LAND USE PLANNING

Protection of Groundwater

Stamford, VT

August 24, 2026

VT Drinking Water and Groundwater Protection Division

Laura Ranker, Source Water Protection Specialist

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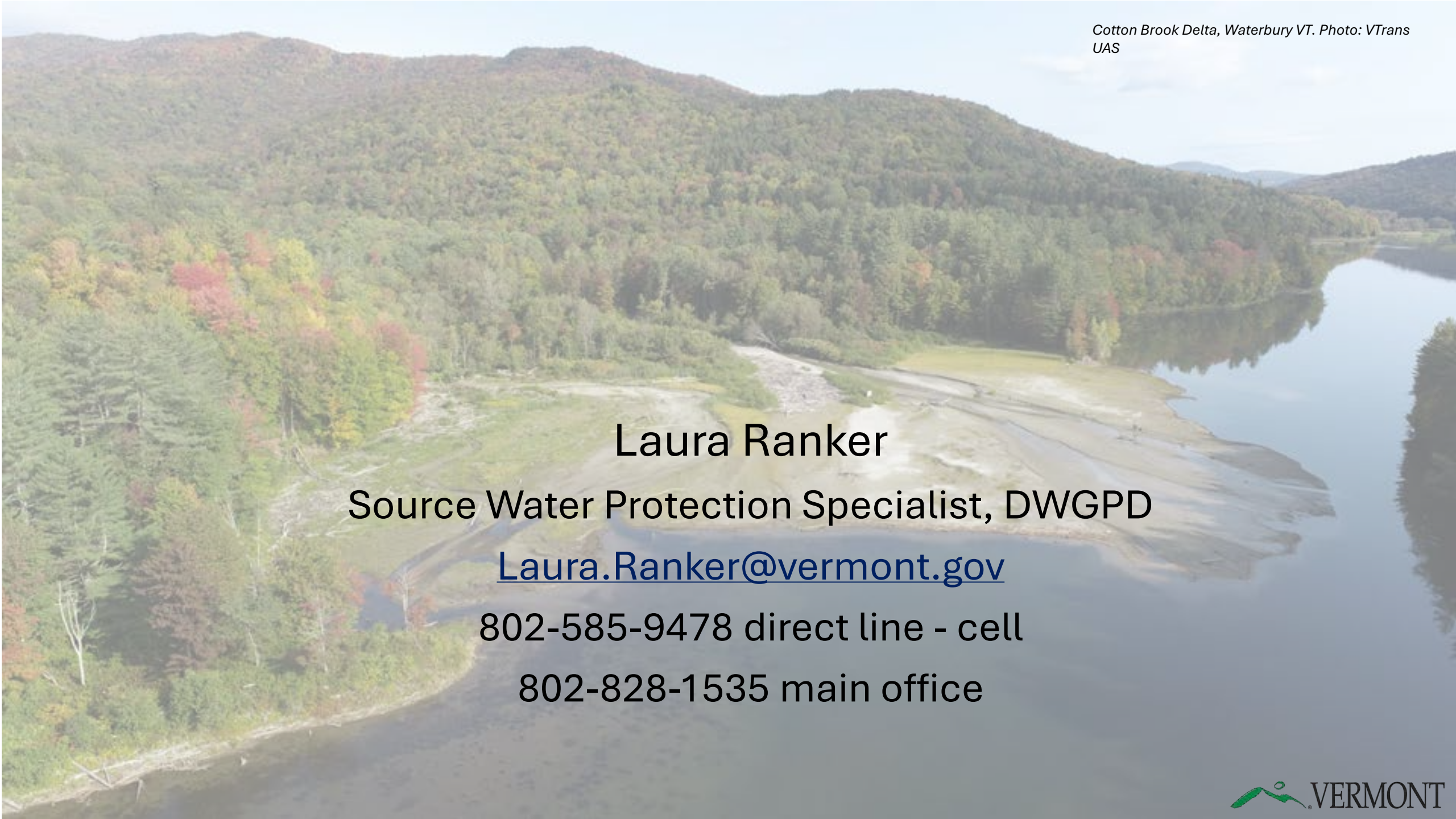

Cotton Brook Delta, Waterbury VT. Photo: VTrans UAS

Laura Ranker

Source Water Protection Specialist, DWGPD

Laura.Ranker@vermont.gov

802-585-9478 direct line - cell

802-828-1535 main office

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Topics Covered

Groundwater and Surface Water Interconnection

Public versus Private Drinking Water

Groundwater Protection

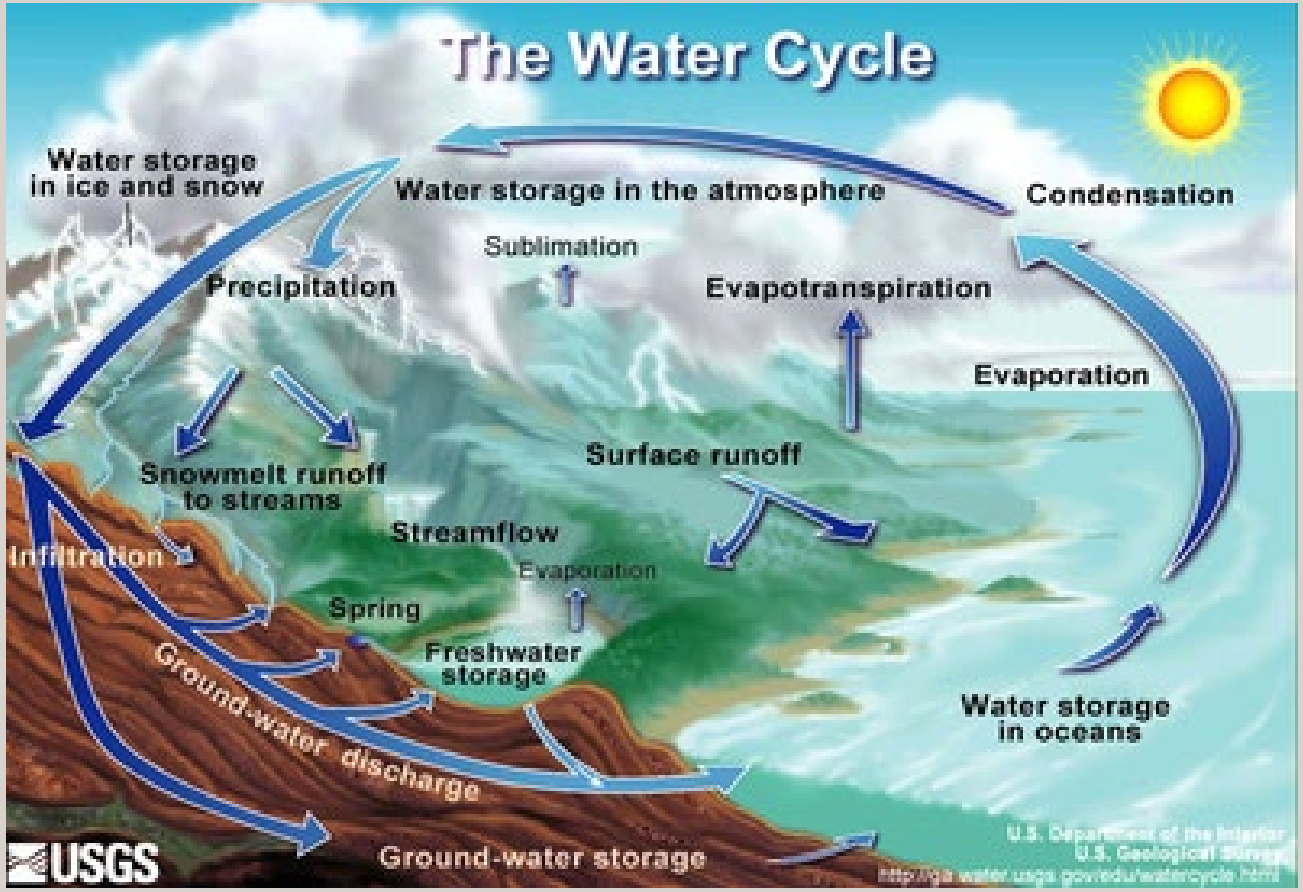
Questions to Ponder

Resources and Tools Available

Questions and Answers

Groundwater-Surface Water Interaction

- Groundwater and surface water are an interconnected system, and they interact with each other.
- Groundwater can affect surface water levels, and vice versa.
- It is imperative that planners consider water as a system rather than two discrete sources.



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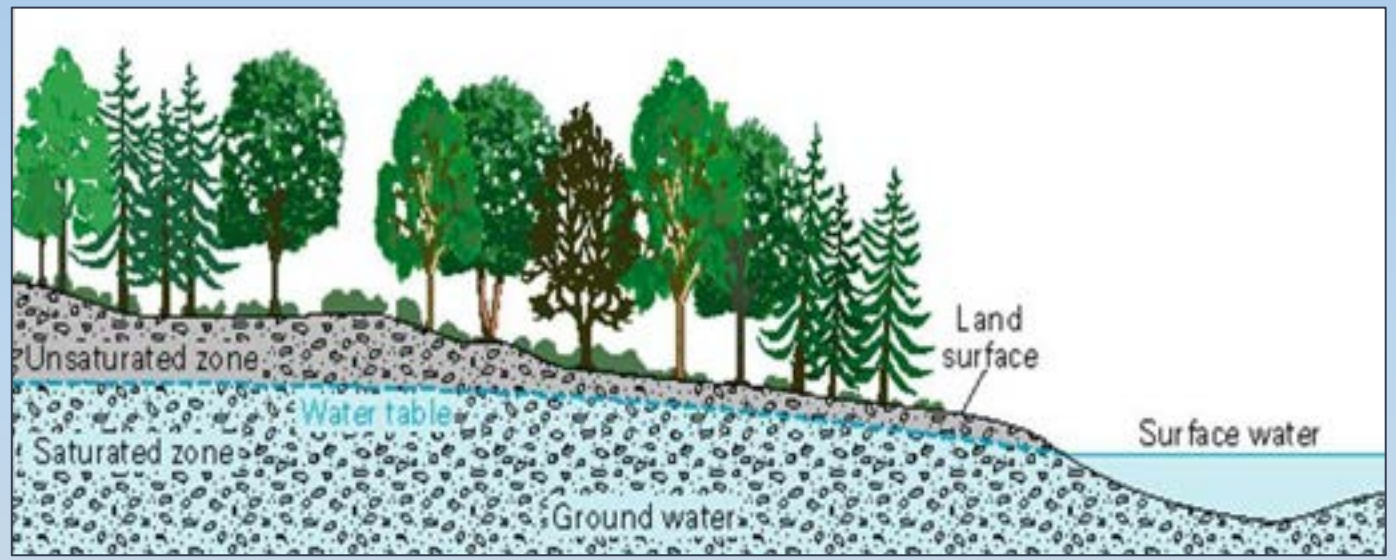
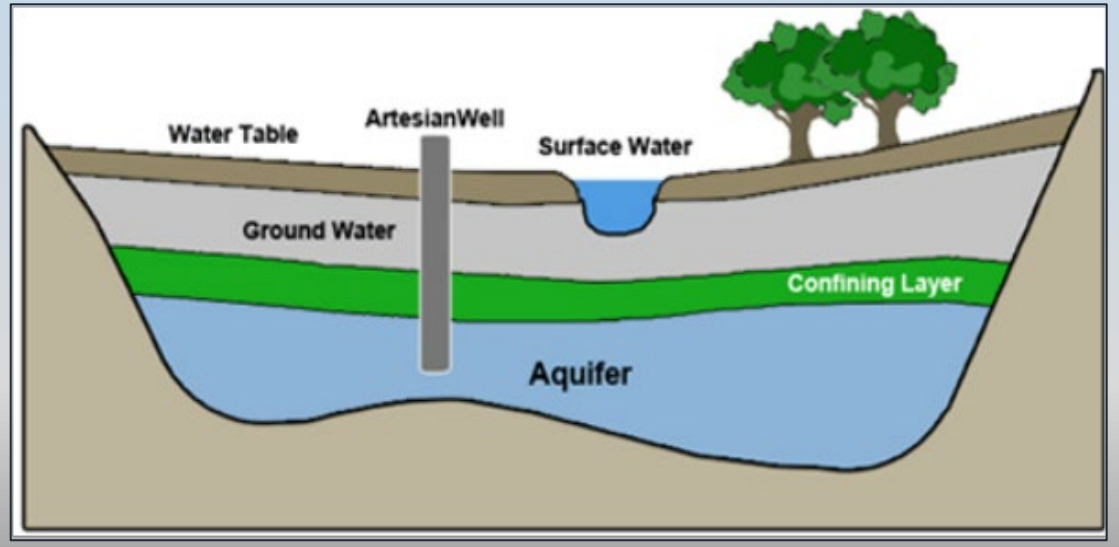
Surface water and groundwater systems are interconnected

Surface water can receive inflow from groundwater and groundwater is recharged from surface water.



Groundwater flow generally mimics surface water flow – Recharges in the uplands and discharges to rivers.

This interaction between groundwater and surface water systems means that the quality and quantity of either can be influenced by each other.

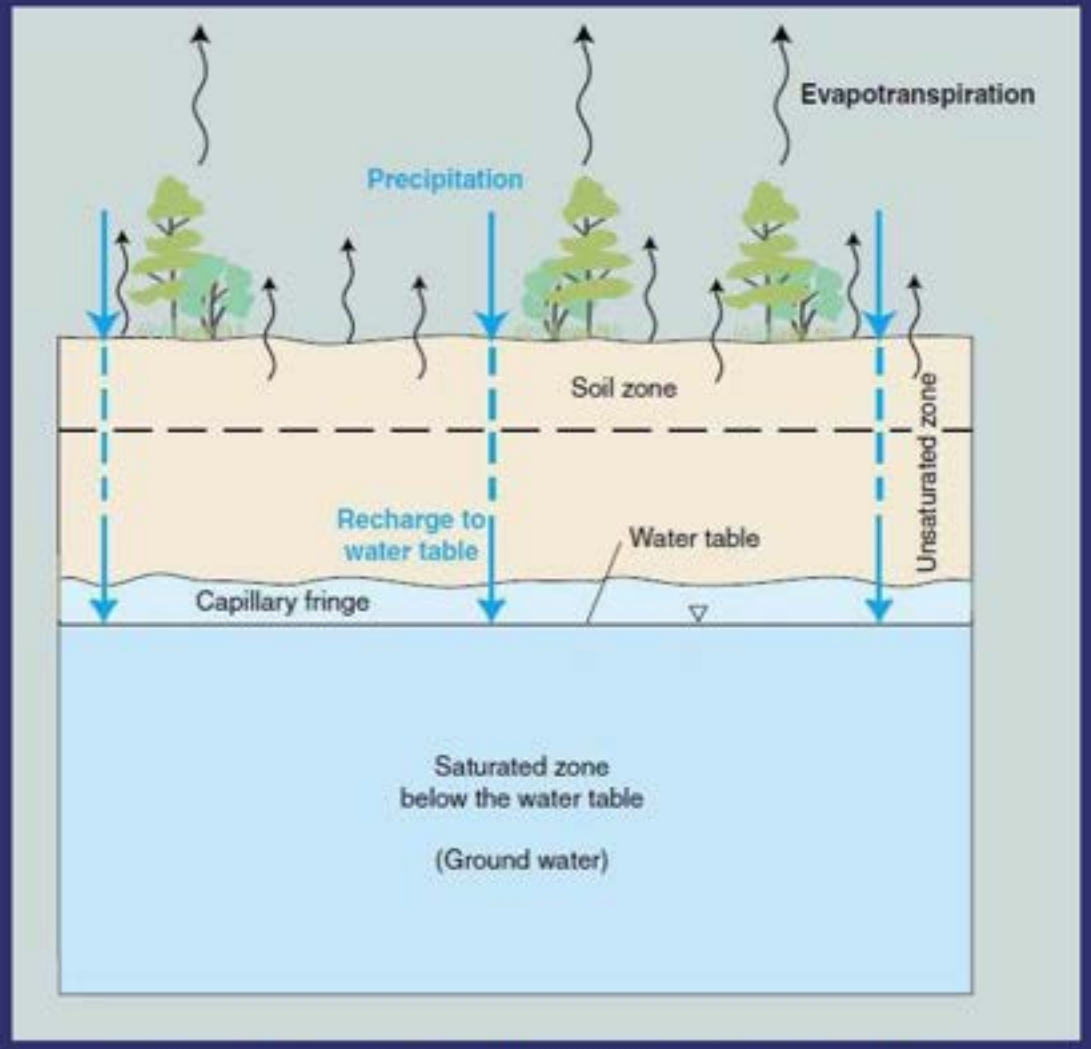


Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells.

