
Acton's
Water Cycle
Welcome!

Water Source

GREEN ACTON
Using Less ~ Living Better

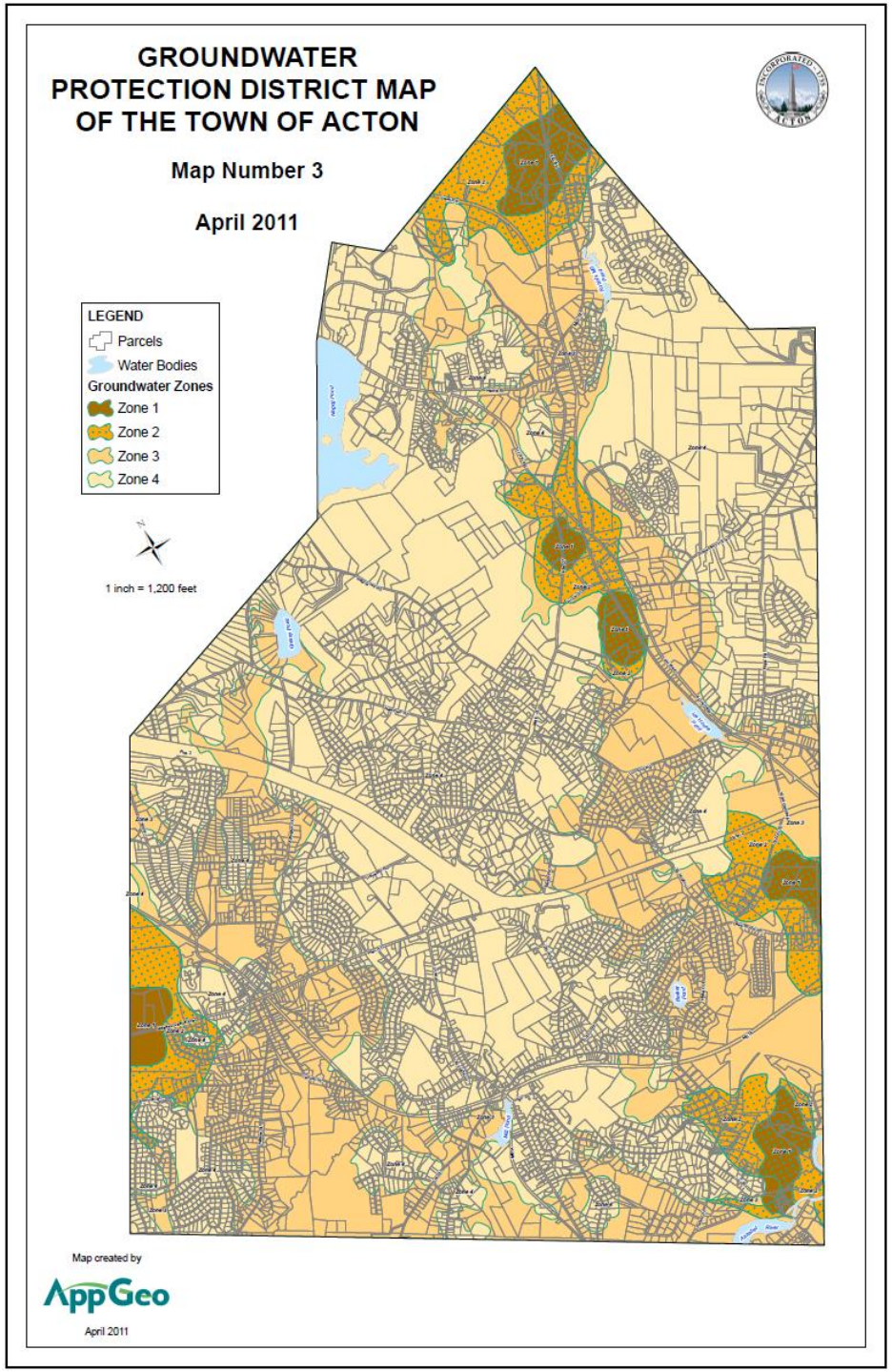
Overview of Water Supply
June 8, 2022

Matthew Mostoller
Assistant District Manager

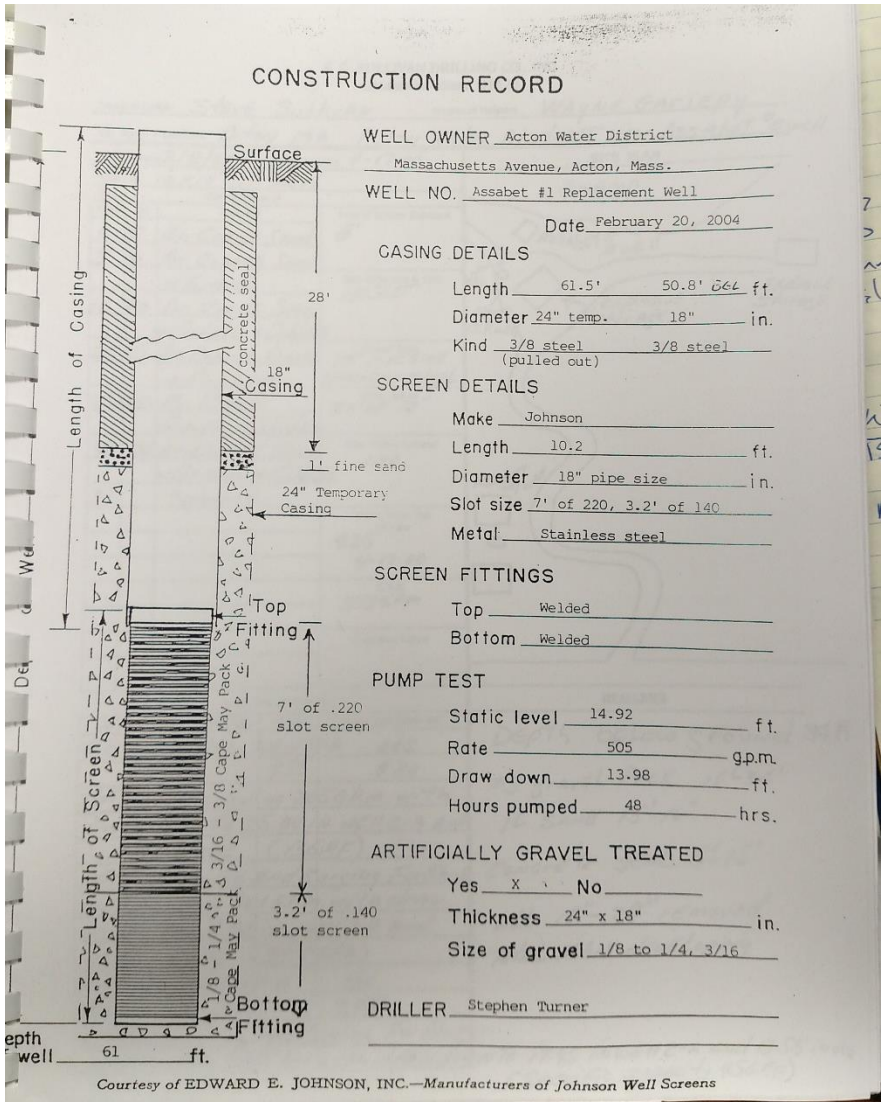
Acton Water District
Est. 1912

Acton Water District

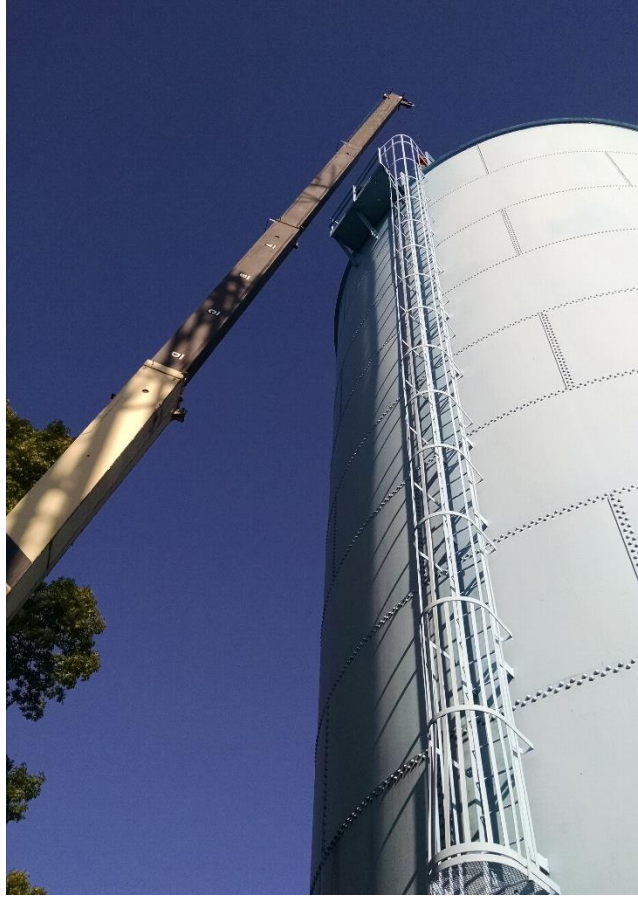
- Chartered 1912
- Primary PWS in Acton
- Regulated by EPA, DEP, DPH, BOH
- 23 Groundwater Wells
- 4 Treatment Facilities
- ~135 Miles Water Main
- 4 Storage Tanks
- 1.94M Gallons per day



What Am I Talking About?





