Public Drinking Water System Regulation and Protection

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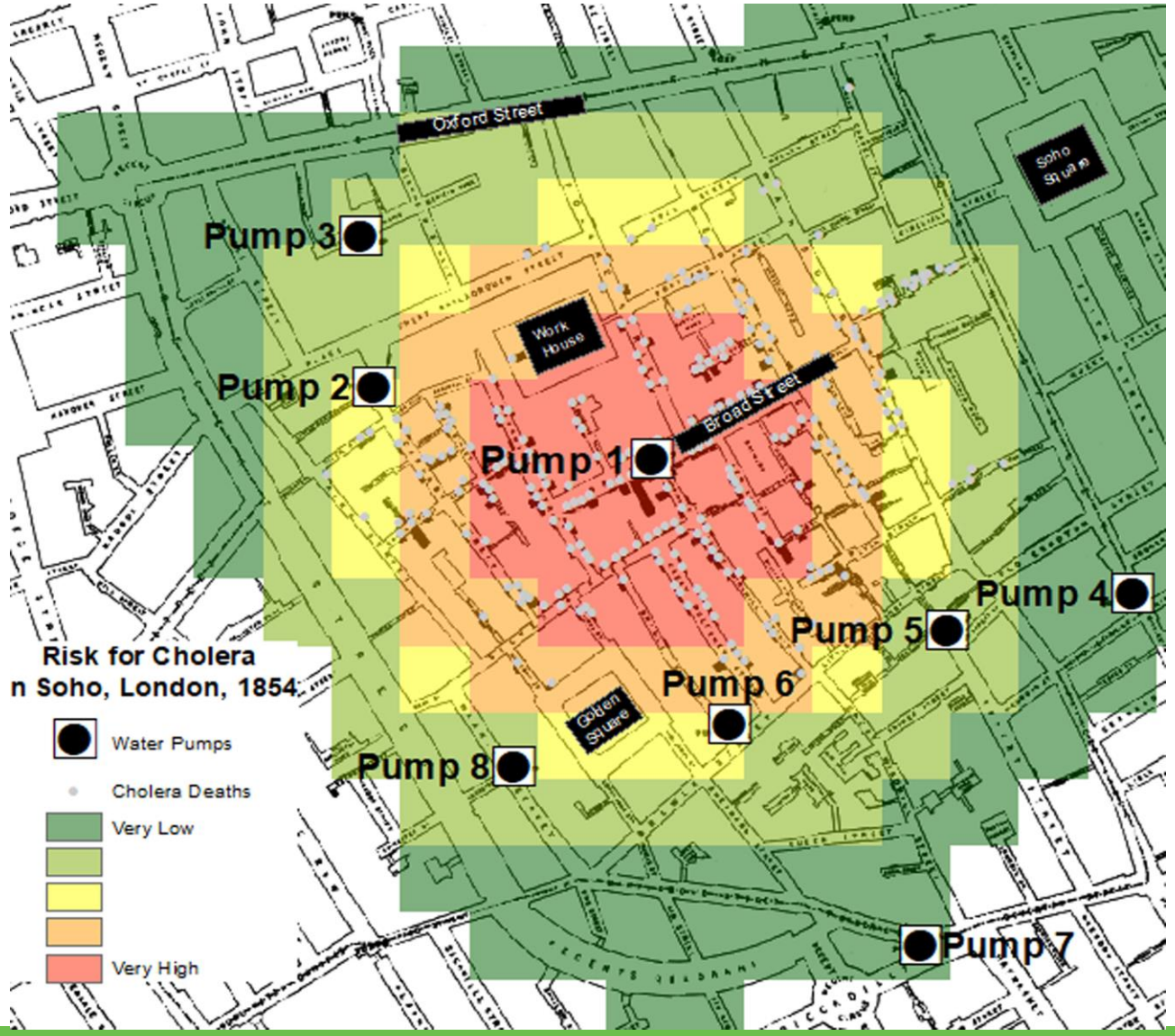
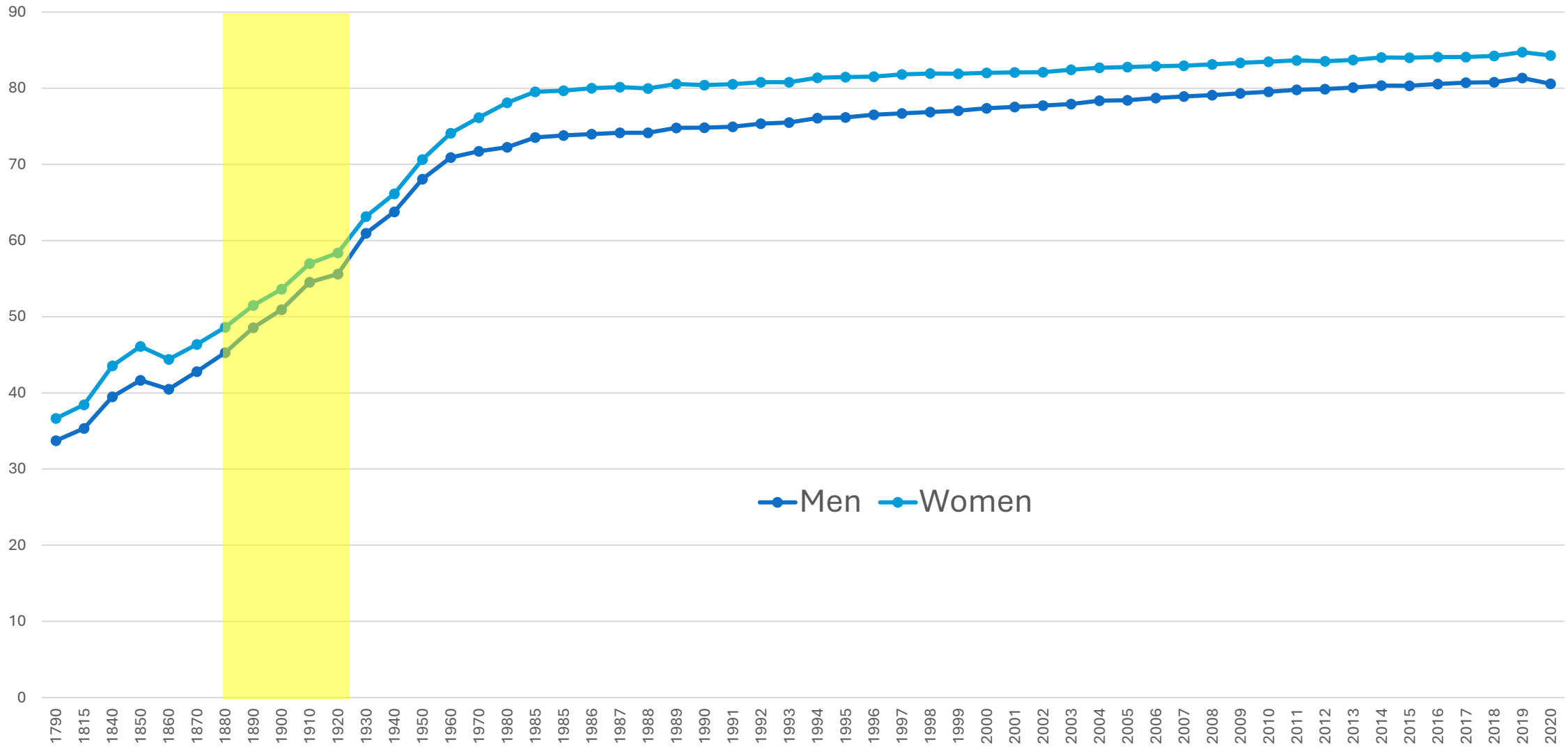
VERMONT

