	28	84	56	3.4
2	Sessions WMA	60	84	72	4.3
3	Scantic River SP	N/A	100	100	6.0
4	Belding WMA	92	100	96	5.8
5	Yale Forest	84	84	84	5.0
6	Aldo Leopold WMA	96	100	98	5.9
7	Sleeping Giant SP	20	84	52	3.1
8	Cockaponset SF	16	84	50	3.0
9	Hurd SP	24	68	46	2.8
10	Franklin WMA	92	92	92	5.5
11	Huntington SP	56	84	70	4.2
12	Barn Island WMA	36	100	68	4.1
Average					4.4

# Connecticut's Tiger of the Night - The Great Horned Owl

Article and photography by Paul Fusco, DEP Wildlife Division

More often heard than seen, the great horned owl is one of Connecticut's largest avian predators. Its size and strength easily surpass that of our large *buteo* hawks, the red-tailed and red-shouldered. Its ferocity has been likened to that of a tiger. Only the eagle is a more formidable raptor.

Known as the traditional "hoot-owl," the great horned is most often heard vocalizing as it sets up its territory and as courtship progresses into the nesting season. The voice is a deep, low-pitched series of three to seven hoots – *hoo, hoo-oo, hoo, hoo, hoo* – which resonates through the night forest.

Males hoot from a number of different perches within their claimed territory. Other nearby males may be heard answering the hoots as territorial boundaries become established. Territories and nest sites are claimed by early winter and nest-

ing begins shortly after.

Great horned owls do not build their own nests. They use existing nests that were previously built by hawks, ospreys, crows, or herons. Because they are early nesters, owls will have nesting well underway by the time red-tailed hawks or other birds come back to reclaim their old nest. Great horneds also may use tree hollows, bare rock ledges, or man-made structures for nests. They rarely will use the same nest as they did the previous year.

In Connecticut, usually one or two eggs are laid. The eggs take 28 to 30 days to hatch, usually in mid- to late winter. They are asynchronous, in that one egg will hatch two or three days before the other. Thus, one chick will be bigger and more dominant.

The young owls leave the nest in six to eight weeks. As they grow, the young gradually crowd the nest, causing them to begin to "branch," or walk out of the nest, onto surrounding branches before they have the ability to fly.

## Description

Great horned owls are large, bulky, and powerful. Their plumage is heavily mottled gray/brown and buff, with fine barring on the underside. They have a rusty orange facial disk and a white throat patch. The large feet and talons have the strength to kill prey that may be larger than the owl. Females are bigger and heavier than males.

Great horned owls have large heads with broad ear tufts. The large yellow eyes are set wide apart and positioned frontally, giving the birds binocular vision, which helps with judging distance and accuracy when hunting. The eyes have limited movement, so the birds must move their head to look in different directions. Flexible neck vertebrae allow the owls to rotate their head 180 degrees to look in any direction without moving their body.

The wingbeats of the great horned owl are power-

ful, steady, and stiff. The owl has broad, rounded wings and a short tail. Owls have serrations on their flight feathers which soften the rush of air through the wings as they fly, making their flight silent and stealthy.

## Distribution

Great horned owls are the most widespread owl in the Western Hemisphere. They are basically nonmigratory, but may disperse from their territories after breeding, and then return for the following breeding season. Although found throughout Connecticut in a variety of habitats, great horned owls are most common in the mature upland forests of the western and central parts of the state.

## Behavior

The great horned owl is an aggressive and ruthless hunter at night. During the day, it stays hidden out of sight with perfectly camouflaged plumage, blending into tree trunks and shadowy evergreens.

Perhaps the best time to see a great horned owl is at dusk. The bird comes out of hiding just after sunset and before the last light of the sky is lost. It will fly up to a hunting perch, frequently in a treetop or other high point along a forest edge or within a clearing, as it begins to scan for prey.

The loud and raucous calls of crows will sometimes alert a person to the presence of a great horned owl. The owls are often harassed when found by crows during the day. At night, however, the tables are turned as roosting crows may get raided by a hungry great horned owl. In fact, great horned owls are the most significant predator of crows.

As one of the most opportunistic predators in Connecticut, the great horned owl will take any animal it can catch. It will take animals that walk or crawl on the ground, birds and bats from roosts or out of the air, and fish out of the water. The owl will even regularly prey on such unappetizing morsels as skunks and sometimes even porcupines.

Their chief prey is small to medium sized mammals, with a large percentage of them being rodents, rabbits, and skunks. They also will take house cats. The birds they are known to kill include ducks, turkeys, hawks, herons, and songbirds. Other owl species normally will not



Great horned owls frequently perch close to the trunk of a tree where their plumage blends into the bark.



Before they are old enough to fly, young owls will normally "branch" from the nest by climbing out of the nest onto surrounding branches.

be found within a great horned's territory as great horned owls have been known to kill and eat smaller owls, including barred owls. When prey is plentiful, an owl will only eat the head and brains of its victim, leaving the carcass for scavengers.

Stealth is the primary technique employed when hunting. Silent flight and radar-like hearing allow an owl to take unsuspecting victims, including ducks that may be sleeping on the water. When all is said and done, there are few nocturnal creatures that can carry out their activities without fear of the great horned owl.

### ***Conservation and Management***

Great horned owls are adaptable and widespread, and they use a great variety of food resources. They have benefitted from forest regeneration and maturation, as well as from laws protecting raptors and other birds. The creation of edge habitat that results from forest fragmentation has likely benefitted great horned owls.

In Connecticut, wildlife managers have found that great horned owls will kill nestling ospreys. In other parts of

the country, there have been localized problems of owls preying on endangered species, which have included peregrine falcons, barn owls, spotted owls, and sea turtle hatchlings. In the past, the great horned owl was considered a harmful

species by many because of its potential for preying on poultry and game animals. Today, however, the great horned owl is widely recognized for the positive role it plays in controlling destructive rodents and other problem species.



# Paugussett State Forest - Sweetest of Them All?

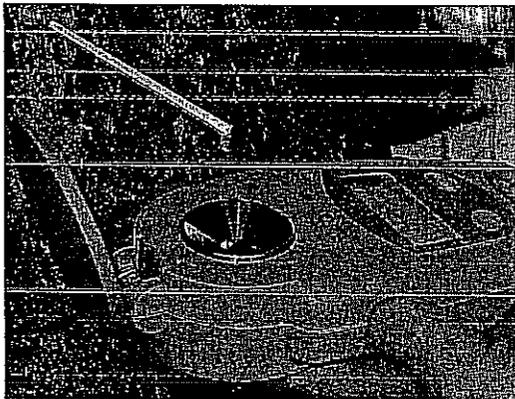
Article and photography by Jerry Milne, DEP Division of Forestry

**P**augussett State Forest in Newtown may be the sweetest woods in Connecticut. That's because the Division of Forestry has been actively managing a sugarbush as a demonstration area. A sugarbush is a stand of sugar maples that is tapped for maple syrup. It gets its name from the Dutch word "bosch," meaning "woods."

## *Sugarbush Features*

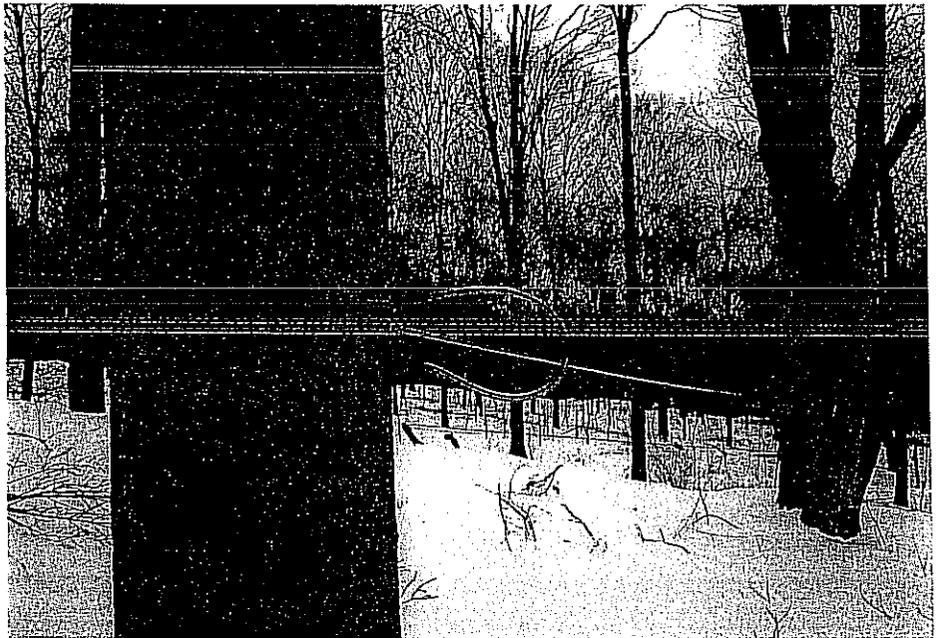
There are several characteristics that make for a good sugarbush. Obviously, the most important criterion is to have a forest made up mostly of sugar maples, although red maples also can be tapped. In addition, the site should be on a gentle slope to allow for the use of tubing and gravity to collect the sap. Even better would be an east-facing slope, allowing the sun to warm the trees early in the day, causing the sap to flow sooner. Moist, fertile soils that provide good growing conditions for sugar maples are needed, and access to a nearby road for sap collection also is helpful.

