
WHAT'S IN YOUR WATER?
A Research Study
performed by
Scituate High School
and
Community Partners
GET WET!
Groundwater Education Through
Water Evaluation & Testing
4.23 km
© 2010 Google
lat 41.785278° lon -71.610000°
Jul 29, 2007

QUATERNARY DEPOSITS OF RHODE ISLAND

You are here

EXPLANATION

- Bedrock
- Stratified Material
- Till

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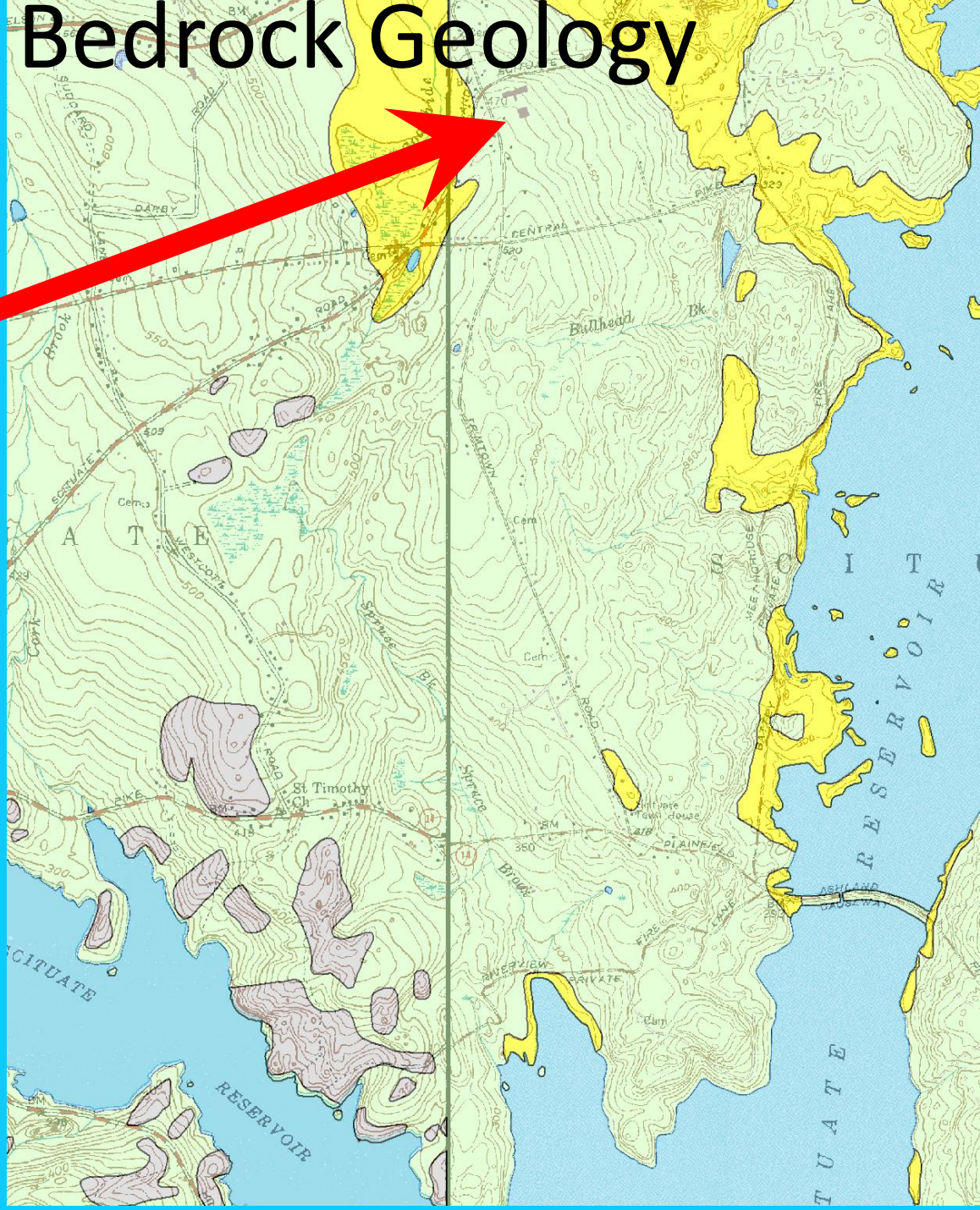


Till

- Glacial drift is a general term for the coarsely graded sediments of glacial origin.
- Glacial till is that part of glacial drift which was deposited directly by the glacier.

http://upload.wikimedia.org/wikipedia/commons/8/83/Glacial_till_exposed_in_roadcut-750px.jpg

http://en.wikipedia.org/wiki/Till

http://academic.emporia.edu/aberjame/ice/lec17/f17f.jpg

BEDROCK

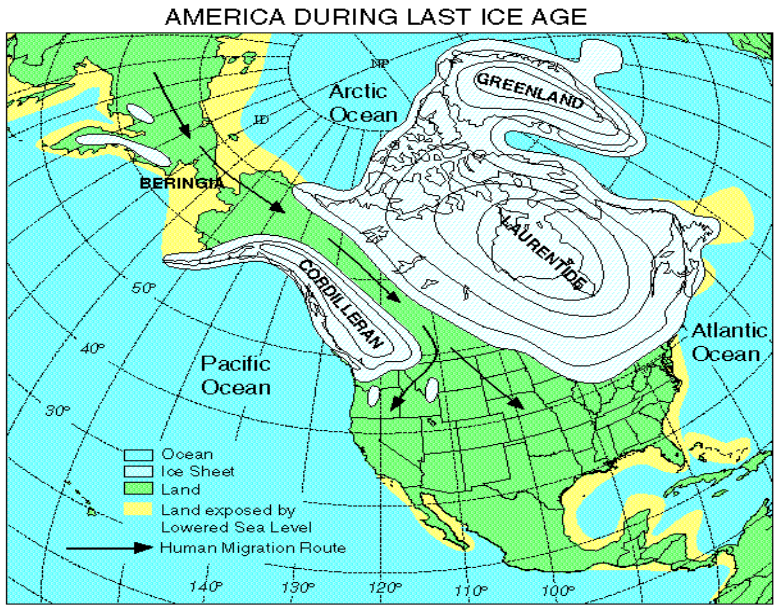
- Bedrock is the rock underlying the surface.
- Many private wells are built into the bedrock.
- Cracks in the bedrock allow water to travel underground into private wells.

http://www.chaosgraphix.org/images/bedrock.jpg

http://en.wikipedia.org/wiki/Bedrock

Last Glacial Maximum

- Approximately 26,000 years ago, Rhode Island and some of the U.S. and Canada were covered by an ice sheet.
- When the ice retreated, the glaciers left behind glacial till , which is why New England is very rocky.
- Where there were hills determined where aquifers were located during the melting period.