More Photos to Move Us Along!


Legend
Hydrant
Diameter (in)
4
6
8
10
12
16
New Water Main
10
N
0 1,000 2,000
Feet
Water Distribution System
By Diameter
Acton Water District
Acton, Massachusetts
WRIGHT-PIERCE
FIGURE
2-1


Recharge
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Groundwater Recharge and Protection

June 8, 2022

Erika Amir-Lin

Acton Water Commissioner

Acton Water District

Est. 1912

Our water comes from an aquifer

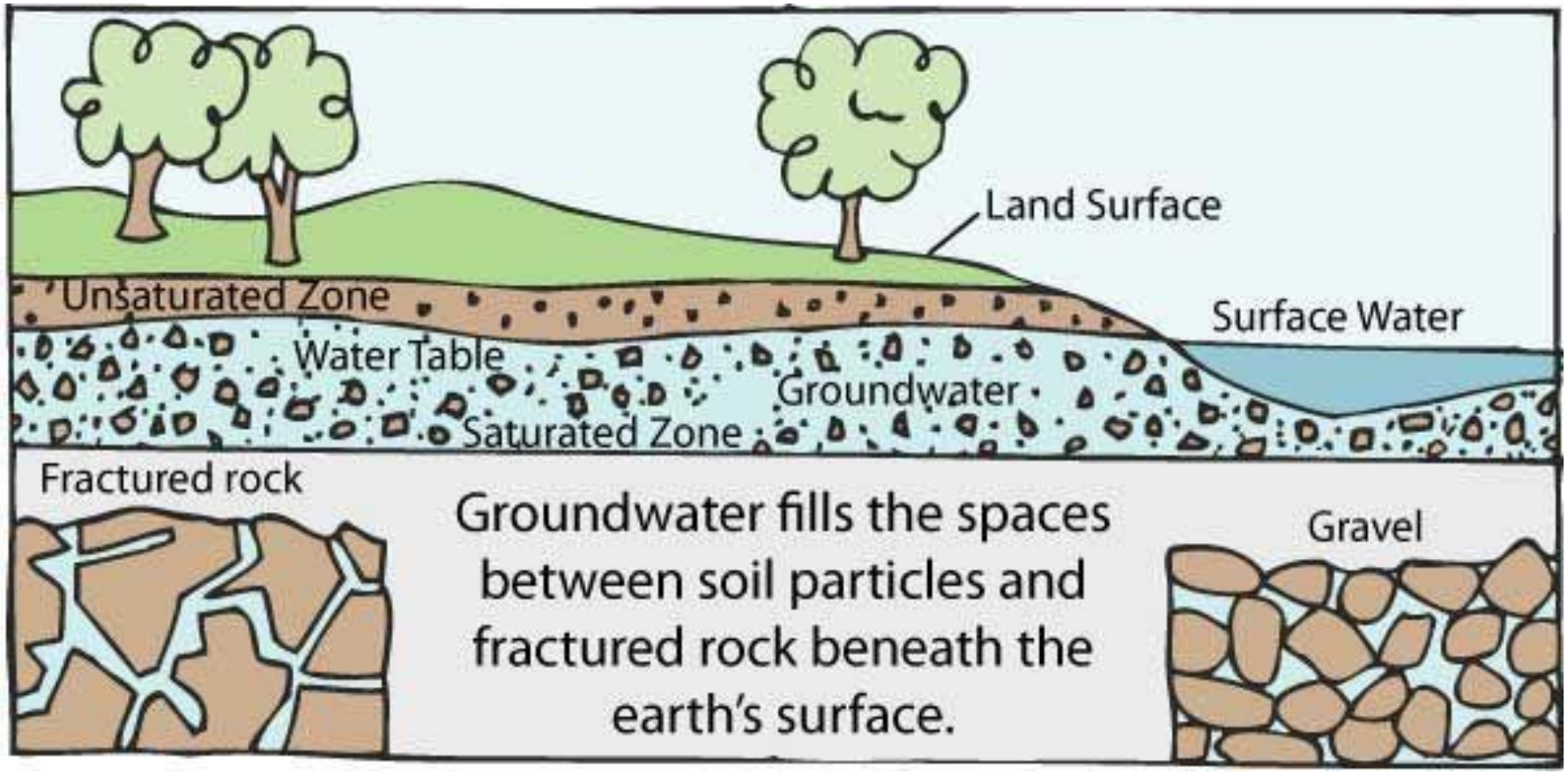
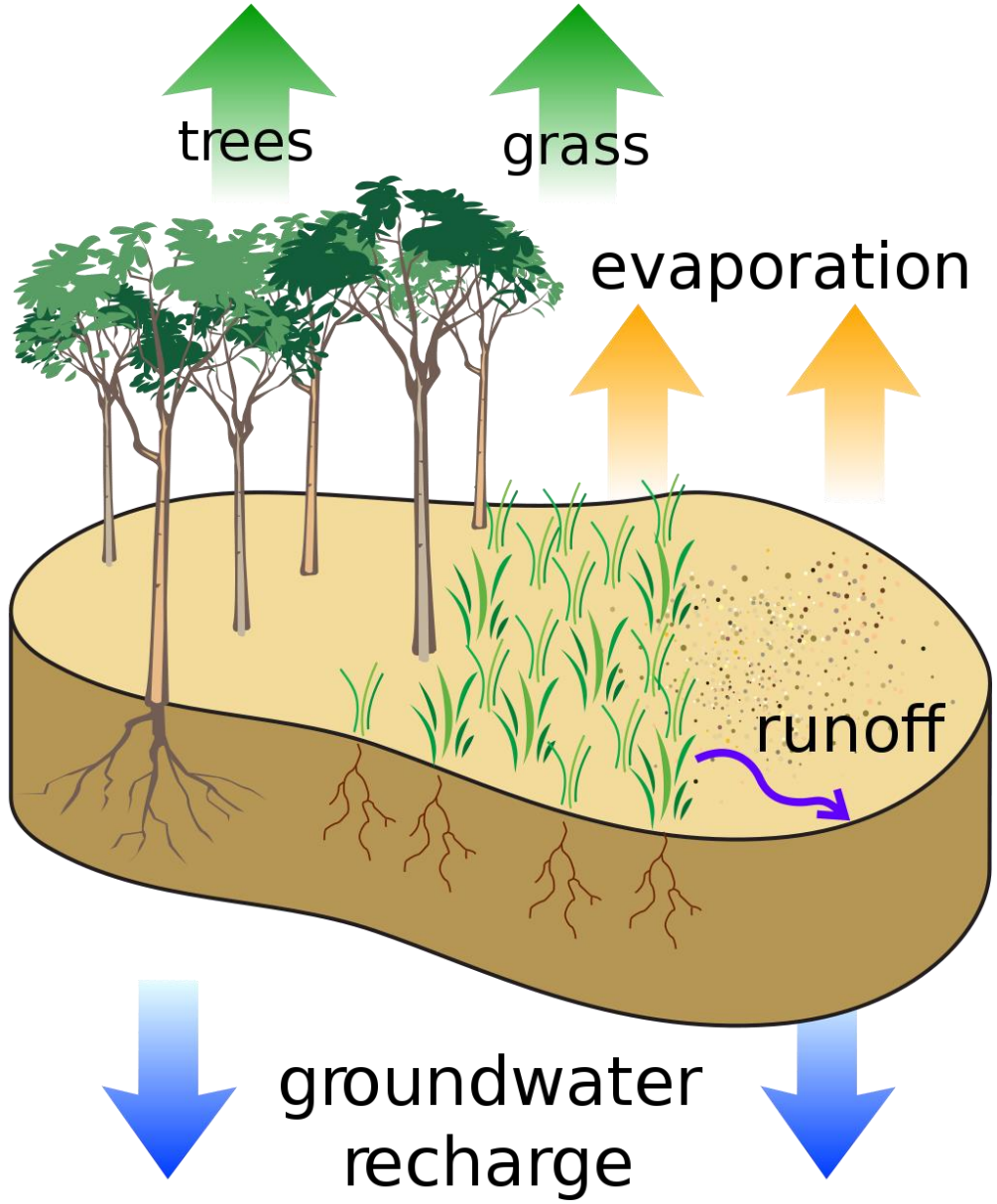


Image: groundwater.org

What is Recharge?