When the first management plan for Paugussett State Forest was written in the 1980s, a six-acre area that met all of the criteria for a sugarbush was identified. It presented the perfect opportunity to show landowners how to manage their own



A refractometer is used to measure sap sugar content. Some trees are consistently sweeter than others and should be favored as crop trees.

woodlots to produce maple syrup, while also allowing the public to cut firewood and the Division of Forestry to generate revenue. This particular grove originated when a pasture was abandoned around 1960, and the sugar maples along the bordering stone walls seeded in. At first, thousands of maple saplings per acre covered the ground. Over the years, as they grew and competed for sunlight, the numbers were reduced to a few hundred trees per acre that were growing slowly. Because the trees were relatively small (the average trunk was six inches in diameter) when the potential area was identified, it presented an ideal time to create a sugarbush of well-spaced, high quality, productive trees.



Tubing has replaced buckets for collecting sap in most sugaring operations.

## *Developing the Sugarbush*

The first step was to identify the potential crop trees. These would be the tallest maples with the widest and healthiest crowns. The trunks would have the fewest defects and forks, and they would be spaced about 25 to 30 feet apart. When these trees were at least 12 inches in diameter (measured at chest height), they would be big enough to tap.

The second step was to measure the sugar content of the sap of these selected trees and compare it to the others. If the sap was as sweet or sweeter, it became a crop tree.

## *The Rule of 86*

Just as people vary in height, the sugar content of sap can vary widely from tree to tree. Sugar concentration can range from as low as one percent to well over five percent, with most trees averaging between two and two-and-a-half percent. Maple syrup producers are familiar with the "Rule of 86" (86 divided by the sap sugar concentration gives the number of gallons of sap needed to make one gallon of syrup). For example, to produce one gallon of syrup, it takes 43 gallons of 2.0% sap compared to only 24.5 gallons of 3.5% sap. That's quite a difference in time and energy needed to produce the same amount of syrup.

Sugar content is measured by placing a drop of sap on a refractometer; the more sugar in the sap, the higher the reading.

## *Competing Trees Sold for Firewood*

After the crop trees were identified, the trees that competed with them for growing space were marked for removal. Trees whose crowns touched the crop trees were targeted. These trees were sold to the public through the Division of Forestry's firewood cutting program. In this program, DEP foresters mark the trees to be removed, and the individual pays \$60 for a permit



Trees that compete with crop trees in a sugarbush are marked for removal and sold to the public through the Division of Forestry's firewood cutting program.



The sugarbush before thinning. The flattening of a tree's crown on one side, shown on the tree to the left, indicates too much competition from adjacent trees.

to cut two cords of firewood. (To learn more about the DEP's firewood cutting program on state forests, go to [www.ct.gov/dep/forestry](http://www.ct.gov/dep/forestry), and click on "firewood.")

After several years of thinnings (and many cords of wood sold), the growth rate of the trees had doubled. This was verified by counting the growth rings. Currently, the trees have eight annual rings per inch, meaning that in eight years, the tree's trunk grew in diameter by two inches. After 16 years, many of the original crop trees were big enough to be tapped. The sugarbush has been leased to a commercial maple syrup producer for many years. Originally, there were enough crop trees to accommodate 50 taps. Now, there are over 400 taps.

Several years ago, the Maple Syrup Producers Association of Connecticut held a field meeting at Paugussett State Forest where sugarmakers learned how to manage their own sugarbushes. Statewide, the Division of Forestry leases a few areas on state forests to large scale maple syrup makers. Suitable sites are limited, and they are carefully chosen to not conflict with other uses of the forests.

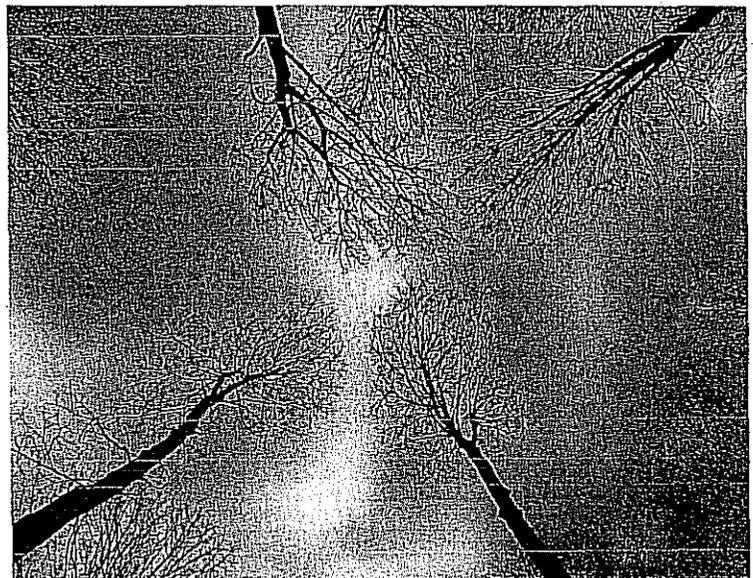
### *Visit the Sugarbush*

The Paugussett State Forest sugarbush is located near the entrance to the forest, at the end of Echo Valley Road in Newtown. You also can reach the sugarbush by hiling the Lillinonah Trail, part of the Blue Trail system maintained by volunteers from the Connecticut Forest and Park Association ([www.ctwoodlands.org](http://www.ctwoodlands.org)). The trail runs right past the area.

### *For More Information*

If you think your woodlot has potential for a sugarbush, call the Division of Forestry at 860-424-3630 to arrange for a visit from one of the DEP Service Foresters.

Maybe you don't have your own woodlot, but have access



The sugarbush after thinning. The crowns of the crop trees have been opened up on two or three sides. They now will grow twice as fast.

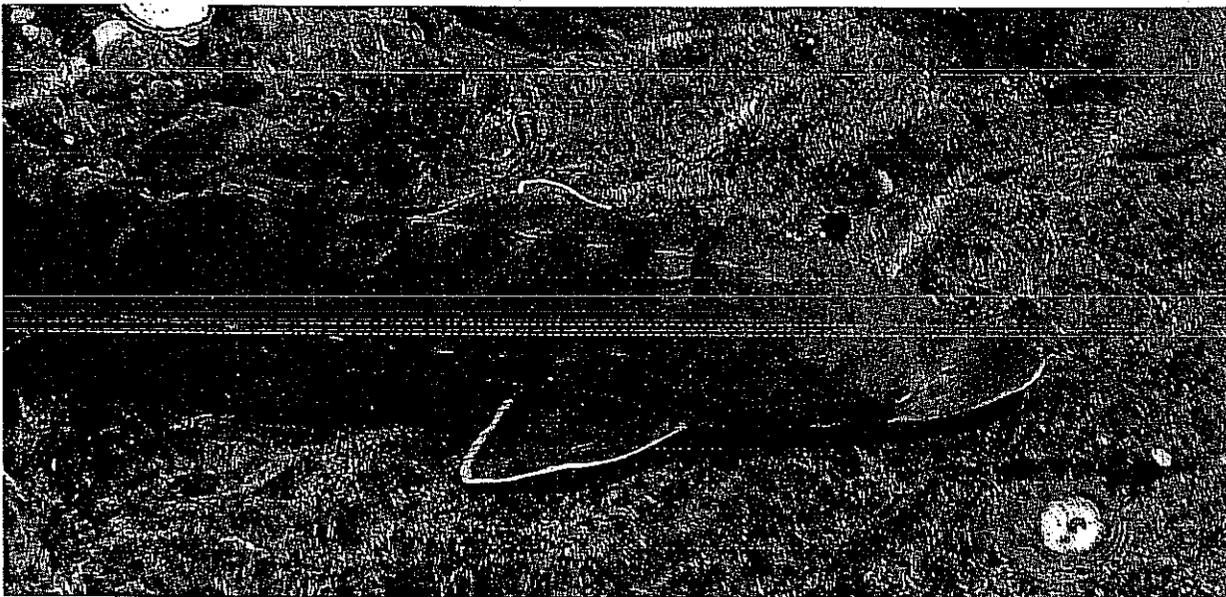
to sugar maples, perhaps roadside trees or some in the backyard. To learn more about making maple syrup, contact the Maple Syrup Producers Association of Connecticut ([www.ctmaple.org](http://www.ctmaple.org)). The DEP Goodwin Conservation Center in Hampton also offers maple sugaring classes ([www.ct.gov/dep/goodwin](http://www.ct.gov/dep/goodwin)). You also should obtain a copy of the North American Maple Syrup Producers Manual, produced by the Ohio State University Extension Service ([www.estore.osu-extension.org](http://www.estore.osu-extension.org)).