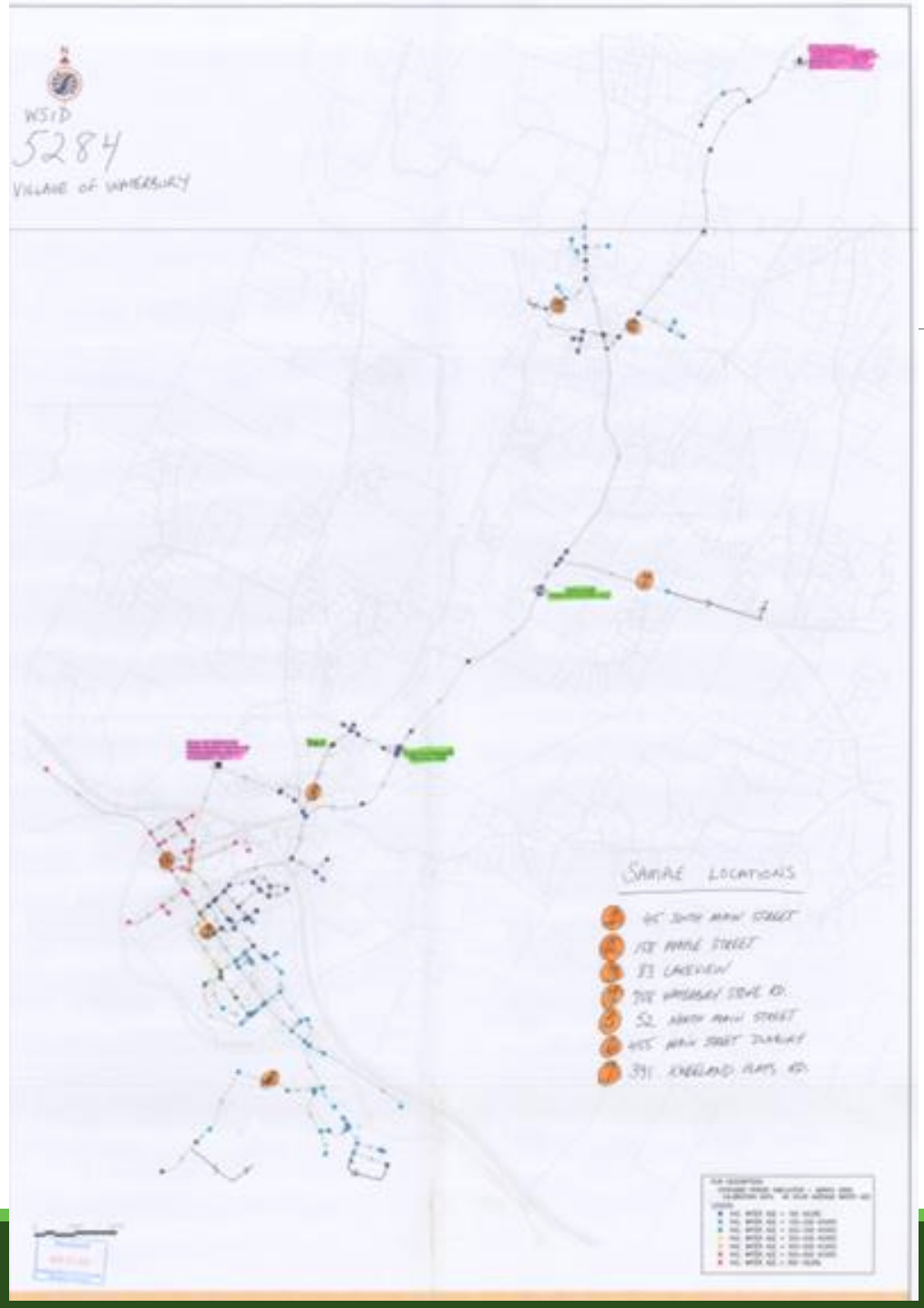
(Modern) Public Health Protection



https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230725

Life Expectancy increase 1790 - 2020





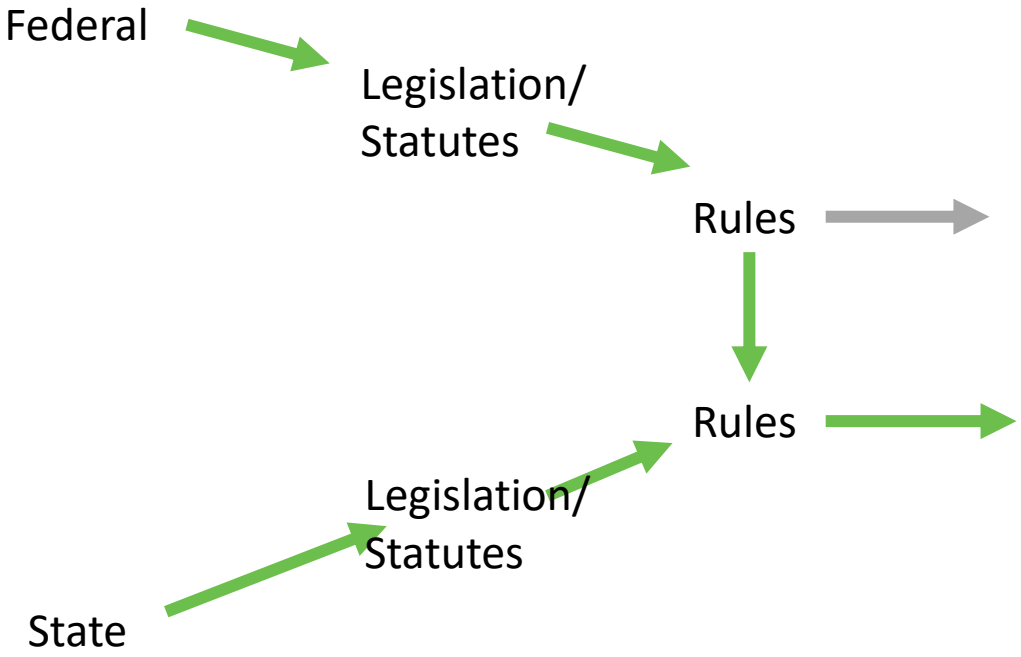
What is a Public Drinking Water System?

- Source(s) of water that combine and serve:
  - 25 or more people for at least 60 days *(Little River State Park)*
  - 25 or more of the same people for at least 6 months
    - *(Copley Hospital –Waterbury Clinic on Route 100: 49 employees)*
  - *15 connections or 25 or more people capable of serving on a year-round basis*.

Edward Farrar Utility District:

- +/-1087 service connections
- Population of +/-6003

Public Drinking Water System Regulatory Context



Federal Standard Setting

1) ID the contaminant – assess occurrence and concentrations Nation-wide

2) Determine the level at which no health risks are present
   - set Maximum Contaminant Level Goal or MCLG

3) Set the enforceable standard or Maximum Contaminant Level (MCL)
   - Over 90 compounds currently have federal MCLs
     - Vermont can be more stringent than the federal regulations

Federal Safe Drinking Water Act

- Safe Drinking Water Act – 1974 (Federal)
  - Purpose = to protect public health by regulating the Nation's public drinking water supplies
- Authorizes US EPA to set national health-based standards for drinking water
  - Protection against both human-introduced and naturally-occurring contaminants found in drinking water.