The *water table* is at the top of the saturated zone. Below the water table all pores are completely filled with water.

Pressure surface where pore pressure= atmospheric pressure

Above the water table, in the *unsaturated zone*, pores are partly or completely filled with air.



source: K. Bradbury (Wisconsin GS) and USGS

Groundwater Source

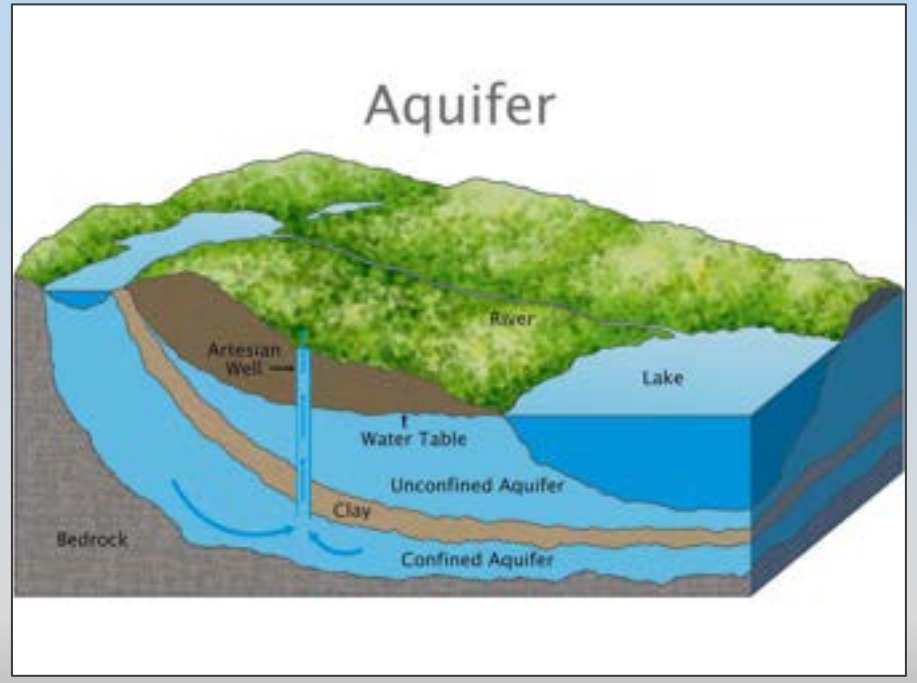
Underground

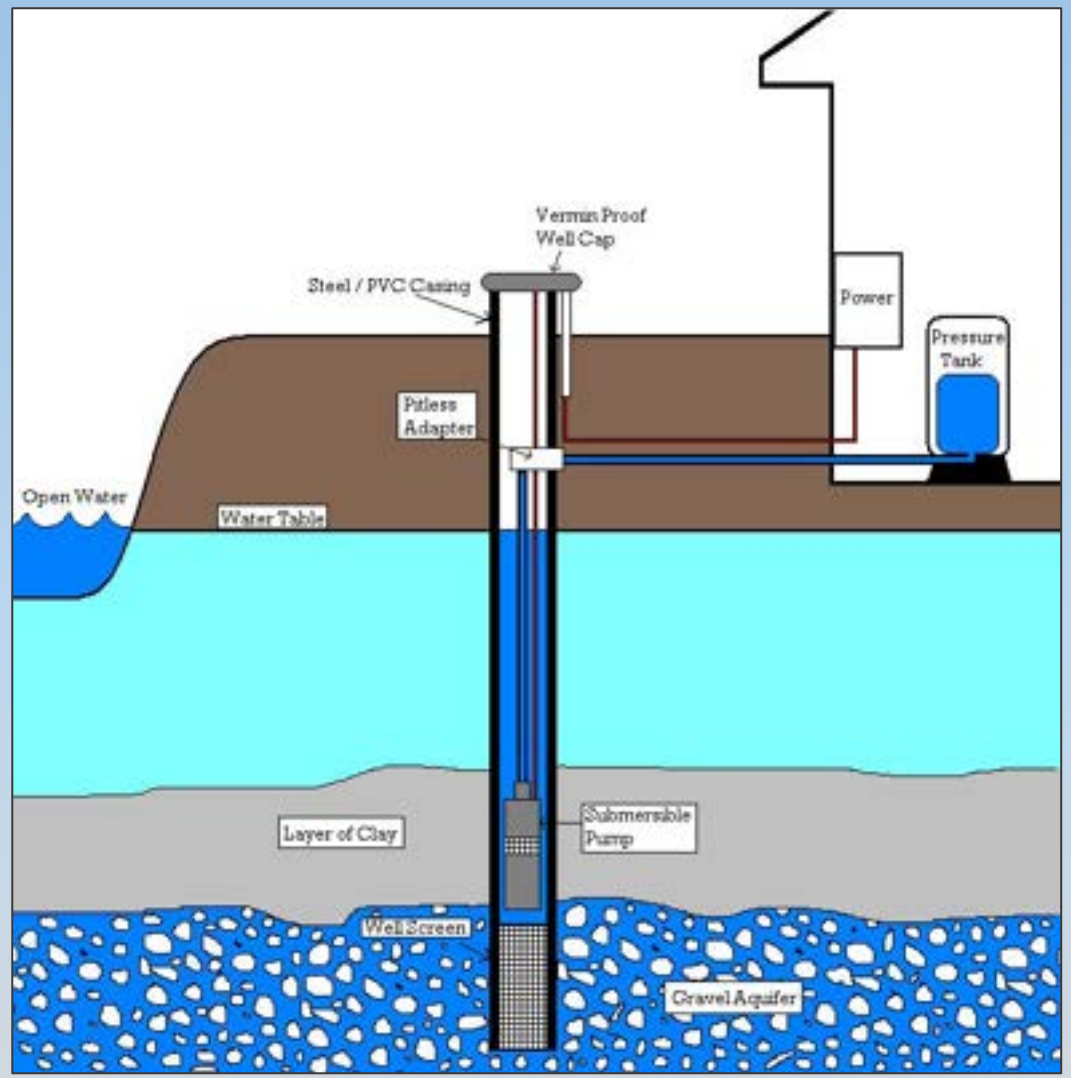
- Aquifers (confined or unconfined)
- Springs

✓ High quality water, generally no treatment required

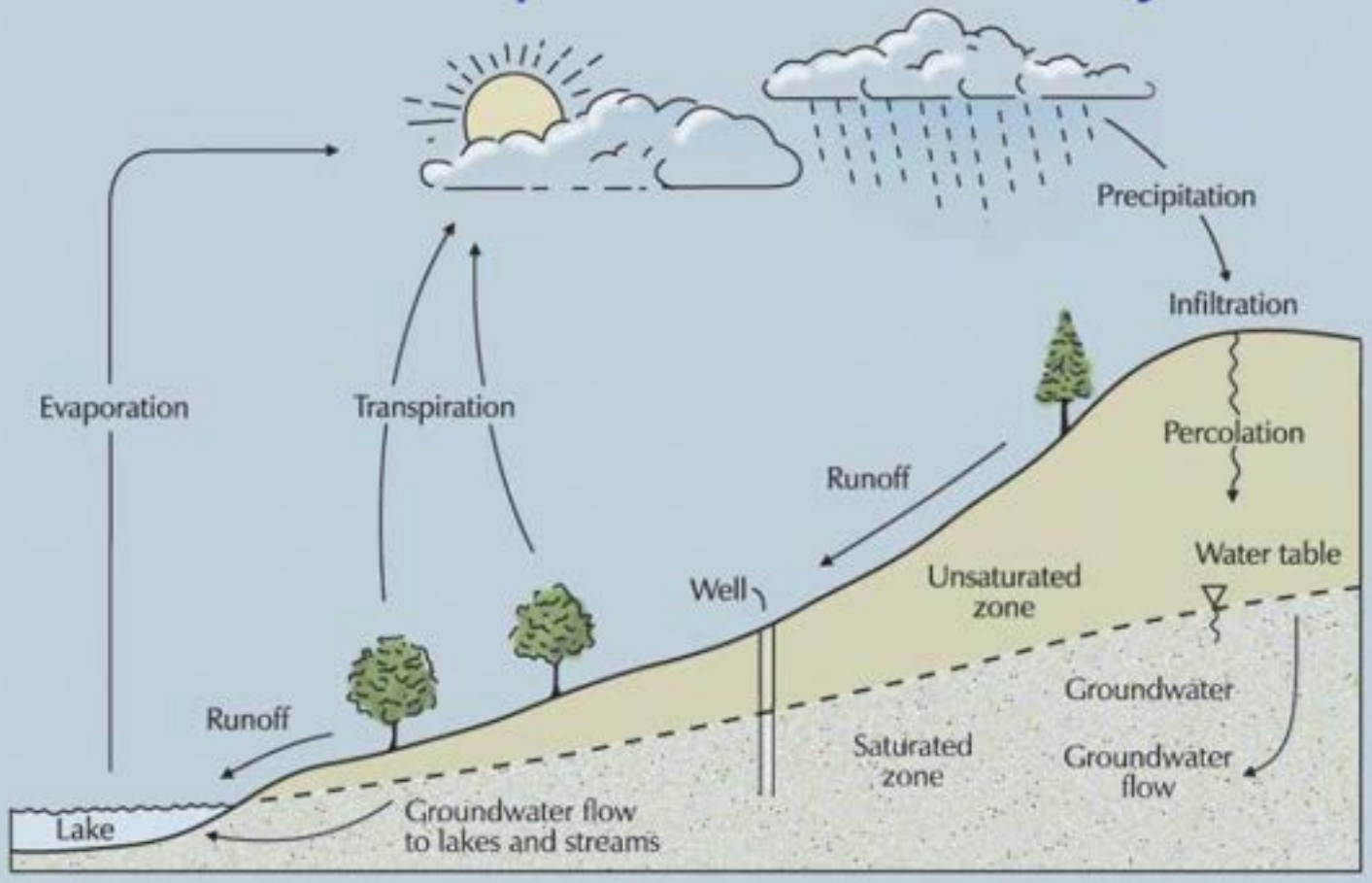
✓ Quantity may fluctuate or be limited

✓ Are susceptible to naturally occurring contaminants (i.e. arsenic, radon, iron, manganese)





All water is part of the water cycle…



Aquifers are geologic units (sand and gravel, sandstone, etc) that can store and transmit significant quantities of groundwater

Groundwater Aquifer Types

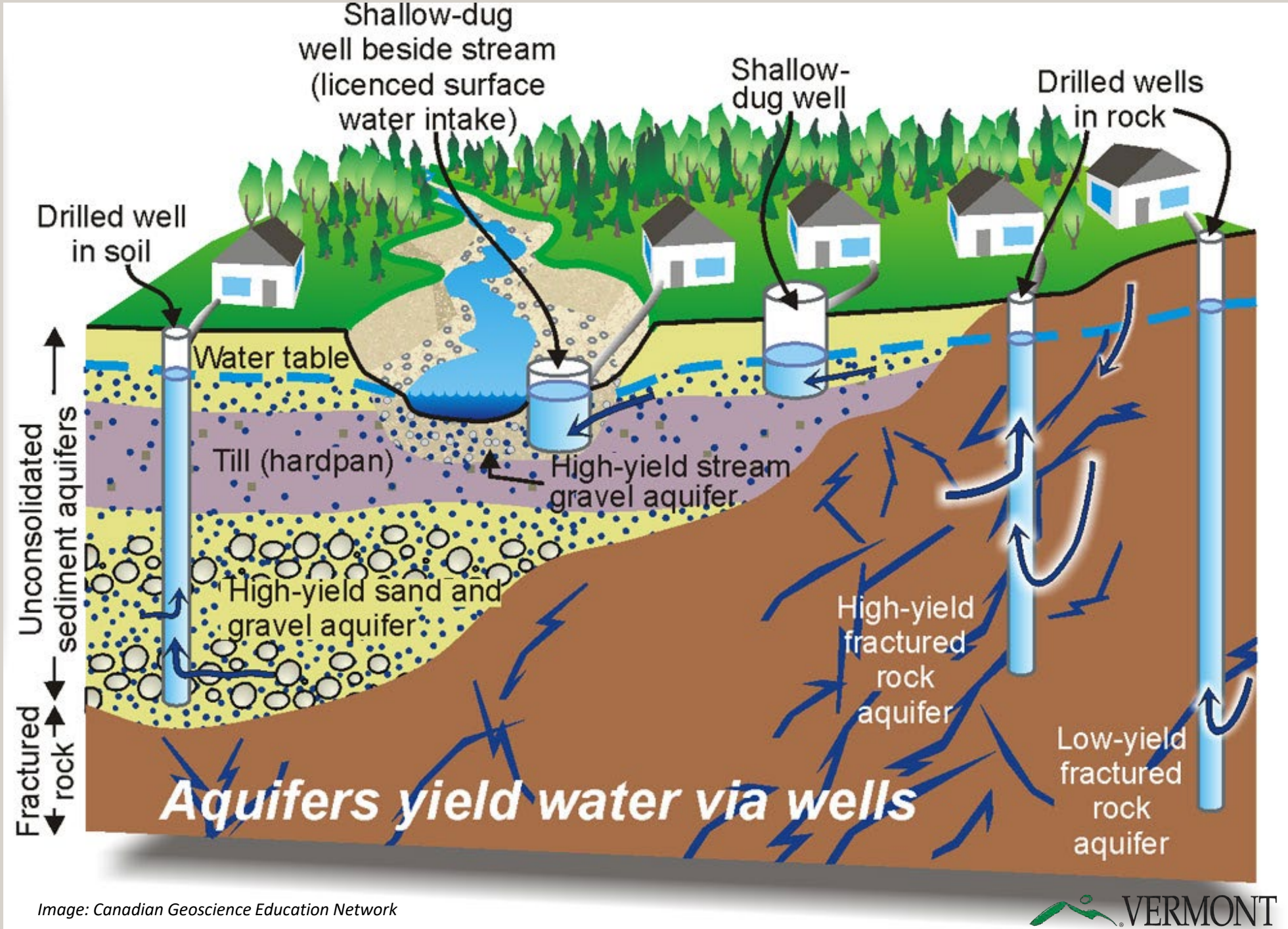


Image: Canadian Geoscience Education Network

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Potential Sources of Contamination (PSOC) to the Aquifer

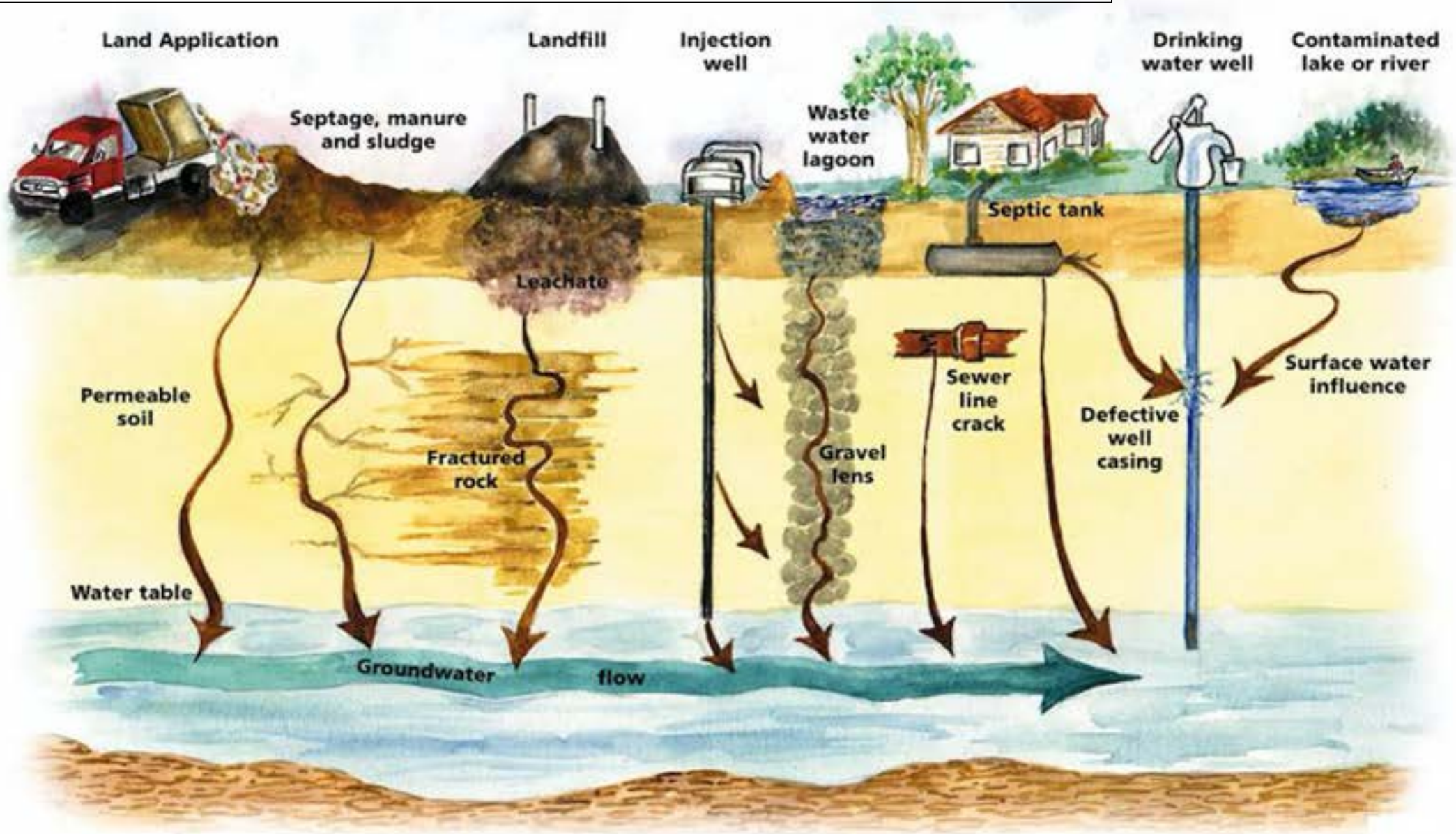

Image: Morwick G360 Groundwater Research Institute

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Public and Private Drinking Water

VT Drinking Water and Groundwater Protection Division

Public Drinking Water Program

Phone: 802-828-1535

Ben Montross, Drinking Water Program Manager

802-498-8981

ben.montross@vermont.gov

https://dec.vermont.gov/water/drinking-water

Focus on implementing the VT Water Supply Rule to provide clean and safe drinking water to VT citizens and visitors.