### *Forest Fire Danger Updates Available on DEP Web Site*

*Connecticut traditionally experiences high forest fire danger from mid-March through May. The Division of Forestry constantly monitors forest fire danger levels to help protect Connecticut's 1.8 million acres of forested land. Throughout the spring forest fire season, DEP posts daily advisories on forest fire danger levels on its Web site ([www.ct.gov/dep/forestfiredanger](http://www.ct.gov/dep/forestfiredanger)). Advisories also are sent to DEP field staff, municipalities, fire departments, and the media. Forest fire danger levels are classified as low, moderate, high, very high, or extreme.*

# Connecticut's 'Prehistoric' Fish

By Tom Savoy and Penny Howell, DEP Marine Fisheries Division; Photos provided by DEP Marine Fisheries Division



Shortnose sturgeon migrate throughout the Connecticut River, moving to the river mouth in spring and northward in summer. The species' distinctive scutes are visible running along its back and sides. The leading edge of the pectoral fin calcifies somewhat and a thin section of a piece of this fin is used to age the fish.

Of the 200 or so species of finfish swimming in Connecticut waters, the sturgeons are among the most primitive and strange-looking fish. Sturgeons appeared in the fossil record around 200 million years ago, during the Mesozoic Pleistocene Era, making them among the most ancient of fishes with very little change in their appearance over millennia. Like some dinosaurs, they have scutes, or hard plates, instead of scales lining their sides and dorsal (top) surface. They have no true bones, no teeth, and a skeleton of cartilage.

Two species can be found in Connecticut waters. The Atlantic sturgeon is the larger of the two and is anadromous, meaning that it spends most of its time in coastal saltwater but swims to freshwater to lay eggs. This species can grow up to 12 feet in length and weigh hundreds of pounds. The smaller shortnose sturgeon is more of a freshwater resident as it does not move into the marine zone for extended periods of time. A remnant population of shortnose sturgeon occurs in the state in the Connecticut River. These fish are usually two to three feet in length, never exceeding four feet. Maturity is a slow process for both species: sturgeon take from 10 to 25 years to become sexually mature, and can live up to age 60. After reaching maturity, males breed every one to two years, but females usually breed every third to sixth year. Females spend multiple years with reduced feeding and

growth and produce 40,000 (shortnose) to 3.8 million (Atlantic) eggs.

## *Abundant to Rare*

American Colonial journals recorded accounts of huge Atlantic sturgeon being harvested commercially for food. In the late 1800s, sturgeon were second only to lobster among important coastal fisheries. Because of their delayed maturity and long reproductive cycle, over-harvesting of sturgeon for flesh and eggs (a.k.a. caviar) in the 1880s caused Atlantic sturgeon numbers to plummet. Life history characteristics, in combination with sensitivity to pollution and loss of access to spawning areas, have kept populations from recovering to pre-Colonial period numbers. A coastwide harvest moratorium was implemented in 1998, but it will take many more years to see any recovery.

The shortnose sturgeon is the only fish species in Connecticut waters which is classified as an endangered species throughout its range, having been recognized as such in 1967. The Atlantic sturgeon currently has no federal status, but it is listed as threatened in Connecticut waters. Action is expected in early 2011 on a federal petition to list the New York bight DPS (Distinct Population Segment) as endangered.

## *Research to Learn More*

DEP Marine Fisheries Division biolo-

gists have been monitoring both sturgeon species in Connecticut waters since the 1980s. To aid in the protection of these unique fish, a variety of tags have been used, including exterior t-bar and surgically implanted ultrasonic tags. These tags have been placed on hundreds of individuals over the last 25 years to record information on movements and behavior. Recent developments include the use of Passive Integrated Transponder (PIT) tags, similar to those used by people to 'mark' their pets. Sturgeon also have had ultrasonic tags surgically implanted to record information on locations and movements of individuals. These studies have revealed that the Connecticut River population of shortnose sturgeon over-winters primarily north of Hartford and then migrates south to the estuarine (brackish) sections of the river near Essex and Old Saybrook with the spring freshet. Access to this region and the available food resources is important to the general health and well-being of this species. These fish slowly move northward over the summer when the lower river regains its salinity. Several key feeding areas have been identified where the fish congregate seasonally. Keeping disturbances away from these areas when the fish are present has paid off. Monitoring and tag return data have shown that the population in the river has increased from about 850 fish in the early 1990s to over 1,800 in 2002.

Studies of Atlantic sturgeon are more

challenging, not only due to the fish's larger size but also because the species migrates seasonally along the entire East Coast. Connecticut's spawning population is essentially extirpated. Spawning rivers along the East Coast with remnant populations of Atlantic sturgeon remain unclear, but the largest population appears to be in New York's Hudson River. Through research grants funded by The Nature Conservancy, U.S. Fish and Wildlife Service, and National Marine Fisheries Service, DEP biologists have captured and examined over 1,500 Atlantic sturgeon in Connecticut waters since 1984. Additionally, 84 Atlantic sturgeon have been implanted with ultrasonic tags in the last five years. Data from self-contained acoustic receivers placed in



Atlantic sturgeon are found in Long Island Sound and the lower sections of Connecticut rivers from May through November. Note the protective scutes running along the fish's side and the finger-like barbels surrounding the mouth, which the sturgeon uses to 'feel' along the bottom for food. Two externally applied t-bar tags can be seen on this sturgeon (small, yellow "threads"); one above the left pectoral fins and one below the dorsal fin. DEP staff examined, measured, weighed, and tagged this sturgeon before releasing it.

Long Island Sound are downloaded monthly to track the movements of the tagged fish. Early data showed that the mouth of the Connecticut River and the area surrounding Faulkners Island, off Guilford, are seasonal concentration zones critical to the fish's successful growth and survival. Over the years,

cooperating scientists in other states have tracked Atlantic sturgeon tagged in Connecticut in waters off New York, New Hampshire, Delaware, Maryland, Virginia, North and South Carolina, and Georgia. Connecticut biologists have recorded similar data from an equal number of sturgeon from other states.

## Emerald Ash Borer Monitoring Underway in Spring

The Connecticut Cooperative Extension System ([www.extension.uconn.edu](http://www.extension.uconn.edu)) will lead an emerald ash borer monitoring effort this spring and summer, with funding and assistance from the Animal Plant & Health Inspection Service (USDA APHIS). The survey will cover approximately 75% of Connecticut to help monitor for the presence of this non-native, invasive insect. Purple traps will be placed on a two-mile by two-mile square grid in all counties except Windham and New London. Private and municipal landowners may be called upon to allow the placement of traps on their property. The traps will be hung by rope, preferably in or near ash trees. State and federal agency staff will periodically monitor the traps from April through August.

Federal agricultural officials confirmed the presence of the emerald ash borer in Saugerties, New York (about 25 miles from the Connecticut border), in July 2010. This destructive pest is an exotic wood-boring beetle from Asia that has killed more than 50 million ash trees, causing extensive environ-

mental and economic damage throughout infested areas in the Northeastern United States and Canada. It has metallic green wing covers and a coppery red or purple abdomen. It is about one-half inch long, with a flattened back.

