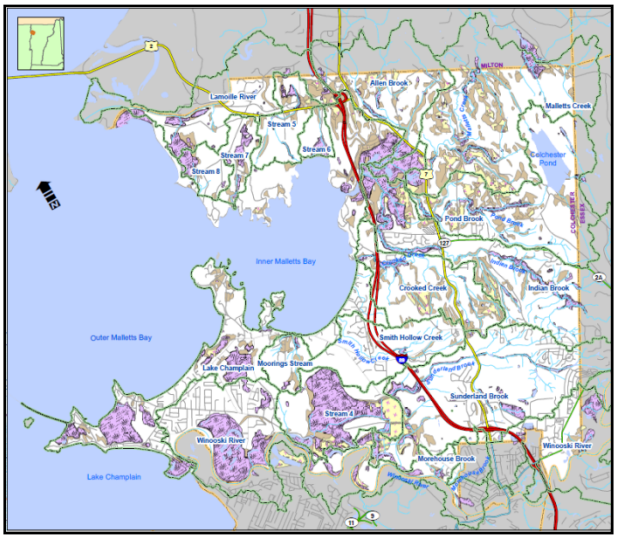
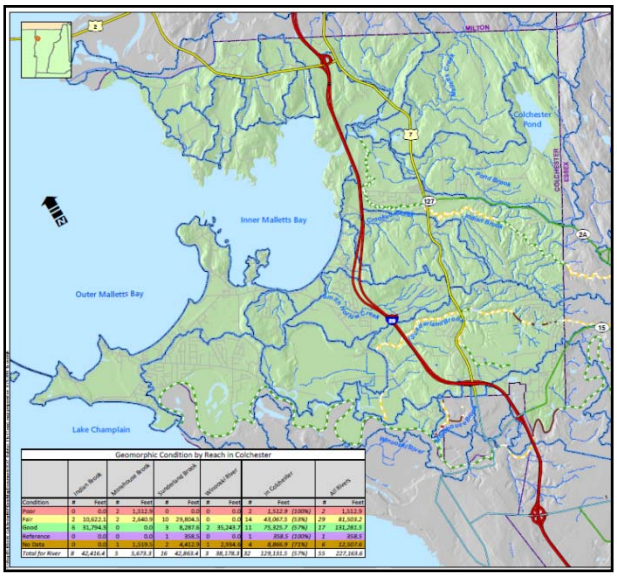


Water Resources Inventory, Mapping, & Assessment

INTEGRATED WATER RESOURCES MANAGEMENT PROGRAM: TASK 2

VOLUME 1 of 2

TOWN OF COLCHESTER, VERMONT



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EXECUTIVE SUMMARY

During Fall of 2009 and Winter of 2010, Stone Environmental completed a comprehensive mapping of water resources within the Town in support of the Colchester Integrated Water Resources Management Program (IWRMP). This project was funded as a demonstration project with funding from the U.S. Environmental Protection Agency (EPA) with a goal to improve the overall management of non-point source pollution control infrastructure that can be supported by the community at large. Volume 1 of the Task 2 report describes the water resources mapping and inventory data developed to support the Town's Integrated Water Resource Management Program (IWRMP).

The following water resources map and inventory compilations were developed as part of this task:

- Wetlands
- Hydrography
- Watershed Delineation
- Stream Conditions Assessments
- Aquifer and Wellhead Protection Areas, and
- Soil Characteristics.

For each inventory and mapped water resource, we describe the existing spatial data in Colchester and how these data were updated and adapted to support the Town's IWRMP. The information from Task 2 and the infrastructure inventory completed in Task 1 provides the baseline information necessary to complete the investigations and assessments in Task 3 and 4. Volume 2 contains the results of the Synoptic Survey of Stream Phosphorus Concentrations sub-task Report.