Wastewater Management and Potable Water Supply (private water supply) Program

Bruce Douglas, Programs Manager

802-636-7545

bruce.douglas@vermont.gov

VT Wastewater System and Potable Water Supply Rule.

VT Department of Health

Private Drinking Water Program

Phone: 802-489-7339

Email: AHS.VDHEnvHealth@vermont.gov

Tom DeBell | Environmental Health Engineer

tom.debell@vermont.gov

802-863-7233

https://www.healthvermont.gov/environment/drinking-water

https://www.healthvermont.gov/environment/drinking-water/private-drinking-water

Helping Vermonters with questions about drinking water quality and human health

Source Water Protection → Public Drinking Water

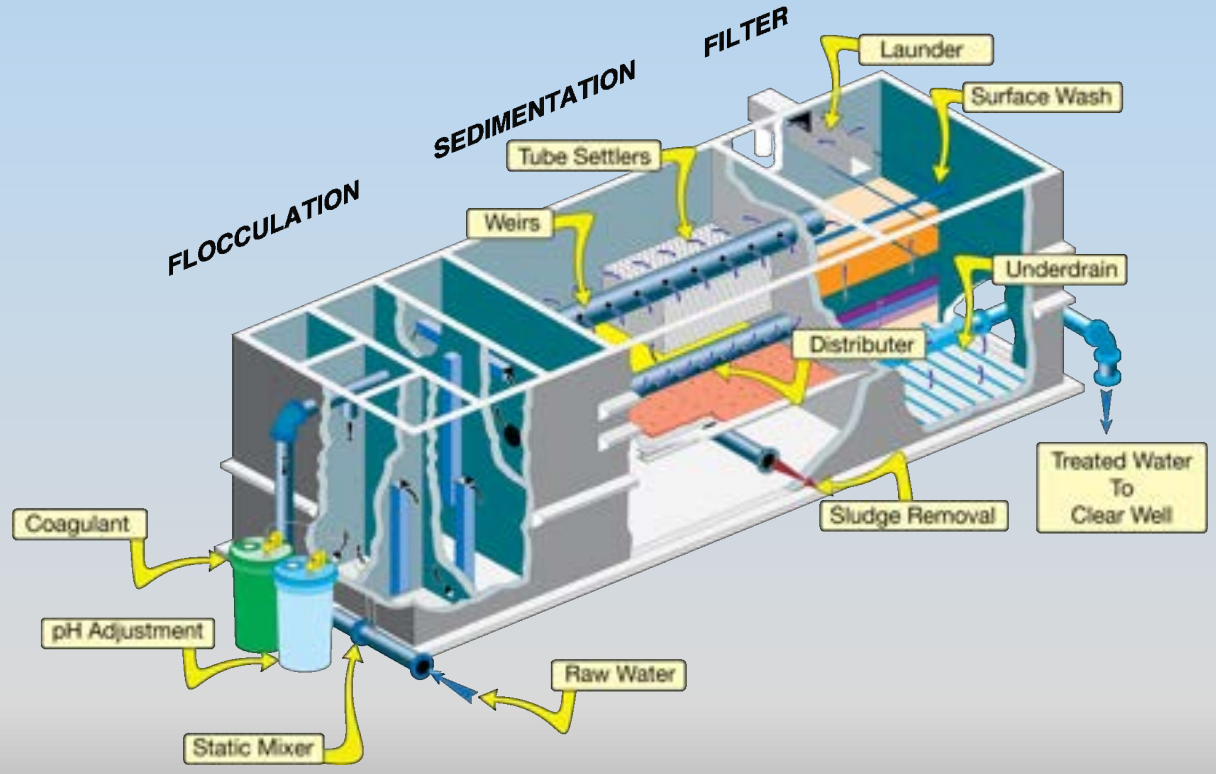
Why Protect Drinking Water Sources

- ✓Protect Public Health – provide safe, clean drinking water
- ✓Reduce water treatment costs
- ✓Reduce costs to water systems and customers

Surface Water Source

Lake, River, Pond

- ✓ Ample quantity but more vulnerable to contamination
- ✓ Requires treatment = filtration and disinfection



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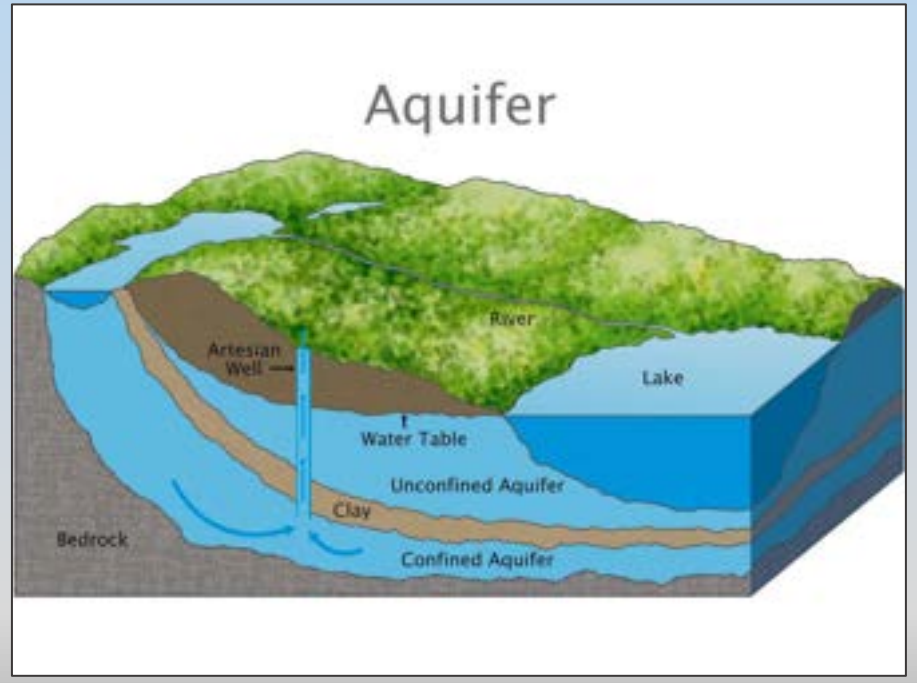
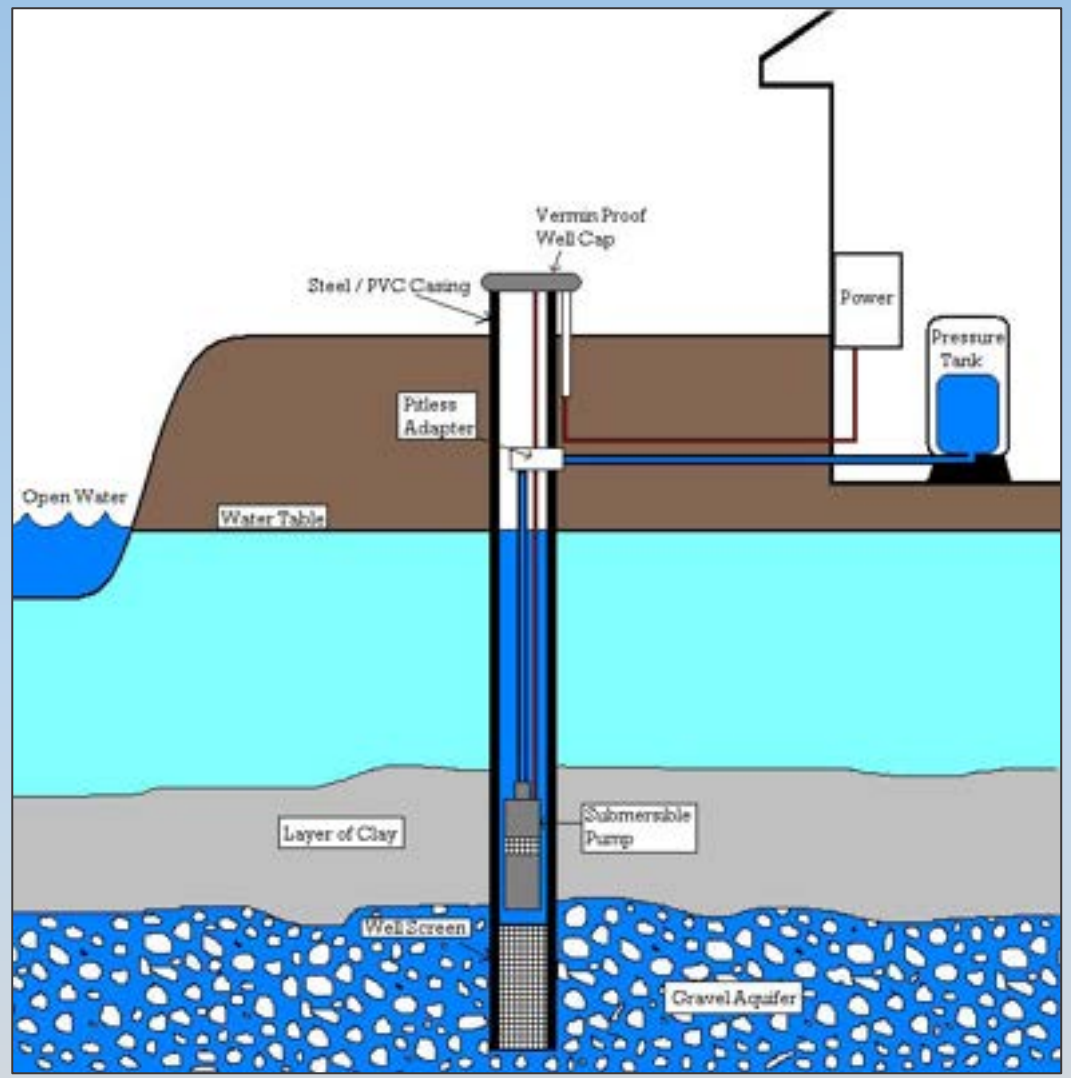




Public Water Systems

Any source(s) or combination of sources owned or controlled by a person, that provides drinking water through pipes or other constructed conveyances to the public and that has at least fifteen (15) service connections or serves an average of at least twenty-five (25) individuals daily for at least sixty (60) days out of the year.

* Public water system also includes a system which bottles drinking water for public distribution and sale.

Public Water Source

Any surface water or groundwater intake used, or permitted to be used, as a source of drinking water for a Public water system.

Public Water System-Requirements

- Operator
  - ✓ Exam & Years Experience = License
  - ✓ Required Continuing Education Hours
- Monitoring Requirements
  - ➢ Total Coliform - bacteria
  - ➢ Nitrates
  - ➢ VOCs
  - ➢ SOCs
  - ➢ Emerging Contaminants
- Source Protection Plan
  - ➢ Community & NTNCs
- Capacity Plan – technical, managerial, financial
- Operation and Maintenance Manual

Classification of Public Water Systems

Public Community water system (PCWS) means a public water system which serves at least fifteen (15) service connections used by year-round residents or regularly serves at least 25 year-round residents.

- Municipalities
- Mobile Home Park
- Home Owners Association
- Fire District

Champlain Water District

BURLINGTON, VT PUBLIC WORKS

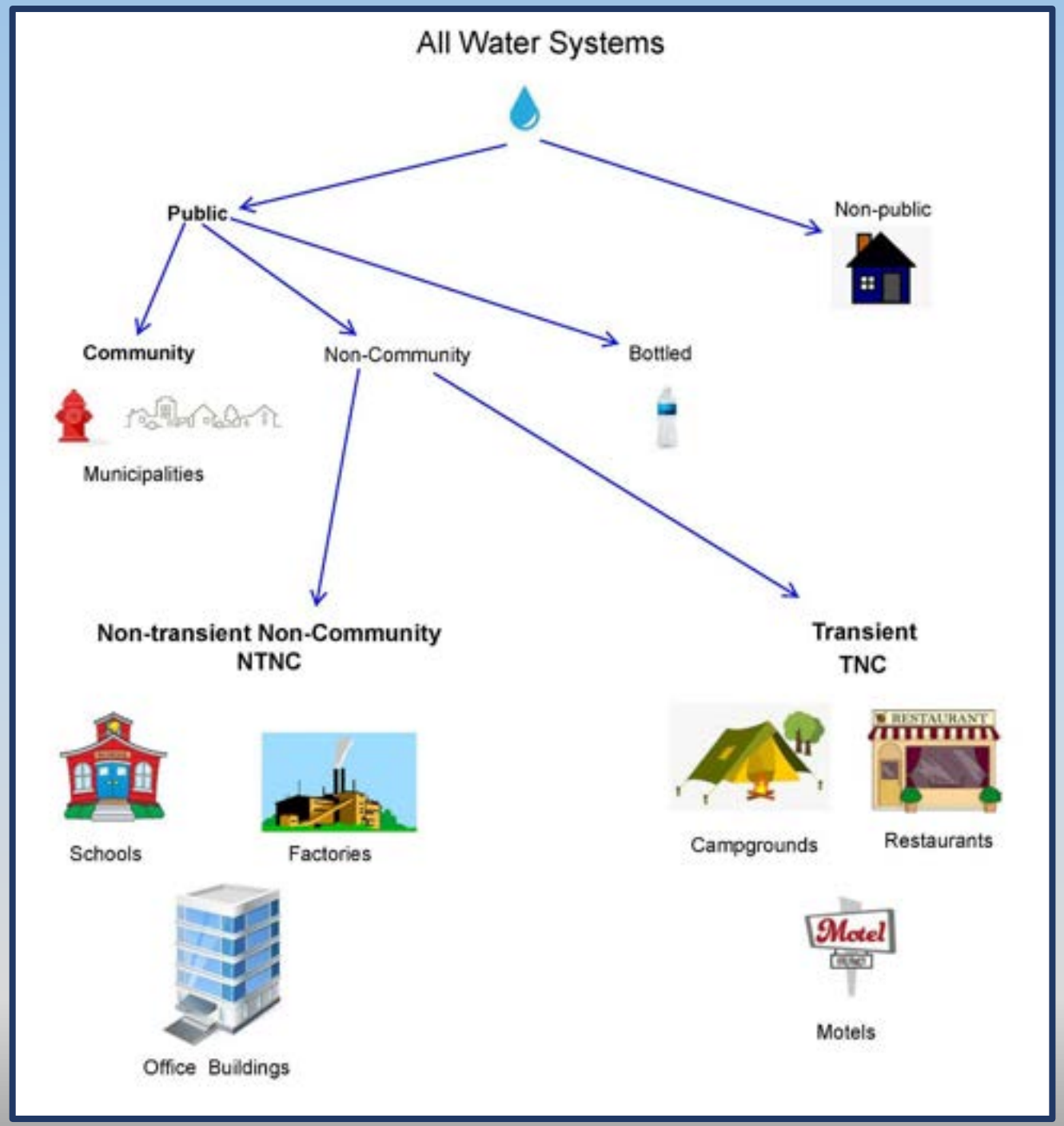
Classification of Water Systems

Public Non-Transient Non-Community water system (NTNC) means a public water system that regularly serves at least 25 or more of the same persons daily for more than six months per year.