Early detection is the best defense against further infestation. Possible emerald ash borer infestations should be reported to the Connecticut Agricultural Experiment Station at 203-974-8474, 203-974-8485, or [CAES.StateEntomologist@ct.gov](mailto:CAES.StateEntomologist@ct.gov) (digital photos of suspect insects are helpful). Suspect infestations also can be reported to APHIS via their Web site at [www.aphis.usda.gov](http://www.aphis.usda.gov). More information on the emerald ash borer can be found on the DEP Web site ([www.ct.gov/dep/forestry](http://www.ct.gov/dep/forestry)), or at [www.emeraldashborer.info](http://www.emeraldashborer.info).



CT COOPERATIVE EXTENSION SYSTEM

# 2011 Is the Year of the Turtle

Turtles are in trouble. Because of the issues surrounding turtles and the need to raise awareness, Partners in Amphibian and Reptile Conservation (PARC) has proclaimed 2011 as the Year of the Turtle. Through outreach efforts to researchers, educators, natural resource managers, and the public, the "Year of the Turtle" campaign aims to increase U.S. involvement in local-to-national turtle issues. State and federal wildlife agencies, along with several conservation and turtle organizations, are partnering with PARC to help spread the word about the plight of turtles. The DEP Wildlife Division also has made a commitment to inform Connecticut residents about the state's native turtles through monthly press releases, articles and species profiles (see page 19) in issues of *Connecticut Wildlife* magazine, a children's art contest, and related events.

The United States has more native turtle species than any other country; it is a turtle biodiversity hotspot. Currently, 328 species of turtles are known worldwide, with 57 species in the United States and Canada, and 12 species in Connecticut (bog, Eastern box, musk, painted, snapping, wood, and spotted turtles; northern diamondback terrapin; and loggerhead, leatherback, Atlantic green, and Atlantic ridley sea turtles).

Turtles (which include tortoises) occur in fresh water, salt water, and on land. Their shells make them some of the most distinctive animals on Earth. Turtles are

## What Is PARC?

Partners in Amphibian and Reptile Conservation (PARC) is an inclusive partnership dedicated to the conservation of the herpetofauna – reptiles and amphibians – and their habitats. Membership comes from all walks of life and includes individuals from state and federal agencies, conservation organizations, museums, pet trade industry, nature centers, zoos, energy industry, universities, herpetological organizations, research laboratories, forest industries, and environmental consultants. The diversity of its membership makes PARC the most comprehensive conservation effort ever undertaken for amphibians and reptiles. PARC is habitat focused, and centers on endangered and threatened species and keeping common native species common.

The Connecticut DEP has been a member of PARC since 1999.



The spotted turtle is one of 12 species of turtles found in Connecticut. It is considered to be of conservation concern throughout most of its range, including in our state. PHOTO BY P. J. FUSCO

typically slow creatures. This isn't limited to their speed; they also grow slowly. It may take 10-15 years before individuals of some species can reproduce. A thriving turtle population relies on turtles surviving many years, if not decades. But if a population loses adults and begins to decline, a slow recovery can be expected. Because of these "slow" characteristics, the primary threats to turtles are intensified.

## Threats to U.S. Turtles

The bad news is that humans cause the largest harm to turtle populations, but the good news is that we have the power to make positive changes toward turtle survival. The largest threats to turtle populations include:

- Habitat loss and degradation;
- Overharvest of wild turtles for food, traditional medicines, and pets;
- Mortality from roads, agricultural machinery, fishing bycatch, and predators;
- Exotic invasive species and diseases;
- Loss of unique genetic makeup due to hybridization; and
- Climate change.

## Conservation Action Can Help

Careful stewardship and conservation action can successfully slow or reduce the declining trend of turtles. Because turtles

can respond well to population management and conservation, it is not too late to preserve our turtle heritage. Three basic approaches for species conservation include: 1) protecting rare species and their habitats; 2) managing common turtle species and their habitats so that they remain common; and 3) managing crisis situations, such as species in peril from acute hazards (e.g., oil spills):

Important progress is already being made in the United States. The freshwater turtle science and conservation community, in conjunction with state and federal wildlife agencies, recently developed recommendations for managing freshwater and land turtle populations. These recommendations include better monitoring and tracking of turtle harvests, as well as the need for more long-term population studies on wild turtles.

Stay tuned to future issues of *Connecticut Wildlife* to learn more about turtles during the "Year of the Turtle." You also can visit PARC's Web site at [www.yearoftheturtle.org](http://www.yearoftheturtle.org) for more information, as well as the DEP Web site ([www.ct.gov/dep/yearofturtle](http://www.ct.gov/dep/yearofturtle)).

Adapted from the "State of the Turtle," written by Deanna Olson from the U.S. Forest Service, and A. Ross Kiester, from The Turtle Conservancy. This report can be viewed at [www.yearoftheturtle.org](http://www.yearoftheturtle.org).

# Bog Turtle

*Glyptemys muhlenbergii*

*State and Federally Endangered Species*

## Background

The state endangered bog turtle is the rarest turtle in Connecticut. Only small, isolated populations exist in the state and information on them is scant. Populations have been documented in five Connecticut towns, and unconfirmed sightings and single specimens have been reported from several other towns between the Housatonic and Connecticut Rivers. Illegal collection for the pet trade has further depleted local populations.

The bog turtle was given protection in 1973 by CITES, the Convention on International Trade in Endangered Species. The turtle was added to the federal endangered species list on November 4, 1997. In Connecticut, it is against the law to remove any bog turtle, including eggs, from the wild.

Intensive development pressure in all portions of the bog turtle's range have caused the draining and filling of wetland habitat. Remaining wetlands have been isolated, resulting in the fragmentation of bog turtle populations. These small populations cannot mix with others and only breed within the population. The result is a loss of genetic variation, which reduces the population's ability to adapt to a changing environment. Bog turtles are extremely sensitive to changes in their environment, such as increased nutrification, altered drainage, vegetation changes, or pollution.

## Range

Bog turtles currently occur in scattered colonies in western Connecticut, western Massachusetts, and through New York, south to northeast Maryland, southern Virginia, western North Carolina, and Georgia.

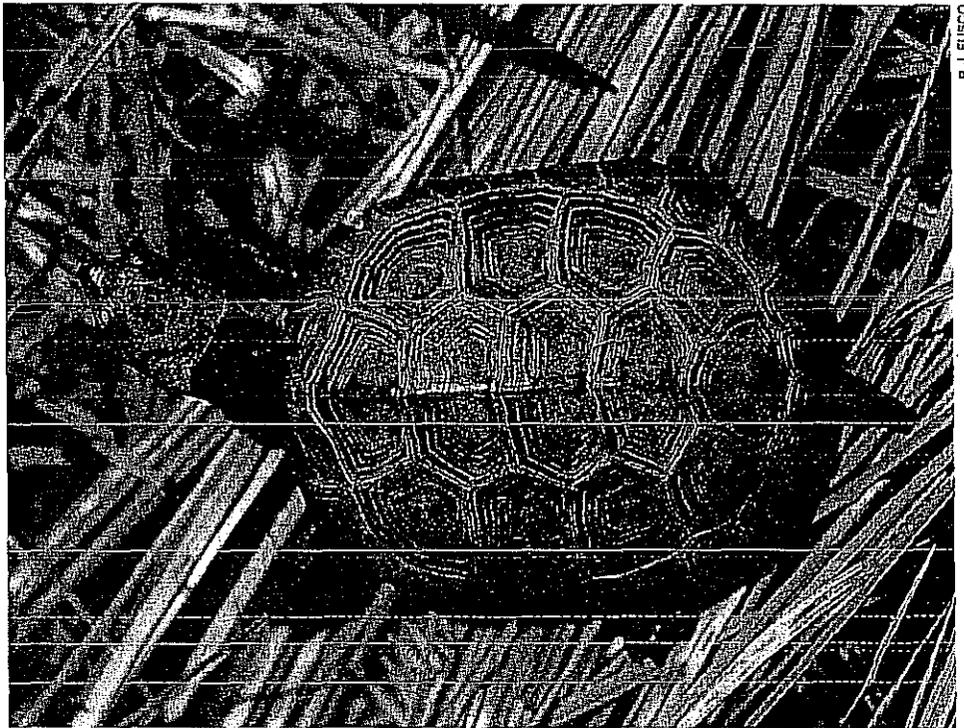
## Description

The bog turtle is the smallest of the turtles found in Connecticut, measuring from three to three-and-a-half inches and weighing approximately four ounces. It has an orange or yellow head patch which is sometimes divided into two parts. The large scutes (shell segments) of the dark carapace (upper shell), have yellow or reddish hues. Males have a flatter carapace, concave plastron (bottom shell), and a long, thick tail. Females have a wider carapace, convex plastron, and a short, thin tail.