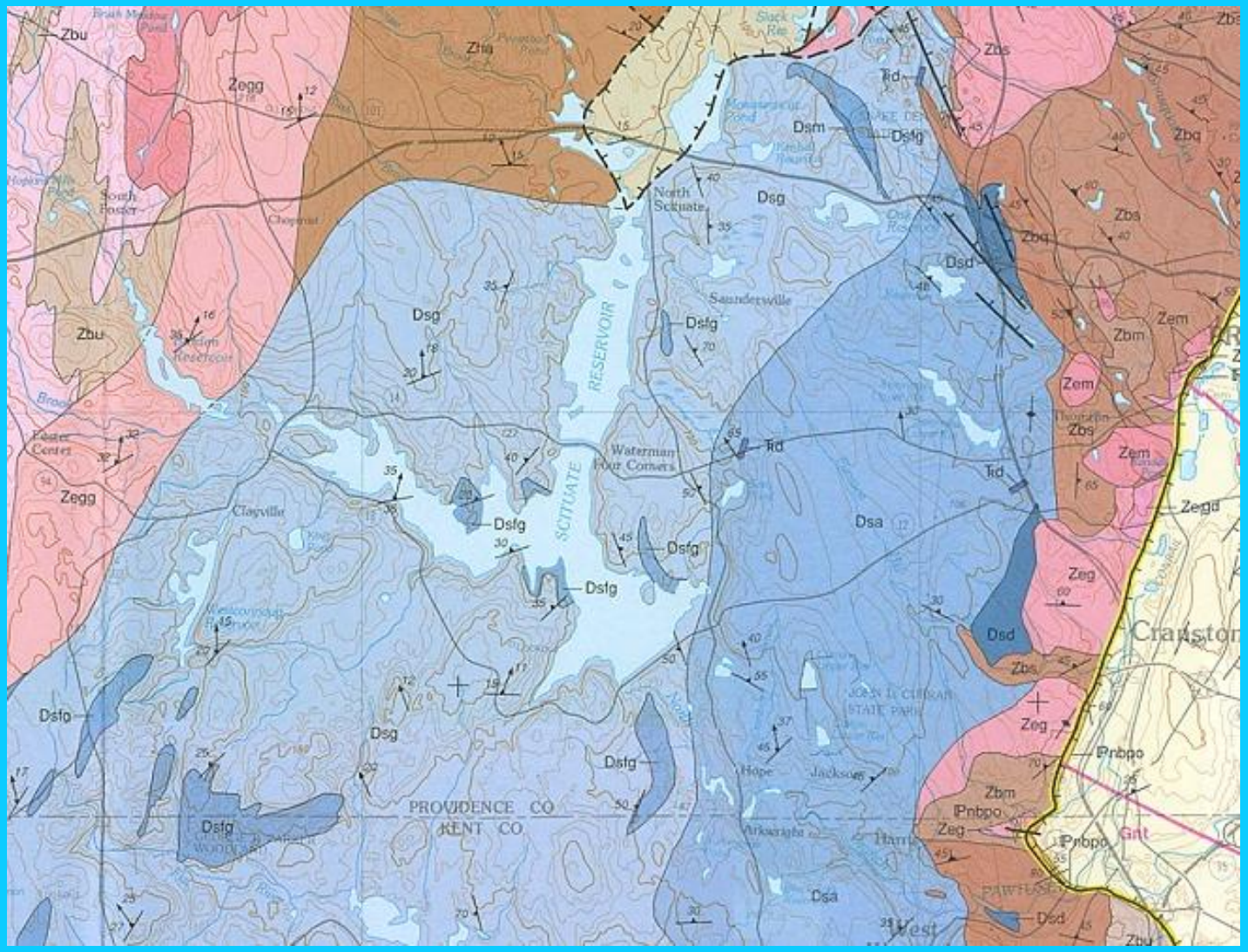


http://www.atmos.washington.edu/~dennis/Hartm.ice.new.gif

http://www.johnstonsarchive.net/spaceart/earthicemap.jpg

http://en.wikipedia.org/wiki/Ice_age

Local Geology



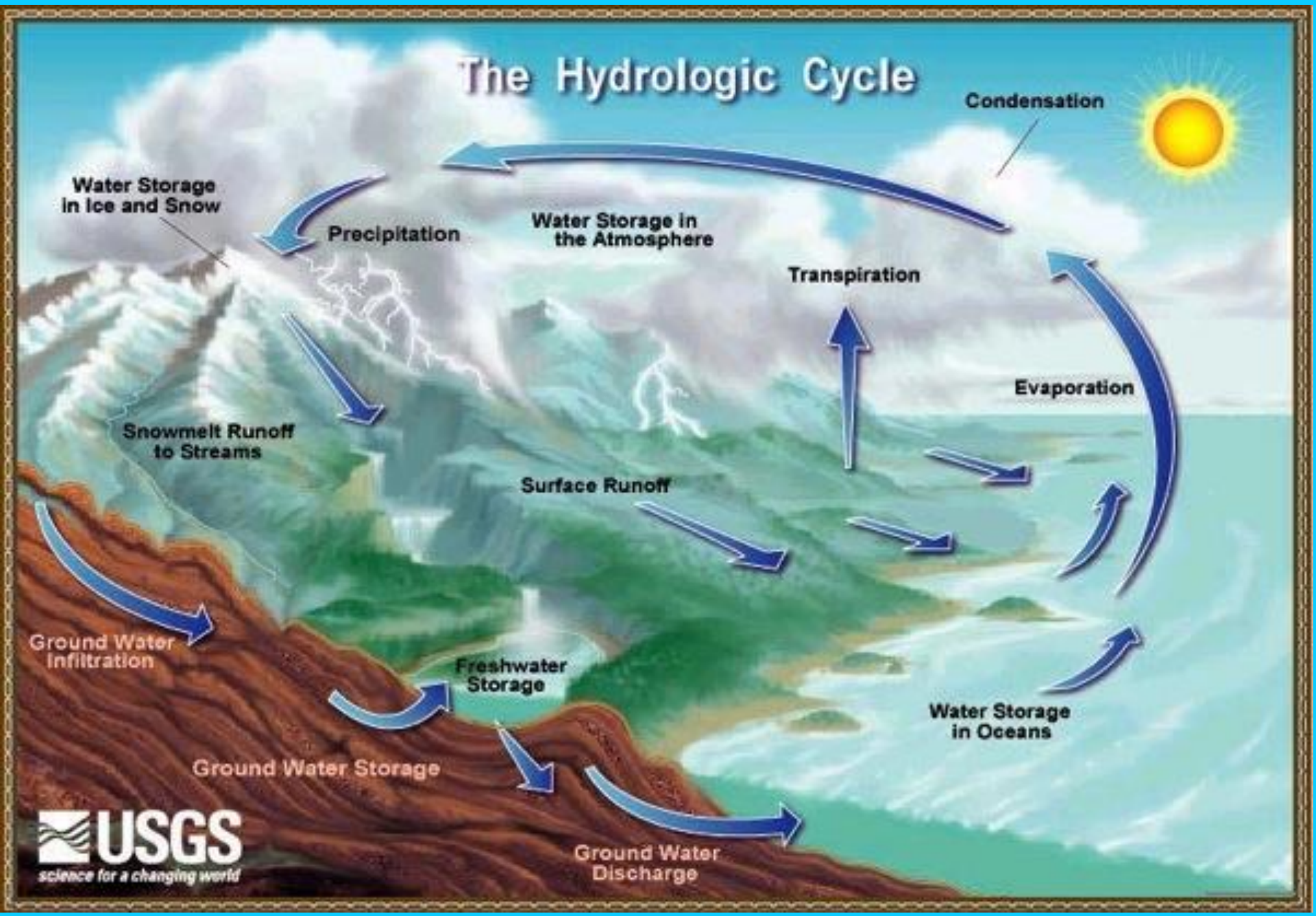
Bedrock Types in Scituate

- Granite: Gray to pink, coarse porphyritic to subporphyrictic subsolvus granite.
- Fine Grained Granite: Gray to pink, fine grained, equigranular to locally porphyritic granite.