    - 1974 – treatment-focused, largely pathogenic concerns but a small number of other contaminants
    - 1996 amendments – expanded to source water protection, operator certification (licensing), funding, and other topics.
      - Became what is referred to now as: **"Source to Tap"** regulation
        - Now – Over 90 compounds listed/regulated and more in the works
- Allows state rules and primary enforcement authority (Primacy)

“Multi-Barrier” Approach to Safe Drinking Water

- Source Water Protection
- Treatment
- Distribution System Integrity

Vermont's Public Drinking Water Regulations

State Authority - 10 V.S.A. 56 Statutory Authority

Section 1672:
(a) Except as provided in subsections (c) through (f) of this section, to prevent and minimize public health hazards, the Secretary shall have authority over and shall regulate the purity of drinking water; the adequacy, construction, and operation of public water systems; public water sources; and public water source protection areas.

(b) The Secretary may establish by rule standards or requirements for:

1) Water Quality

2) Construction, protection, testing and monitoring of public water sources

3) The design, flows, construction, installation, operation, and maintenance of new public water systems

…

7) Public water system source protection areas

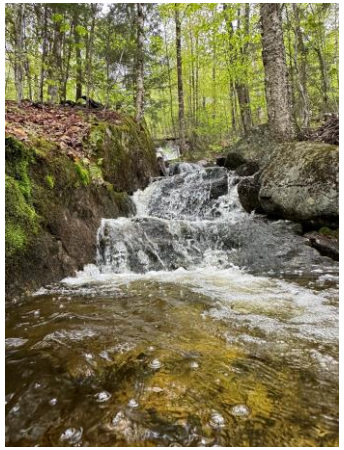
8) The mitigation or prevention of public health risks arising from public water sources, public water systems, and public water source protection areas.