## Habitat and Diet

Suitable bog turtle habitat consists of calcareous (containing calcium carbonate, calcium, or lime) wetlands, such as open sphagnum bogs, wet meadows, and wet pastures. In Connecticut, these special habitats only occur in the western part of the state. Bog turtles rely on an abundance of grassy or mossy cover and high humidity. Open, sunny areas where the turtles can bask to raise their body temperature also are important.

Bog turtles eat seeds, berries, insects, slugs, worms, crayfish, frogs, snakes, snails, and carrion.



P. J. FUSCO

## Life History

Bog turtles breed in late April to early June after emerging from hibernation. Nests are usually in tussocks or on sphagnum moss in sunny areas of a bog. The two to five (usually 2-3) eggs are laid from June to July and are left on their own to develop and hatch. Incubation lasts for seven to eight weeks and hatching occurs from July to early September. In Connecticut, eggs may overwinter in the nest and hatch in spring when there is an abundant food supply. The nests are often preyed on by skunks and raccoons. The young are only one inch long at hatching and are often taken by a variety of birds and mammals. Bog turtles reach sexual maturity between nine and 15 years of age.

## Interesting Facts

During winter, bog turtles hibernate underwater in deep areas of bogs in about six to 18 inches of mud. Immature turtles do not hibernate in deep mud until they are two to three years old. The turtles emerge from hibernation in late March through April and may migrate short distances to feeding and breeding sites.

Bog turtles feed during the daylight hours; however, they are seldom active during the hottest part of the day and are inactive on chilly mornings.

Adults are preyed on by raccoons, skunks, foxes, and dogs.

## How You Can Help

According to Connecticut regulations, bog turtles may not be collected from the wild. They also should never be kept as pets. The pet trade has encouraged illegal capture of bog turtles in many areas of the country and can only effectively be stopped by reducing the demand for bog turtles as pets.

Another way to help bog turtles is to protect their bog habitats by not disturbing or damaging them.

# Musk Turtle

*Sternotherus oderatus*

## Background and Range

Both the scientific and common names of the musk turtle pay heed to the odor produced when this turtle is captured or disturbed. The musk of this turtle and its relatives in the Kinosternidae family comes from a yellow fluid produced by two pairs of glands beneath the margin of the carapace (top shell).

Musk turtles occur throughout much of the eastern United States. Within Connecticut, musk turtles are found in low elevation areas, especially in the Housatonic and Thames River drainages. They are less widespread in north central Connecticut, with very localized populations.

## Description

This small turtle, which measures 3 to 5 inches, has a tan, brown, gray, or black carapace that may bear dark flecks, a central longitudinal keel, and a thick coating of algae. Though variable, the carapace is usually smooth, oval, and steeply domed. Musk turtle hatchlings are dark and have a rough carapace with a prominent or possibly multiple keels. Like the snapping turtle, the musk turtle's plastron (bottom shell) is highly reduced. A good amount of the turtle's flesh is exposed around the limb and tail joints. The color of the plastron is often similar to that of the carapace and may have a dark coloration on the scutes (shell segments) with a light ivory color in between scutes.

The musk turtle's head is distinct from the heads of Connecticut's other turtles in that it is triangular in shape and large when compared to body size. A pair of yellow lines runs along each side of the head from the nostrils to over and under the eyes. These lines may become broken or fade completely with age. A set of short barbels (soft barb-like projections) can be found on the chin and another set on the throat. The musk turtle's feet are heavily webbed and clawed.

Several characteristics can be used to distinguish males from females: 1) Males have patches of rough scales on the inside of the hind legs that are used to grasp the female's carapace during mating; 2) More skin is in between the seams of the scutes on the male's plastron; 3) The tails of males are longer, thicker, and equipped with a spike at the tip; and 4) Males have larger heads than females.

## Habitat and Diet

The most common habitat types for this highly aquatic turtle are rivers, streams, and reservoirs associated with river systems (including impoundments). Shallow, slow-moving streams and rivers with muddy bottoms and dense aquatic vegetation are preferred. Unlike most other species, the musk turtle actually benefits slightly from dam construction because this creates the slow moving, muddy water habitats in which these creatures thrive.

The diet of the musk turtle includes freshwater mussels, snails, crayfish, aquatic insects, worms, small fish, tadpoles, carrion, and aquatic vegetation.



Both the scientific (*Sternotherus oderatus*) and common names of the musk turtle pay heed to the odor produced when this turtle is captured or disturbed. PHOTO BY P. J. FUSCO

## Life History

One beneficial aspect of the musk turtle's biology is that it reaches sexual maturity in a relatively short amount of time compared to the Connecticut state-listed wood turtle (special concern), box turtle (special concern), and bog turtle (endangered). These imperiled species often take well over a decade before they can reproduce. Male musk turtles usually mature in only three years, while females take from four to seven years. Mating occurs underwater. This generally takes place from April through early May. Female musk turtles will leave the water to nest up to three times during May to June. Nest cavities are dug near the water's edge, often under a log, tree stump, or leaf litter. Approximately five to eight eggs are laid in the cavity and covered up. Hatchlings emerge in September and October.

## Interesting Facts

When the colder weather of fall arrives and the water temperature drops below 50 degrees Fahrenheit, musk turtles head to their hibernacula beneath the mud, where they are safe from impending freezing temperatures. Following this period of winter dormancy, musk turtles become active again in spring. They can be found during the day basking in shallow water or on top of emerging rocks, logs, and angled tree trunks. These turtles are known to climb high up into the branches of shrubs and trees.

Musk turtles often are found walking along the bottom of a waterbody rather than swimming. They also camouflage themselves by burrowing slightly into the muck. The algae frequently found growing on their shells help the animals blend in among the plants and similar-looking algae-covered stones.

A largely nocturnal species, activity increases as the sun sets and continues into the night. The barbels on this turtle's chin and throat are sensory organs which allow the turtle to feel for prey resting on the bottom of the waterbody.

Musk turtles are rarely found on land, typically leaving the water or their elevated basking perches only to nest or find new aquatic habitats. They also are gregarious animals and are usually found together in numbers.

# Numbers Up for the 2011 Midwinter Waterfowl Survey

Written by Min T. Huang, DEP Wildlife Division

Every year since 1955, the Wildlife Division has conducted the Midwinter Waterfowl Survey to obtain an index of long-term wintering waterfowl trends. The total number of ducks observed during the 2011 survey – 22,926 – was the highest since 1999, and the puddle duck count was the highest since 1985. Puddle ducks, which are typically found in fresh, shallow marshes and rivers, include the mallard, American black duck, American wigeon, and gadwall.

The Midwinter Waterfowl Survey is conducted in early January throughout the Atlantic Flyway. The Atlantic Flyway is a bird migration route that generally follows the Atlantic Coast of North America and the Appalachian Mountains. Most of the states that make up the Atlantic Flyway participate in the survey. The survey is conducted from a helicopter in Connecticut and a census is obtained from the coast, the three major river systems (Connecticut, Thames, and Housatonic) and selected inland lakes and reservoirs. The survey is a snapshot in time of waterfowl distribution throughout the Flyway.

The survey was conducted in Connecticut during the first week of January 2011. Survey conditions were excellent. Many of the inland lakes and ponds were frozen due to prolonged cold weather in the weeks prior to the survey. When inland water areas freeze, waterfowl concentrate along the coast and on the major river systems. Clear skies and light winds on the day of the survey led to unlimited visibility and good flying conditions.

## Survey Results

Continuing the trend of 2010, counts of all puddle ducks in 2011 were above their five-year averages. The mallard count was the highest in over 15 years, as was the count for American black ducks. American wigeon and gadwall counts also were above their respective five-year

## Please DO NOT Feed Waterfowl

More and more puddle ducks are being observed in urban sanctuaries during the Midwinter Waterfowl Survey where, in many instances, supplemental feeding by the public is occurring. The Wildlife Division discourages citizens from feeding waterfowl for a number of reasons, including increased risk of disease transmission and potential for poor nutrition. The Division has published a brochure, "Do Not Feed Waterfowl," that outlines the potential hazards of feeding waterfowl. It is available on the DEP Web site ([www.ct.gov/dep/wildlife](http://www.ct.gov/dep/wildlife)).

averages. There has been a slow, but noticeable redistribution of puddle ducks on the coastline in recent years.

