CANAAN STREET LAKE

Preserving our Recreation and Water Source Why YOU should care!

A discussion on the current state of the lake, why it is changing, and what you can do.



Tuesday, August 5th at 6:30 pm Cardigan Mountain School Auditorium

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Sponsored by: Canaan Conservation Commission Canaan Lake Association Cardigan Mountain School Upper Valley Land Trust Water Source Protection Committee



Canaan Street Lake's Protection Plan

John Bergeron Dave Shinnlinger Town of Canaan Source Water Protection Committee

Introduction

Basic statistics

- Canaan village public water supply
- Potential contamination sources
- Water quality
- Recommendations
- DES source protection grant
- Comprehensive shoreland act
- Summary

Basic Statistics

Canaan St. Lake Watershed

The Canaan Street Lake watershed is defined as the area of land and network of wetlands, ponds, and tributaries that drains to Canaan Street Lake.

Public Water Systems

Intake Area

Large amount of forested land





BASIC STATISTICS

- Watershed Size 1,600 acres (2.5 sq. mi.)
- Lowest Elevation: 1,142 ft. (outflow point)
- Highest Elevation: 1,476 ft.
- Topography: gentle to steep slopes (3-80%)

Relatively Undeveloped
 Good Water Quality
 Entirely within Canaan

BASIC STATISTICS

Avg. Lake Depth: 11 feet
Max Lake Depth: 22 feet
Shoreline: 4 miles
Predominantly Spring Fed

CANAAN STREET LAKE
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BASIC STATISTICS

Lake Area: 303 acres
 Lake Volume: 3,330 acre feet (4.1 mill. m³)
 Flushing Rate: 0.7 times per year

 NH average flush rate is 3.0

Recreational Activities

- Swimming
- Fishing
- Boating
- Water-skiing
- Beaches
- Loon watching
- Snowmobile

Ice-skating
CC Skiing
Ice fishing
Bird hunting
Seaplane
Fireworks

All prohibited in reservoir area

Canaan Village Public Water Supply

Source is Canaan Street Lake

Treatment System can...

- Filter Suspended Particles
- >Adjust pH
- Disinfect water for bacteria and most viruses



Treatment System can't remove:

Toxic Algae Blooms
Petroleum Products
Hazardous wastes
Certain viruses
MTBE

*Better to protect the source of our water proactively.

Treatment Creates Byproducts

Canaan's drinking water has high DBPs

- DBPs are disinfection byproducts
 - These can cause cancer
- EPA lowered the safe limit recently
 - We were passing, but now fail frequently

DBPs are caused by high organic carbon

• Plants, fish, animals, birds, insects, etc.

Organics flourish with high nutrient levels

Treatment Creates Byproducts

- Sources of nutrients (phosphorous)
 - Older septic systems
 - May be too close to water or water table
 - Tank full or leach field flooded
 - Irregular pumping schedule
 - Stormwater delivers sand and silt to lake
 - Phosphorous binds to silt and carries to lake
 - Shore vegetative buffer impaired by road salt
 - Salt stunts growth and reduces phosphorous uptake
 - Lawn fertilizer (even away from shoreline)

Treatment Creates Byproducts

Byproducts are a common problem
 Caused by EPA lowering limits
 Town has hired engineering firm

Firm will identify solution for Canaan

Active Public Water Supplies

System Name	System Type	Population	Source Type	Well Depth	Yield (gpm)
Canaan Water Department	Community	600	Surface		1 million (gpd)
Cardigan Mountain School (Well #1)	Community	300	Bedrock	540	23
Cardigan Mountain School (Well #2)	Community	300	Bedrock	525	12
Crescent Campsites- North	Non- community Transient	211	Bedrock	500	3
Crescent Campsites-South	Non- community Transient	25	Bedrock	190	15

Potential Contamination Sources Water Quality Recommendations

Potential Contamination Sources

Roads (salt and sand/silt)

- Salt reduces shore vegetation nutrient uptake
- Silt carries nutrients and viruses into lake
- Recreational Activities on Lake
 - Discarded fish parts & dying bait
 - Trucks dropping salt & sand on ice
 - Power boats churning lake bottom
 - Human and dog waste at beach and shore

Erosion / Silt









Septic System

Distance to lake is critical
Height above water table is critical
Inspection every three years is critical