Vermont Water Supply Rule - Purpose

First, and most importantly, the rule's primary purpose is to regulate water systems in the state so that they provide clean and safe drinking water to Vermont's citizens. The rule also establishes well construction standards (contained in Part 12 of Appendix A) .

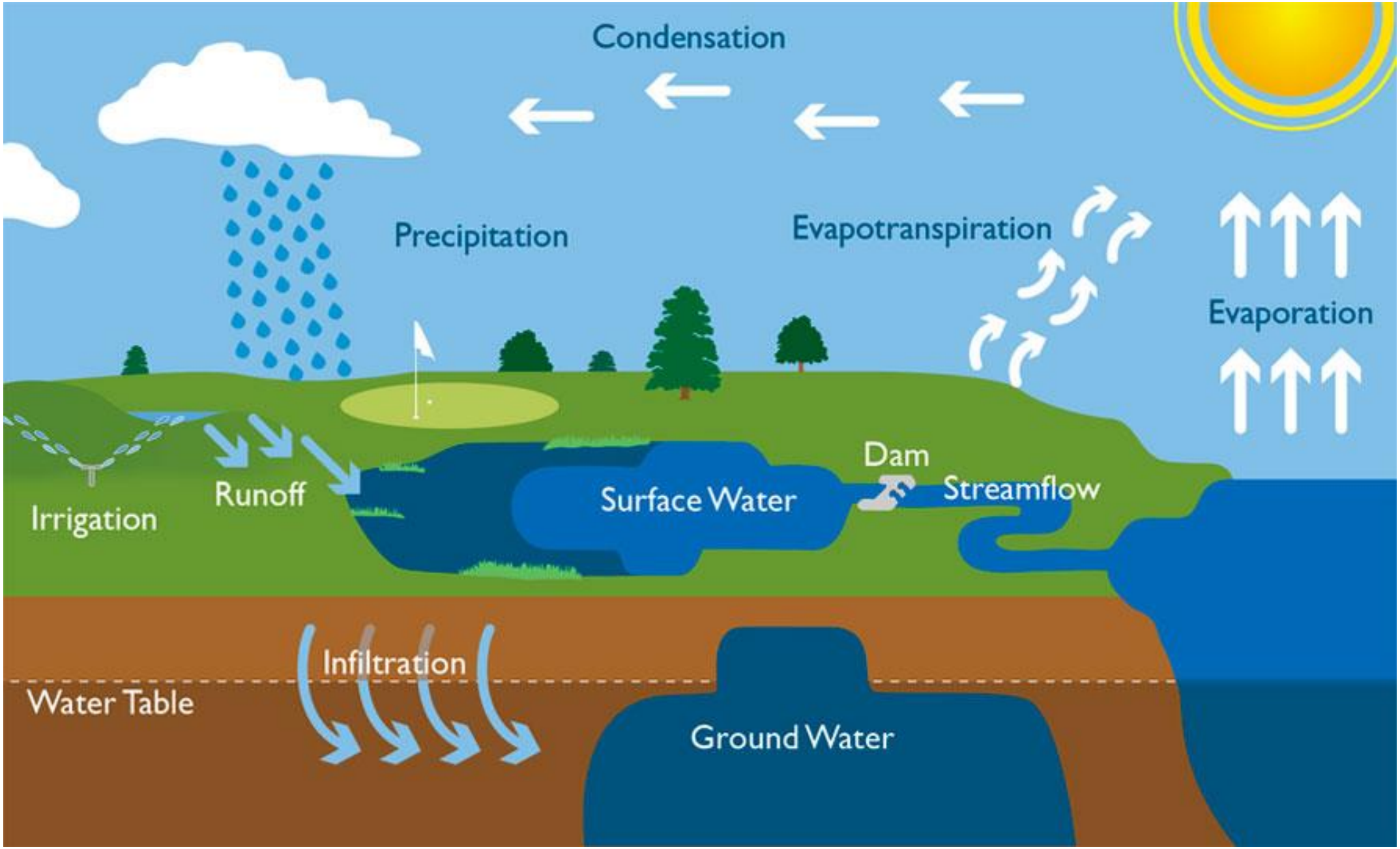
Second, by implementing this rule, Vermont qualifies to retain "primacy" for the Safe Drinking Water Act from the federal US Environmental Protection Agency (EPA). Primacy means that the state will administer the federal regulations that apply to all Public water systems in the country, instead of EPA. Without state regulations that are at least as strict as the federal ones, Vermont may not administer the federal regulations.

Water Sources



GROUNDWATER means water below the land surface in a zone of saturation.

SURFACE WATER means any body of surface water including rivers, streams, creeks, brooks, reservoirs, natural or artificial ponds, lakes, swamps and marshes which have discernible edges and in which terrestrial vegetation does not grow.