- All the water which reaches the aquifer
- Mostly rainwater and snowmelt, which move through the ground
- Surface water contributes also



Groundwater Protection

Threats:

- Contaminant releases
- Industrial activity
- Sewage
- Agricultural Drainage
- Stormwater
- Landfills

Protections:

- Pollution source control
- Strong environmental regulations
- Proper wastewater treatment
- Fertilizer and pesticide reduction programs
- Stormwater management
- Land use controls

Precipitation

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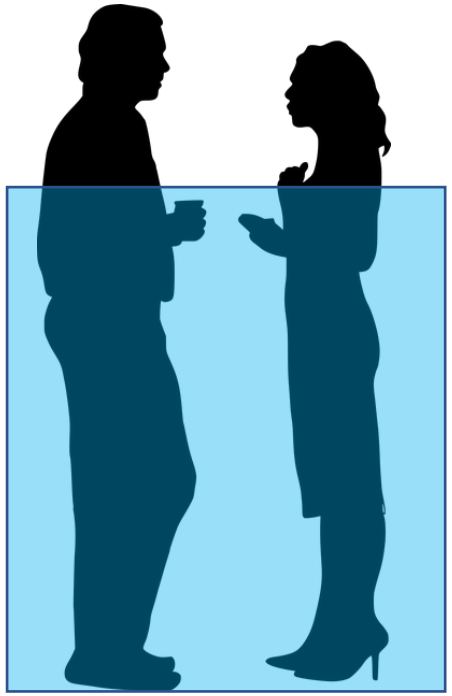
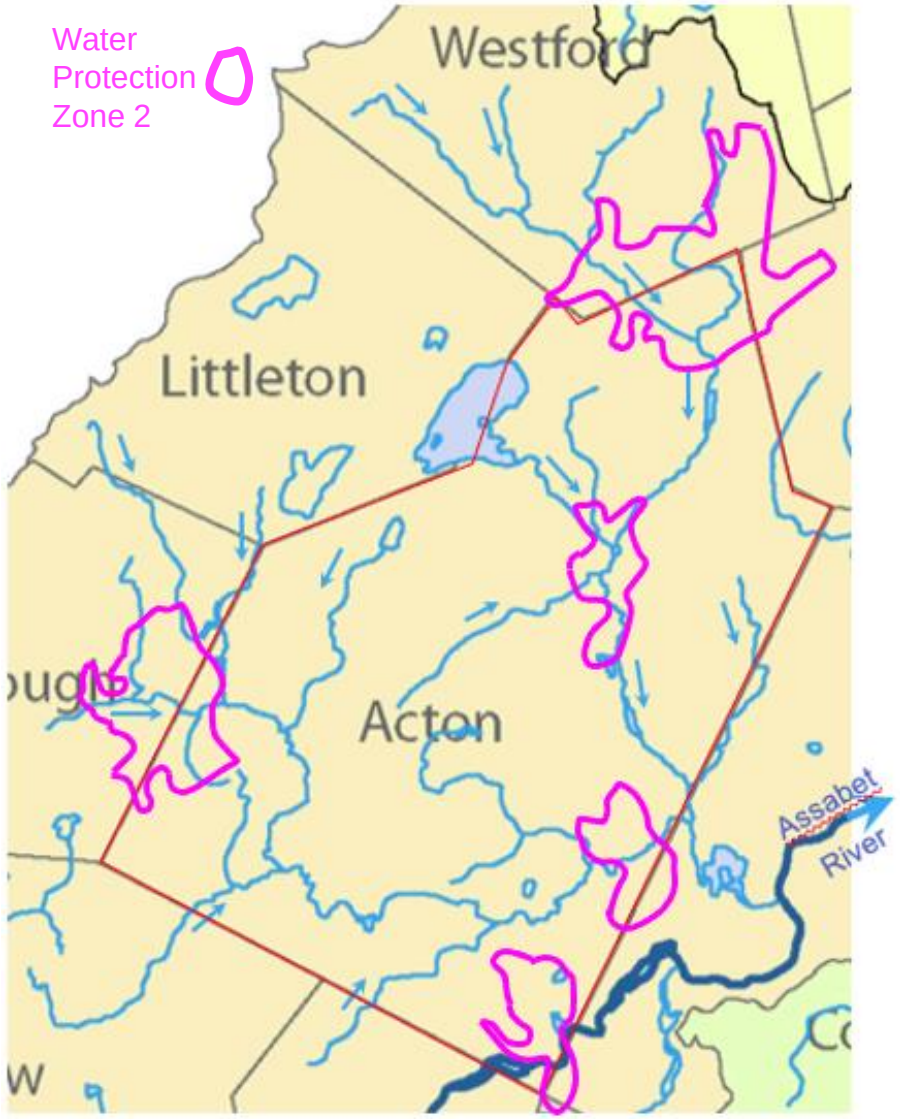
Acton gets on average ~48” of precipitation per year…

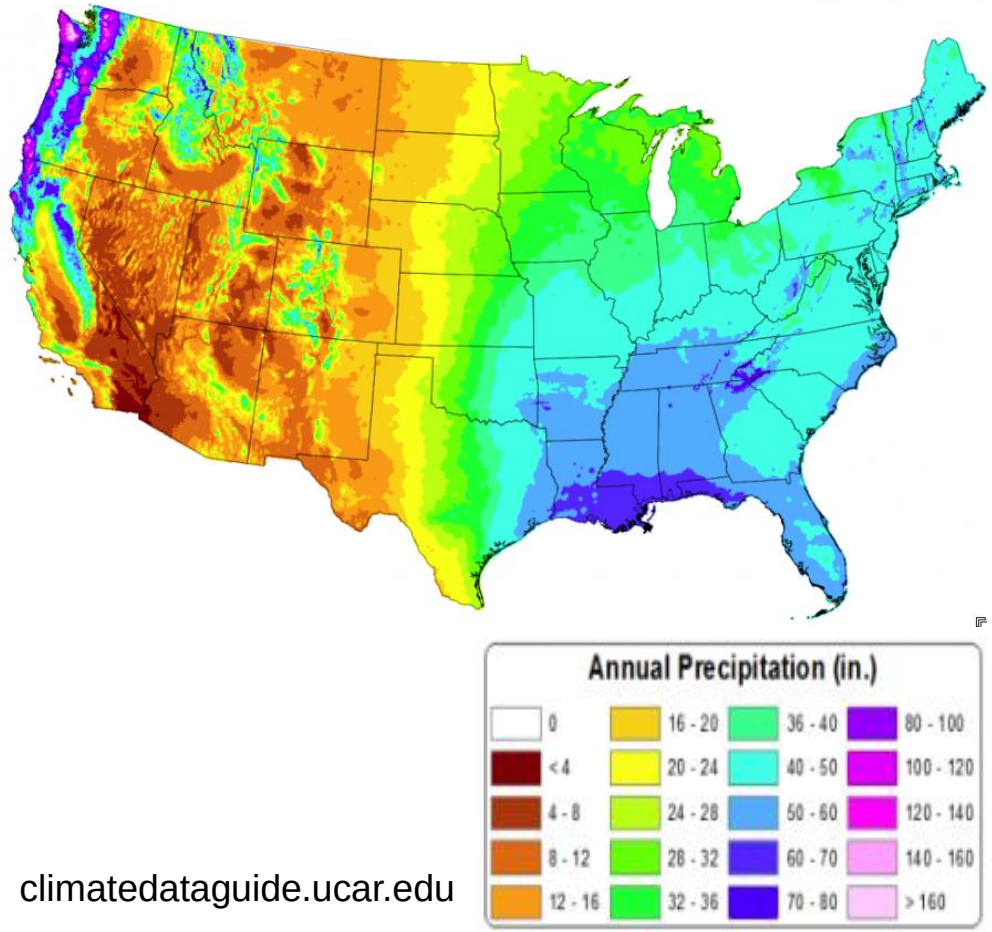


… plus some water flows in from neighboring towns.