Failed Septic System



This failure not is in Canaan

Potential Contamination Sources

Two cycle engines
 Inject oil and fuel into water
 New fuel injected two cycle engines are safer
 Refueling while on the lake
 Boats, snowmobiles, ice augers
 Exterior above ground tanks
 Underground storage tanks

Potential Contamination Sources

Inadequate Water Resources Protection (e.g. no town ordinance)

- Auto repair shops
- Hair salons
- Veterinarians
- Animal feedlots
- Gasoline dealers
- Fuel depots
- Snow dumps

Water Quality Monitoring

	Chloro-			Phos-	Conduc-		
Date	phyll-a	Color	Secci	phorous	tivity	Chloride	PH
1979	2.7	10	5.0	3	44	3	6.5
1990	2.5	16	4.0	9	54	5	7.2
2005	6.8	18	4.7	7	75	11	7.1

Guide							
Good	0-5	0-25	2-4.5	Below 10	0-100	*	6-8
Poor	Above 15		0-1.9	Above 20		**	

 * NH remote surface water chloride mean is 4
 ** NH drinking water chloride typically below 75 DES Lake Survey data

Lake is Slowly Changing

- Home sites are being added
- Conversions from seasonal to year round
- Old septic systems are no longer efficient
- Lawns and gardens are stressing the lake
- Stormwater brings undesirables into lake
- Above applies to entire watershed
 - Tributaries and springs are bringing trouble to the lake

Recommendations

Roads Control stormwater Septic Systems Septic survey Recreation Study boating impact Land use Regulate hazards

New construction

- Maintain buffers
- Conserve land
- Fuel storage
 - Emergency plan
- Reservoir markers
 - Mark in winter
- Testing program
 - Identify problems

DES Source Protection Grant

DES Source Protection Grant

Watershed Protection Plan 2006 For drinking water protection Developed many recommendations Submitted grant proposal 2007 Implements a few recommendations With PSU Center for the Environment DES awarded drinking water grant 2008 34 proposals submitted, 16 awards Average award \$12k, ours \$19k Funds come from EPA through DES

DES Source Protection Grant

Comprehensive testing program

- 51 samples, 18 months, 6 parameters (phosphorous, nitrate, sodium, chloride, turbidity, color)
- Septic system survey
 - Locate high risk systems
- Watershed boundary signs
- Educate land owners and lake users
 - Shoreland, septic, recreation, land use
- Long range recommendations

Septic Survey (sample)



Red = older
White = newer
Green = vacant

Soil characteristics

Drainage class

➤ Water table





Preliminary Boundary Sign





Comprehensive Shoreland Act

Comprehensive Shoreland Act

Protects water quality with vegetative buffer

- Captures nutrients, silt, bacteria, viruses
- Salt reduces buffer effectiveness
- Lawn & garden fertilizer can disable buffer
- Lawns are not effective buffers
- Vegetative buffer is 250 feet wide

Stormwater carries all of above toward lake

- Channel flow reaches lake
- Sheet flow is largely captured by buffer



Within 50 feet of water

Limited tree cutting

- Retain groundcover, stumps, brush, rocks
- Trimming above 3 feet allowed for view
- Six foot wide path to water allowed
- Existing lawns may be maintained
 - However you may attract geese
- Beach permit required
- Single dock allowed
- Accessory building allowed with permit

Between 50 and 150 Feet

If lot has over ½ acre between 50 &150 ft
 50% of pervious area must be unaltered
 Otherwise

25% of pervious area must be unaltered

Within 250 Feet of Water

DES shoreland permit required for almost all construction, filling, or excavation 80% of area within 250 ft must be pervious One dwelling unit per 150 ft of shore Building distance from shore At least 50 feet for primary building At least 20 feet for secondary building Conversion from seasonal to year round Requires septic permit

Summary

Summary

Canaan Street Lake is in good condition Threats to water quality are increasing Water quality is slowly degrading Drinking water is marginally safe Organic carbon is the problem Protection measures will be implemented Additional measures are needed

Conserved & Public Lands in and around Canaan, NH



Prepared: August 1, 2008 Other Conserved/protected lands: NH ords, surveys Other Conserved, ArcGIS file: CANAAN.mxd (ALB) records, Data Sources: Topograhic base map: NH GRANIT: DRG tiles 92, 93, 94, 105, 106, 107. UVLT Conserved Lands: UVLT r GRANIT consp layer (2004-08) Town Boundary: NH GRANIT, edited Map Projection: NH SPCS, NAD83,