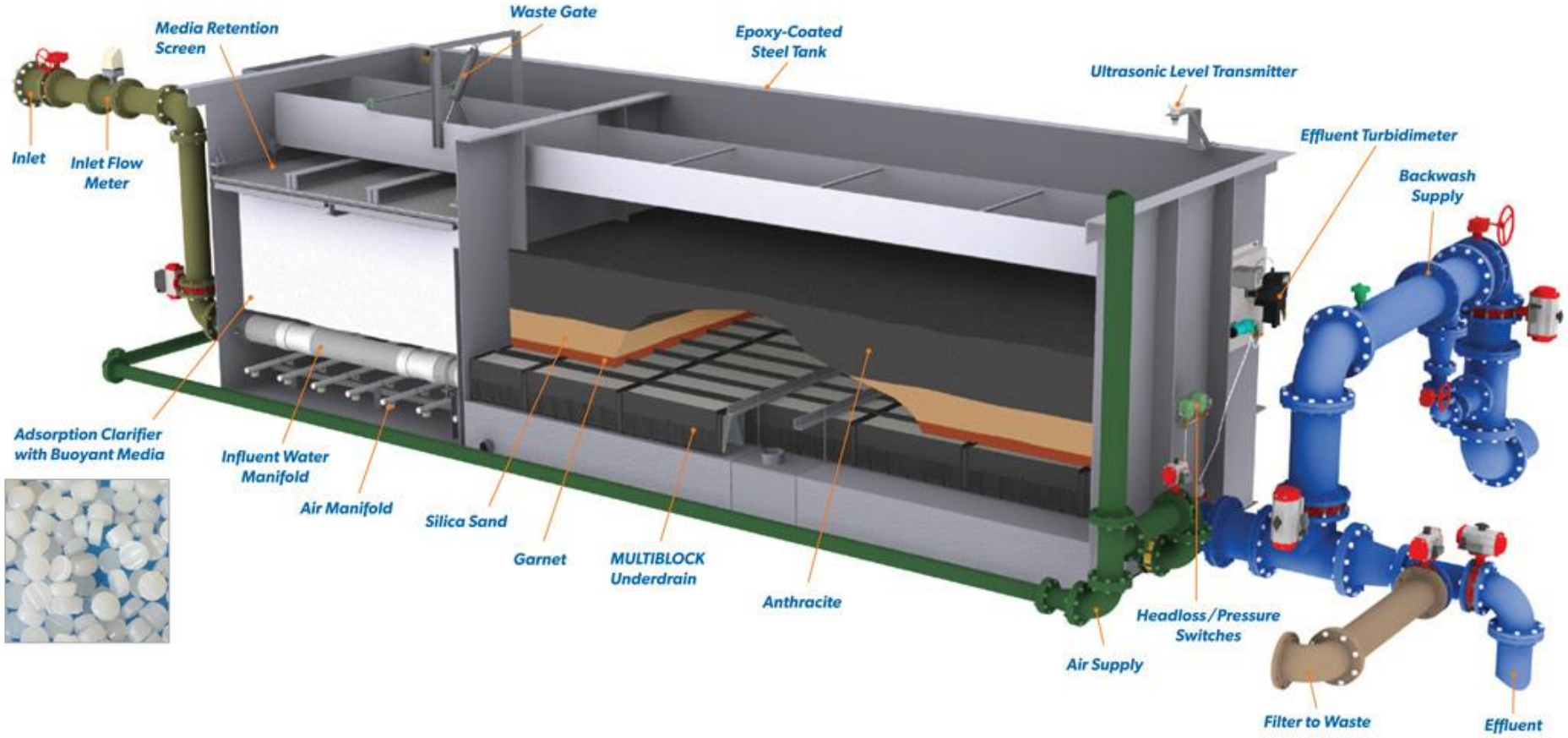


Source: US Geological Service

Surface Water Treatment Requirements

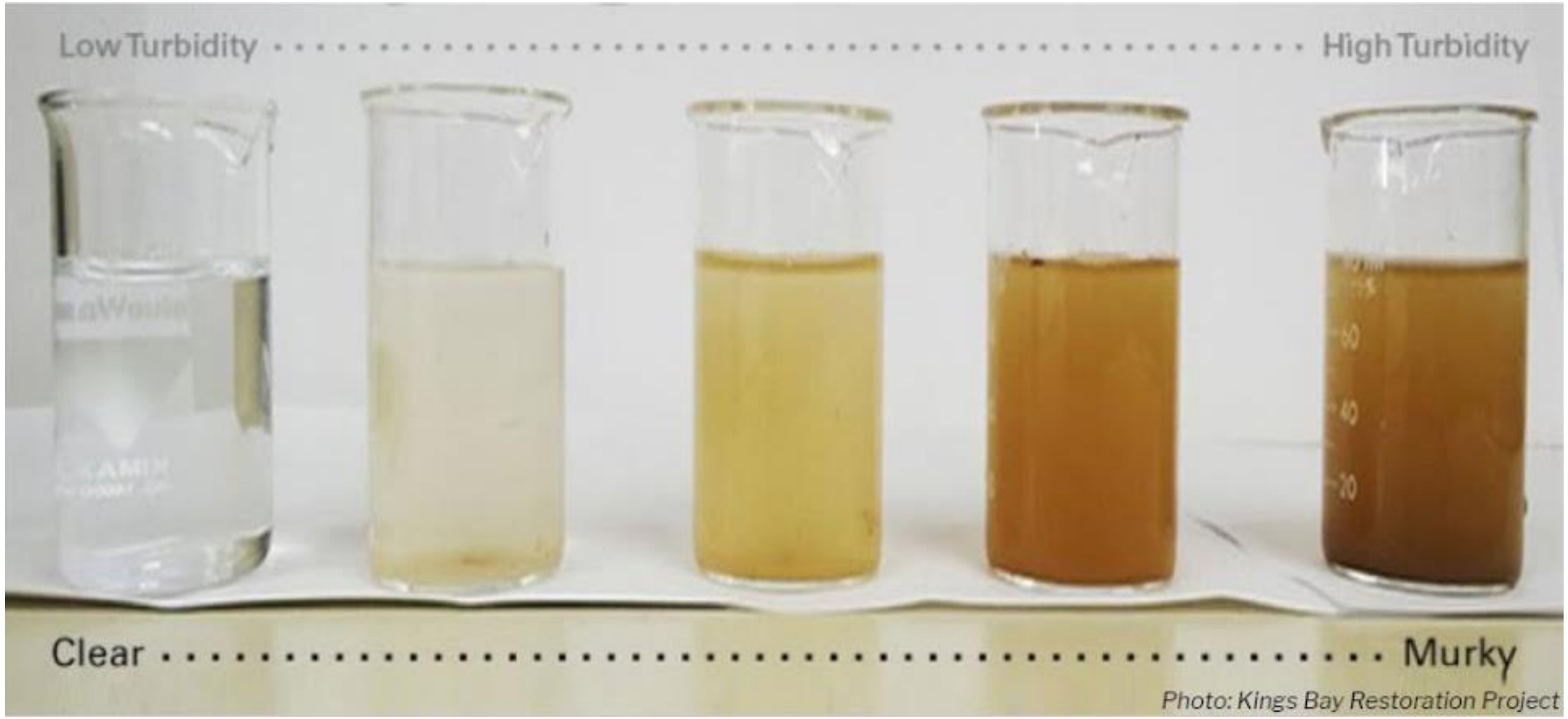
- There are multiple federal rules, adopted in VT, governing surface water
  - Goal – Reduce illness caused by pathogens
    - Examples: *Giardia lamblia, cryptosporidium, E. coli*
- Surface water systems are required to filter and disinfect their water sources
  - SOME systems have avoidance of filtration waivers (none in VT)
- Standards include:
  - Minimum Disinfection requirements
  - Turbidity removal