- Schools
- Factories
- Office buildings

Public Transient Non-Community water system (TNC) means a public water system that serves at least 25 or more different people for more than sixty days of the year.

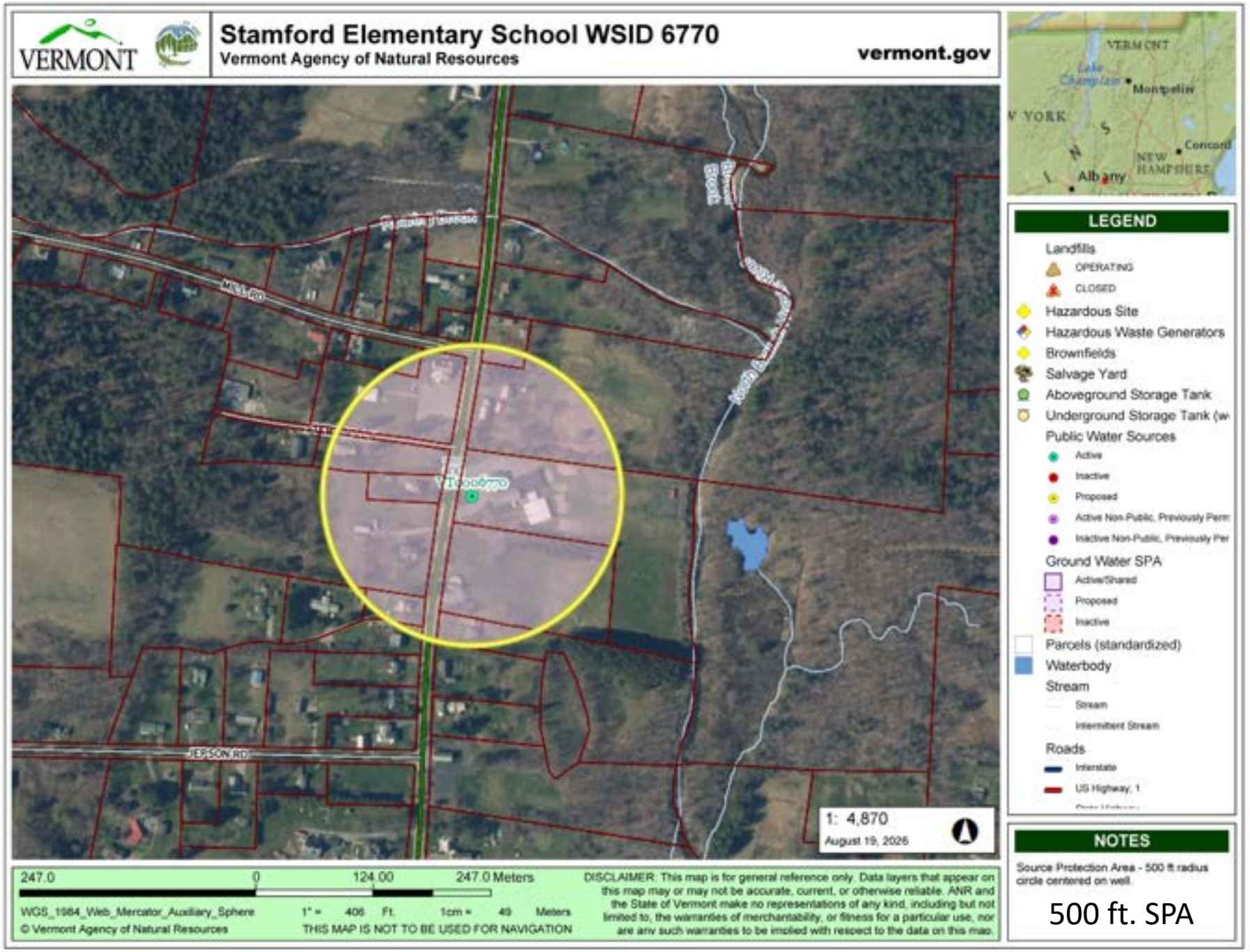
- Restaurants
- Motels
- Campgrounds


All Water Systems
Public
Non-public
Community
Non-Community
Bottled
Municipalities
Non-transient Non-Community
NTNC
Transient
TNC
Schools
Factories
Campgrounds
RESTAURANT
Restaurants
Office Buildings
Motel
Motels

System Info 8/24/2026

VT0006770 - STAMFORD ELEMENTARY SCHOOL

System Type: NTNC - Non Transient Non Community
Town: STAMFORD
State Type: NTNC - Non Transient Non Community
County: BENNINGTON
Water Type: GW - Groundwater
Population: 310
Activity Status: A - Active
Operating Category: 2
Status Date: 9/20/1989
Food and Lodging Numbers:
Status Reason:
Owner Type: L - Local Government
Status Comments:
Sys Comments: Physical Address: 986 Main Rd in Stamford
WW-8-0172, N-2259-08.0 // ADD = 6,200 gpd (310 students/staff x 20 gpd)
max population per WW permit WW-8-0172. //
The school, town office and public town/school library are all located in the building - SEB 03.07.24


VERMONT
Stamford Elementary School WSID 6770
Vermont Agency of Natural Resources
vermont.gov
VERMONT
Montpelier
NEW YORK
Concord
NEW HAMPSHIRE
Albany
LEGEND
Landfills
OPERATING
CLOSED
Hazardous Site
Hazardous Waste Generators
Brownfields
Salvage Yard
Aboveground Storage Tank
Underground Storage Tank
Public Water Sources
Active
Inactive
Proposed
Ground Water SPA
Active/Shared
Proposed
Inactive
Parcels (standardized)
Waterbody
Stream
Stream
Intermittent Stream
Roads
Interstate
US Highway, 1
1: 4,870
August 19, 2026
247.0
0
124.00
247.0 Meters
WGS_1984_Web_Mercator_Auxiliary_Sphere
1" = 406 Ft.
1cm = 40 Meters
© Vermont Agency of Natural Resources
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NOTES
Source Protection Area - 500 ft radius circle centered on well.
500 ft. SPA

How to protect aquifers from contamination or over-pumping?

- Source protection areas (SPAs) offer a way for municipalities to plan and manage their water source's vulnerable areas
- SPAs can help municipalities protect the **quality** and **quantity** of their drinking water source

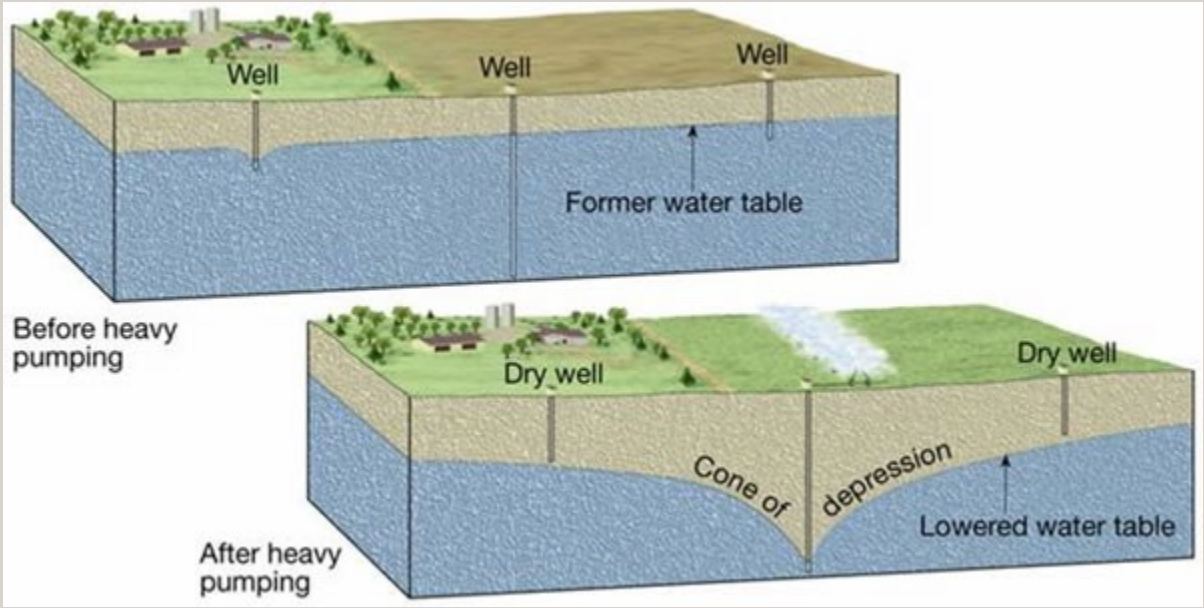

Image: AP Environmental

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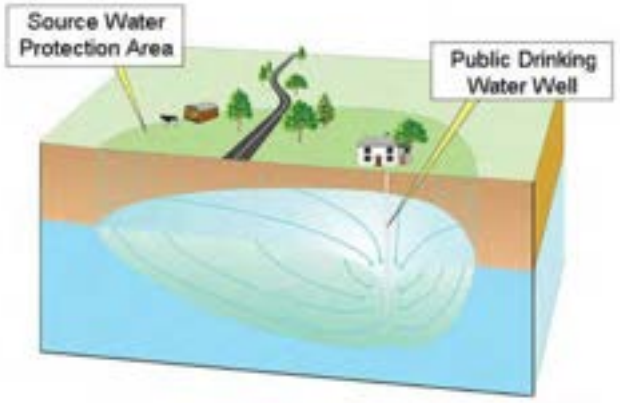
Source Protection Area

Well Head Protection Area = Source Protection Area

- **The surface and subsurface area through which contaminants are likely to move toward and reach water supplies (*Vermont Water Supply Rule*).**

Source Protection Areas (SPA's) are areas through which contaminants are reasonably likely to reach a public water system source

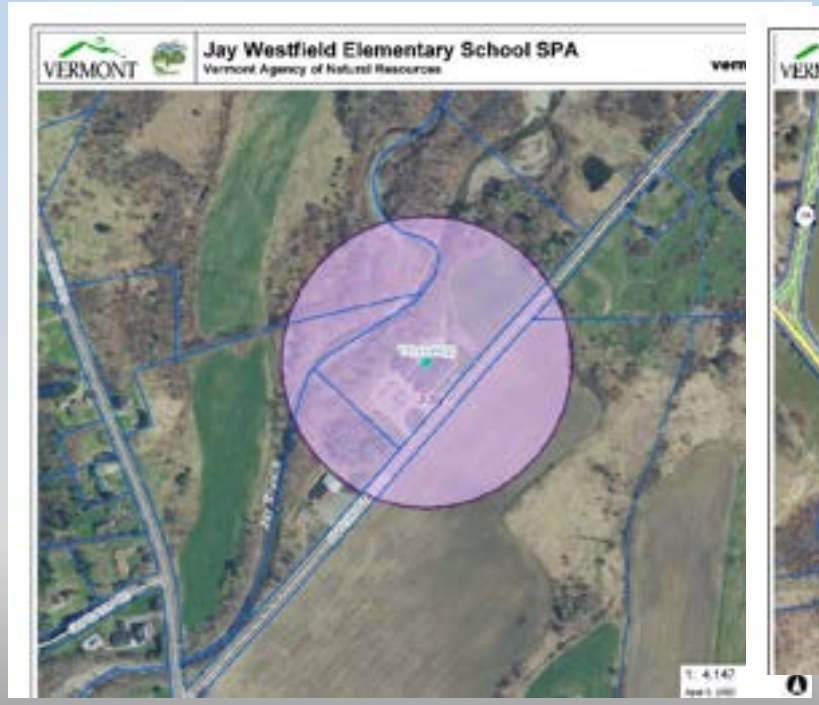


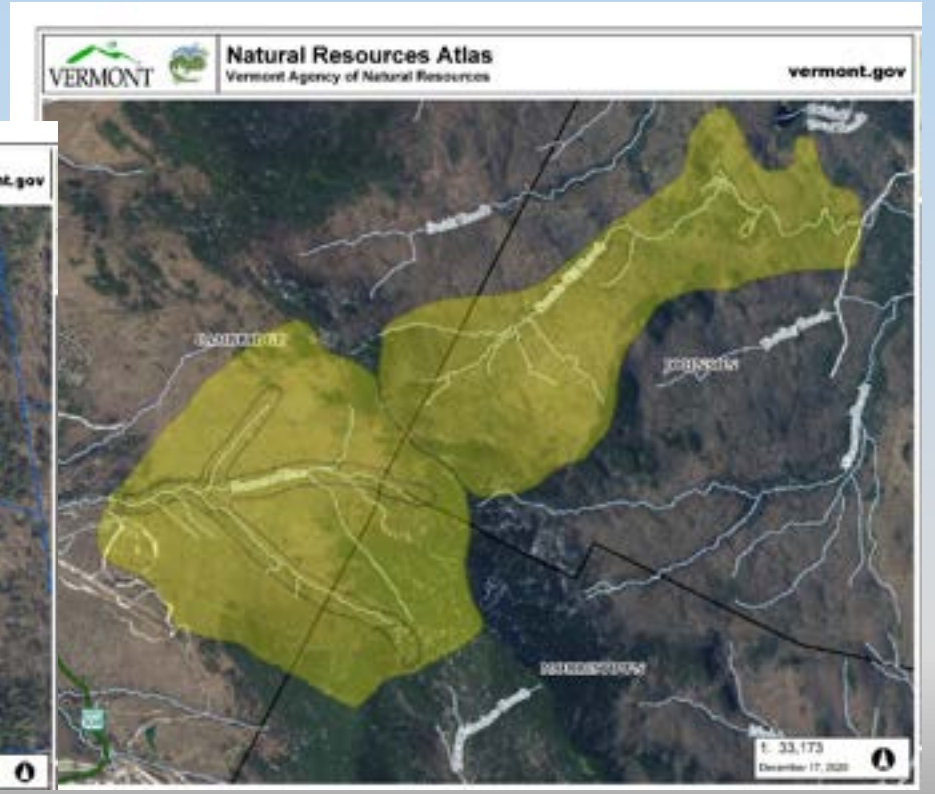
Groundwater SPA

Surface Water SPA

Source Protection Area Delineation

Delineation defines the area of land in which activities are likely to impact the quality of a drinking water source.
Determine the recharge area that supplies water to a public water source.
Establishes boundaries.





Groundwater SPA Delineation

A Groundwater SPA is the land area beneath which groundwater flows to a well, spring, or infiltration gallery. A contaminant released to the land surface or subsurface in a Groundwater SPA would be reasonably likely to move toward, and reach, the drinking water source.

Community Groundwater Systems

- Delineation created using existing geologic and hydrogeologic data, and pumping test data
- Established Zones

Non-Transient Non-Community Groundwater Systems

- The SPA boundaries are determined by using the fixed-radius-circle calculation method
- Calculation is based on Maximum Daily Demand (MDD)
- No Established Zones
  - Minimum set back to land uses
  - Minimum distance to Potential Sources of Contamination (PSOC)
  - VT WSR Appendix A, Part 11. Table A 11-1 and A 11-2

MDD of Source (gpm)	Radius of Proposed SPA (feet)
0'-4.9	500
5 - 19.9	1000
20-49.9	2000
50- 99.9	2500
100 or greater	3000

* NTNC can choose to delineate the SPA using hydrogeologic methods

Questions to Consider

- Can my town support areas of more intense development?
- Where are areas of favorable water supply?
  - ❖ What are the anticipated depths and yields in my area?
  - ❖ Are there water quality issues such as arsenic, uranium, manganese, radon, or iron?
  - ❖ Other Water Quality issues such as salt, nitrates, PFAS or other contaminants and how can we avoid or mitigate these?
  - ❖ Are there aquifer potential maps available for our town?
- What areas should we protect? Where are the sensitive areas?
- Should amendments to the Zoning regulations be considered?
- Should we partner with other entities such as Land Trusts, Forest Service?

Vermont Geological Survey

The Vermont Geological Survey, also known as the Division of Geology and Mineral Resources in the Department of Environmental Conservation, conducts research and mapping relating to the geology, resources, and topography of Vermont. Accessible geoscience data, maps, and publications provide a foundation for stewardship of natural resources and for support of infrastructure. The Vermont Geological Survey also provides information to the public, government, industry, and other organizations who request assistance; reviews projects as they relate to Criteria 9D and 9E of Act 250; and maintains and publishes Vermont geological information.