Hydrology

Local Waters: Scituate Reservior

- The Scituate Reservoir was begun in 1915 as a means of supplying the City of Providence with a clean supply of water for residential and industrial use. 23.1 square miles acquired by Providence Water.
- The creation of the reservoir and the purchase of a large watershed were a loss to some past Scituate residents. The reservoir's waters covered the villages of Ashland, Kent, South Scituate, and Richmond.
- Rockland was entirely lost; the western part of what was North Scituate village was covered by water or taken into protective watershed boundaries. Mills at Clayville, Elmdale, Harrisdale and Glenrock were lost.
- 1,195 buildings : 375 houses, 233 barns, 6 mills, 7 schools, 6 churches, 30 dairy farms, 11 ice houses, 5 halls, post offices, taverns, general stores, blacksmith and wheelwright shops, cider mills, 2 fire stations, and an electric railway systems were also lost

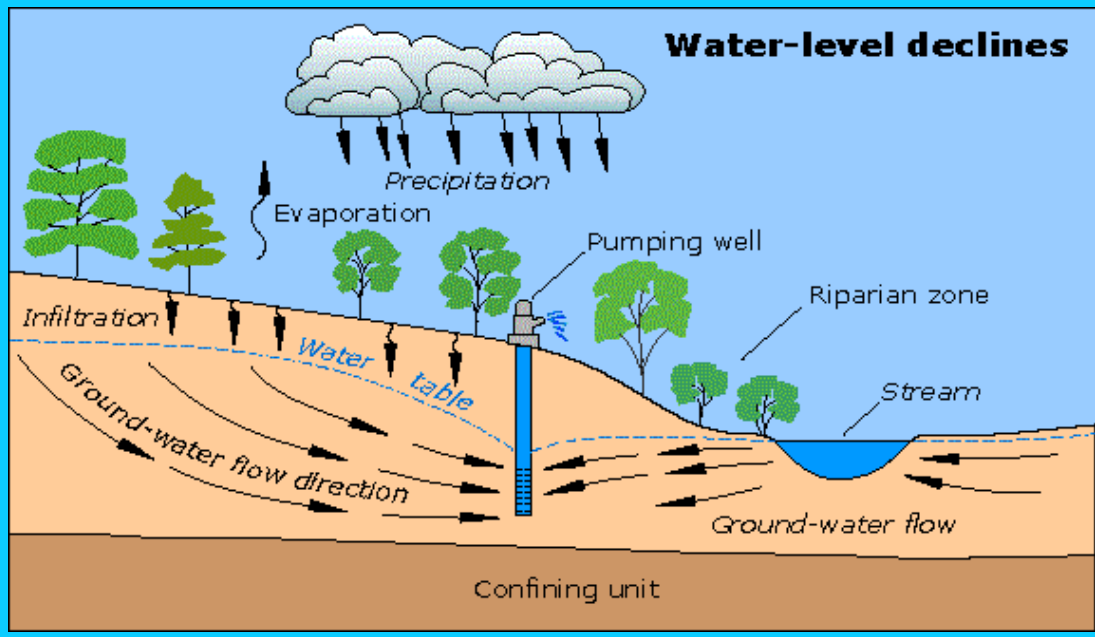

The Hydrologic Cycle
Condensation
Water Storage in Ice and Snow
Precipitation
Water Storage in the Atmosphere
Transpiration
Evaporation
Snowmelt Runoff to Streams
Surface Runoff
Ground Water Infiltration
Freshwater Storage
Water Storage in Oceans
Ground Water Storage
Ground Water Discharge
USGS
science for a changing world

Hydrology

Ground water and surface water are connected!

Hydrology is the study of the movement and distribution of the waters of the earth.

Groundwater is not "held" in one place underground, it flows through the aquifer. Groundwater is transported through aquifers because of two main reasons: gravity and pressure. In unconfined aquifers, which we concentrate on because they are more likely to be contaminated, water always flows from high points to low points because of gravity.



Southern NE Historical Land Use

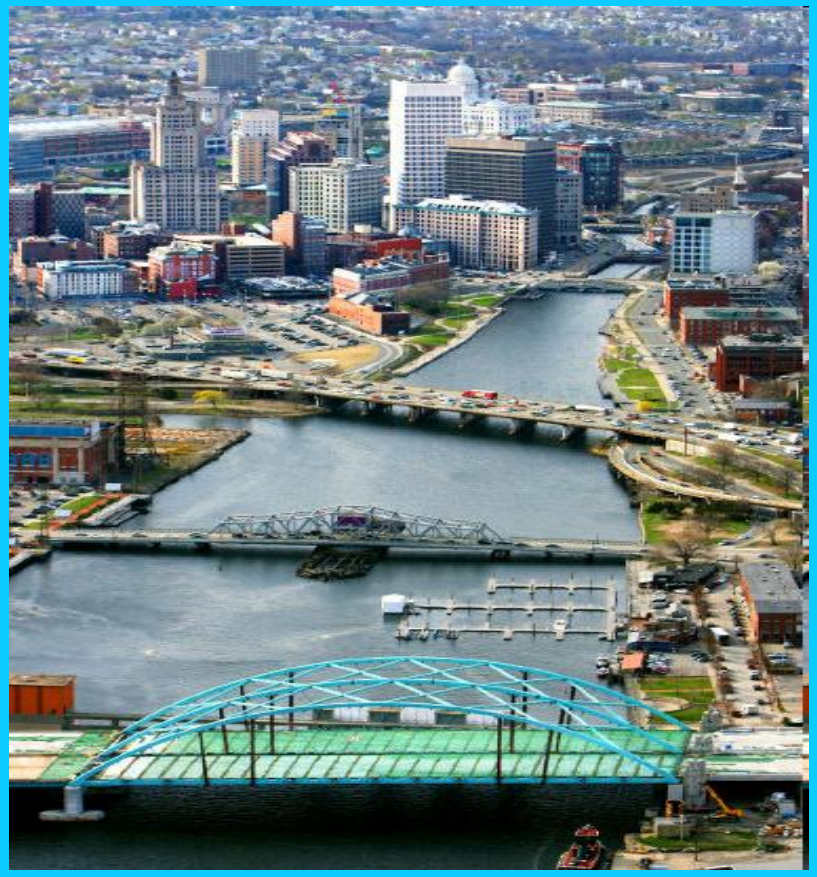
- 1700- minor European settlements and various Indian camps
- 1740- Forests starting to be cleared by settlers for farming
- 1830- Major forest clearing, lots of farms developing

Southern NE Historical Land Use

- 1850- Farm abandonment, large white pine forests develop in their place
- 1910- White pine forests get cut down for lumber for marketing
- 1915- downed pine forests transform into hardwood forests

Southern NE Historical Land Use

- 1950+- Lots of development for cities and towns
- Suburban development increase
- Large residential development in rural, suburban, and urban areas



Current Providence

Northern NE Historical Land Use

- Has been and still is mainly forest

- Less conversion of forest land to other uses due to low population

Historic Land Use of RI

WAY back when...