The Town of Colchester is rich in the extent of its water resources and wetlands. There are approximately 30 miles of shoreline on Lake Champlain, with 10 miles surrounding Inner Malletts Bay. Colchester borders approximately 2.1 miles of the Lamoille River to the north and approximately 7.2 miles of the Winooski River on its southern border. The following is a summary of this compilation:

- Wetlands mapping: There are 3,429 acres of Vermont Significant wetlands in the town which cover 14% of the town's area.
- Hydrologic mapping: Vermont's Hydrography Database (VHD) was extracted for the town. There are approximately 107 miles of streams and rivers and approximately 232 acres of water bodies (not considered a wetland).
- Using the most recent LiDAR elevation data for the town, 17 major watershed drainages with 145 sub-drainages were delineated and were then adjusted to fit with the stormwater inventory conducted in Task 1.
- Vermont's Stream Geomorphic Assessments for Smith Creek: Indian, Pond; Morehouse, and Sunderland Brooks, and Lamoille and Winooski Rivers. Each of the assessment conditions were integrated and summarized as a group for: Channel Evolution; Geomorphic Condition; Habitat Rating; and Stream Sensitivity. Based on this summary 59% the streams assessed have stream

bank scouring or incising occurring. This physical process results in more sediment and nutrients flowing into the lake. In addition 72% of the town's streams assessed have fair to poor habitat conditions.

- The two known aquifer and wellhead protection were extracted from the State of Vermont's GIS database.
- Soil characteristics needed for understanding onsite wastewater capacity for the town were extracted from the USDA's Digital Chittenden County Soil Survey and attribute databases.

Table of Contents

List of Figures

Appendices

C.2. FIT_PointImpacts

C.3. Reach_PhaseI

C.4. Reach_PhaseII

C.5. tblPhaseI

C.6. tblPhaseII

Appendix D: SGA Executive Reports

D.1. Indian Brook Phase I & II

D.2. Morehouse Brook Phase I & II

D.3. Pond Brook & Smith Hollow Creek Phase I

D.4. Sunderland Brook Phase I & II

D.5. Winooski River Phase I & II

Appendix E: Stream Phosphorus Concentrations

E.1. Sampling Locations

Appendix F: Aquifer and Wellhead Protection

F.1. GWSPA

F.2. SDWISUpdates

F.3. WaterWellsUpdates

Appendix G: Soil Conditions

G.1. ColchesterSoils_Top20

1. INTRODUCTION

The Town of Colchester is rich in the extent of its water resources and wetlands. There are approximately 30 miles of shoreline on Lake Champlain, with 10 miles surrounding Inner Malletts Bay. Colchester borders approximately 2.1 miles of the Lamoille River to the north and approximately7.2 miles of the Winooski River on its southern border. Inland from Lake Champlain lays Colchester Pond, a 186-acre waterbody. In addition, the Town has 159 mapped state significant wetlands, comprising a total of 3,429 acres of wetlands.

This report (Volume 1) describes the inventory and compilation of water resources mapping and inventory data to support the development of the Town's Integrated Water Resource Management Program (IWRMP). This effort has resulted in a comprehensive inventory of current existing data from a many sources. Volume 1 of the water resources mapping and inventory task includes the following datasets:

- Wetlands mapping;
- Hydrologic mapping and watershed delineation;
- Stream conditions assessment;
- Aquifer and wellhead protection mapping; and
- Soil conditions mapping.

For each inventory and mapping water resource, we describe pre-existing spatial data in Colchester and how these data were updated and adapted to support the Town's IWRMP. The information from this task and the infrastructure inventory completed in Task 1 provides the baseline information necessary to complete the investigations and assessments in Task 3 and 4.

Volume 2 contains the results of the Synoptic Survey of Stream Phosphorus Concentrations sub-task Report.

2. WETLAND INVENTORY

The Vermont Significant Wetlands Inventory (VSWI) is the wetlands datalayer used by the Vermont Agency of Natural Resources (ANR) to regulate impacts of development on wetlands. At the State level, development activities are regulated within and adjoining Class I and II wetlands indicated in the VSWI, as well as activities within and adjoining unmapped wetlands which are contiguous with mapped Class I or II wetlands. The objective of this task was to compile the most recent wetland information for the Town for use in later town-wide assessments for developing the IWRMP.

The wetland inventory compiled for this project needs to use the most current data on wetlands available. Since the State of Vermont has developed new, revised wetland boundaries based on new mapping, no new mapping efforts were conducted. Table 1 provides a comparison of the differences between the areal extents of wetlands in the previous VSWI versus the newly revised VSWI in Colchester.