Forty-eight inches per year on average is a generous amount compared to many parts of the nation.

30-yr Normal Precipitation Annual
Period: 1981-2010

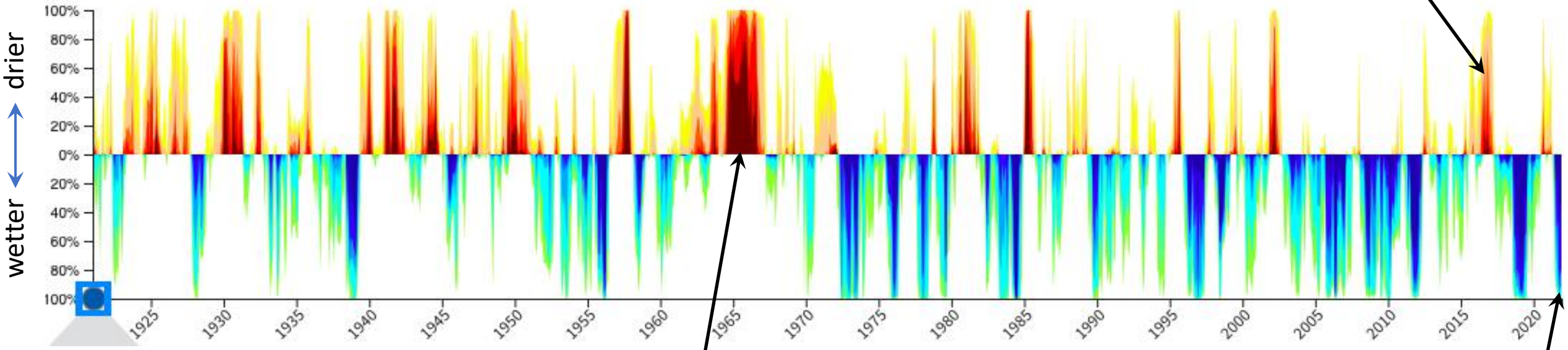


climatedataguide.ucar.edu

However, many years are far from average…

2016 in Acton reached D3-extreme drought

Based on Standardized Precipitation Index (SPI) for Massachusetts for last 100 years



Multi-year severe drought In mid-1960s

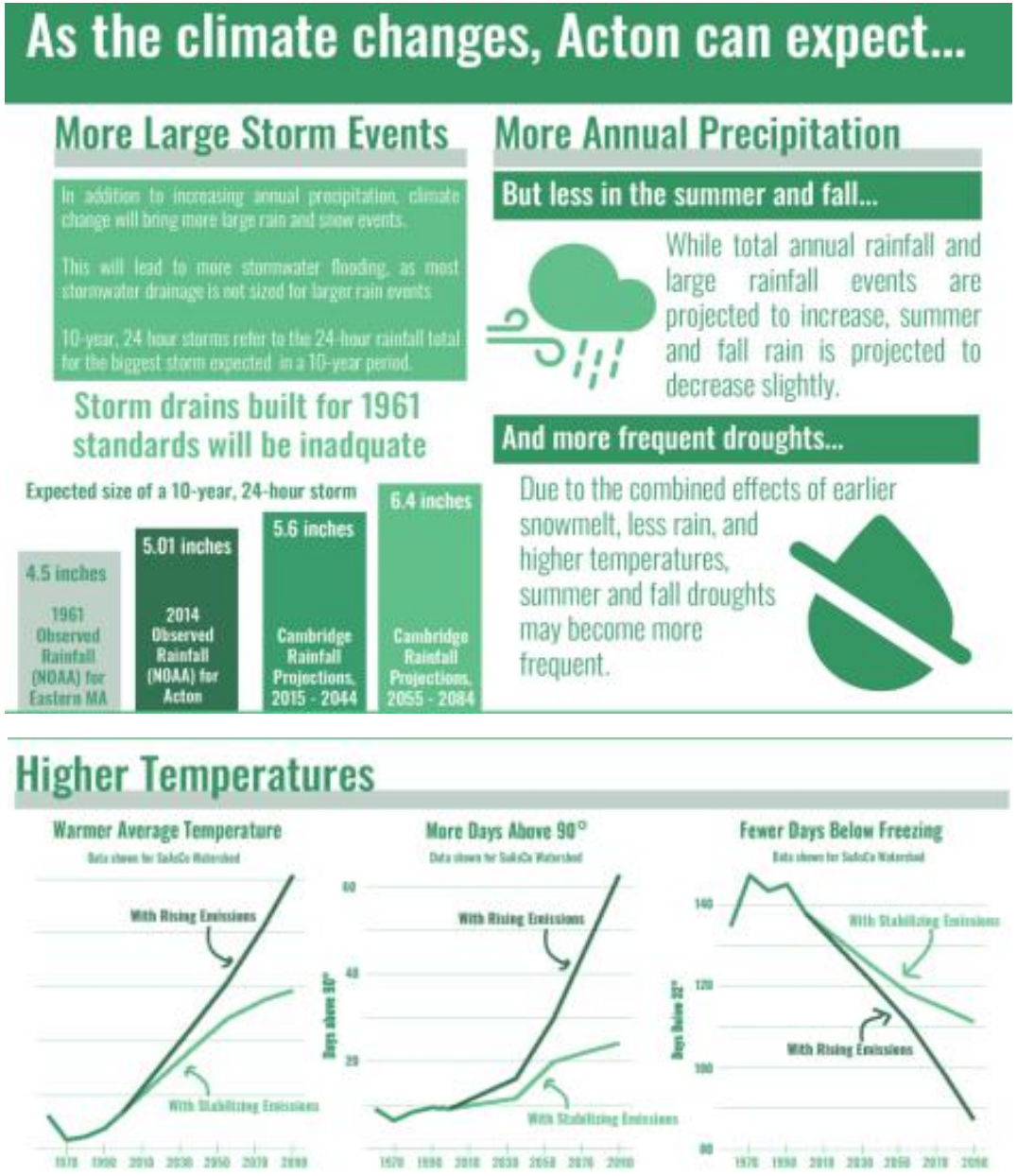
Last year, 2021, was moderately to severely wet

- D0– Abnormally Dry
- D1– Moderate Drought
- D2- Severe Drought
- D3- Extreme Drought
- D4 - Exceptional Drought
- W0– Abnormally Wet
- D1– Moderate Wet
- D2- Severe Wet
- D3- Extreme Wet
- D4 - Exceptional Wet

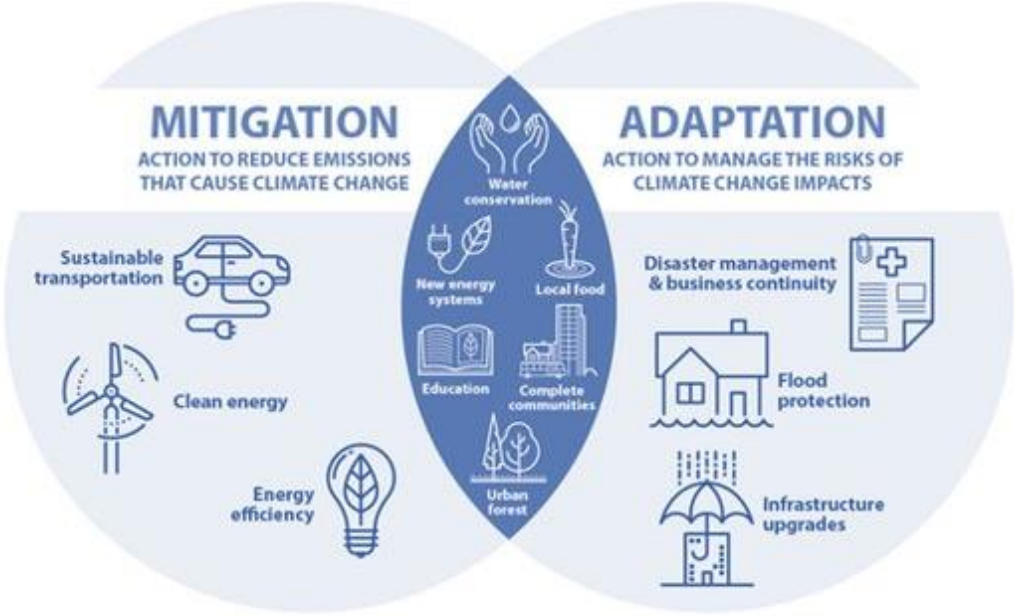
Source: NOAA Drought.gov Historical Data & Conditions

Looking ahead: future impacts of climate change

June 8, 2022



What is Resilience?