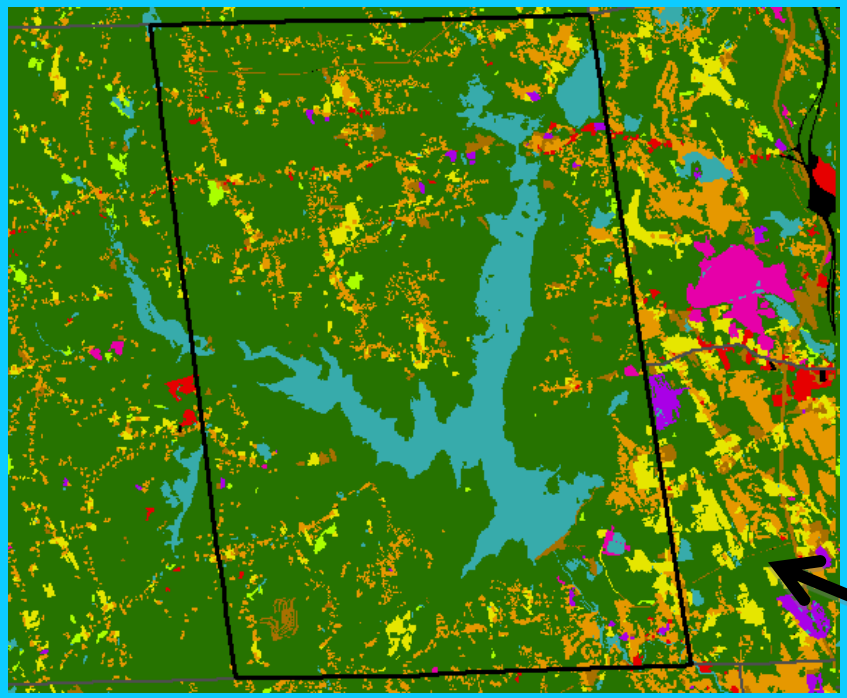
- **RI established in 1636 by Roger Williams**
- **Clearing of the forests in the 1600s through the mid-1800s**
- **Rhode Island's landscape was primarily farms and small villages**
- **Industrial Revolution changed the landscape significantly**
- **Rapidly expanding cities**

(http://www.planning.ri.gov/landuse/pdf/Guide.pdf)

- 1800, 80% of the population lived in rural areas
- 1850, 80% of the population lived in cities
- 1897, many farms abandoned for city life
- Abandoned farm fields become woodlands
- Rhode Island became both more urban and more forested during the first half of the twentieth century
- 1930s, movement away from the cities
- 1940 to present, suburbs & sprawl

. (http://www.planning.ri.gov/landuse/pdf/Guide.pdf)

Current Land Use In Rhode Island



Red= low residential
Pink= high residential
Blue= commercial/industry
Purple= bare rock/sand/clay
Peach= gravel pits
Green=forest's
Dark green= evergreen forests
Light purple= shrub land
Grey= orchards/vineyards
Yellow= row crops
Grey/blue= urban/recreational grasses

Historical Land Use in Scituate

- The Scituate reservoir is owned and was built by the city of Providence.
- Before the reservoir residents of providence would get their water from private wells.
- A total of 1,485 graves were removed from the immediate reservoir site; 1,080 of them were relocated to the new Rockland Cemetery in Clayville and the rest went to other cemeteries in the area.
- In the 1920s, the population decreased by 24 percent.

- The Scituate Reservoir was begun in 1915 as a means of supplying the City of Providence with a clean supply of water for residential and industrial use.
- The creation of the reservoir and the purchase of a large watershed were destructive to Scituate. The reservoir's waters covered some villages - Ashland, Kent, South Scituate, and Richmond.
- Rockland was entirely wiped off the map by condemnation; the entire western part of what was North Scituate village was covered by water or destroyed by land taking. Mills at Clayville, Elmdale, Harrisdale and Glenrock were lost.
- Within the 23.1 square miles acquired by Providence were 1,195 buildings - consisting of 375 houses, 233 barns, seven schools, six churches, six mills, 30 dairy farms, 11 ice houses, five halls, post offices, taverns, general stores, blacksmith and wheelwright shops, cider mills, two fire stations, and an electric railway systems were also lost

2010 Horseshoe Damn

1921 Horseshoe Damn

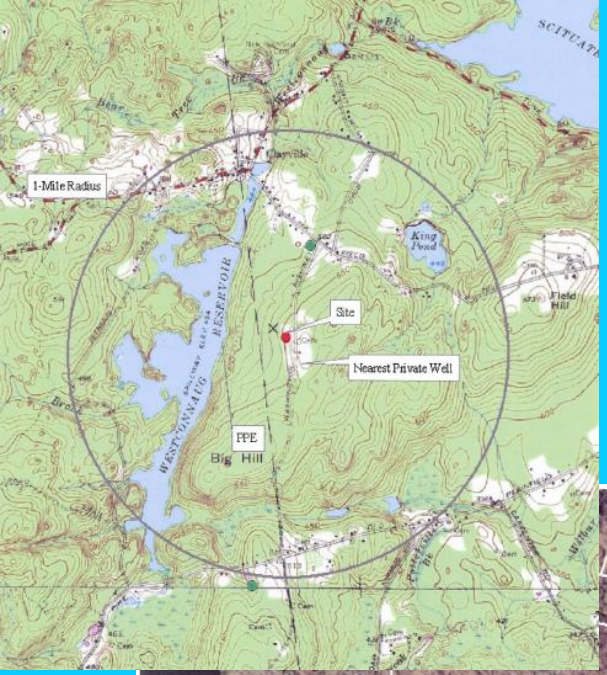
Land fill's Effect on Ground Water

- **LANDFILLS ALLOW MANY DIFFERENT TOXIC CHEMICALS TO LEAK INTO GROUNDWATER**
- These chemicals are called "leachate"
- Include 4 groups of contaminants
  - Dissolved Organic matter
  - inorganic macro components
  - heavy metals
  - xenobiotic organic compound

North Scituate Landfill

- 1946: located behind Manning Field on Danielson Pike.
- 1,300 tons of waste annually
  - 52,000 cubic yards of material
  - 20 ft high.
- ***UNLINED***
- public drinking water supply 0.24 miles southwest of landfill
- runs off travels through stream into the Scituate Reservoir
- 1989: last Preliminary Assessment
- 1993: groundwater presence of cadmium, copper, lead, and zinc
- 1994: Site inspection
- **NO SOIL SAMPLES CONDUCTED**: contents in the soil a mystery