Table 1. VSWI Inventory Comparison

Previous VSWI		New VSWI	
Acres	% of Town	Acres	% of Town
2,621.4	11.0%	3,428.7	14.0%

For this subtask, Stone acquired the recently updated and adopted (2010), Vermont Significant Wetland Inventory (VSWI) from the Vermont Center for Geographic Information (VCGI). We extracted all polygons falling inside or on the town boundary of Colchester. All polygons falling across the town boundary were not bisected. These cross boundary polygons were split to be divided by "In Town" or "Outside Town". A hydric soils layer was added to the Wetland data layer so that the town can recognize the distribution and extent of potential or historic wetlands. Finally, we included the datalayer developed in 2007 by Pioneer Environmental, Inc. and Stone for Vermont Department of Environmental Conservation (DEC) displaying and ranking potential wetlands restoration sites. All wetlend layers described above are displayed in Figure 1.The metadata for the compiled wetland datasets can be reviewed in Appendix A.

3. HYDROGRAPHY MAPPING

The objective of this subtask was to adapt the existing state-wide spatial dataset of surface water features for Colchester and to perform a refined delineation of watershed boundaries throughout the Town. The Vermont Hydrography Dataset (VHD) developed by VCGI is a detailed GIS dataset of Vermont's streams, rivers, lakes, and ponds, with associated attribute data. This derived spatial dataset provides the detailed mapping of Colchester's surface waters. From this data there are approximately 30 miles of shoreline on Lake Champlain, with 10 miles surrounding Inner Malletts Bay; 113 miles of mapped streams and rivers of which 54 miles are major streams; and approximately 305 acres of ponds with 16 miles of shoreline. Colchester borders approximately 2.1 miles of the Lamoille River to the north and approximately 7.2 miles of the Winooski River on its southern border.

The watershed areas draining to the Town's surface waters were less well defined, however. There were three existing sources of watershed boundary data, all of which were developed using low resolution topographic data. As part of this subtask, we evaluated watershed boundaries in the National Hydrography Dataset (NHD Plus) available from USGS; watershed boundaries delineated by Griffin Environmental as part of their 2002 Stormwater Management Plan for Colchester; and watershed boundaries available from the State of Vermont. The State of Vermont watershed data were not high

enough resolution for project use. The NHD Plus watersheds are more accurate than the Griffin Environmental watersheds but appear "stair-stepped" because they were derived from a gridded digital elevation model. There approximately 30 miles of shoreline on Lake Champlain, with 10 miles surrounding Inner Malletts Bay. Colchester borders approximately 2.1 miles of the Lamoille River to the north and approximately 7.2 miles of the Winooski River on its southern border.

High resolution elevation data derived from LiDAR (Light Detection and Ranging) remotely sensed data captured in 2004 for the Chittenden County Metropolitan Planning Organization was available for all of Colchester. The University of Vermont's Spatial Analysis Laboratory has developed a 2-foot contour interval topography datalayer from the raw LiDAR elevation data. As a result, a more refined delineation of watershed boundaries could be performed using the LiDAR derived topography. Using this detailed topography, new detailed watershed boundaries were created for Colchester. The new watershed boundaries GIS dataset was created using the ArcSWAT processing extension. The digital watershed boundaries were then adjusted to account for altered drainage patterns resulting from stormwater drainage systems inventoried and mapped in Task 1. There are a total of 17 major watershed drainages with 145 subdrainages. The mapped stormwater drainage systems were then overlain on the preliminary watershed boundary layer, and then adjusted through heads-up digitizing wherever stormwater piping or swales cross the natural (topographic) drainage divides. To enable efficient use of this large dataset, the hydrography network was clipped to the watershed boundaries created by Stone. These boundaries encompass Colchester and adjoining areas in neighboring towns. The VHD hydrography and new sub-watershed and watershed boundaries are mapped in Figure 2. Metadata for hydrography related datasets can be found in Appendix B.

Not explicitly mapped but important component of the water resource conditions within the town is the Clean Water Act status for waters in Colchester. Per section 303(d) of the Clean Water Act, waterbodies that are impaired are placed on a list along with the pollutant causing the impairment, the uses that are impaired, and the surface water quality problem - the cause of the impairment. Total Maximum Daily Loads (TMDL) are used to allocate the contributions, or loads, to sources of pollution with the objective of bringing waterbodies into compliance with water quality standards. After watershed-specific analyses of potential sources of the impairment, TMDL plans are developed for each water body.