  - Vulnerability determinations for certain pathogens – Giardia
    - If increased risk, need to increase types and levels of treatment

Complete Package Plant



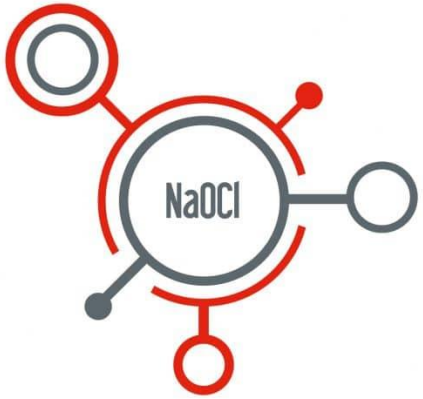
Surface Water Filtration

Source: Trident Package Plant brochure


Low Turbidity
High Turbidity
Clear
Murky
Photo: Kings Bay Restoration Project

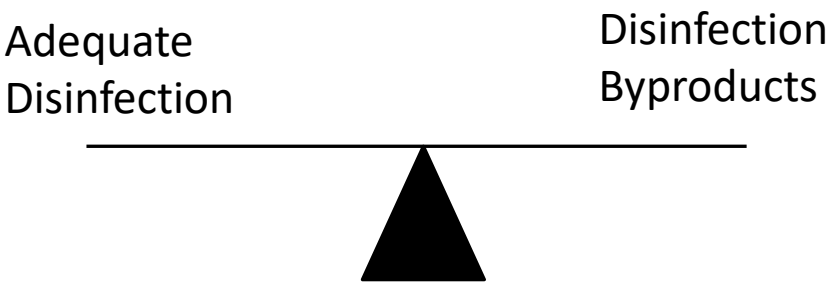
The Role of Disinfection

Life magazine cited filtration of drinking water and use of chlorine as 'probably the most significant public health advance of the millennium'."



