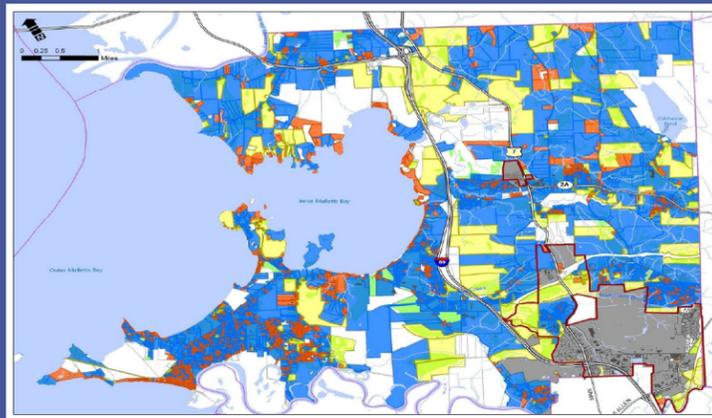


# Town of Colchester Integrated Water Resource Management Study

## PROJECT PURPOSE

- ◆ A 4-year study of all public and private wastewater and stormwater infrastructure under a \$2M EPA demonstration grant to determine whether on-site wastewater can effectively serve a community as large as Colchester and still protect its water resources.
- ◆ For Colchester to continue to grow—wastewater and stormwater capacity needs to be able to support the growth. Can existing infrastructure meet the need?
- ◆ Proper management of wastewater and stormwater infrastructure is essential to protect public health and water resources. Are there any management strategies that can achieve this goal?

## WASTEWATER & STORMWATER INVENTORY & ASSESSMENT

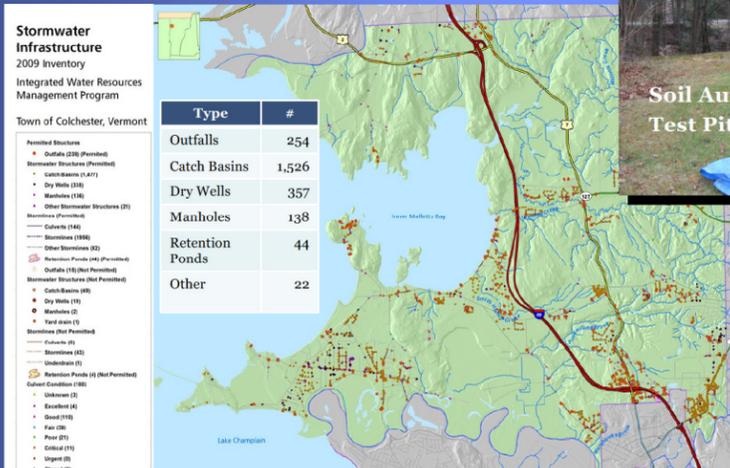


Wastewater Conditions Map

Current Condition Status	# of Parcels	% of Parcels	Acres	%
Developed, Conforming	3,125	55%	10,676	44%
Developed, Not Conforming	1,828	32%	1,579	7%
Undeveloped, Suitable* for Conventional Onsite System	186	3%	4,414	18%
Undeveloped, Not Suitable* for Conventional Onsite System	316	6%	5,880	24%
Sewered with Municipal Service	227	4%	1,674	7%
<b>TOTAL</b>	<b>5,682</b>	<b>100%</b>	<b>24,223</b>	<b>100%</b>

### Wastewater

- ◆ 95% of developed parcels are sewered by onsite wastewater! This is an extraordinary number of onsite systems given the size of the community.
- ◆ 32% (more than 1,800 parcels shown in orange and yellow on the map above) do not meet current onsite wastewater design standards.
- ◆ Detailed wastewater assessments were completed at more than 170 parcels (with landowner permission) to validate the findings.