Based on the State of Vemont's 2008 303(d) List of Impaired waters, the following water bodies are listed. Those with United States Environmental Protection Agency (USEPA) approved TMDL plans for stormwater include: Morehouse, Sunderland, and Indian Brooks. Lake Champlain has a TMDL for phosphorus, that is currently undergoing revision by the EPA. The remaining impaired waters needing a TMDL plan with a low priority are: the direct smaller drainages to Inner Mallets Bay for E. coli from urban runoff, failed/failing septic systems; includes Smith Hollow Brook & Crooked Creek; and Malletts Bay for Polychlorinated Biphenals (PCBs) which have been detected in lake trout.

4. STREAM CONDITION ASSESSMENT

The objective of this task was to compile known information on the geomorphic condition of streams in Colchester as to enable efficient analysis and to understand the extent and location of related issues. The primary data source for creating a townwide stream condition dataset came from the available, existing Phase 1 and Phase 2 stream geomorphic assessments (SGA) conducted for a number of Colchester's streams (Figure 3). These assessments were performed according to the *Stream Geomorphic Assessment Protocols* established by the Vermont Department of Environmental Conservation. Supplemental data obtained during the Task 1 infrastructure inventories were also incorporated where relevant to stream conditions. No new stream geomorphic data was generated in this task as further study was deemed unnecessary.

The Vermont Department of Environmental Conservation (DEC) has established three protocols for assessing stream channel stability, channel adjustment processes, and other aspects of stream geomorphology. The Phase 1 SGA protocol involves a general assessment of the stream corridor, primarily through topographic maps and windshield surveys. The Phase 2 SGA protocol involves measurement of numerous stream channel characteristics over designated stream reaches. In Colchester, Phase 1 geomorphic assessments have been performed on eight streams, while more detailed Phase 2 assessments have been completed on five (Table 2). Consultant reports for the Town also provide a summary of the findings of each assessment.

Table 2. Colchester Stream Geomorphic Assessments

Stream	Phase 1	Phase 2
Indian Brook	■	■
Lamoille River	■	
Morehouse Brook	■	■
Pond Brook	■	
Smith Creek	■	
Sunderland Brook	■	■
Winooksi River (Lower to Alder)	■	■

Source: Vermont DEC, River Management Program

Stream condition information was compiled from the DEC stream geomorphic assessments. Appendix C contains the metadata of the complied datasets. Figure 3 provides an illustration and data summary for the streams within Colchester for which Phase 1 and Phase 2 assessments have been conducted. The data from the seven (7) Phase 1 and five (5) Phase 2 Stream Geomorphic studies were compiled into a town-wide Stream Geomorphic Assessment database, which became part of the Town's Hydrography

Geodatabase. Most of the stream geomorphic data, including spatial locations and summary data of the assessed streams, is available from DEC's Stream Geomorphic Assessment DataViewer and Stream Geomorphic Assessment Database Application.

In addition, Stone contacted Staci Pomeroy and Gretchen Alexander, members of the DEC's River Management staff responsible for each of the studies, to obtain data not readily available. This included Feature Indexing Tool (FIT) data for all Phase 2 assessed streams. The FIT consists of both point and line spatial layers of impact features along the reach, such as storm water inputs, grade controls, and straightened channels. The FIT data was also compiled into the town-wide Stream Geomorphic Assessment database. A select number of Geomorphic Assessment attributes found by the Phase II assessments were geomorphic health. Channel Evolution (Table 3 and Figure 4), Geomorphic Condition (Table 4 and Figure 5), Habitat Rating (Table 5 and Figure 6), and Stream Sensitivity (Table 6 and Figure 7) are the four key attributes mapped to provide a visual representation of the assessed streams' compiled and mapped. Appendix D contains the executive summaries of all the Phase I and/or Phase II for Colchester assessed streams.