VGS Contact Information

State Geologist / Director:

Benjamin DeJong, PhD, PG,

(802) 461-5235,
benjamin.dejong@vermont.gov

Geologist:

Jonathan Kim, PhD, PG,

(802) 522-5401,
jon.kim@vermont.gov

Geologist:

Emma Myrick, MS, (802)

480-1260,
emma.myrick@vermont.gov

Geologist:

Cora Deininger,

(802) 480-1256,
cora.deininger@vermont.gov

What is the Hydrogeology of your Community?
Vermont Geological Survey

Town Resource Maps

- Surficial and Bedrock Geology
- Locate Water Well Data
- Depth to Bedrock
- Flow Directions – Generalized
- Hydrogeologic Units – Bedrock
- Recharge Potential to Bedrock
- Potential Overburden Aquifer with Direct Recharge
- GW – Plan, Map, Test, Protect

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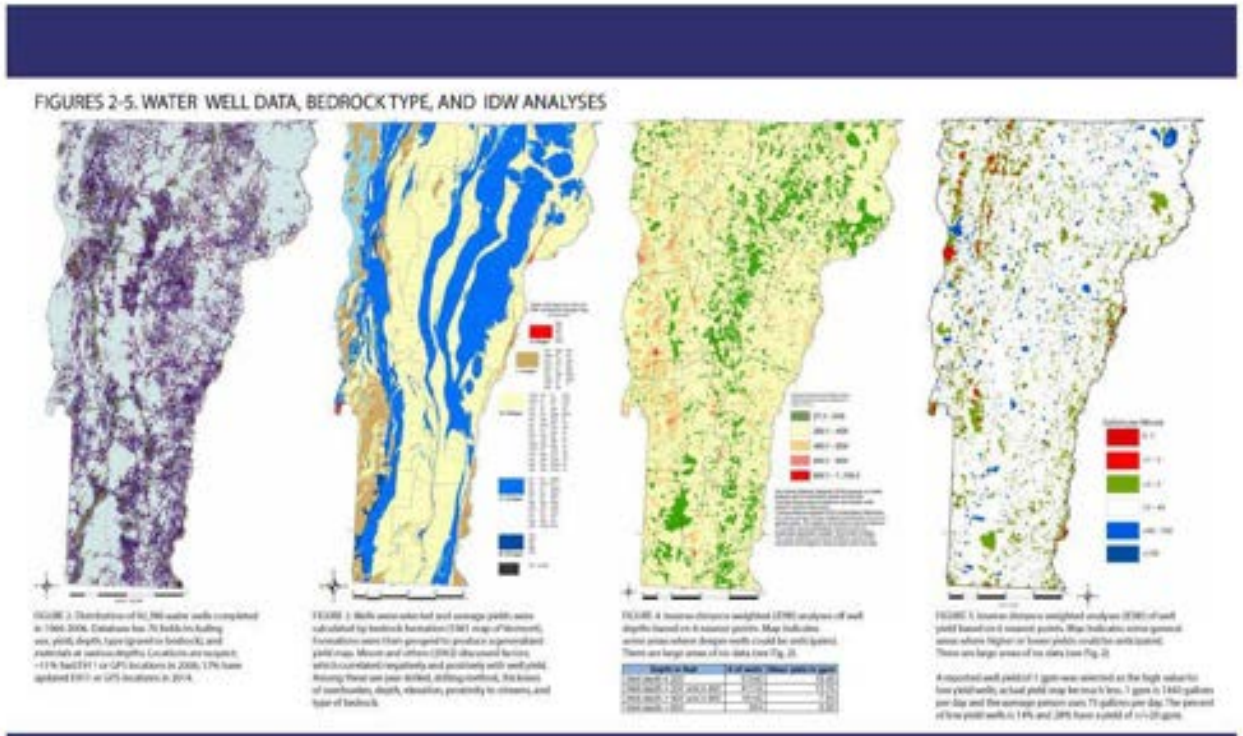
AGENCY OF NATURAL RESOURCES
Vermont Geological Survey



Water Well Data and Analysis

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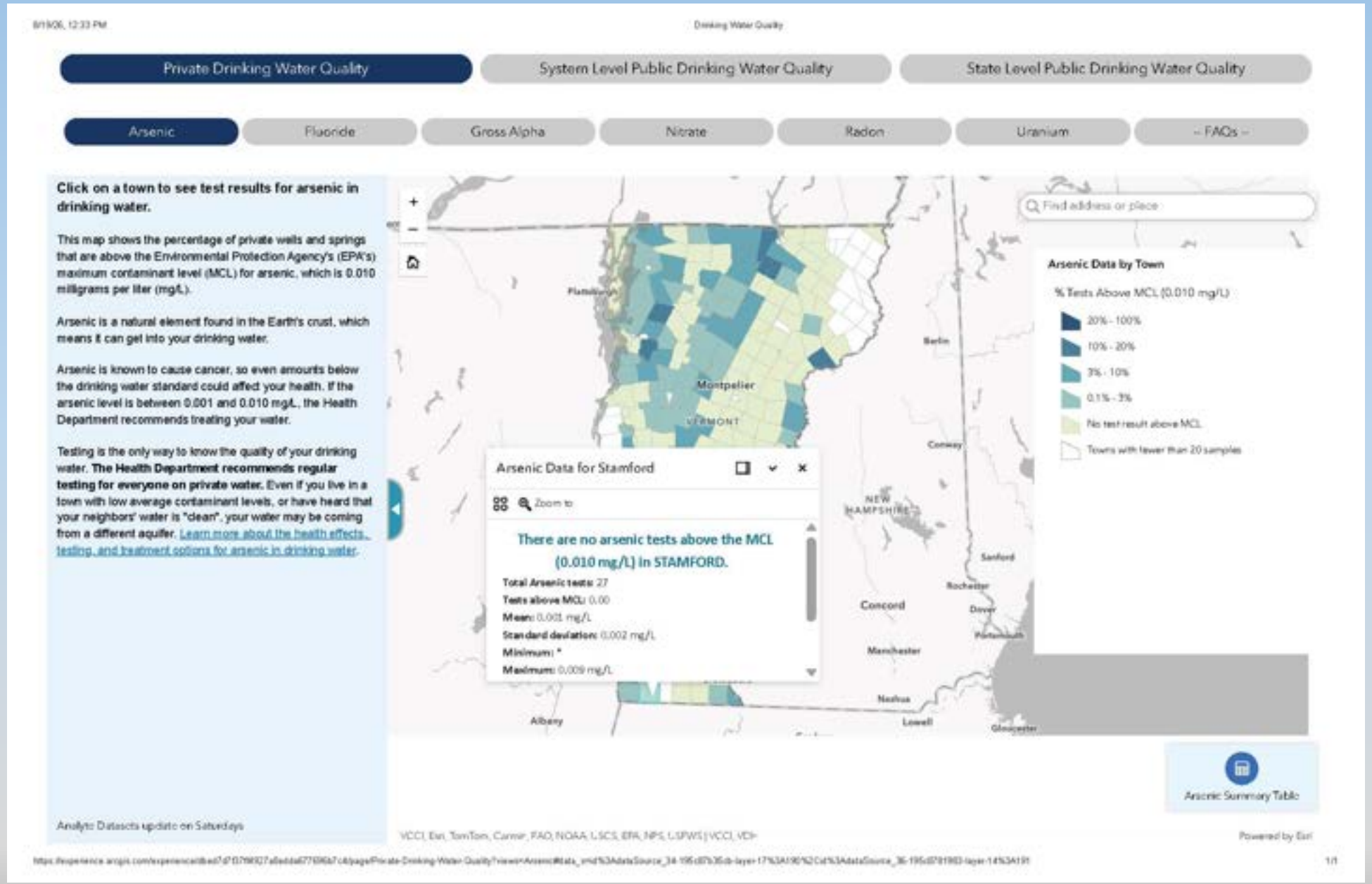
AGENCY OF NATURAL RESOURCES
Vermont Geological Survey

VERMONT DEPARTMENT OF HEALTH - PRIVATE DRINKING WATER PROGRAM

Water Quality Maps



https://www.healthvermont.gov/environment/tracking/drinking-water#maps

Private Drinking Water Program

Phone: 802-489-7339

Email: AHS.VDHEnvHealth@vermont.gov

https://www.healthvermont.gov/environment/drinking-water

ANR Natural Resources Atlas

ANR Atlas: Vermont ANR - Natural Resources Atlas HTML5 Viewer

Guidance Document: VT Natural Resources Atlas Guide

Video Tutorial: What's New in the Vermont Natural Resources Atlas

Atlas Modernization : Modernization Memo

Environmental Research Tool Database: ERT

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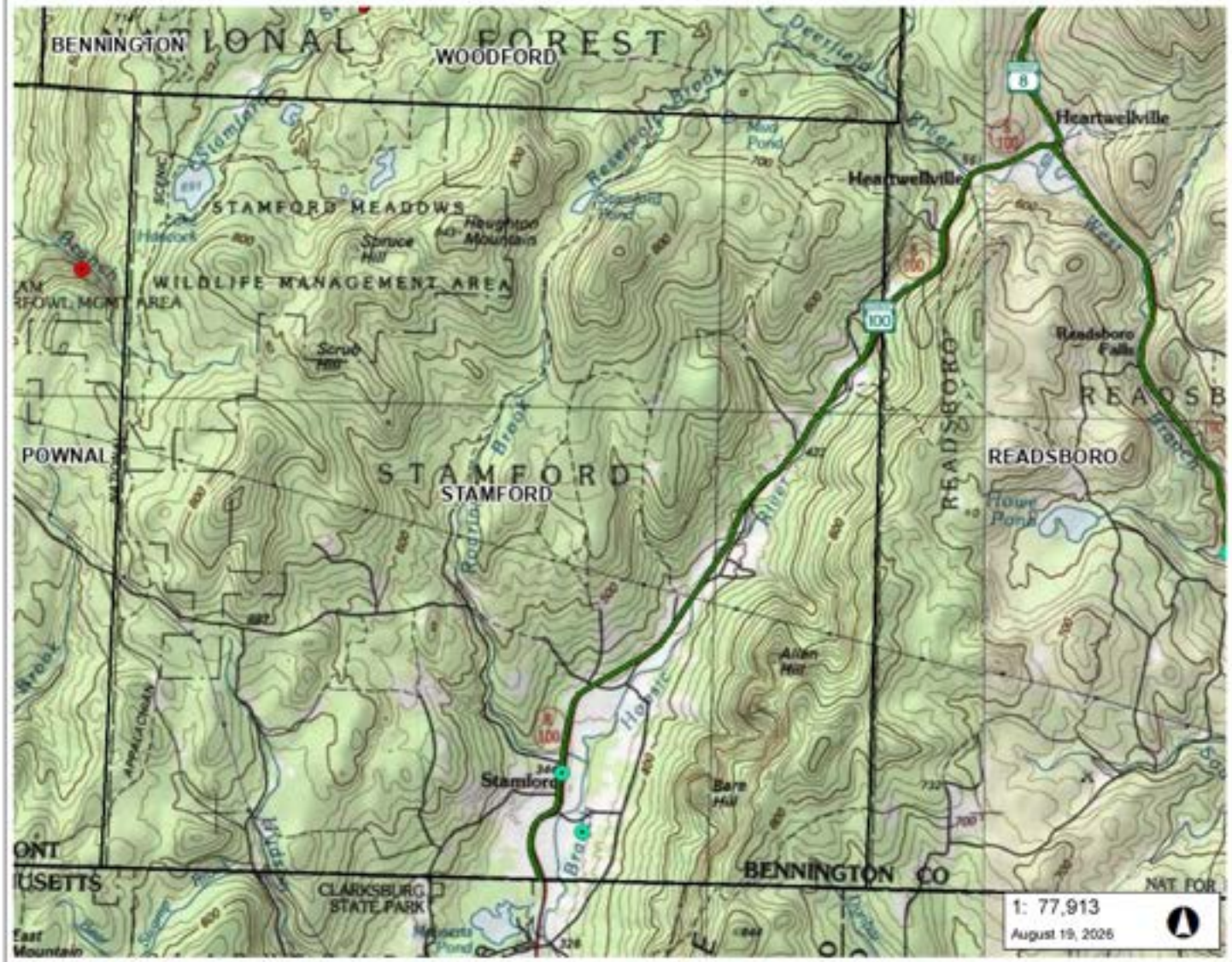
Stamford, VT USGS MAP

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Public Water Sources
- Active
- Inactive
- Proposed
- Active Non-Public, Previously Perm
- Inactive Non-Public, Previously Per

Roads
- Interstate
- US Highway; 1
- State Highway
- Town Highway (Class 1)
- Town Highway (Class 2,3)
- Town Highway (Class 4)
- State Forest Trail
- National Forest Trail
- Legal Trail
- Private Road/Driveway
- Proposed Roads

Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas

3,958.0 0 1,979.00 3,958.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 6493 Ft. 1cm = 779 Meters

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Stamford, VT

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LEGEND

- Landfills
  - OPERATING
  - CLOSED
- Hazardous Site
- Hazardous Waste Generators
- Brownfields
- Salvage Yard
- Aboveground Storage Tank
- Underground Storage Tank (w
- Public Water Sources
  - Active
  - Inactive
  - Proposed
  - Active Non-Public, Previously Perm
  - Inactive Non-Public, Previously Per
- Ground Water SPA
  - Active/Shared
  - Proposed
  - Inactive
- Waterbody
- Stream
  - Stream
  - Intermittent Stream
- Roads
  - Interstate
  - US Highway; 1
  - State Highway

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3,958.0 0 1,979.00 3,958.0 Meters

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Natural Resources Atlas

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LEGEND

- Waterbody
- River Area
- Stream
  - Stream
  - Intermittent Stream
- Roads
  - Interstate
  - US Highway; 1
  - State Highway
  - Town Highway (Class 1)
  - Town Highway (Class 2,3)
  - Town Highway (Class 4)
  - State Forest Trail
  - National Forest Trail
  - Legal Trail
  - Private Road/Driveway
  - Proposed Roads
- Town Boundary

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Map created using ANR's Natural Resources Atlas

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WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 5041 Ft 1cm = 605 Meters

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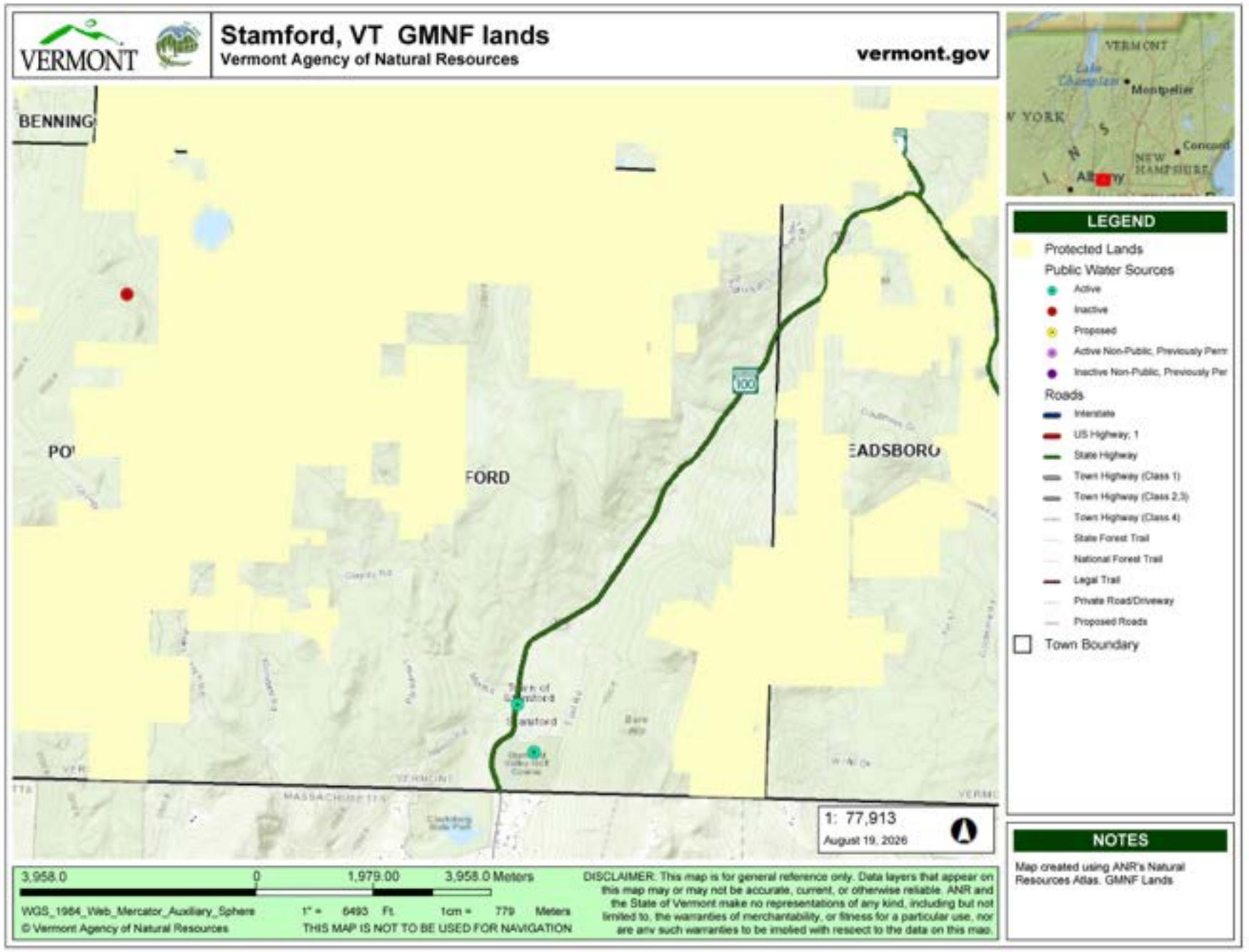
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Stamford, VT GMNF lands
Vermont Agency of Natural Resources
vermont.gov
BENNING
PO
FORD
EADSBORO
100
Stamford
VERMONT
MASSACHUSETTS
1: 77,913
August 19, 2026
3,958.0
0
1,979.00
3,958.0 Meters
WGS_1984_Web_Mercator_Auxiliary_Sphere
1" = 6493 Ft
1cm = 779 Meters
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Montpelier
Concord
NEW HAMPSHIRE
LEGEND
Protected Lands
Public Water Sources
Active
Inactive
Proposed
Active Non-Public, Previously Perm
Inactive Non-Public, Previously Per
Roads
Interstate
US Highway, 1
State Highway
Town Highway (Class 1)
Town Highway (Class 2,3)
Town Highway (Class 4)
State Forest Trail
National Forest Trail
Legal Trail
Private Road/Driveway
Proposed Roads
Town Boundary
NOTES
Map created using ANR's Natural Resources Atlas. GMNF Lands