Stormwater Infrastructure Map

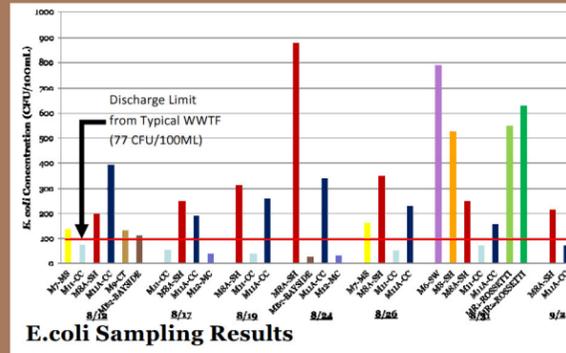


Soil Auger Test Pits

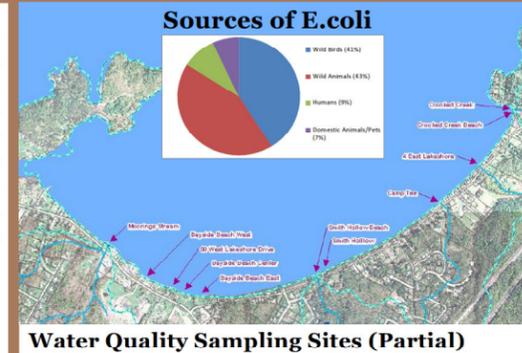


Field Inspection-Catch Basin

## WATER QUALITY TESTING



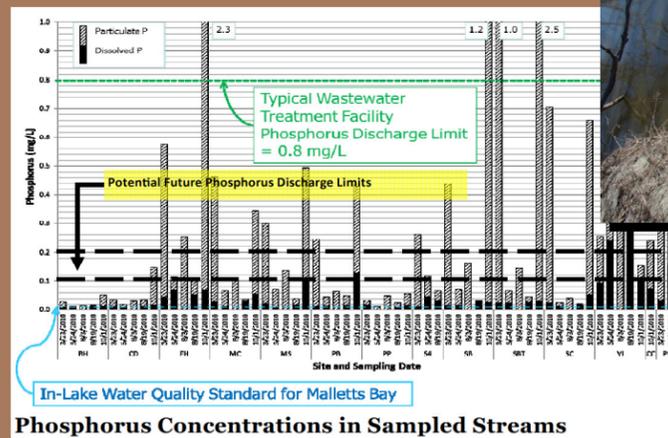
E. coli Sampling Results



Water Quality Sampling Sites (Partial)

### Bacteriological Testing (E. Coli) at 36 Discreet Sampling Sites

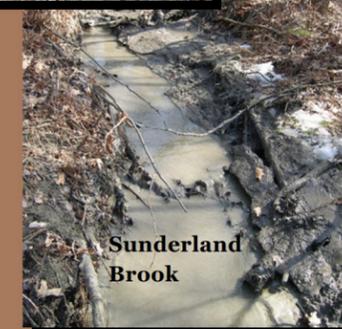
- ◆ E. coli levels significantly exceed standards at some locations.
- ◆ DNA ribotyping of E. coli for source identification (nearly 300 samples analyzed).
- ◆ 84% of all E. coli attributed to wild birds and wild animals.
- ◆ Only 9% of all E. coli attributed to humans, but found at 10 of 36 sampling sites.



Phosphorus Concentrations in Sampled Streams



Water Quality Sampling



Sunderland Brook

### Testing for Phosphorus at 14 Discreet Sampling Sites

- ◆ Phosphorus levels significantly exceed the in-lake water quality standard—especially during wet weather events.
- ◆ Most phosphorus is particulate, transported from tributaries during wet weather events.
- ◆ Stream bank erosion and sediment transfer are the primary sources of phosphorus.
- ◆ Demonstrated that stormwater BMPs and natural wetlands in the Exit 16 drainage basin are effective in filtering phosphorus.
- ◆ Stormwater infrastructure improvements that alternate high flows would lower phosphorus loadings to the bay.

## PUBLIC OUTREACH

- ◆ More than two dozen public meetings were conducted with local leaders and the public.
- ◆ Meetings were videotaped and re-broadcast for public viewing.
- ◆ Expansive website was developed as an easily accessible public resource of information on all facets of the study.
- ◆ E-newsletter and RSS feed notified interested parties of website updates and meetings.
- ◆ Public was informed and involved in developing strategies.



## CONCLUSIONS/RECOMMENDATIONS

- ◆ Continued growth will require management of stormwater & wastewater to ensure public health, water quality and economic vitality.
- ◆ A wastewater utility can be created to manage on-site systems that treats property owners equitably, is cost-effective, and can be supported by reasonable user charges.
- ◆ Colchester does not need to pursue municipal sewers in a majority of the town to meet future growth. On-site systems are adequate in a number of areas if they are properly managed.
- ◆ A stormwater utility is needed to improve stormwater management and prepare Colchester for impending more stringent requirements.
- ◆ Both wastewater and stormwater utilities should have integrated administration to save costs.
- ◆ All property owners would participate in this combined water quality utility since everyone impacts water quality at some level.

American Council of Engineering  
Companies/Vermont Section  
2014 Engineering Excellence Awards Entry

Category F: Studies

### Stormwater

- ◆ Stormwater infrastructure is scattered throughout Colchester.
- ◆ Most stormwater infrastructure is permitted and regulated.
- ◆ Stream bank stabilization is a significant concern along some stretches of tributaries to Malletts Bay.