Clayville Landfill

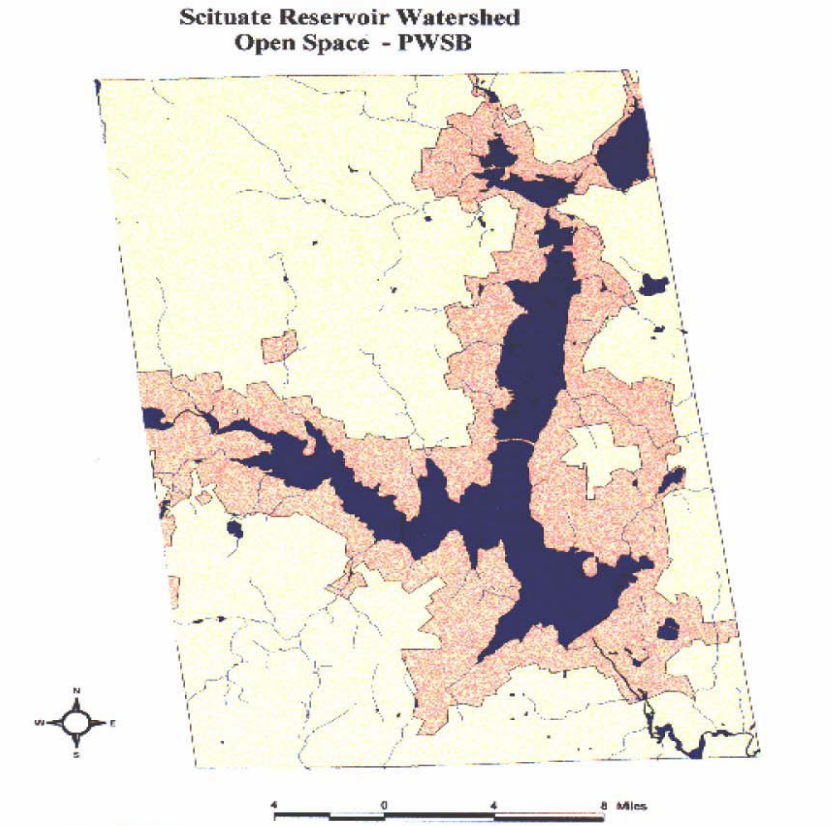


- Opened 1955, closed in 1977: on Washington Highway in Clayville
- In 1985: a potential hazardous waste site.
- The ground water provides 205 people with drinking water.
- Run-off into the Westconnaug Reservoir, Westconnaug Brooke, connecting to Scituate Reservoir.
- **NO SAMPLES OF WATER CONDUCTED**
- The Clayville Elementary School is located ½ a mile away from landfill
- 1990: presence of mercury, chromium, methylene chloride, and endosulfan sulfate.

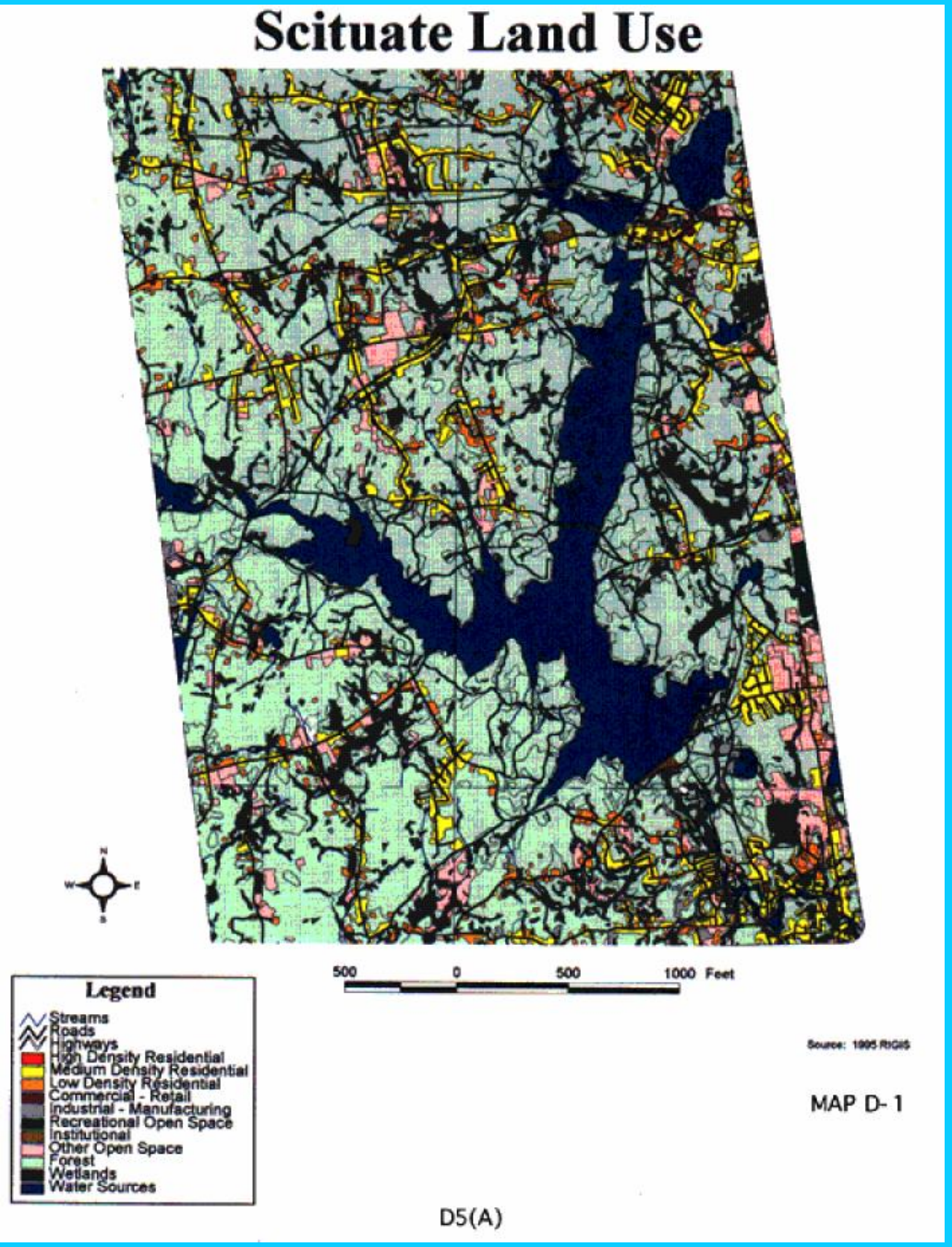
Scituate Land Trust

- The purpose of the Land Trust is to preserve suitable open spaces
- The Town of Scituate consists of approximately 35,000 acres.
- 38% of the total town land area is devoted exclusively to the production of water (for about 70% of the state's residents)

Scituate Land Use



- The approximate vacant land available for residential development is about 9,000 acres.
- Only 1,500 approximate acres of this total lies outside the watershed.



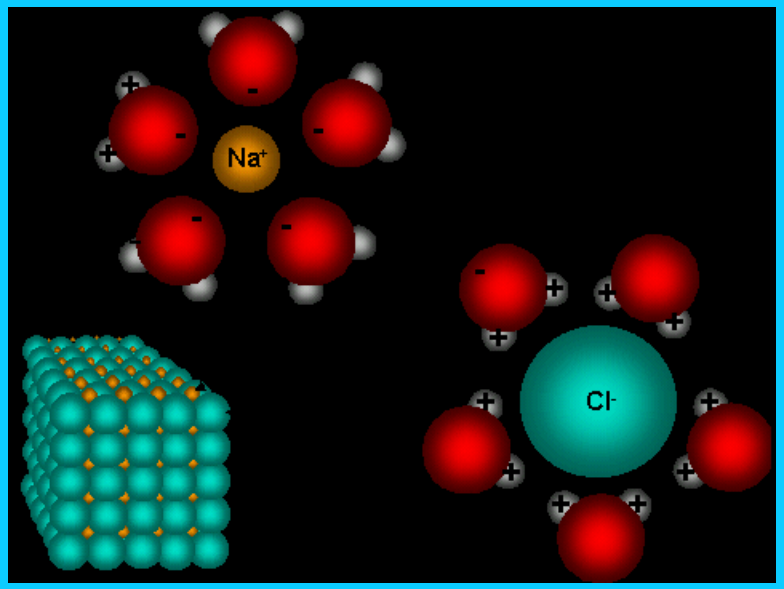
Land Use Category	Acres
High Density Residential -	118
Medium Density Residential-	2,651
Low Density Residential -	726
Commercial -	117
Industrial -	17
Transport, Communicatns, Util. -	103
Developed Recreation -	57
Urban Vacant -	3
Cemeteries -	9
Institution -	131
Agriculture -	1,514
Forest/Brushland -	21,352
Water -	4,047
Wetland -	3,848
Barren Land -	63
Mines and Quarries -	33
Total	**34,789**

PARAMETERS TESTED

Chloride Sources and Indicators of Chlorides In Water

Sources

- Sewage treatment plants.
- Road Salt.
- Occurs naturally.