VERMONT

Stamford Elementary School WSID 6770

Vermont Agency of Natural Resources

vermont.gov

LEGEND

- Landfills
  - OPERATING
  - CLOSED
- Hazardous Site
- Hazardous Waste Generators
- Brownfields
- Salvage Yard
- Aboveground Storage Tank
- Underground Storage Tank (w
- Public Water Sources
  - Active
  - Inactive
  - Proposed
  - Active Non-Public, Previously Perm
  - Inactive Non-Public, Previously Per
- Ground Water SPA
  - Active/Shared
  - Proposed
  - Inactive
- Parcels (standardized)
- Waterbody
- Stream
  - Stream
  - Intermittent Stream
- Roads
  - Interstate
  - US Highway, 1

NOTES

Source Protection Area - 500 ft radius circle centered on well.

247.0 0 124.00 247.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 406 Ft. 1cm = 40 Meters

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

ANR Atlas and Environmental Research Tool Databases

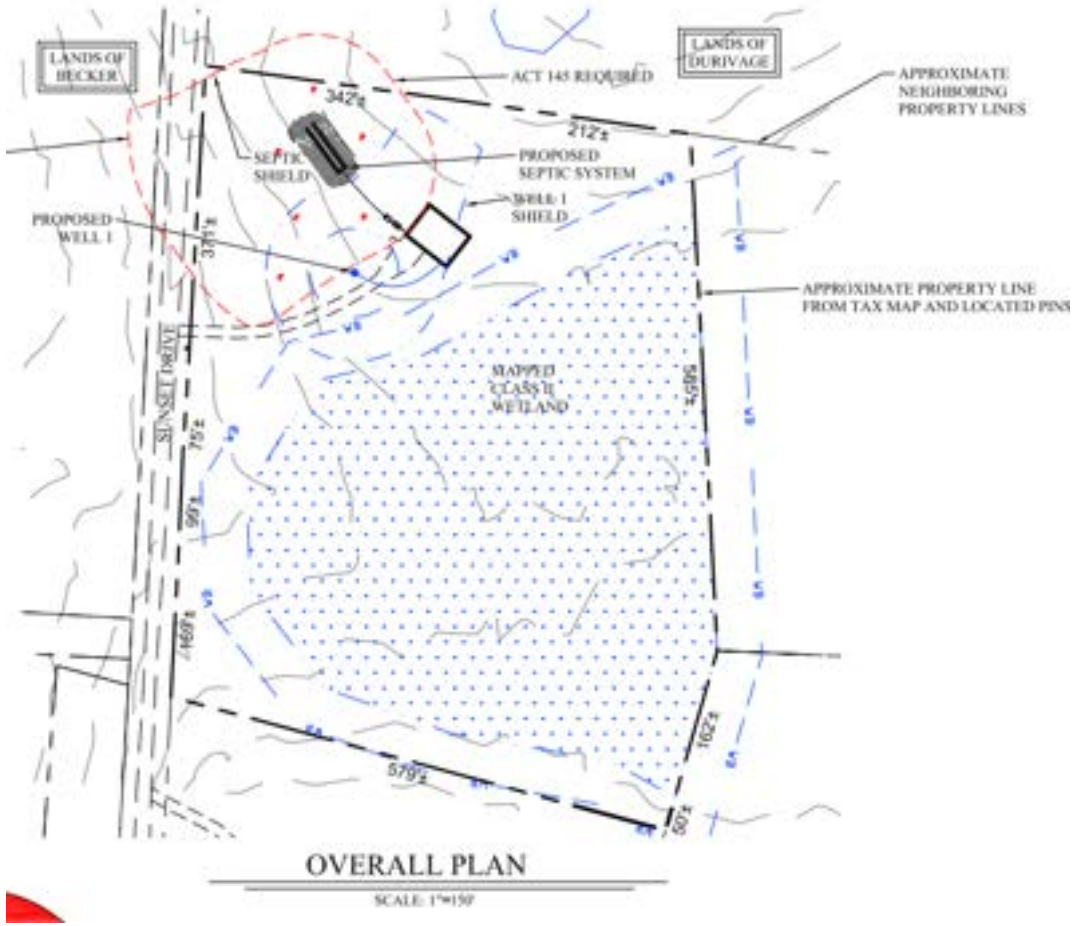
ANR Natural Resources Atlas

- Online mapping tool to provide spatial environmental data managed by ANR
- Guidance Document: VT Natural Resources Atlas Guide
- Video Tutorial: What's New in the Vermont Natural Resources Atlas

ANR Environmental Research Tool

- Searchable online database for environmental records including:
  - Waste Management
  - Stormwater
  - Wetlands
  - Groundwater Reclassification
- Includes many of the same data presented on the Atlas, but in tabular form

Overshadowing



Definition:

When the required safety buffer (isolation distances) for a private well or septic system extend across property lines onto a neighboring lot.

Notification Rules:

Under state laws (Act 145), a property owner applying for a Wastewater System and Potable Water Supply Permit must notify affected neighbors by certified mail at least 7 days before filing if their system overshadows another lot

S.212 - An act relating to potable water supply and wastewater system connections.

Technical Advisory Committee to report on overshadowing of property by potable water supplies and wastewater systems by January 15, 2027

Questions about overshadowing:

Contact your regional engineer at:
Rutland Regional Office | Department of Environmental Conservation

ISOLATION DISTANCES
A PRESENTATION TO THE VERMONT STATE HOUSE

A presentation by Sille Larsen, MS (she/her)
Engineering and Water Resources Program Manager
and Ben Montross, Drinking Water Program Manager
Drinking Water and Groundwater Protection Division
Department of Environmental Conservation
March 25, 2026.
https://www.youtube.com/watch?v=kLQqUUJRucI

- *YouTube*

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LOCAL PLANNING

LAND USE REGULATIONS & Policies

- Town Plan
- Zoning Ordinance
- Overlay District
- Groundwater Ordinance
- Groundwater Reclassification
- Hazard Mitigation Plan
- Emergency Management Plan
- Road Salt Reduction Policy
- Participate in Act 250 & Section 248 Permit applications
- Stormwater planning & MRGP (Municipal Roads General Permit)
- Watershed Management Plan
- Forest Management and Timber Harvest Plan

TOWN PLANS

- Express objectives and policies to guide future growth & to protect the environment, including water supply.
- Provides guidelines for zoning bylaws, subdivision regulations, and official Maps
- Future land use

Include

- ❖ public groundwater and surface water sources (public utilities and facilities, schools)
- ❖ Source Protection Areas, aquifer areas (Water Resource Map)
- ❖ Use maps from the VT Geological Survey, ANR NR Atlas, RPC's
- ❖ Natural resources (ground and surface waters, forested areas)
- ❖ Water Supply and Wastewater Disposal
- ❖ Conservation Areas

Act 250 projects must comply with the local Town Plan and the Regional Plan

MIDDLESEX TOWN PLAN, SAMPLE LANGUAGE

E. GROUNDWATER

Groundwater is an extremely important public health and safety resource. It begins as precipitation that infiltrates through the soil to the water table. In the saturated zone, below the water table, groundwater occupies pore spaces between rocks or within fractures. Generally following the topography, groundwater slowly flows downgradient and is a source of recharge to lakes and ponds, rivers and streams, and wetlands. Groundwater also supplies thousands of Vermonters with drinking water. This is especially true in rural areas where springs, dug wells, and drilled wells serve single family homes.

Everyone should be knowledgeable about their water system. To protect groundwater, homeowners must be mindful of where their drinking water supplies are located with respect to potential source of contamination. For instance, water supplies need to be an appropriate distance from a septic system and away from the path of leachate, wells should not be placed near roads to prevent salt contamination, pesticide and fertilizer use should be limited around drinking water sources, while oil spills and leaking fuel tanks can pollute drinking water. The State of Vermont offers a drinking water testing service.

Areas around water sources are critical to keeping water safe and clean. These source water protection areas are monitored and, in most cases, regulated by the State of Vermont Department of Environmental Conservation.

Middlesex has several Non-Transient Non-Community (NTNC) Water Systems. These systems by definition regularly serve at least 25 of the same people daily for more than six months per year. Rumney School serves more than 200 users, while the General Services Complex and Welch Park Association serve a combined 100 users. Private wells in Middlesex are also non-transient. These water sources are vitally important to the people of Middlesex and afforded high levels of protection.

The Planetary Matters property (currently Red Hen, Nutty Steph's), and Wrightsville Beach are part of a Transient Non-Community Water System (TNC). While the risk of effects from contamination are slightly lower than in a NTNC because most users are not consuming the water for sustained periods of time, Middlesex is nevertheless committed to ensuring clean and safe water for its residents, employees and visitors.

Middlesex is also committed to planning for future municipal groundwater needs. It does not currently have a Public Community Water System,but recognizes that the need may arise with population growth or economic growth in the village and multiuse districts. Middlesex should identify these future areas and plan now for groundwater protections, regulating accordingly.

Approved by Middlesex Voters March 1, 2022 *https://middlesexvermont.org/about/*

Stowe, VT Town Plan

sample language
https://www.stowevt.gov/Government/Planning-Commission/Town-Plan-Drafts

Groundwater

Groundwater is a vital source of drinking water for communities across Vermont, including Stowe, where most residents and businesses rely on wells or public water systems supplied by underground aquifers. These aquifers naturally filter and store water, providing a reliable supply that is often cleaner and more consistent than surface water. Protecting groundwater from contamination, whether from septic systems, road salt, fertilizers, or other pollutants, is essential to ensuring safe drinking water, sustaining public health, and supporting the town's long-term water needs.

Stowe is served by fourteen public community water systems, including the municipal system and four consecutive systems it supplies. Public community systems serve at least fifteen year-round service connections or twenty-five year-round residents and are typically operated by condominium associations, fire districts, municipal entities, or homeowners' associations. In addition, the town has fourteen non-transient non-community (NTNC) systems, which serve at least twenty-five of the same people daily for more than six months per year, such as schools, daycares, office buildings, and factories. There are also eleven transient non-community (TNC) systems, which serve at least twenty-five different people for more than sixty days per year, including restaurants, motels, and campgrounds.

Because groundwater can be contaminated by waste, chemicals, or other pollutants within recharge areas, federal and state regulations require every public system to have a source protection plan. These plans help guide local land use decisions, ensuring that future development does not compromise water quality. For more information on the municipal water supply, see Chapter 5 – Our Essential Municipal Utilities & Infrastructure.

ZONING BYLAWS

Provide An Extra Layer of Protection

Vermont Statutes

Title 24 : Municipal and County Government

Chapter 117 : Municipal and Regional Planning and Development

Subchapter 007 : Bylaws

- PURPOSE: Permit, prohibit, restrict, regulate and determine land development.
- In conformance with the Town Plan

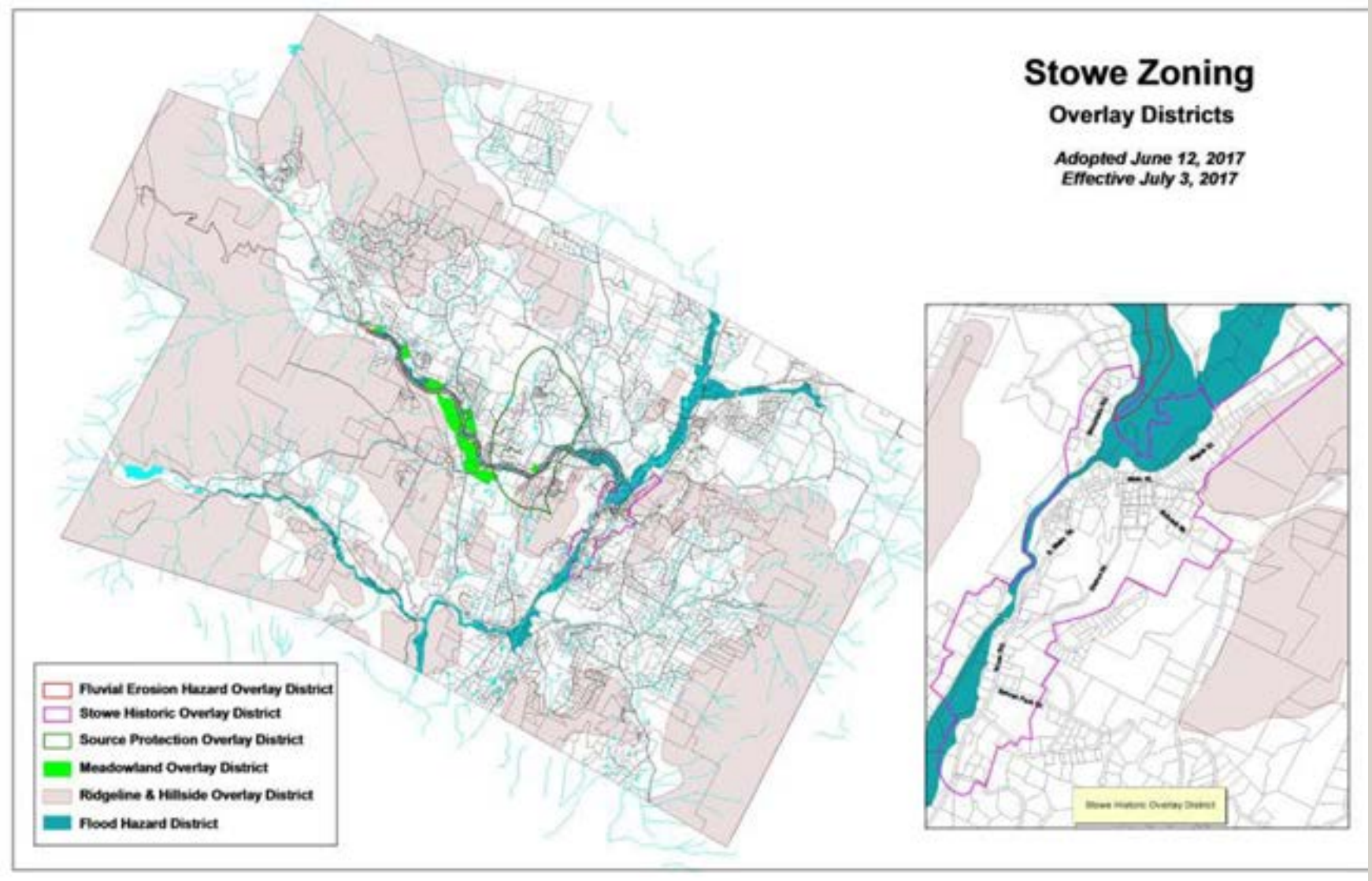
Permissible Types of regulations

24 V.S.A. § 4414

- Zoning Districts
- Protection of Surface waters
  - (D) Shorelands
  - (G) River corridors and buffer
- **(2) Overlay Districts**
  - **Shorelands and floodplains**
  - **Aquifer and Source Protection Areas**
- **(3) Conditional Uses**

OVERLAY DISTRICTS

Special districts.
Add layers of protection to those already existing in the underlying zoning district.