Table 3. Channel Evolution Stage by Reach in Colchester

Table 3. Channel	Indian Brook		Morehouse Brook		Sunderland Brook		Winooski River		In Colchester			All Rivers	
Stage	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet		#	Feet
I. Stable	6	32,471.0	0	0.0	5	13,180.9	1	263.4	12	*45,915.3*	*(50%)*	*19*	*92,007.4*
II. Incision	1	8,040.8	1	1,955.0	3	11,494.5	0	0.0	5	*21,490.3*	*(56%)*	*10*	*38,348.6*
IIb. Incision	0	0.0	0	0.0	2	3,454.9	0	0.0	2	*3,454.9*	*(80%)*	*3*	*4,302.5*
IIc. Incision	0	0.0	0	0.0	1	4,067.8	0	0.0	1	*4,067.8*	*(100%)*	*1*	*4,067.8*
III. Widening	0	0.0	2	1,312.2	1	5,068.0	0	0.0	3	*6,380.3*	*(51%)*	*7*	*12,415.7*
IV. Stabilizing	0	0.0	1	886.5	1	826.1	1	34,980.3	3	*36,692.9*	*(61%)*	*6*	*59,678.4*
No Data	1	1,904.6	1	1,519.5	3	4,771.3	1	2,934.6	6	*11,130.0*	*(68%)*	*9*	*16,343.2*
Total for River	*8*	*42,416.4*	*5*	*5,673.3*	*16*	*42,863.4*	*3*	*38,178.3*	*32*	*129,131.5*	*(57%)*	*55*	*227,163.6*

For SGA, channel evolution is categorized into five stages. Each stage represents the level of stream channel degradation and the channel's adjustment from the reference stream type. The reference stream type refers to the type of stream expected to exist in the current geological setting without human alterations and development. Once the reference stream has been identified, the level of adjustment from the reference stream is used to establish to which of the following five stages the channel has currently evolved:

I. Stable: In regime, reference to good condition, insignificant to minimal adjustment.
II. Incising: Fair to poor condition, major to extreme channel degradation.
III. Widening: Fair to poor condition, major to extreme widening and aggradation.

IV. Stabilizing: Fair to good condition, major reducing to minor aggradation, widening, and planform adjustments.

V. Stable: Stream returns to stable condition. In regime, reference to good condition, insignificant to minimal adjustment.

Table 4. Geomorphic Condition by Reach in Colchester

	Indian Brook		Morehouse Brook		Sunderland Brook		Winooski River		In Colchester			All Rivers	
Condition	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**		**#**	**Feet**
Poor	0	0.0	2	1,512.9	0	0.0	0	0.0	2	*1,512.9*	*(100%)*	*2*	1,512.9
Fair	2	10,622.1	2	2,640.9	10	29,804.5	0	0.0	14	*43,067.5*	*(53%)*	*29*	*81,503.2*
Good	6	31,794.3	0	0.0	3	8,287.6	2	35,243.7	11	*75,325.7*	*(57%)*	*17*	*131,281.5*
Reference	0	0.0	0	0.0	1	358.5	0	0.0	1	*358.5*	*(100%)*	*1*	*358.5*
No Data	0	0.0	1	1,519.5	2	4,412.9	1	2,934.6	4	*8,866.9*	*(71%)*	*6*	*12,507.6*
Total for River	*8*	*42,416.4*	*5*	*5,673.3*	*16*	*42,863.4*	*3*	*38,178.3*	*32*	*129,131.5*	*(57%)*	*55*	*227,163.6*

Geomorphic condition is an assessment of each of the following four parameters against the reference stream state:

- Degree of Channel Degradation: The degree that the stream bed has lowered due to erosion.
- Degree of Aggradation: The degree that the stream bed has risen due to sediment accumulation.
- Widening Channel: The expansion of the stream channel as it erodes the stream bank.
- Changes in Planform: Changes in the shape of the channel when viewed from above looking down.

Based on the average assessment score for each of the above parameters, each reach is assigned one of four levels of stream geomorphic condition: reference, good, fair, and poor.

Habitat rating is an assessment of the stream's physical, chemical, and biological environment against the

Table 5. Habitat Rating by Reach in Colchester

	Indian Brook		Morehouse Brook		Sunderland Brook		Winooski River		In Colchester			All Rivers	
Rating	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**		**#**	**Feet**
Poor	1	1,904.6	1	886.5	5	11,384.0	1	263.4	8	*14,438.6*	*(37%)*	*12*	38,543.7
Fair	1	5,528.6	3	3,267.3	7	20,112.1	1	34,980.3	12	*63,888.3*	*(52%)*	*25*	*124,014.3*
Good	6	34,983.3	0	0.0	4	11,367.3	1	2,934.6	11	*49,285.1*	*(79%)*	*16*	*62,252.0*
Reference	0	0.0	0	0.0	0	0.0	0	0.0	0	*0.0*	*(0%)*	*1*	*834.2*
No Data	0	0.0	1	1,519.5	0	0.0	0	0.0	1	*1,519.5*	*(100%)*	*1*	*1,519.5*
Total for River	*8*	*42,416.4*	*5*	*5,673.3*	*16*	*42,863.4*	*3*	*38,178.3*	*32*	*129,131.5*	*(57%)*	*55*	*227,163.6*