What to look for

- Shortens life of pipes, pumps, and hot water heaters.
- Dying plants.

Occurs naturally but is used on the roads in salt.

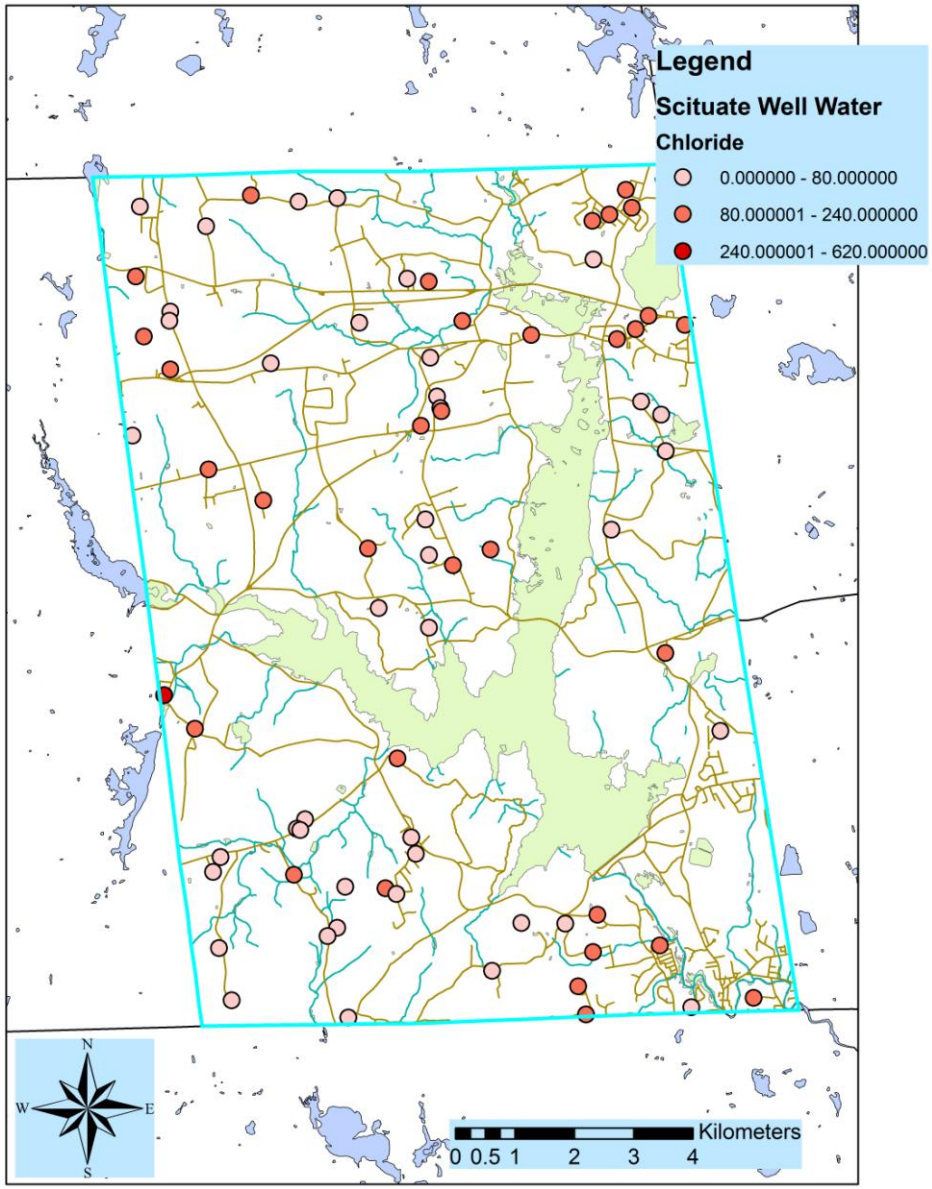
Chloride Health Concerns

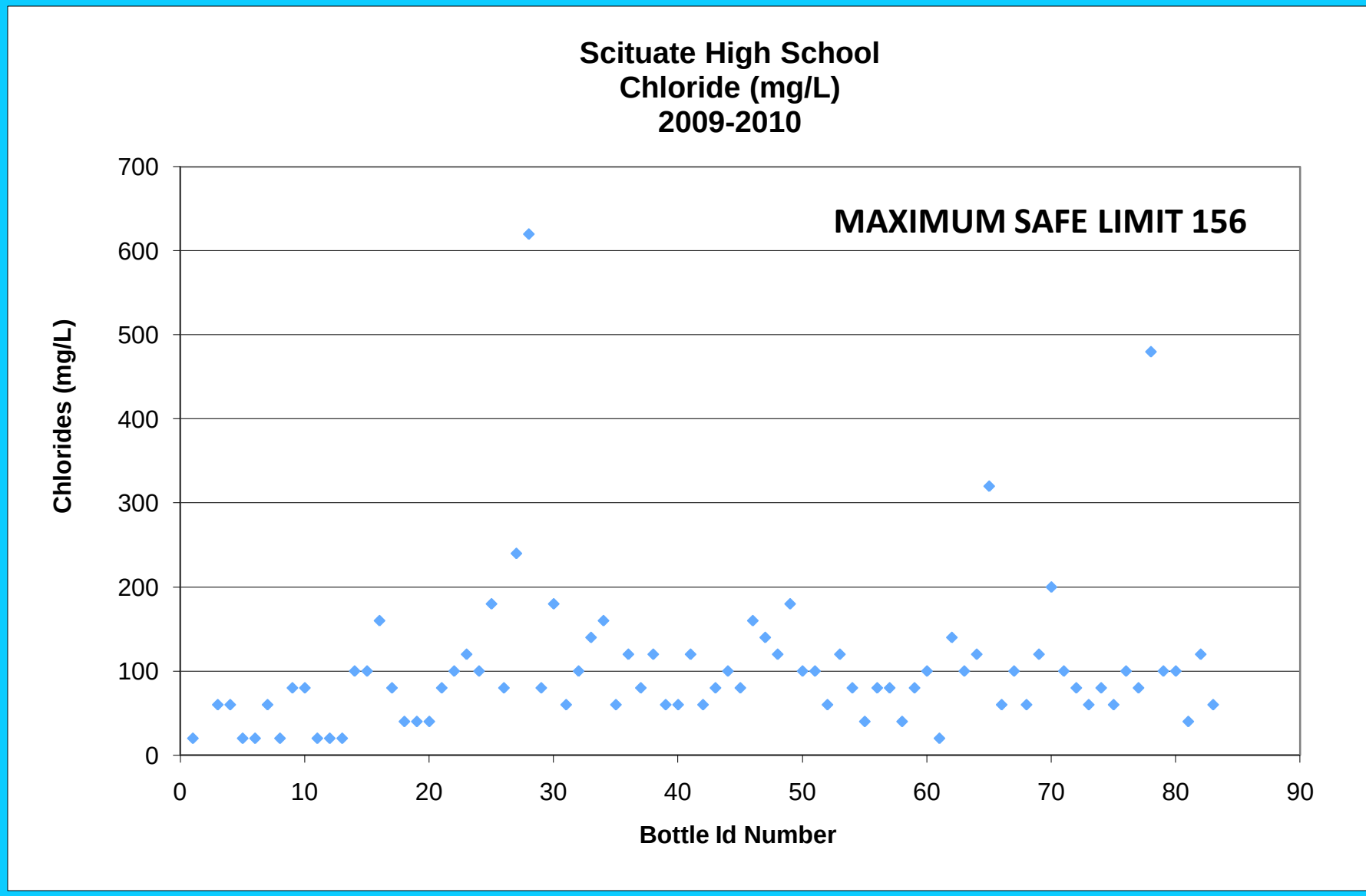
- The maximum amount of chlorides for human intake is 250mg/L.
- Has a slightly salty taste, so be sure to test chlorine levels if water tastes funny.
- High levels of sodium chloride have been known to raise blood pressure.