The scaup count was well above that of 2010 and the highest since 1999. Despite a relatively high count this year, scaup wintering numbers in Connecticut continue to be lower than historical counts. The decline in the continental scaup population continues to be of concern for biologists nationwide. Habitat changes on the scaup's breeding grounds may be a factor in the long-term decline of the population. Eiders were not observed in the survey, but the number of scoters observed was higher than in 2010. Mergansers were abundant and above the levels observed in 2010, but under the five-year average.

The common goldeneye count was much higher than last year. The vast majority of goldeneyes were counted from New Haven to Norwalk. Counts for buffleheads and long-tailed ducks were above those from last year and slightly above their five-year averages. Atlantic brant numbers were higher than in 2010 and above the recent average. Canada goose counts were once again high.

## Rethinking the Survey



Mallards have adapted well to co-existing with humans. Recent wintering numbers of mallards have been increasing. PHOTO BY P. J. FUSCO

Winter surveys are costly and dangerous, and with the recent advent of breeding ground surveys for most hunted species, the continued utility of the winter survey is in question. Currently, regulatory decisions (promulgation of hunting seasons) for only two species, Atlantic brant and Eastern Population tundra swans, are set using midwinter survey data. Consequently, the U.S. Fish and Wildlife Service and the four Flyway Councils (Atlantic, Central, Mississippi, and Pacific) are conducting an analysis of the Midwinter Waterfowl Survey, and may replace the survey in the near future.



## Connecticut Midwinter Waterfowl Survey Results for Major Species\*

Species	2011	2010	Five-year Avg.
Atlantic Brant	1,600	1,000	1,300
Black Duck	3,500	3,200	2,200
Bufflehead	1,200	1,100	800
Canada Goose	3,800	4,800	3,400
Canvasback	100	0	100
Mallard	2,600	2,500	1,400
Merganser	1,100	900	1,200
Mute Swan	700	700	800
Long-tailed Duck	600	200	200
Common Goldeneye	1,000	400	700
Scaup	5,400	800	2,000

\* rounded to nearest hundred



## CT Forest Products Now Marketed Under "Connecticut Grown" Label

Goods, such as furniture, flooring, lumber and fencing, made from wood harvested in Connecticut forests will now bear the popular "Connecticut Grown" marketing label. This initiative appeals to the growing number of consumers who choose to buy locally grown materials and is a boost for the state's forest products industry and the jobs it creates.

The Connecticut Grown Program was developed in 1986, when the green and blue logo was created to identify agricultural products grown in the state. Over the past two decades, a strong marketing and outreach effort has established Connecticut Grown as a well-known and popular program.

Connecticut's foresters are committed to managing forests responsibly to ensure a continual source of valuable products for future generations by applying long-term forest stewardship principles. Supporting the forestry industry by purchasing Connecticut Grown products is one way to give back to the local economy, and through the Connecticut Grown logo, consumers will know that the forest products came from local wood grown in Connecticut's forests.

Expansion of the Connecticut Grown program to include products from Connecticut forests is the result of an agreement between the DEP and the Department of Agriculture. To be given permission to attach the Connecticut Grown labeling to their products, companies must participate in a rigorous certification process to ensure that the label is only used on forestry products made from Connecticut lumber, similar to what exists for agricultural products.

**Connecticut's Forests:** With 1.7 million acres, or about 60% of its land area, in forest, Connecticut is one of the most heavily forested states in the nation. Ironically, Connecticut also is one of the most densely populated states. The state's forests and trees add immensely to the quality of life for residents. Not only do they produce locally grown forest products, they filter the air, safeguard private and public drinking water sources, provide essential wildlife habitat, and moderate summer and winter temperatures near homes. To learn more about Connecticut Grown expanding to include forestry products, contact the Division of Forestry at 860-424-3630.



## Programs at the Sessions Woods Conservation Education Center

Programs are a cooperative venture between the Wildlife Division and the Friends of Sessions Woods. Please pre-register by calling 860-675-8130 (Mon.-Fri., 8:30 AM-4:30 PM). Programs are free unless noted. An adult must accompany children under 12 years old. No pets allowed! Sessions Woods is located at 341 Milford St. (Route 69) in Burlington.

**March 20, Medicinal Mushrooms, from 9:30 -11:30 AM.** Join the Connecticut Valley Mycological Society during their annual meeting at Sessions Woods for a presentation on medicinal mushrooms. Author Gary Marley from Maine will be the speaker for the event. Refreshments will be served at 9:30 AM, followed by the speaker at 10:00 AM.

**April 10, Friends of Sessions Woods Annual Meeting with a program on "Turtles," starting at 1:00 PM.** The annual meeting is open to all! In honor of the "Year of the Turtle," The Children's Museum Education Director and Master Wildlife Conservationist Cindy King will present an informative program on "turtles." Cindy will bring live turtles for the audience to view as she provides information on this diverse and unique group of reptiles. A potluck dessert extravaganza will precede the presentation at 12:30 p.m. Please bring a dessert to share.

**May 14, Charcoal to Iron: An Interpretive Hike, starting at 1:30 PM.** Join Master Wildlife Conservationist Shirley Sutton for a hiking talk, featuring Sessions Woods and the importance of the charcoal industry. Shirley is an avid educator about the history of Connecticut's past land use. She has presented programs on the "Leatherman" and "Native Americans in Northwest Connecticut." This program will include a slide presentation indoors and an outdoors hike to view signs of past land use.

**May 25, Plants and their Wildlife Value, from 10:00 AM-12:00 PM.** Join Jack Hamill on an interpretive walk to identify plants and shrubs and their use to wildlife as food or shelter. A mile or so in length, this program will traverse mild terrain. Please wear appropriate outdoor gear and meet in the exhibit room.

**June 4, Trails Day Educational Walk at Sessions Woods, starting at 1:30 PM.** Sessions Woods will be participating in National Trails Day with an educational walk to learn about wildlife and wildlife habitat on a one-mile hike to the beaver marsh. Participants can return the same way or continue on their own to complete a three-mile loop of the property. Meet leader Laura

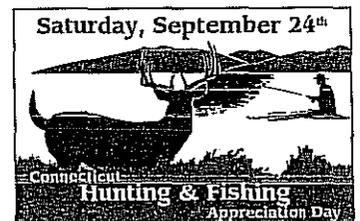
Rogers-Castro at the flagpole in front of the Conservation Education Center.

**July 9, Butterflies of Sessions Woods, starting at 10:00 AM.** Visit the flowers and fields at Sessions Woods to identify the local butterfly fauna with Wildlife Division Natural Resources Educator Laura Rogers-Castro. Participants will learn the basics to butterfly identification, including tips on distinguishing the various butterfly families.

## Paul Fusco's Photographs on Display at Session Woods

Wildlife Division photographer, Paul Fusco, whose stunning photographs are found throughout *Connecticut Wildlife* magazine, recently captured a series of images of an amazing predator-prey encounter while visiting Yellowstone National Park in Wyoming. Paul was fortunate to witness and photograph a desperate struggle for survival as a majestic, but injured, bull elk tried to elude a pack of wolves. Unfortunately, the wolves prevailed and the elk met its demise.

The photographic "story" will be on display in the Sessions Woods Conservation Education Center through the month of April 2011. The Center is open on Mondays through Fridays, from 8:30 AM until 4:00 PM. You may also view the exhibit if you attend the Friends of Sessions Woods Annual Meeting and "Turtle" presentation on April 10 or any other public program scheduled at Sessions Woods.



**Save the Date! The 2nd Connecticut Hunting & Fishing Appreciation Day will be held on Saturday, September 24, 2011, at the Sessions Woods Wildlife Management Area in Burlington. Stay tuned to Connecticut Wildlife and the DEP Web site ([www.ct.gov/dep/wildlife](http://www.ct.gov/dep/wildlife)) for updates.**

# Calendar of Events

- Late March..... Remove bird feeders from your yard to avoid attracting hungry bears that are emerging from their winter dens. Whenever a bear visits a bird feeder, take the feeder down immediately. To learn more about what to do if you encounter a black bear, visit the DEP's Web site at [www.ct.gov/dep/wildlife](http://www.ct.gov/dep/wildlife).
- March 13-20 ..... **National Wildlife Week**, sponsored by the National Wildlife Federation. The National Wildlife Week Web site ([www.nwf.org/nationalwildlifeweek](http://www.nwf.org/nationalwildlifeweek)) offers resources for kids, teens, parents, and educators.
- Late April-August.... Respect fenced and posted shorebird and waterbird nesting areas when visiting the Connecticut coastline. Also keep dogs and cats off shoreline beaches to avoid disturbing nesting birds.
- April 22 ..... **Earth Day** — Visit the DEP Web site for more information and a listing of Earth Day events ([www.ct.gov/dep/earthday](http://www.ct.gov/dep/earthday)).
- May 14 ..... **International Migratory Bird Day** — The theme for the 2011 annual celebration, "Go Wild, Go Birding!" focuses on involving youths and adults in learning about birds, birdwatching, and bird conservation. To learn more about this special day, visit [www.birdday.org](http://www.birdday.org).
- June 4 ..... **Rainbow Dam Fishway Open House** in Windsor, from 10:00 AM-3:30 PM (see page 9 for more information).