reference condition. The reference condition is the stream without human related changes. The habitat rating is based on an assessment of each of the ten habitat related parameters: epifaunal substrate/available cover; embeddedness; pool substrate characterization; velocity/depth patterns; pool variability; sediment deposition; channel flow status; channel alteration; frequency of riffles; channel

sinuosity; bank stability; bank vegetative protection; and riparian vegetative zone width. A composite final average score of these ten parameters is compared with a reference condition score for each reach.

Table 6. Stream Sensitivity by Reach in Colchester

	Indian Brook		Morehouse Brook		Sunderland Brook		Winooski River		In Colchester		All Rivers	
Sensitivity	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**	**#**	**Feet**
Extreme	0	0.0	1	886.5	0	0.0	0	0.0	1	*886.5 (32%)*	*2*	*2,747.0*
Very High	2	10,622.1	2	2,581.4	8	27,364.3	0	0.0	12	*40,567.8 (59%)*	*22*	*69,051.8*
High	6	31,794.3	1	685.9	5	10,727.8	2	35,243.7	14	*78,451.8 (65%)*	*19*	*121,135.6*
Moderate	0	0.0	0	0.0	0	0.0	0	0.0	0	*0.0 (0%)*	*2*	*13,135.1*
Low	0	0.0	0	0.0	1	358.5	0	0.0	1	*358.5 (100%)*	*1*	*358.5*
Very Low	0	0.0	0	0.0	0	0.0	0	0.0	0	*0.0 (0%)*	*2*	*6,655.5*
No Data	0	0.0	1	1,519.5	2	4,412.9	1	2,934.6	4	*8,866.9 (63%)*	*7*	*14,080.1*
Total for River	*8*	*42,416.4*	*5*	*5,673.3*	*16*	*42,863.4*	*3*	*38,178.3*	*32*	*129,131.5 (57%)*	*55*	*227,163.6*

Stream sensitivity is determined as "the likelihood that a stream will respond to a watershed or local disturbance or stressor." The stream type and geomorphic condition is used to determine the steam's sensitivity. The stream type is determined based on the following four stream characteristics: entrenchment ratio; width/depth; sinuosity; and slope. The stream sensitivity assessment assigns one of six levels of stream sensitivity ranging from extremely sensitive to very low sensitivity based on an assessment of each stream type and each geomorphic condition for each reach. The reference stream type describes the natural central tendency of channel form and process that would exist in the absence of human related changes to the channel, flood plain, and/or watershed. The reference stream type is based largely on characteristics of the valley, geology, and climate of the stream.

Table 7 provides a summary of the four geomorphic conditions for the streams assessed by the state for the Town. It is clear that these streams' overall health assessment is fair to poor. Based on this summary 59% the streams assessed have stream bank scouring or incising occurring. This physical process results in more sediment and nutrients flowing into the lake. In addition 72% of the town's streams assessed have fair to poor habitat conditions. These conditions are affected by stormwater impacts both within the town and from upstream watersheds. It will be important for the State to complete the geomorphic assessments for the Crooked and Mallets Creek and Allen Brook to completely assess conditions within the town.

Table 7. Geomorphic Health Summary

Total Feet Assessed 227,164	Condition	Feet	% Assessed	Fair Condition	Feet	% Assessed
Channel Evolution	Fair to Poor	135,156	59.5%	na	na	na
Geomorphic Condition	Poor	1,513	0.7%	Fair	83,017	36.5%
Habitat Rating	Poor	38,543	17.0%	Fair	124,014	54.6%
Stream Sensitivity	Extreme/V.High	71,799	31.6%	High	121,136	53.3%

Source: Vermont DEC, River Management Program

5. AQUIFER AND WELLHEAD PROTECTION MAPPING

Protecting water supply wells and vulnerable aquifers from contamination by chemical and microbial pollutants is necessary to sustain beneficial use of groundwater. In Colchester, managing the risks posed by onsite dispersal of wastewater is probably the most important aspect of aquifer and wellhead protection. Other important sources of contamination that must be managed include fuel and salt storages and landfills. The objective of this task was to acquire the data and map wellhead and aquifer protection areas using existing data provided by the State of Vermont and the Vermont Center for Geographic Information (VCGI) for conducting the townwide onsite needs assessment required in Task 3.