Examples of water resiliency planning

Stormwater management- improve water quality, control toxic algal blooms, lower cost of treating water, and improve fish habitat and health

Strengthen Social and Climate Resilience - educate local residents about climate impacts and community and emergency preparedness

Sustainable Landscaping - green infrastructure such as bioswales and rain gardens can be an effective solution for managing runoff, protecting our waterways, and beautifying our neighborhoods

Your Water Use

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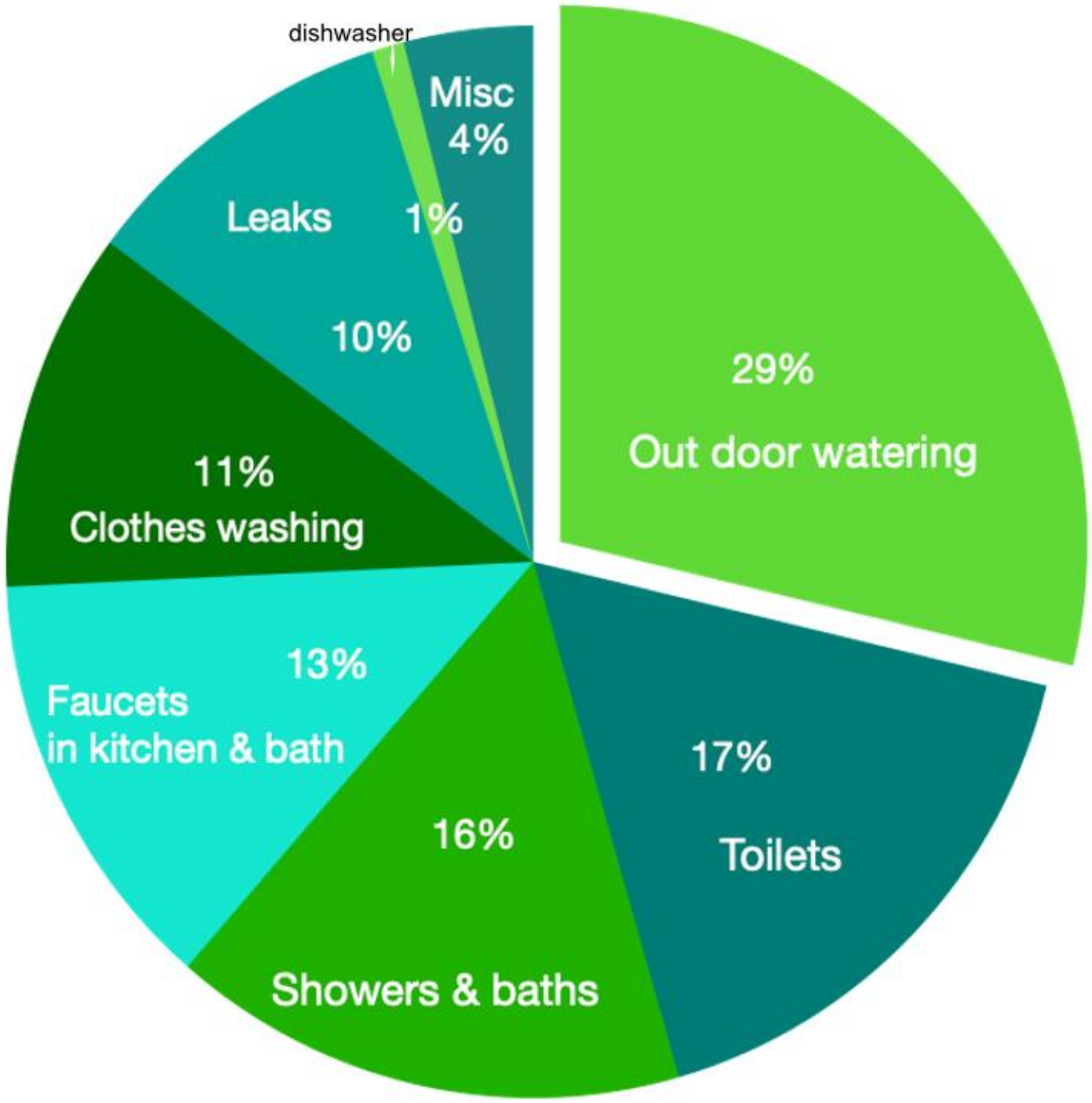
Household Water Consumption
June 8, 2022

Lucy Kirshner
Green Acton
Water Committee



Water Research Foundation's Residential End Uses of water, (2016)

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Water Conservation and Efficiency
June 8, 2022

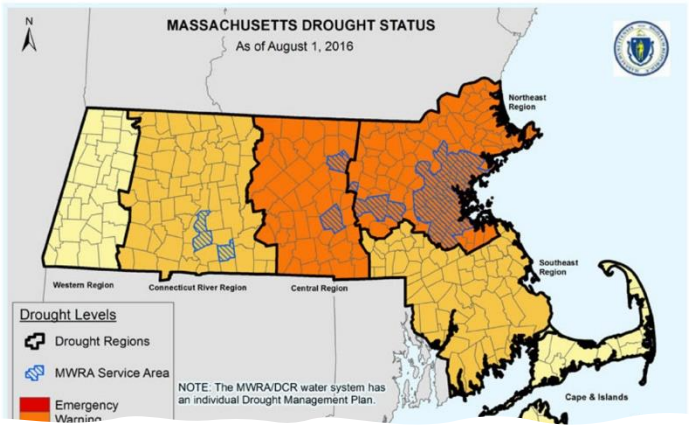
Alexandra Wahlstrom
Environmental Analyst

Acton Water District
Est. 1912

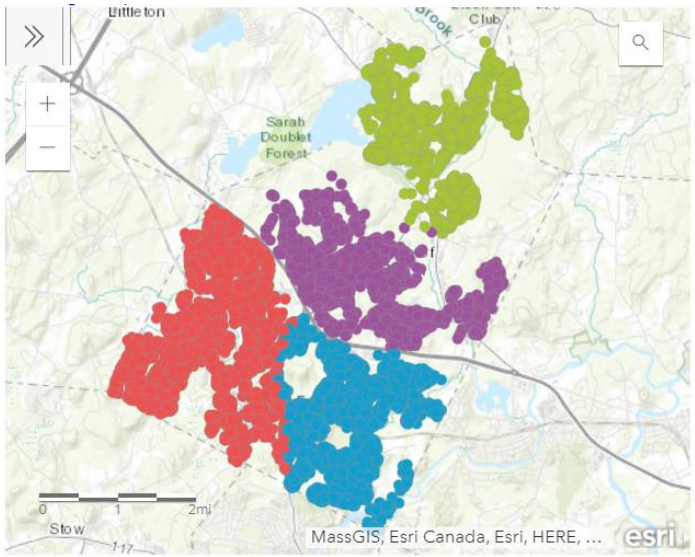
What *motivates* us to conserve?