## Programs at the Kellogg Environmental Center

The DEP's Kellogg Environmental Center is located at 500 Hawthorne Avenue, in Derby. Call 203-734-2513 for more information. Visit the Calendar Events section of the DEP Web site for a complete listing of programs offered at the center.

- April 9 ..... **Get Your Fishing On**, from 1:00-4:00 PM. Learn about water, habitats, fish, and fishing through activities, DVDs, and demonstrations. The program, for both kids and adults, will cover the basics of fishing through hands-on use of equipment. Participants will learn how to identify fish and understand habitat needs, follow rules and regulations, and enjoy the outdoors.
- May 17 ..... **Singing Leaves: The Stories and Songs of the Crickets and Katydid**s, starting at 7:30 PM. This 50-minute presentation by John Himmelman introduces the audience to the creators of the insect songs we have all heard since childhood. John Himmelman is the author and co-recording artist for "Guide to Night-singing Insects of the Northeast" and "Cricket Radio." His book is illustrated by local artist Michael DiGiorgio. A field guide will be available for purchase and signing. A donation of \$4.00/adult and \$2/student or child is requested. Registration is requested but not required.
- June 21 ..... **Here Come the Birds**, starting at 7:30 PM. Teresa Kramer, Director of Canton Raptor Care, will give a presentation on raptors and will be bringing five live birds of prey, including a screech owl, great horned owl, kestrel, and red-tailed hawk. A donation of \$4.00/adult and \$2/student or child is requested. Registration is requested but not required.

## Hunting and Fishing Season Dates

- Jan. 1- June 1 ..... Application period for deer lottery permits, either online ([www.ct.gov/dep/hunting](http://www.ct.gov/dep/hunting)) or by mail. To apply, you must possess a 2011 hunting license. There is no fee to apply for the deer lottery. Applications must be postmarked by the June 1 deadline.
- April 16 ..... Opening day of trout season.
- April 16 & 23 ..... Spring Turkey Junior Hunter Training Days to provide junior hunters with an opportunity to learn safe and effective hunting practices from experienced hunters. Visit the DEP Web site ([www.ct.gov/dep/hunting](http://www.ct.gov/dep/hunting)) to learn more.
- April 27-May 28 ..... Spring Turkey Hunting Season
- ..... Consult the 2011 Connecticut Hunting and Trapping Guide and 2011 Angler's Guide for specific season dates and details. Printed guides will be available in April at more than 350 locations statewide -- including town halls, bait and tackle shops, DEP facilities, and commercial marinas and campgrounds. The guides also are available on the DEP Web site ([www.ct.gov/dep/hunting](http://www.ct.gov/dep/hunting) or [www.ct.gov/dep/fishing](http://www.ct.gov/dep/fishing)). Go to [www.ct.gov/dep/sportsmenlicensing](http://www.ct.gov/dep/sportsmenlicensing) to purchase Connecticut hunting, trapping, and fishing licenses. The system accepts payment by VISA or MasterCard.

## Subscription Order

Please make checks payable to:

Connecticut Wildlife, P.O. Box 1550, Burlington, CT 06013

Check one:

- 1 Year (\$8.00)     2 Years (\$15.00)     3 Years (\$20.00)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

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Check one:

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 New Subscription  
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Gift card to read: \_\_\_\_\_

**Donation to the Wildlife Fund:**

\$ \_\_\_\_\_

Help fund projects that benefit songbirds, threatened and endangered species, reptiles, amphibians, bats, and other wildlife species.

# Connecticut Wildlife







# Trust Earns National Accreditation

After years of planning and volunteer work, Joshua's Trust has been granted national accreditation by the Land Trust Accreditation Commission.

The accreditation – one of only four granted in Connecticut – signifies that Joshua's Trust meets national standards of excellence in upholding the public trust and ensuring that conservation efforts are permanent. The Land Trust Accreditation Commission is an independent program of the Land Trust Alliance, based in Washington, D.C.

The accreditation is a landmark achievement for an organization that started with a handful of volunteers in 1966. Madge Manfred, former Trust president and chair of the Trust's accreditation committee, explained how challenging the process was.

"It took five years of teamwork to transform an energetic, all-volunteer land trust into a professional level or-

ganization," Madge said. "Decades of informal operations had to be translated into written policies, internal assumptions about long-term costs had to be confronted, and hard

questions had to be asked about our ability to fulfill our promises."

The accreditation process required the Trust to undergo a rigorous external examination of its management, systems, and policies used to protect its lands.

"We had to stop patting ourselves on the back for being a pretty good outfit and face the scrutiny of an external

review," Madge said. "We now have a clearer sense of what we do well and what we need to do to be better. It hasn't been easy, but the benefits have been significant."

"We are all that much prouder having achieved the seal of accreditation," added new Trust President Allison Burchell-Robinson of Ashford. "Madge was our goal set-

"...hard questions had to be asked about our ability to fulfill our promises."  
— Madge Manfred

*Continued on Page Two*

## Annual Meeting Is April 12

Come celebrate another year of accomplishments at the annual meeting on April 12 at Knowlton Memorial Hall in Ashford.

The meal will be catered by the well-known Hartford barbecue and Cajun food eatery, Black-Eyed Sally's. Appetizers, wine, and soft drinks will be served at 6 p.m., dinner at 6:30 p.m., followed by reports and a noted speaker.

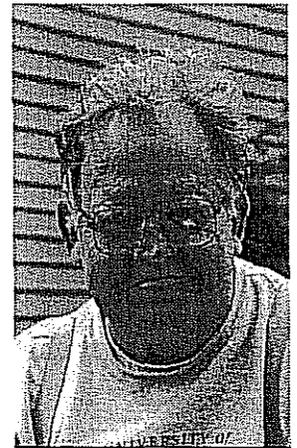
The per person cost is still just \$20.

Mona Anderson, who organizes the event, was told last year that our favorite gathering spot in previous years, the Hole-In-The-Wall Gang Camp, had such an extensive schedule that it would no longer be available to outside groups.

Please use the reservation form on the back of the newsletter. Check the Trust website for news about the guest speaker and other activities.

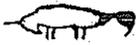
**Directions:** Knowlton Memorial Hall in Ashford is located on Route 44 just west of its intersection with Route 89, or, when coming from Route 195 in Mansfield, one mile east of the Route 44 intersection with Route 74, next to the Cumberland Farms convenience store.

### Longtime Trust Activist Birge Dayton Passes



See Tribute On Page 5

**Reserve Your Place At The Annual Meeting Using The Form On Back Page.**



## Joshua's Tract Conservation And Historic Trust, Inc.

P.O. BOX 4  
MANSFIELD CENTER, CT 06250  
Email: [joshuastrust@snet.net](mailto:joshuastrust@snet.net)  
[www.joshuaslandtrust.org](http://www.joshuaslandtrust.org)

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Vice President: Mona Anderson  
VP Land Acq: Richard Hyde  
Secretary: Carol Enright  
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Asst. Treasurer: Pat Mochel

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Newsletter: Madge Manfred, Paul Stern

**Joshua's Tract Conservation and Historic Trust** was formed in 1966 to receive gifts of money and land, or to buy land of historic, aesthetic, or scientific value, for the benefit of future generations.

It is designed to supplement the open space efforts of federal, state and local governments. The Trust protects over 4,100 acres in the region, maintains trails which are open to the public, and publishes *The Joshua's Tract Walk Book*.

The office is located in the historic Eagleville Schoolhouse, South Eagleville Rd., in Mansfield.

Office hours: Thurs.1:30-3:30 pm.