How We Tested For Chlorides

To test for the chlorides, we added chloride indicator to our water sample. After the contents were mixed, we added silver nitrate titrant drop by drop until the water turned from yellow to orange. To get the chloride content, we had to multiply the number of drops by 20 and multiply the mg/L by 1.6.

Chloride


Legend
Scituate Well Water
Chloride
0.000000 - 80.000000
80.000001 - 240.000000
240.000001 - 620.000000
N
W
E
S
Kilometers
0 0.5 1 2 3 4


Scituate High School
Chloride (mg/L)
2009-2010
MAXIMUM SAFE LIMIT 156
Chlorides (mg/L)
700
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
80
90
Bottle Id Number

Statistical Results of Chloride
(mg/L)

mean	102
median	80
mode	80
standard deviation	88
range	20-480
MAX SAFE LIMIT	156

Nitrates

- Nitrates are colorless, odorless and tasteless.
- Nitrates can be shown as NO_3
- Nitrates above the EPA maximum contaminant level can cause “Blue Baby Syndrome”
- Making sure to properly manage these can minimize contamination in drinking water.

Nitrates

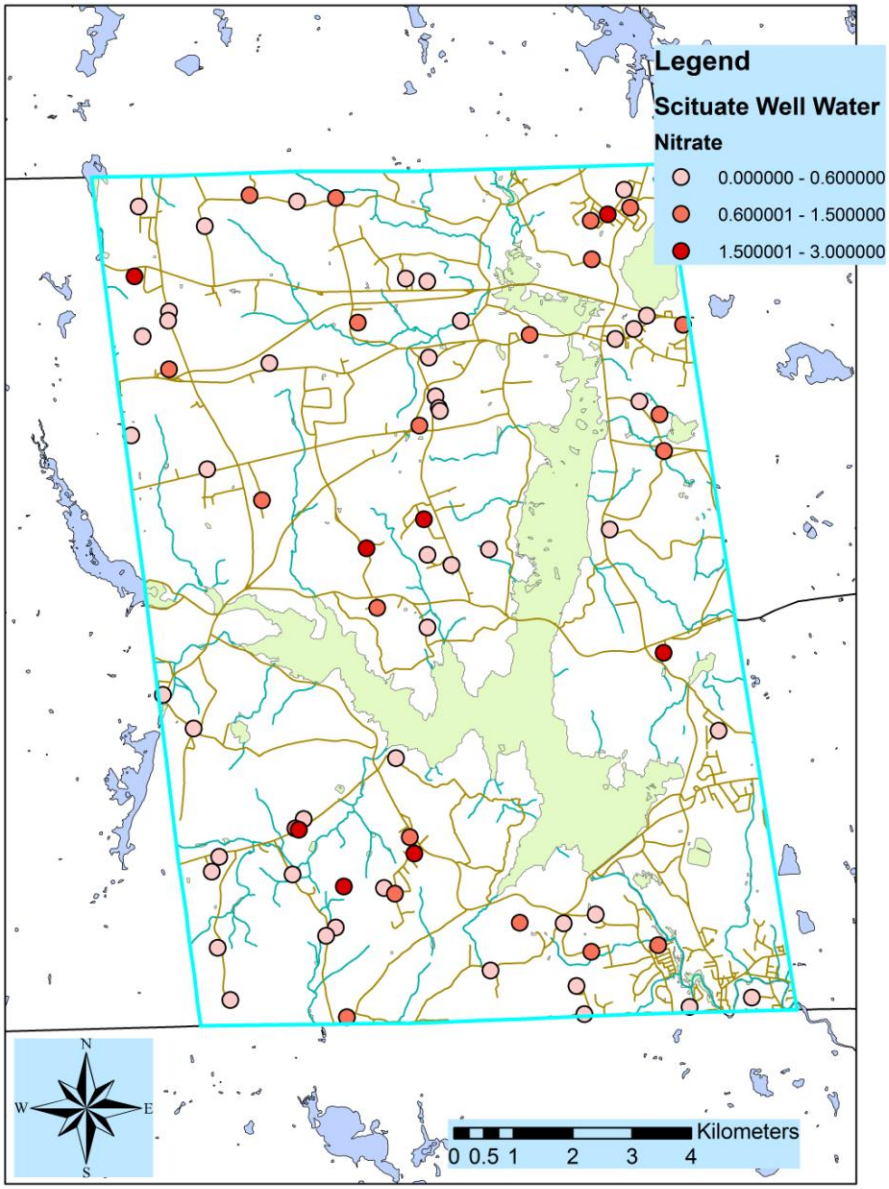
- Nitrates are a naturally occurring form of nitrogen found in the soil.
- Nitrogen is essential to all life. Most crop plants require large quantities to sustain high yields.
- Sources of nitrogen are :
  - Commercial fertlizers
  - Live stock manure
  - Pet waste
  - Leaking Sewers
  - Compost Facillties