- Financial implications
- Water quality considerations,
  - PFAS
  - 1,4-dioxane
- Infrastructure impacts
- Climate resiliency
  - Drought conditions
- Environmental stewardship

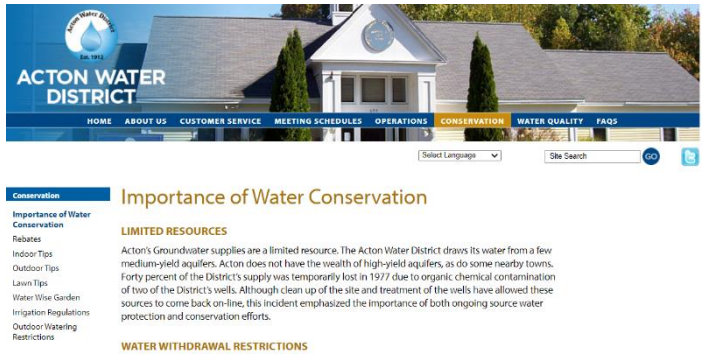
Central Acton Water Treatment Plant
Contract No. 1
Acton Water District
Wright-Pierce
Waterline Industries

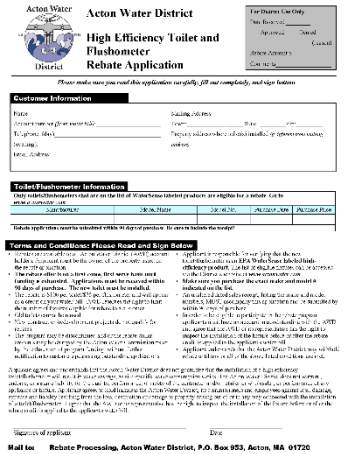


Water-savings Resources



Free Efficiency Evaluations for residential AWD customers!




Acton Water District

High Efficiency Toilet and Flushometer Rebate Application

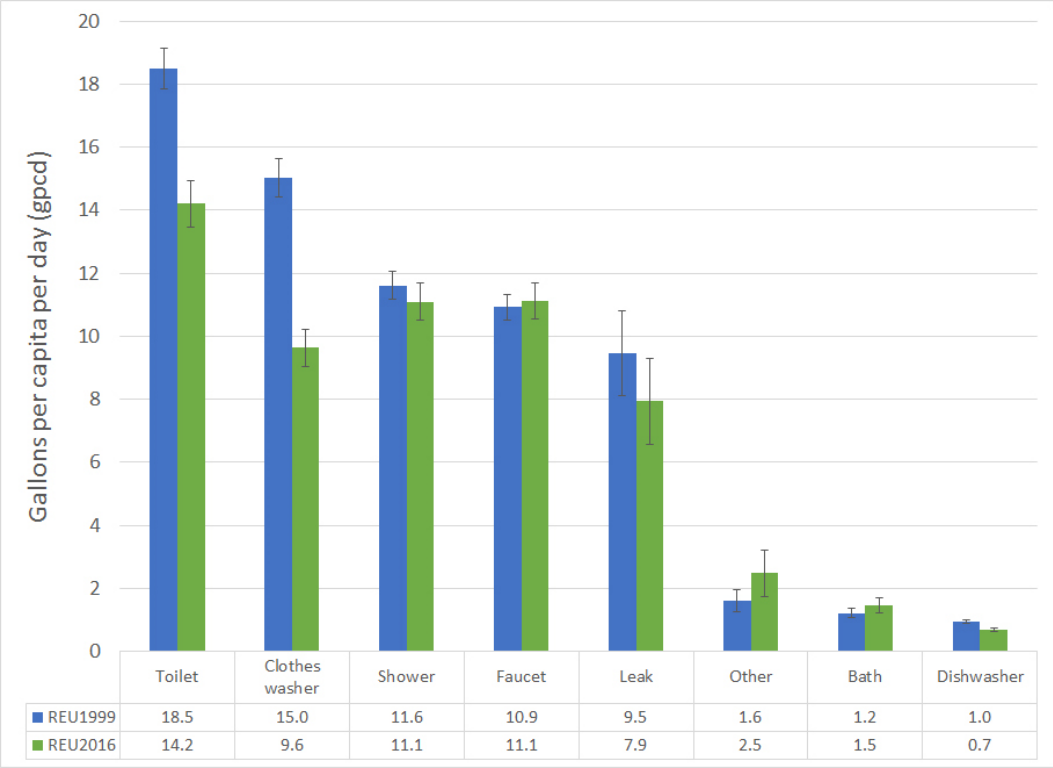
Customer Information

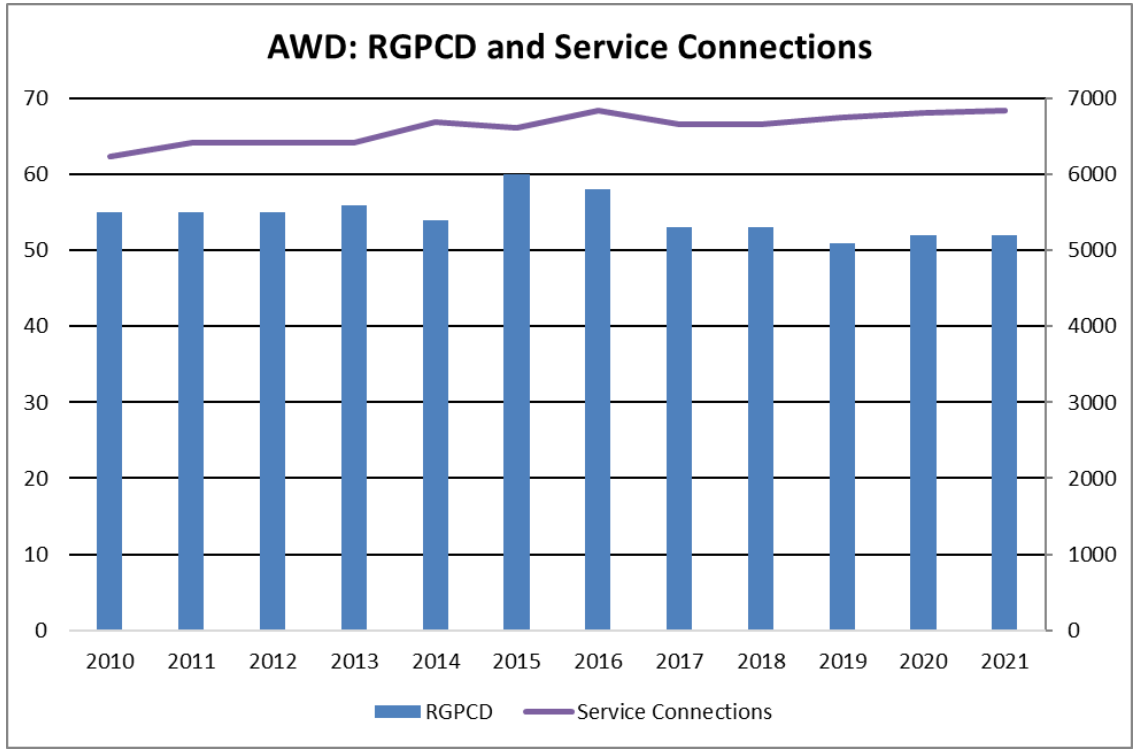
Toilet/Flushometer Information

Terms and Conditions: Please Read and Sign Below

Mail to: Rebate Processing, Acton Water District, P.O. Box 953, Acton, MA 01720

Conservation and Efficiency Successes





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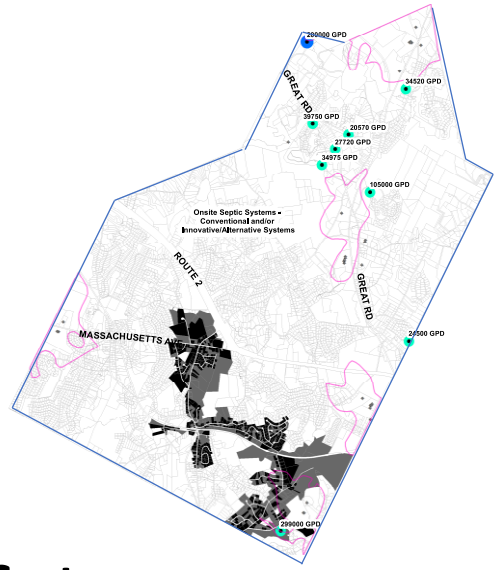
Down the Drain

Workings and Maintenance of Sewers and Septic Systems

Map of Acton, showing protected zones, Town's sewer system, package plants and cluster septic systems

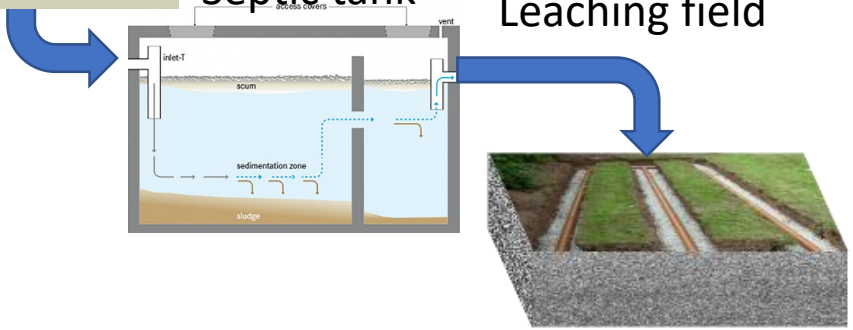


Waste water generator

Septic System

Septic tank

Leaching field



Waste water Solutions

- **Pay for someone else to take your waste water, sewer**
- **Take care of your own waste water, septic system**
- **Outline**
  - **Sewer and Septic system operation**
  - **Septic system maintenance**