The State of Vermont Agency of Natural Resources and the Vermont Center for Geographic Information (VCGI) maintain a state-wide dataset of community water supply well source protection areas. These data include recent work by the Vermont Rural Water Association and Stone Environmental on a well interference study for all public/community water supply wells in the state. The new well interference study data has improved the resolution of the locations of these wells.

For this task, Stone obtained the existing wellhead and aquifer protection data, including the newer well interference study data. Figure 8 contains the illustration of these datasets. The documentation provided in the source data appears adequate to describe the data development processes. In addition to compilation of existing data, new protection areas were delineated based on the distribution of private wells mapped in Task 1. Appendix F contains all the metadata describing the layers compiled for this task.

6. SOIL CONDITIONS MAPPING

Soils are an integral element in many aspects of water resources management. Soil conditions affect the suitability of land for dispersal of wastewater; the fate of nutrients and contaminants in agricultural and urban land and their potential for transport to receiving waters; the appropriate selection of stormwater management practices; the extent and character of wetlands; the geometry of stream channels, including their degree of resistance to various erosion processes; and many other aspects relevant to water supply, water quality, and ecological function. Existing USDA-Natural Resources Conservation Service (NRCS) digital soil mapping (*SSURGO*) for Chittenden County was obtained for this project. The objective for this task was to manipulate and provide the USDA-NRCS SSURGO soil mapping in a townwide geodatabase format to enable efficient analyses of relevant soil conditions related to project needs.

The SSURGO soils dataset published by USDA-NRCS is an electronic version of the traditional county soil survey map books. The original survey work focused particularly on arable lands. Soil scientists mapped soils in units generally no smaller than 3 acres, up to a maximum of 25 acres in size. For each mapped soil polygon, up to three soil components were characterized. The first soil component typically covers 80-85% of the mapped polygon. The SSURGO data include layer and component tables that

provide numerous soil attributes for each mapped soil unit. Examples of soil attributes in the SSURGO database that will be critical to the analyses conducted in this project are given in Table 8.

Table 8. Important SSURGO Attributes

Soil Attribute Name	Table
Depth to Groundwater	Component
Depth to Bedrock	Component
Erosion Potential	Component
Hydrologic Group	Component
Horizon Soil Types	Layer

From the County SSURGO dataset, we created a town-based datalayer for each soil attribute listed in Table 8 for use in the various onsite wastewater, stormwater, and wetlands assessments. Appendix G contains the metadata for the compiled soils dataset. These datalayers were used with our ArcGIS ModelBuilder application for conducting the townwide assessment onsite wastewater dispersal capacity according to town and state wastewater management rules. In addition, "layer" files were created so that the Town will be able to create their own maps using pre-classified data with appropriate classification and symbolization.

7. OBSERVATIONS AND CONCLUSIONS

The Town of Colchester has extensive and diverse water resources. This task was to compile this information into a townwide information system to enable the townwide assessments from onsite wastewater and stormwater to be conducted. This Volume of the Task 2 Report focuses on the inventory and compilation of the town's water resources information. The state's Geomorphic Assessment for the streams and rivers within the town are adversely affected by stormwater runoff from within in the town and from upstream communities. Volume 2 of this report and the Microbial Source Tracking (Task 7) report will focus on the water quality issues facing the town.

There are several interesting observations from the compilation or the water resources information for the town. The first is that the recently revised Vermont Significant Wetlands map data shows that the proportion of the town's area in wetlands increased from 11% to 14%. The second is that from our compilation of the State's geomorphic assessment data on streams assessed in the town, 59% have stream bank scouring or incising occurring. This physical process results in more sediment and nutrients flowing into the lake. In addition 72% of the town's streams assessed have fair to poor habitat conditions. The last observation is that there are four streams with EPA approved TMDLs and several on the list to be developed.