Phone: 860-429-9023



The accreditation seal recognizes land conservation organizations that meet national standards for excellence, uphold the public trust and ensure that conservation efforts are permanent.

# Lessons To Be Learned From A Wicked Winter

Have you ever felt that your words have come back to haunt you? I know in my last column that I said I like the cold, but this is ridiculous!

Winter has been here for a little over a month and there is more snow on the ground than I can ever remember.

Knocking the icicles off the roof, I fell into a drift that came over my waist.

Come on. Still, there are lessons

to be learned from this winter siege. Just watching the birds on the feeders carefully catching one seed per time, fluffing their wings in the brutal wind gusts, scratching the surface to find the buried seed and the squirrels undaunted returning after time to the only food available makes one believe in survival. I can't see the other wildlife out there but I do see their tracks.

Survival.

We all survive, but only our land does so in perpetuity.

And, if we want to keep our Joshua's Trust land protected and preserved as we have promised, we need you and your help. Our operating budget is comprised primarily from membership dues and contribu-

tions. Our membership numbers have dropped a bit in the last couple of years, down from our high of more than 850. That could lead to decreasing revenues in the years to come.

I have challenged the Board of Trustees and the Officers to each bring in two new members this year. I have done so.

Now I am reaching out to you to encourage just one friend/acquaintance/family to become a member.

How about a gift membership for someone special?

Just imagine: if you were 100 percent successful, that would equal double the membership.

Why not give it a go?

I am looking forward to seeing and meeting many of you at the annual dinner held this year for the first time at the Wilderness Camp Ground in Willington. Please mark April 12 on your calendar right now.

We can talk about your membership success then, along with anything else on your mind.

Keep in mind we will have survived this winter.

## REFLECTIONS ON THIS AND THAT

By Allison  
Burchell-Robinson

*Joshua's Trust President*



## Trust Earns National Accreditation

*Continued from Page One*

-setter, task master and cheerleader all rolled into one. She set the bar high and she made sure we met it."

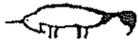
The newsletter and other Trust materials will now display the accreditation seal visible at the top of Page One and in the masthead to the left.

# Thanks To All You Trust Contributors In 2010

*Thanks to all listed here who made donations of \$50 or more in addition to their yearly membership dues during 2010. Without your additional support, the Trust would not be able to carry out its mission. Please let us know if your name was inadvertently omitted or misspelled.*

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*Continued on next page*



## Property Stewards Stay Busy Even Through Winter Months

With more than 60 individual properties to care for, the stewards are always busy, even through the winter months.

Hill Bullard and Gary Griffin have been leading crews to continue marking boundaries. They expect to complete another 12 while the leaves are off the trees.

Clean-up at the Ashford Oak has been completed, a frontage fence installed and a brochure box positioned.

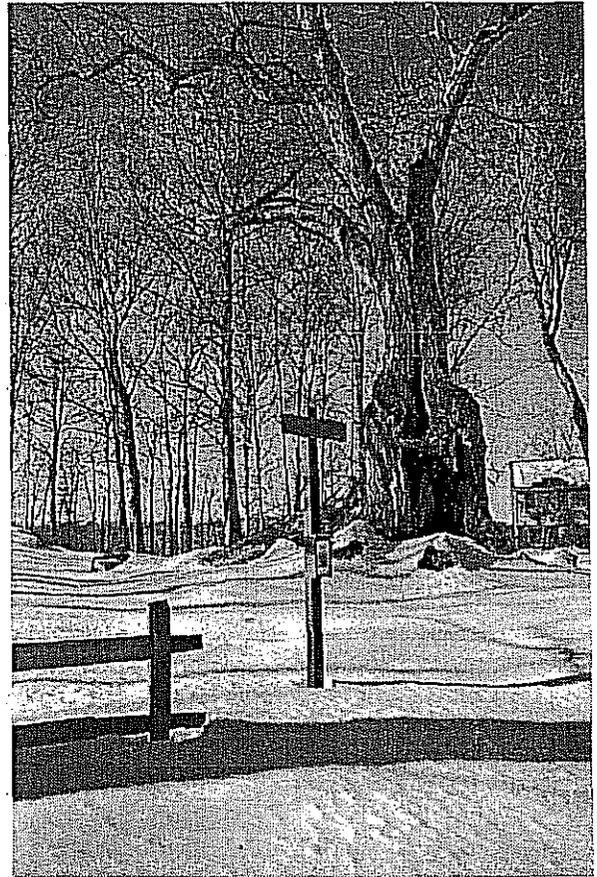
At the Preston Sanctuary, a December workshop on control of the invasive barberry was well attended.

A team of stewards, assisted by volunteers from the CT Agricultural Experiment Station, whacked two acres of barberry in preparation for further treatment during the growing season.

Work on invasives control has been funded in part by a multi-year federal grant to improve wildlife habitat. The cleared acres will be turned into a hayfield buffer of native plants and shrubs.

Many thanks to retiring Church Farm steward Art Runnels and to Charlene and John Meyer, long-time stewards at the Hubbard Sanctuary, all of whom provided many years of outstanding service.

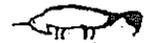
**The Ashford Oak has been cleaned up and a frontage fence and brochure box added.**



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*Continued from previous page*

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## Birge Dayton, Longtime Trust Volunteer, Passes

By Gary Griffin

Longtime Trust member and volunteer trail worker Birge Dayton, 80, of Coventry, passed away on Saturday, Jan. 15.

Born in Worcester, Mass., Birge worked at Pratt & Whitney for 37 years before his retirement. He is survived by daughters Deborah Smith and Linda Dayton and son Robert Dayton.

For several years, Birge was the Trust's chief bridge designer and builder. He procured the lumber and hardware needed for each bridge and arranged delivery to the site, where he patiently oversaw construction with the help of other Trust workers.

In recent years, when it became increasingly difficult for Birge to get around, the Trust's Stewardship Committee still called upon him for his expertise and knowledge. His fellow trail workers began to furnish him with a "director's chair" so that he could oversee the building of his designs while sitting.

Birge was also a member of the Appalachian Mountain Club, the Connecticut Forest and Parks Association, and the Chatham Trails Association (Southern NH). Trust trail worker and steward Bob Schoff recalls that Birge was well known in AMC circles for his repairs of structures on the Appalachian Trail in western Connecticut.

Greg Anderson described Birge as a "special member of the Trust," one who was dedicated to securing property for



**BIRGE DAYTON (1930-2011) sitting in a directors chair watching CFPA workers replace a bog bridge in the Pachaug Forest in Voluntown.** Photo by Bob Schoff.

the common good, "and then making it appropriately accessible to the general public."

A memorial service was held on Jan. 20. Online condolences can be expressed at [www.pietrasfuneralhome.com](http://www.pietrasfuneralhome.com).

## Trust Acquires 27-Acre Property In Tolland



**INSPECTION: Stewardship Committee members examining the new property are, left to right, Ken Hankinson, Joan Hill (chair), Dan Donahue, Gary Griffin and Ann Dunnack.**

Photo by John Pagini

A 27-acre parcel in Tolland has been given to Joshua's Trust in December by the Lemek family as part of a subdivision open-space requirement.

Located off Lemek and Goose lanes, the property offers the primary benefit of permanently protecting about 600 feet of the Skungamaug River and its buffer area.

The Skungamaug enters the western portion of the property about half way down the western boundary, meanders to the southwest, and exits the parcel into a large open space owned by The Coventry Game Club, Inc.

A natural resource inventory will be conducted on the property during the next several months to determine the location of vernal pools, wildlife habitat, rare flora, and other characteristics.

A management plan will then be developed to detail the best uses and protection of the land.

**Join us for this year's annual meeting...  
...at Ashford's Knowlton Memorial Hall**

*This year's annual meeting and dinner will be held at Ashford's Knowlton Memorial Hall. It includes wine, appetizers, dinner and a guest speaker. New members are encouraged to attend!*

**Joshua's Trust annual dinner reservation form**  
Please submit by March 31.

Name \_\_\_\_\_  
Telephone \_\_\_\_\_  
E-mail address \_\_\_\_\_  
Please make reservations for \_\_\_\_\_ people (\$20 per person)  
2011 dues if not yet paid: \_\_\_\_\_ Total enclosed \$ \_\_\_\_\_  
Is this the first annual meeting you are attending? (Yes / No) \_\_\_\_\_  
Make check payable to: Joshua's Trust  
Mail to: Joshua's Trust, P.O. Box 4, Mansfield Center, CT 06250-0004.

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