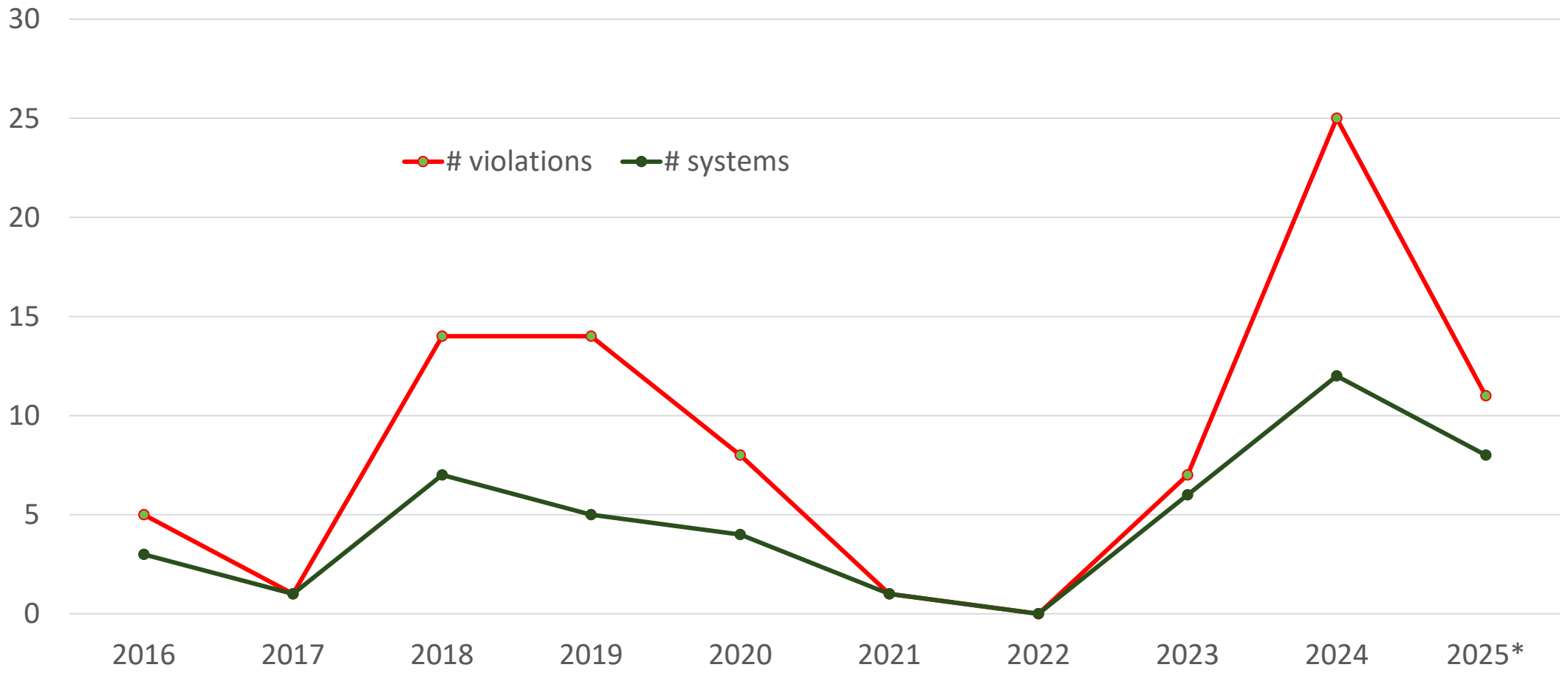
George Pinwell, 1866

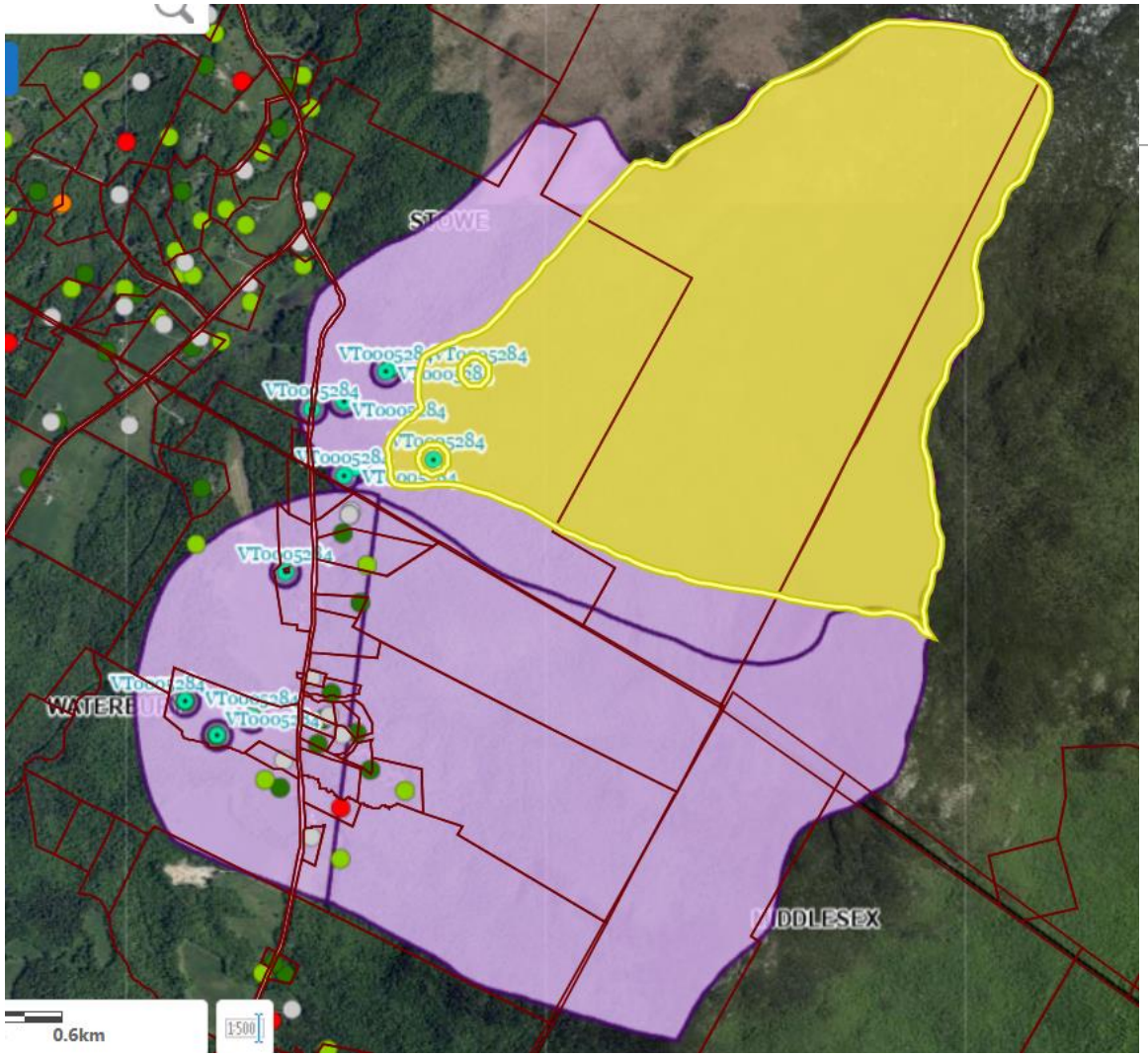
Surface Water Related Water Quality Concerns