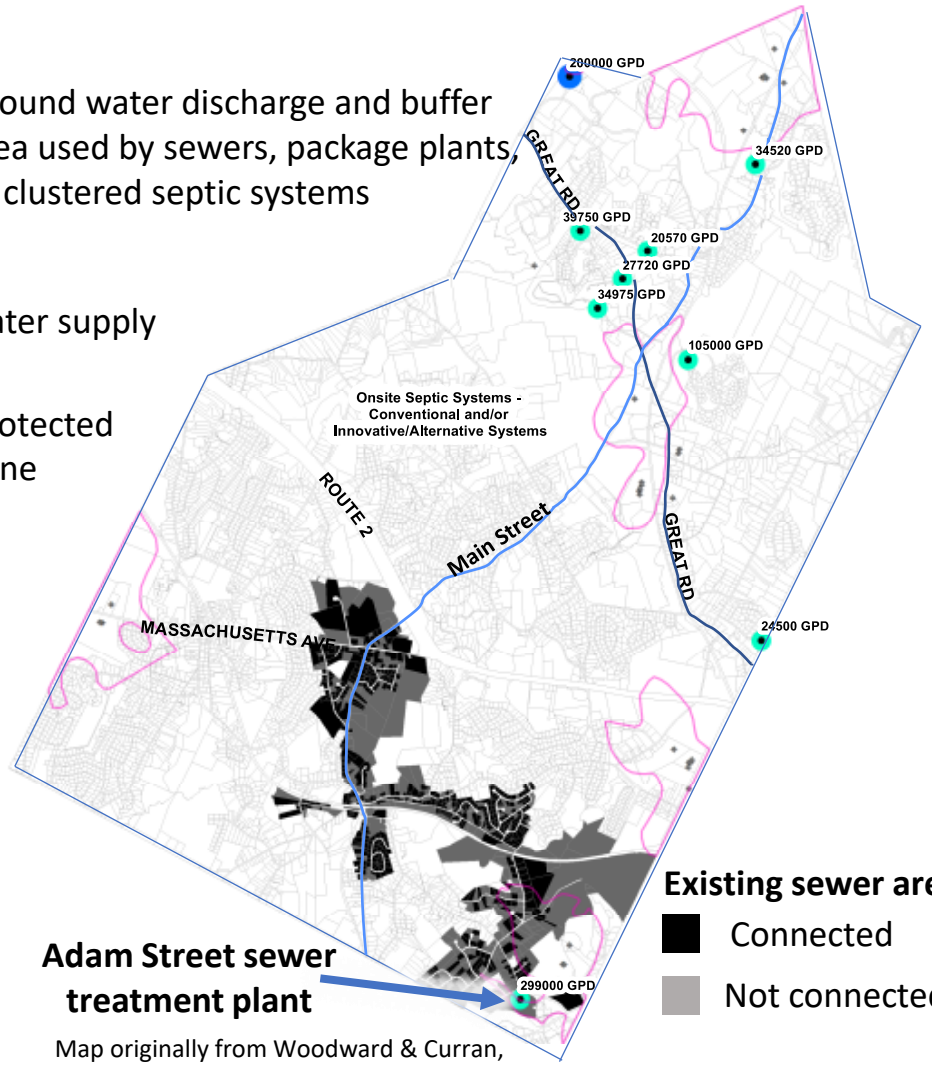
Workings Sewer

Chemically and physically controlled treatment

Ground water discharge and buffer area used by sewers, package plants, or clustered septic systems

Water supply

Protected zone



Map originally from Woodward & Curran,
Project #: 230166, Map Created: March 2022

Adam Street Sewer

Purpose to remove from waste water:

- Pathogens
- Nitrogen both ammonia and nitrate
- Phosphate

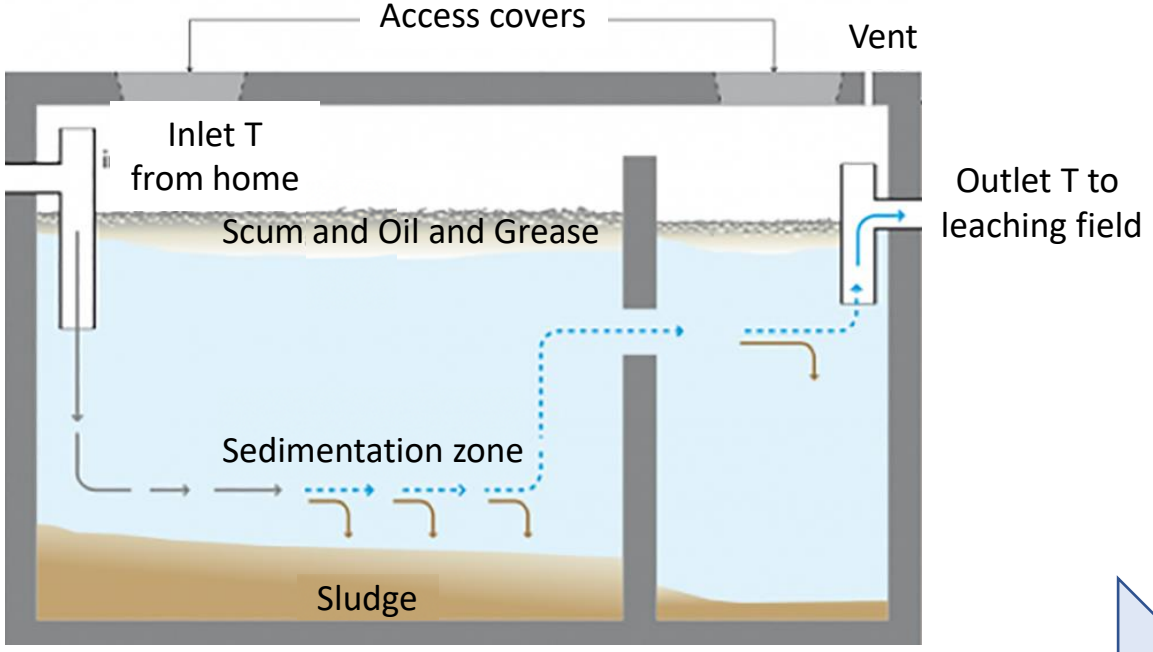
Waste water treatment procedure:

1. Use piping and pumping stations to deliver waste water from homes and businesses to waste water treatment plant
2. Cycle the waste water between anaerobic an aerobic environments to reduce nitrogen concentration
3. Add aluminum salt to settle solids and bind phosphate to the sludge and remove resulting sludge
4. Adjust pH
5. Filter water to remove any remaining solids
6. Disinfect waste water with UV radiation.
7. Discharge treated water into a rapid filtration bed