Town of Stowe – OVERLAY DISTRICT Zoning Regulations adopted 1/10/2024, Effective 1/31/2024

PURPOSE

(1) Promote the health, safety, and general welfare of the community by ensuring an adequate quality and quantity of drinking water for the residents, institutions, and businesses of the Town of Stowe who rely on the Town's municipal water supplies;

(2) Preserve and protect existing and potential sources of drinking water supplies; and

(3) Conserve the natural resources of the town and prevent temporary and permanent contamination of the environment.

ESTABLISHMENT AND DELINEATION OF OVERLAY DISTRICT

The Source Protection Overlay District encompasses an area surrounding the Village Green municipal well where a contaminant released to the land surface or subsurface would be reasonably likely to move toward and reach the well. The Overlay District coincides with the Source Protection Area developed by the State of Vermont, Department of Environmental Conservation, Water Supply Division. The boundary of the District is delineated on the Stowe Zoning map of overlay districts as adopted by the Stowe Selectboard on June 12, 2017.

TOWN OF STOWE OVERLAY DISTRICT
PERMITTED USES:

"All uses permitted within the underlying primary zoning districts are permitted within the Overlay District after a determination that the proposed use will not have an undue adverse impact on groundwater resources.

All geothermal heating systems and underground fuel tanks within the Overlay District require a zoning permit."

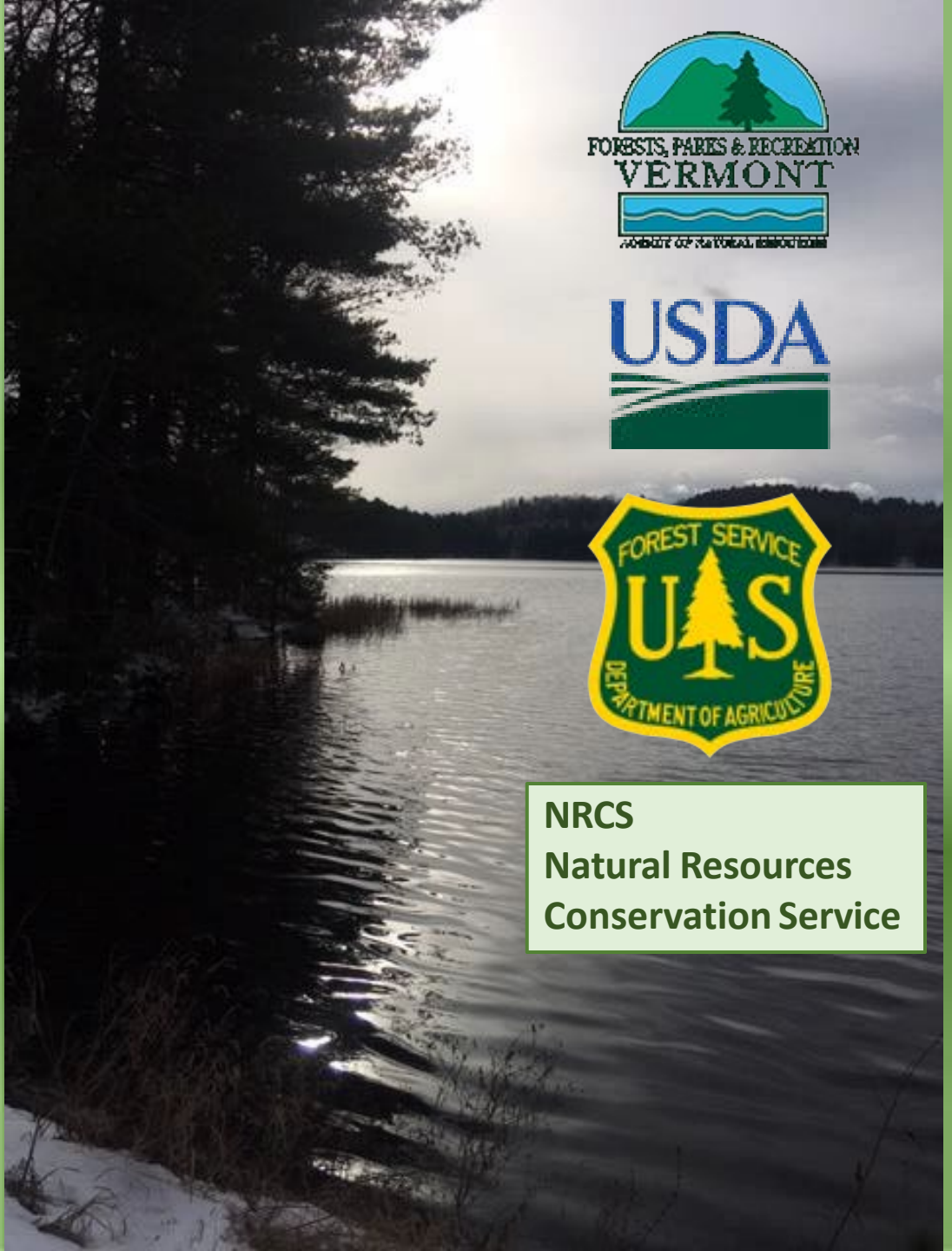
This gives the Town added control and knowledge of where UST and geothermal wells are located and can be used in planning decisions.

PROHIBITED USES:

- ❑ Landfills and open dumps.
- ❑ Automobile graveyards and junkyards.
- ❑ The release of any hazardous materials into surface waters, groundwater or onto the land. Any proposed use that will generate hazardous waste shall be required to submit a groundwater protection plan for approval by the Stowe Public Works Director.
- ❑ Storage of deicing chemicals unless such storage, including loading areas, is within a structure designed to prevent the generation and escape of contaminated runoff or leachate.
- ❑ Storage of animal manure unless covered or contained in accordance with the specifications of the Vermont Agency of Agriculture.
- ❑ Earth removal, consisting of the removal of soil, loam, sand, gravel, or any other earth material (including mining activities) to within 4 feet of historical high groundwater as determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey, except for excavations for building foundations, roads, or utility works.
- ❑ Discharge to the ground of non-sanitary wastewater including industrial and commercial process waste water.
- ❑ Stockpiling and disposal of snow and ice containing deicing chemicals brought in from outside the District.
- ❑ Storage of commercial fertilizers, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate.
- ❑ Single-walled underground fuel storage tanks.
- ❑ Closed loop geothermal heating systems, unless they use non-toxic, environmentally friendly, food-grade antifreeze.

ACQUISITION/CONTROL

- Landownership - minimum 200 feet around water source(s)
- Own or acquire land in the SPA or aquifer
- Easements
- Restrictive covenants
- Deed Restrictions
- Land Trusts- https://vlt.org/about/
- Drinking Water State Revolving Fund-
  - Source Protection Loan Program



NRCS
Natural Resources
Conservation Service

Forestry Stewardship

- Current Use Program (Use Value Appraisal)
- Forest Stewardship Practices
- Conservation Practices
- Forest Management Plan and Timber Harvest Plan
- Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in VT, rev Aug. 2018
- County Foresters
  https://fpr.vermont.gov/forest/list-vermont-county-foresters
- Woodlot management on small parcels
- Tree Farms
- Federal and State SPA initiatives for forested lands located within a Source Protection Area

Benefits of Forested Areas – Improving water quality and quantity

- Reduces treatment costs
- Natural land cover provides infiltration and capacity to store water in the soil (groundwater recharge)
- Filters sediments, chemicals and nutrients (purifier)
- Mitigate stormwater flow and reduces runoff
- Tree canopy and root systems stabilize soils and help prevent erosion
- Riparian Buffers to surface waters
- Flood control; slowly releasing water
- Buffer to development and other land uses
- Reduce summer air and water temperatures

What are the PSOC associated with Forested Watersheds

Fertilizers

Pesticides and Herbicides

Equipment fluids and fuels

Soil Erosion–Sediment and Debris

- Logging roads
- Poor forest health
- Recreational Uses

Forest Stewardship Practices

- Maintain riparian buffers.
- Follow Acceptable Management Practices (AMPs) for Maintaining Water Quality on Logging Jobs in Vermont, last revised 2019
- Follow accepted soil erosion control measures and design standards.
- Promote reforestation/revegetation, emphasizing native plant species.
- Minimize areas of disturbance.
- Have spill kits on hand for hazardous materials.
- Filter runoff, implement use of silt fences, mulching , and sediment basins.
- Minimize soil compaction and use low impact techniques and machinery.
- Follow acceptable road design and bridge standards.
  - Avoid fords through waterways such as streams and brooks.
  - Encourage use of portable bridges
- Consider weather and seasonal conditions.
- Maintain water flows and designate buffer zone areas to protect water quantity and quality.

Best Management Practices

FOSTER RELATIONSHIPS with

- LANDOWNERS
- COUNTY FORESTER
- STATE, FEDERAL, AND LOCAL REGULATORS and OFFICIALS
- LOGGERS
- LAND TRUSTS
- NON-PROFITS, VRWA, Lake Shore and River watch organizations, VT Woodlands Assoc.

INCREASE AWARENESS OF THE LOCATION OF THE WATER SOURCE(S).

PROTECT SENSITIVE AREAS

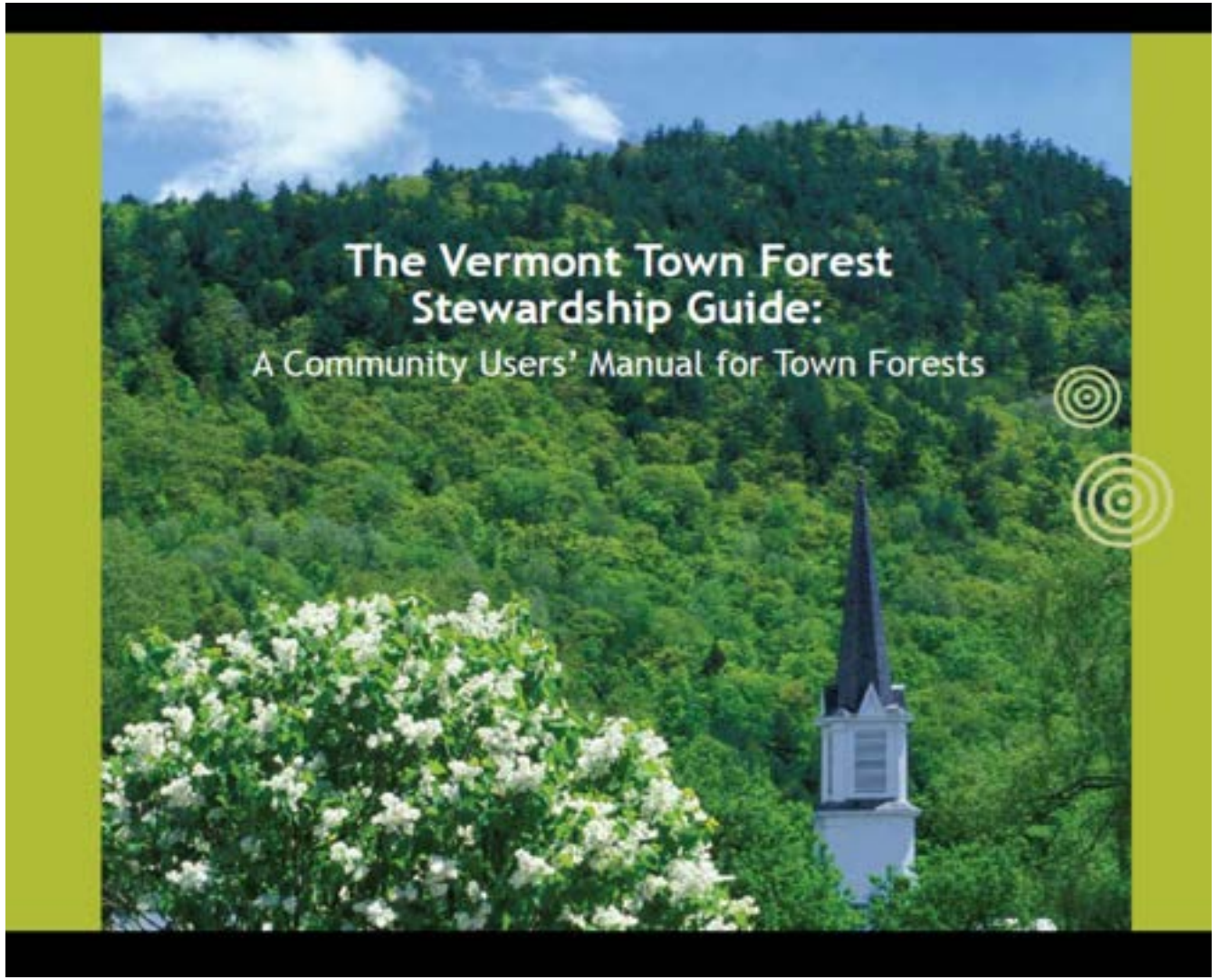
Participate at the local level and be engaged with Conservation Commissions, Planning Commissions, and Selectboards.

WATCH - assess logging jobs for adherence to AMPs and effectiveness of implementation measures.

Best Management Practices

LAND USE PLANNING

- **Limit nature of land development and land uses**
- **Forest Management Plan and Timber Harvest Plan**
  - Include provisions for Pest and disease control that is integrated.
  - Include provisions for Fire protection and prevention
  - Keep it current
- **Current Use Program**
- **Land Conservation and Acquisition**
- **Town Plan, Zoning, Overlay Districts**
- **Natural Resources Conservation Service –funding for Conservation Practices**



Agency of Natural Resources

Department of Forests, Parks and Recreation

County Forester Program

https://fpr.vermont.gov/CountyForesters

https://fpr.vermont.gov/forest/list-vermont-county-foresters

County Foresters at Vermont Department of Forests, Parks, and Recreation provide forest management and forest stewardship information, technical assistance, and outreach to landowners in Vermont. Landowners with questions about how to take care of their woods, can reach out to County Foresters for advice. They are the primary point of contact for questions about forestland enrollments in Vermont's Use Value Appraisal program (UVA), also known as Current Use.

Matt Langlais, County Forester serving towns in Essex and Caledonia Counties.

Forest Stand Improvement

Forest Stand Improvement involves reducing competing vegetation that hinders development and health of preferred trees and/or understory species. Removing undesirable trees to concentrate subsequent growth on the most desirable trees and allows for plant regeneration to restore natural communities. These activities reduce soil erosion, sedimentation, and runoff. Other benefits include improved water conservation and wildlife habitat.

Fuel Break

A fuel break is a strip or block of land on which the vegetation, debris, and litter have been reduced and/or modified to control or diminish the intensity of fires. Fuel breaks are planned and located at strategic locations on the landscape to reduce wildfire risk and unwanted damage to land and structures.

Riparian Forest Buffer

A riparian forest buffer improves water quality by filtering contaminants from entering open water. Woody vegetation stabilizes the banks along water bodies while improving fish and wildlife habitat. These buffer zones reduce the amount of sediment, organic matter, nutrients, pesticides, and other pollutants in surface runoff and the amount of nutrients and other chemicals in shallow groundwater.

Other Forestry Practices

Other forestry practices are available through the NRCS, including alley cropping, firebreaks, stream crossings, access roads, prescribed fire, and more. Contact your local NRCS Service Center in your county for more information.

For More Information

To learn more about conservation planning or to request assistance from an NRCS Certified Conservation Planner, contact the NRCS office in a local USDA Service Center or visit www.nrcs.usda.gov.

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April 2024

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

EQIP Forestry Practices

Forest Management Plan

A Forest Management Plan (FMP) is a site-specific plan developed for a client that addresses resource concerns on land where forestry-related conservation activities will be applied. The FMP is drafted by a pre-approved forester or natural resource professional. The FMP includes planned practices, the amounts of each to be applied, the schedule for implementation, and appropriate specifications for each practice.

The following practices require a FMP that meets Natural Resources Conservation Service (NRCS) requirements found on the states eFOTG webpage when applying on forested land. The plan must be developed prior to practice implementation and must specifically state that these practices are needed to address a resource concern.

Brush Management

Brush management can be used to improve or restore meadows and open areas. Many plant species are "out of place" and this practice allows for the use of herbicides or mechanical treatments to remove these species. The goal of this practice is to allow desired plant communities and wildlife habitats to be re-establish in forest or pasture environments.

Woody Residue Treatment

This practice allows removal and disposal of "slash," resulting from natural disasters, forestry activities, or where the slash causes a resource concern. This slash can be converted into wood chips or piles. The branches and treetops can be scattered on the forest floor in a manner that allows for quick decomposition. These activities cut down on the amount of fuel that would be available in the event of a fire and prevent the spread of insects and diseases.