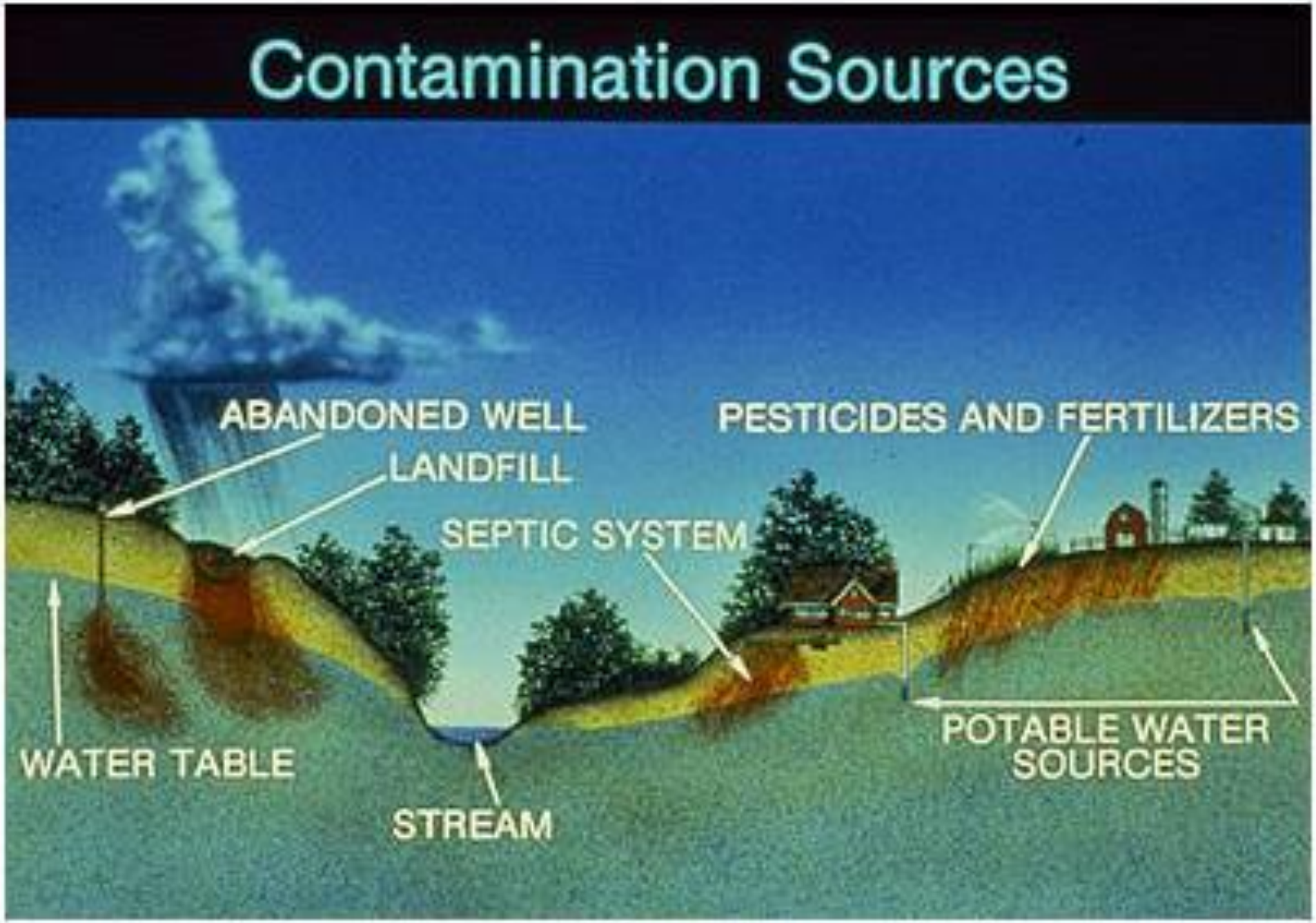
“Simultaneous Compliance”

Vermont DBP Violations by Year





Source Protection



Source: US EPA

Source Protection

3.2.6 Source Protection

A source protection area shall be delineated for the surface water source and a source protection plan shall be developed which mitigates risks associated with existing and potential sources of contamination.

7.6 Source Protection

7.6.1 All Public Community, Domestic Bottled, and Public Non-Transient Non-Community water systems shall have a Source Protection Plan approved by the Secretary and shall maintain the plan as required in Subchapter 21-16…

16.2.3 Inventory of Potential Sources of Contamination

16.2.4 Assessment of Potential Sources of Contamination

Source Protection Areas

State Rule Requirement:

Zone 1 – 200’ radius around the intake or otherwise defined

- Impacts in this area are expected to be immediate and certain

Zone 2 – Within 200 feet of surface water body, not to exceed 17,000 acres

- Impacts from potential sources of contamination in this area are probable

Zone 3 – Remaining watershed beyond Zones 1 and 2.

- Impacts from potential sources of contamination in this area are possible