Workings of a Septic System

Natural Solution, no electricity, chemicals, pumps, or personnel

Septic Tank



E. coli. > 240,00 colonies/100 mL [1-3]

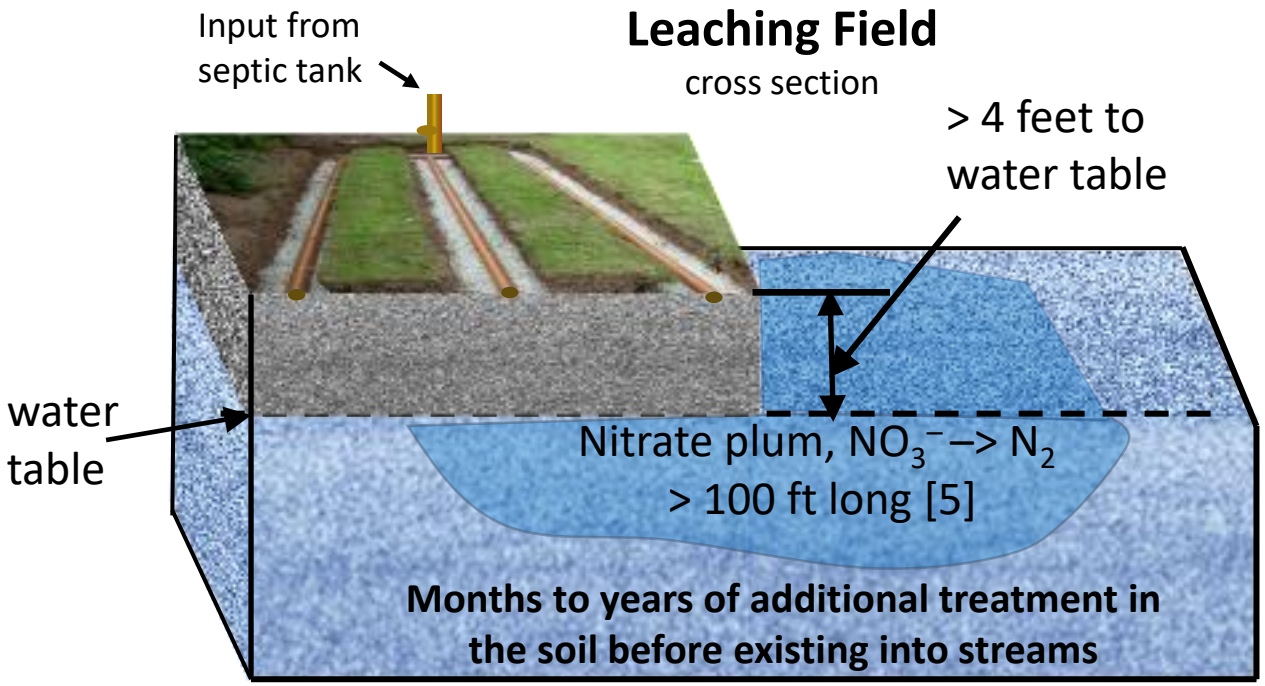
NH_3, Ammonia, toxic for aquatic life [2]

PO_3^{-3}, Phosphate, toxic algae blooms [2,4]

H_2S, Hydrogen Sulfide, toxic and corrosive [2]

Several functions performed in the leaching field

Leaching Field



E. coli. < 10 colonies/100 mL [1]
EPA, < 200 colonies/mL safe for swimming

$NH_3 \rightarrow NO_3^- \rightarrow N_2$, Nitrate slowly reduced to nitrogen

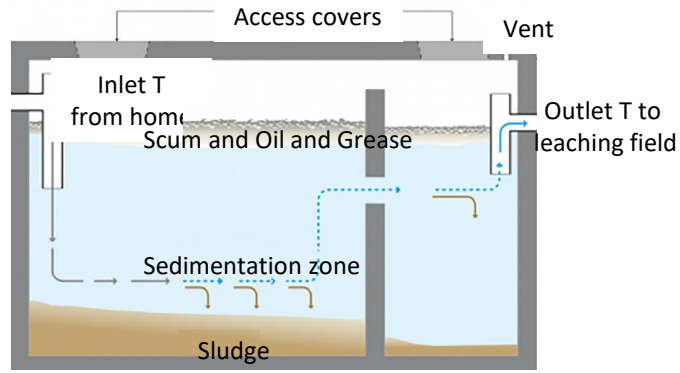
$PO_3^{-3} \rightarrow AlPO_3(H_2O)_2$, Aluminum binds phosphate to soil.

$H_2S \rightarrow S$ and SO_4^{-2}, Not toxic, less corrosive

Protect Your Septic System

Nature's Solution, needs your help

Septic Systems installed since Title 5, 1995, have project life times of 60 to 80 years if maintained [5,6].



Two common failures [7-9] and one environmental impact

1. Sludge or scum and oil entering the leaching field

   Solutions:

   Pump your septic tank [10], Town requires once ever two years [11}.

   Minimize oils and grease introduction in septic system

   Don't run the washing machine, dish washer and bath tub at the same time

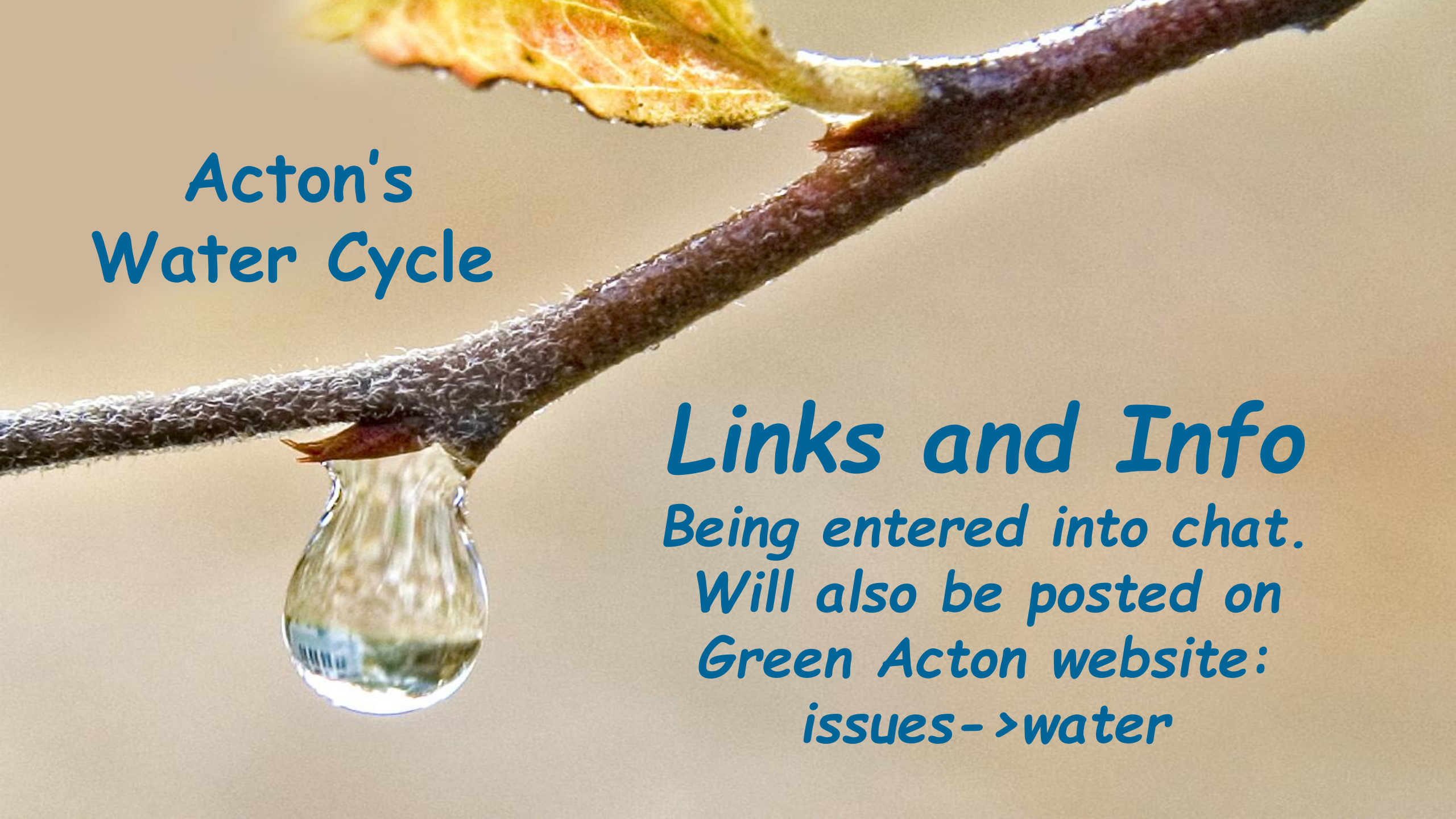
2. Leaching field becomes impermeable from trees roots or bio-mat sealing off the field

   Solutions:

   Keep deep rooting plants and trees away from the field

   Minimize water and organic material into the system, don't feed the bio-mat

3. Never flush medicine or hazardous materials into the sewer or a septic system. Deposit unwanted medications at Acton Police Department and hazardous materials at Hazard Waste Day at the Town's Transfer Station [12].


Acton's
Water Cycle
Links and Info
Being entered into chat.
Will also be posted on
Green Acton website:
issues->water

Acton's Water Cycle

Q and A

Please enter questions in the chat or email to water-contact@greenacton.org


Acton's
Water Cycle
Thank you
for participating!!!