Silvopasture

Silvopasture systems are specifically designed and managed to produce trees, forage, and livestock on the same acreage. Silvopastures are created when forage crops are introduced or enhanced in a forested system. Silvopasture practices contribute to the well-being of livestock and provides high-quality forages along with shade and shelter from sun, wind, and storms.

Forest Trails and Landings

Having access to your woods is important when maintaining and managing a healthy stand of trees. This practice minimizes damage to soil, water, plant, and animal resources. It is not intended to establish trails for recreational activities. Forest trails and landings involve the creation and/or management of temporary or infrequently used routes, paths, or cleared areas. This practice is to establish a new trail/landing or to restore old ones in the forest land.

Road Trail and Landing Closure

Roads, trails, and landings can be relocated to reduce or eliminate erosion from steep erodible areas. Avoiding sensitive areas, such as wetlands and riparian zones, and by closing roads or trails, including gully erosions and sedimentation to water bodies, will restore vegetation, protect wildlife habitat, and provide human safety.

Tree and Shrub Pruning

Trees and shrubs have the potential to be damaged from pests, disease, and wildfires. Pruning branches of trees can increase the health and strength of the tree. Pruning also helps to reduce wildfire, pest, and disease risk by eliminating branches that show signs of stress.

Tree and Shrub Site Prep

Tree and shrub site preparation involves the treatment of areas to improve site conditions for establishing trees and/or shrubs. It encourages natural regeneration of desirable woody plants and permits artificial establishment of woody plants. This practice may be applied on all lands needing treatment to establish trees or shrubs.

Tree and Shrub Establishment

New trees and shrubs are established under this conservation practice to achieve desired species composition. Areas that are favorable for planting woody vegetation are eligible for this activity. Tree and shrub establishments can also be used to diversify existing stands and create and increase wildlife habitat. It can be used on non-forested land to establish a new forest and reduce soil erosion.

Windbreak/Shelterbelt Establishment & Renovation

Windbreaks are planted to provide needed protection in preventing damage to farmsteads from wind and snow. Open areas of cropland or livestock can be protected from wind erosion by establishing windbreaks. A renovation improves an existing windbreak that is no longer functioning or growing satisfactorily. That may be caused from poor design, overcrowding, dead or dying trees, insufficient width, or extreme competition from sod or weeds.

THANK YOU
Questions and Answers
Sharing

Questions?

Laura Ranker, Source Protection Specialist
Laura.Ranker@vermont.gov
802-585-9478

Will Ebby, Source Protection Specialist
William.Ebby@vermont.gov
802-261-5749

Drinking Water and Groundwater Protection Division
1 National Life Drive – Davis 4
Montpelier VT 05620-3704

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GROUNDWATER RECLASSIFICATION

Groundwater Protection Law (10 V.S.A. Chapter 48) passed 1985, effective July 1, 1985

This law provides for four classes of groundwater based on

1. existing use **and** probable use for drinking water supply
2. exposure to risk of contamination

Class III groundwater

All groundwater in VT, unless reclassified to I. II. Or IV groundwater.

Suitable as a source of water for

- individual domestic water supplies,
- irrigation,
- agricultural use
- general industrial and commercial use.

Extra slides on groundwater reclassification follow for information purposes.
The Division is currently looking at the reclassification process under the current Groundwater Protection Rule and Strategy.

Class I and II groundwaters

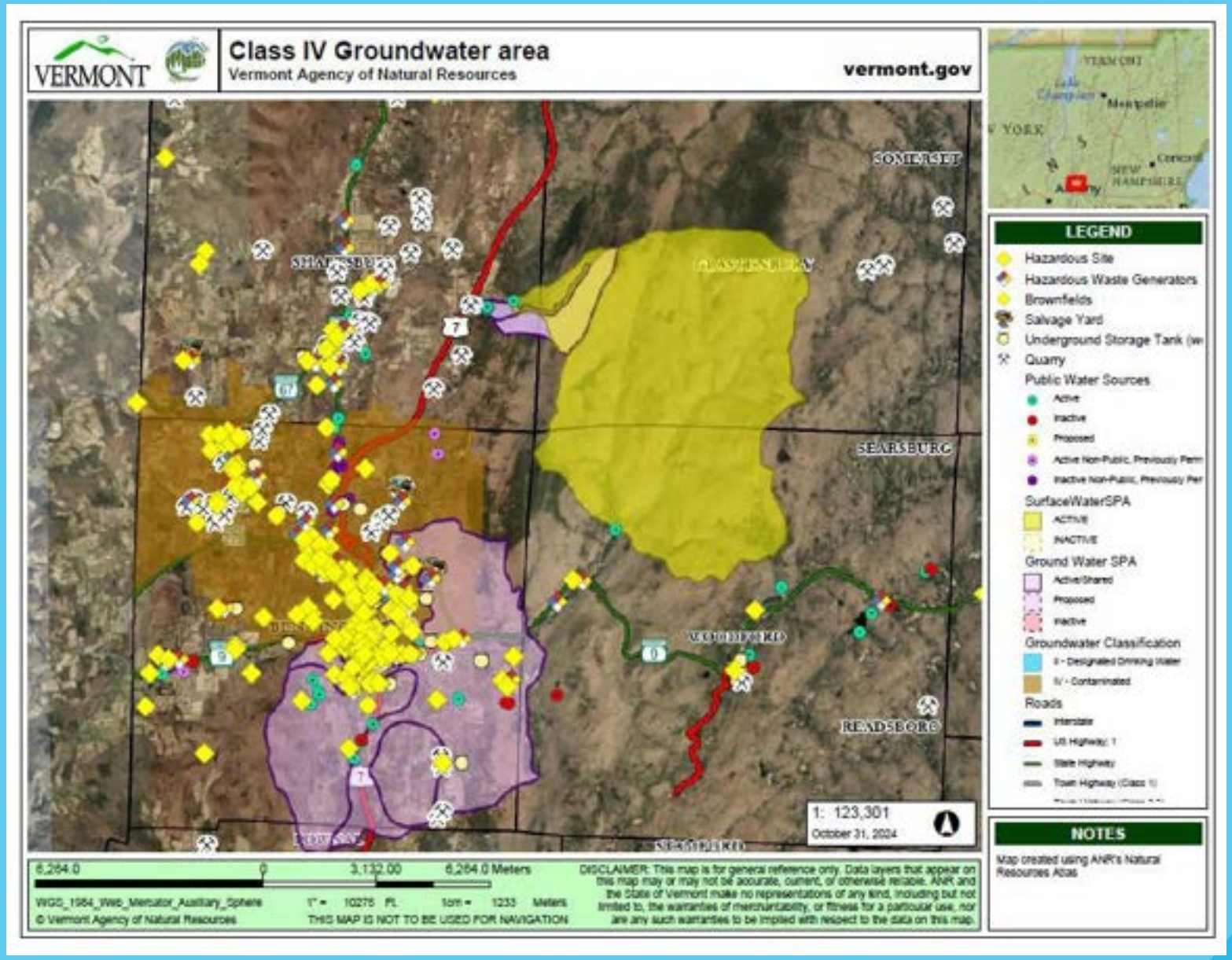
- uniformly excellent character
- aquifers in use as a public water supply source or have a high probability for such use.

Class I groundwater is free from exposure to activities which pose a risk to its current or potential use as a public water supply.

Class II groundwater is exposed to such activities.

Class IV groundwater is not suitable as a source of potable water.

The purpose of reclassification to Class IV is to prevent people from accidentally drinking non-potable groundwater and to prevent spreading of subsurface contamination


VERMONT
Class IV Groundwater area
Vermont Agency of Natural Resources
vermont.gov
SEARSBURG
READSBORO
1: 123,301
October 31, 2024
6,264.0
0
3,132.00
6,264.0 Meters
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© Vermont Agency of Natural Resources
THIS MAP IS NOT TO BE USED FOR NAVIGATION
DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.
LEGEND
Hazardous Site
Hazardous Waste Generators
Brownfields
Salvage Yard
Underground Storage Tank (w
Quarry
Public Water Sources
Active
Inactive
Proposed
SurfaceWaterSPA
ACTIVE
INACTIVE
Ground Water SPA
Active/Shared
Proposed
Inactive
Groundwater Classification
II - Designated Drinking Water
IV - Contaminated
Roads
Interstate
US Highway 1
State Highway
NOTES
Map created using ANR's Natural Resources Atlas

PURPOSE OF RECLASSIFICATION TO CLASS I or II

- To delineate areas of groundwater requiring **extra protection** for current or future public drinking water supplies.
- Managed for activities.
- Requires activities to be consistent with SPPs and requirements of Overlay Districts
- Differs from a SPA - can be used to designate an estimated zone of contribution for a future public water supply without incurring the immediate expense of fully developing and permitting a supply source.

A groundwater reclassification applies to all groundwater under a site, regardless of depth, in accordance with statutory language.

MANAGEMENT OF GROUNDWATER by ACTIVITIES

Class I Groundwater

- shall not permit **high potential risk activities** or **moderate potential risk activities.**
- shall not permit wastewater systems
- shall not permit stormwater discharge systems that infiltrate to groundwater from stormwater "hotspots"
- shall not permit other activities unless the applicant seeking approval for the activity demonstrates the activity complies with the requirements in Section 12-604 of the GW Rule
- Participation in Act 250 and Section 248 project application reviews and recommendations

Class II Groundwater

- shall not permit **high potential risk activities**
- shall not permit other activities in Class II groundwater areas unless the applicant seeking approval for the activity demonstrates the activity complies with the requirements in Section 12-604 of the GW Rule
- Participation in Act 250 and Section 248 project application reviews and recommendations

(15) “Moderate potential risk activities” means the following activities:
(A) the storage of a regulated substance in an underground storage tank with a capacity less than or equal to 1,100 gallons;
(B) the storage of a regulated substance in an aboveground storage tank with a capacity less than or equal to 1,100 gallons;
(C) a solid waste storage or transfer facility with a leachate collection system;
(D) a hazardous waste storage facility;
(E) a hazardous waste generator that meets the requirements of Section 7-308(a) of the Vermont Hazardous Waste Management Regulations (Large Quantity Generators); and
(F) a new indirect discharge of sewage using a disposal system with a design with a capacity less than 50,000 gallons per day.

(11) “High potential risk activities” means the following activities:
(A) a solid waste landfill, except those that are closed in accordance with an enforcement action or a certification under the Solid Waste Management Rules;
(B) a hazardous waste treatment or disposal facility;
(C) the storage of a regulated substance in an underground storage tank with a capacity greater than 1,100 gallons;
(D) the storage of a regulated substance in an aboveground storage tank with a capacity greater than 1,100 gallons;
(E) an automobile graveyard, as defined by 24 V.S.A. § 2241;
(F) a new indirect discharge of sewage using a disposal system with a design capacity greater than 50,000 gallons per day;
(G) the land application of biosolids or stabilized septage; and
(H) injection wells.

When to Reclassify:

1. Identifying and Mapping Potential Future Water Supplies. (First step in identifying community water needs).
2. Establishing a High Probability of Future Use

3. Reclassifying New Source Protection Areas

4. Reclassifying Existing Source Protection Areas

A hydrogeological study performed by a Hydrogeologist is required for the delineation of the SPA for the reclassified GW Area.

WHO CAN PETITION FOR A RECLASSIFICATION OF GROUNDWATER?

- ❑ Secretary of ANR on own motion
- ❑ State Agency
- ❑ Municipality
- ❑ 25 or more potentially affected persons

Print - 8x11 Landscape Map (1)Brandon Reclass GW class2.pdf - Adobe Acrobat Pro (32-bit)
File Edit View E-Sign Window Help
Home Tools Print - 8x11 Landsc... classiandiprocedur... ClassIV GW area.pdf 2019.07.06 - GWP... 2-Geology and Gro... Print - 8x11 Landsc...
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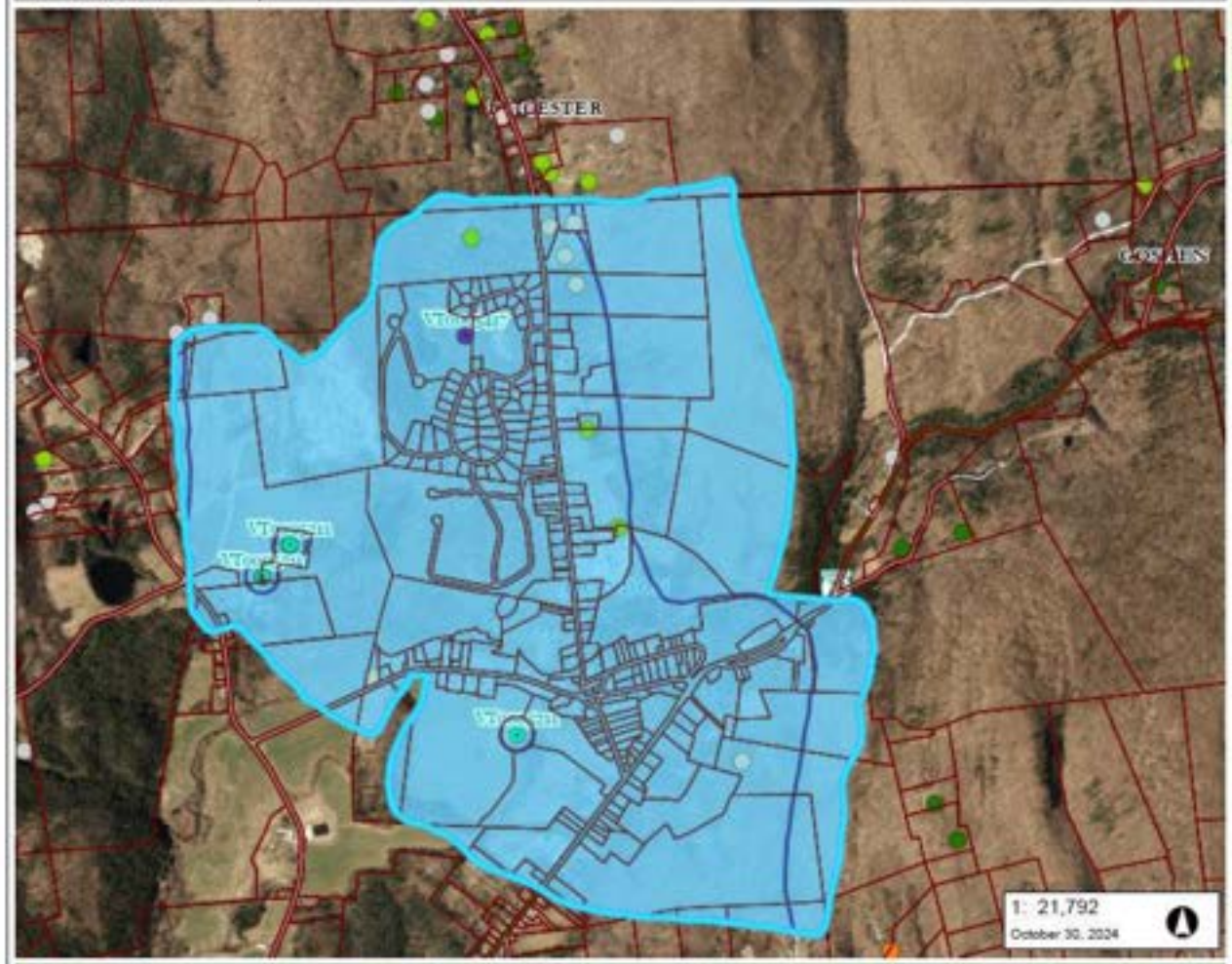
Brandon FD#1, Groundwater ID 4014. Class 2

VERMONT

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Public Water Sources
- Active
- Inactive
- Proposed
- Active Non-Public, Previously Perm
- Inactive Non-Public, Previously Per

Private Wells
- GPS Located
- Screen Digitized
- E911 Address Matched
- Wellorifice/Clarion
- Unknown Location Method
- Incorrectly Located

Ground Water SPA
- Active/Shared
- Proposed
- Inactive

Groundwater Classification
- II - Designated Drinking Water
- IV - Contaminated

Parcels (standardized)

Roads
- Interstate
- US Highway, 1
- State Highway
- Town Highway (Class 1)
- Town Highway (Class 2,3)

NOTES

Map created using ANR's Natural Resources Atlas

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

Communication

The key tool for promoting protection

- Talk with landowners
- Promote voluntary participation
- Perform field visits
- Attend town/board/zoning meetings
- Reach out to Emergency Contacts
- Hold Informational Gatherings
- Present/Display at Town Meeting Day
- Annual letters, notes in billing statements, and or CCR (Consumer Confidence Report)