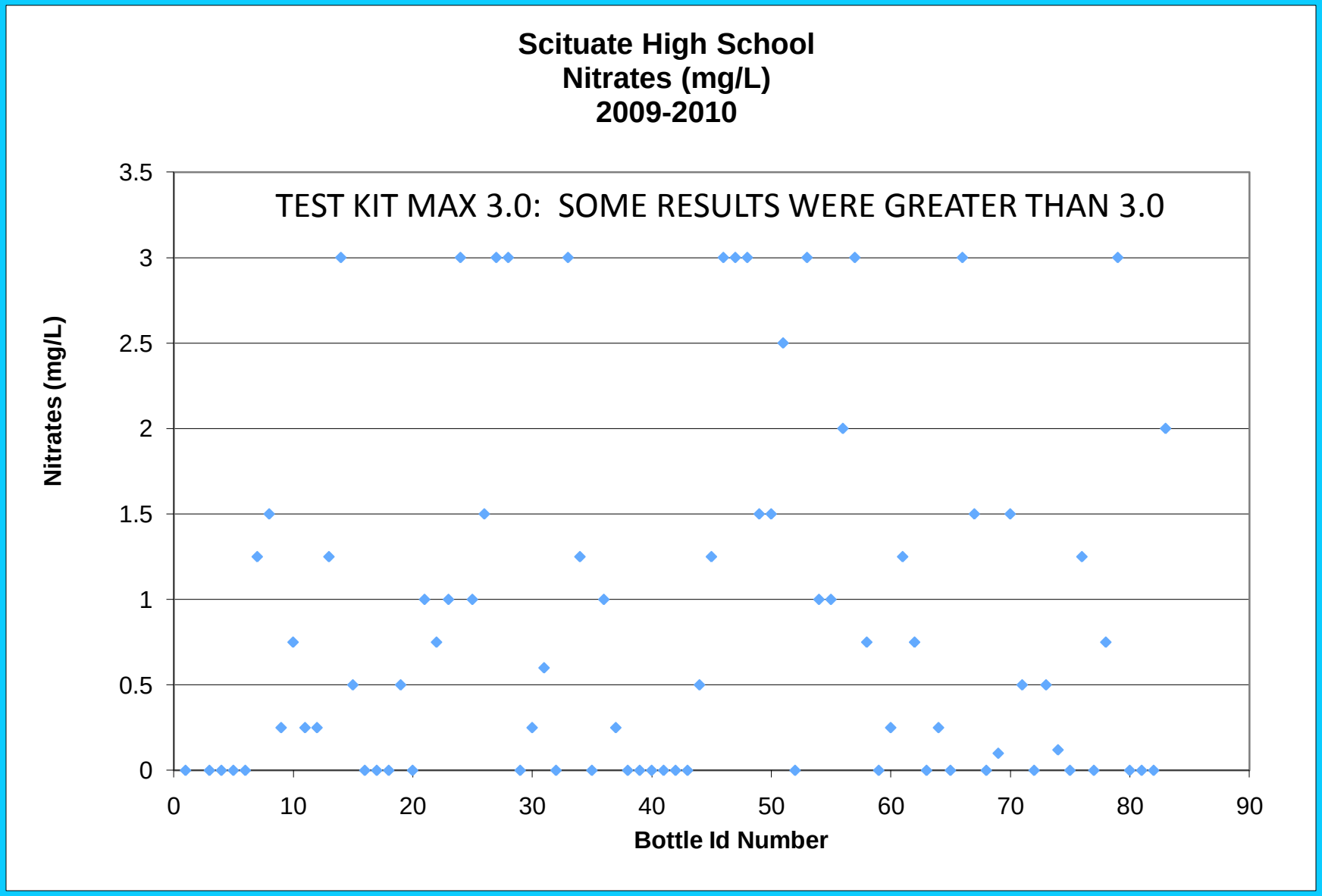
Nitrates: how we tested for them

- Fill the reaction tube to the 15 ml mark.
- Egypt the contents of the of one cadmium foil packet into the reaction tube and shake vigorously for 3 minutes, and let it sit for 2 minutes.
- Pour 10 ml of sample water into the sample cup, and be careful not to transfer any of the cadmium particles.
- Place the CHEMet ampoule in the sample cup. Snap the tip by pressing the ampoule against the side of the cup.
- Mix the contents by turning the tube up and down, make sure to wipe the sides of all excess water.
- Wait ten minutes for color change.
- Take the ampoule and hold it next to the different colors and estimate which ones they come closest to

http://www.ehow.com/how_4884092_test-nitrates-drinking-water.htmlen.wikipedia.org/wiki/Nitrate google.com/images

Nitrate


Legend
Scituate Well Water
Nitrate
0.000000 - 0.600000
0.600001 - 1.500000
1.500001 - 3.000000
N
W
E
S
Kilometers
0 0.5 1 2 3 4


Scituate High School
Nitrates (mg/L)
2009-2010
TEST KIT MAX 3.0: SOME RESULTS WERE GREATER THAN 3.0
Nitrates (mg/L)
3.5
3
2.5
2
1.5
1
0.5
0
0
10
20
30
40
50
60
70
80
90
Bottle Id Number

Statistics Nitrates

(mg/L)

mean	0.9
median	0.5
mode	0
standard deviation	1.05
range	0 – 3.0+

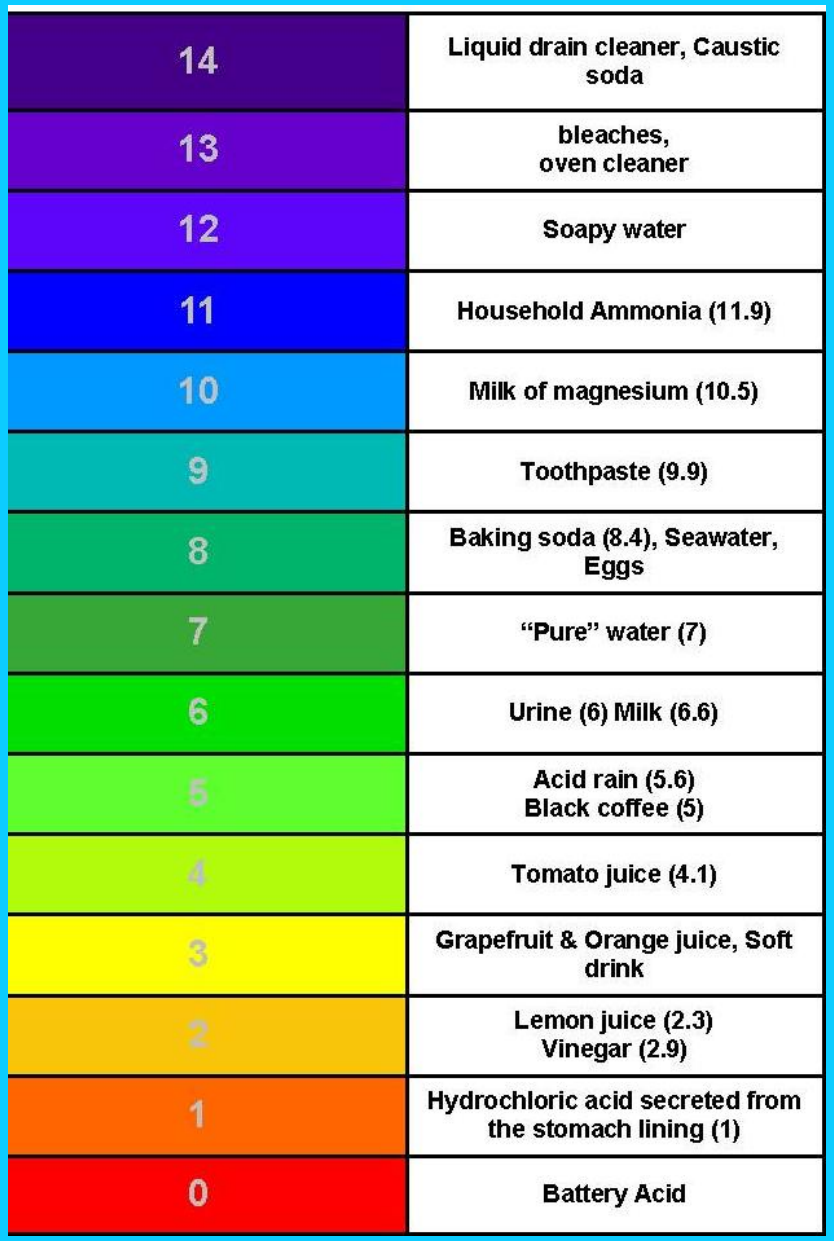
(some readings exceeded this test kits capabilities: max for kit 3.0)

MAX SAFE LIMIT	10.0

pH

What is pH in drinking water?

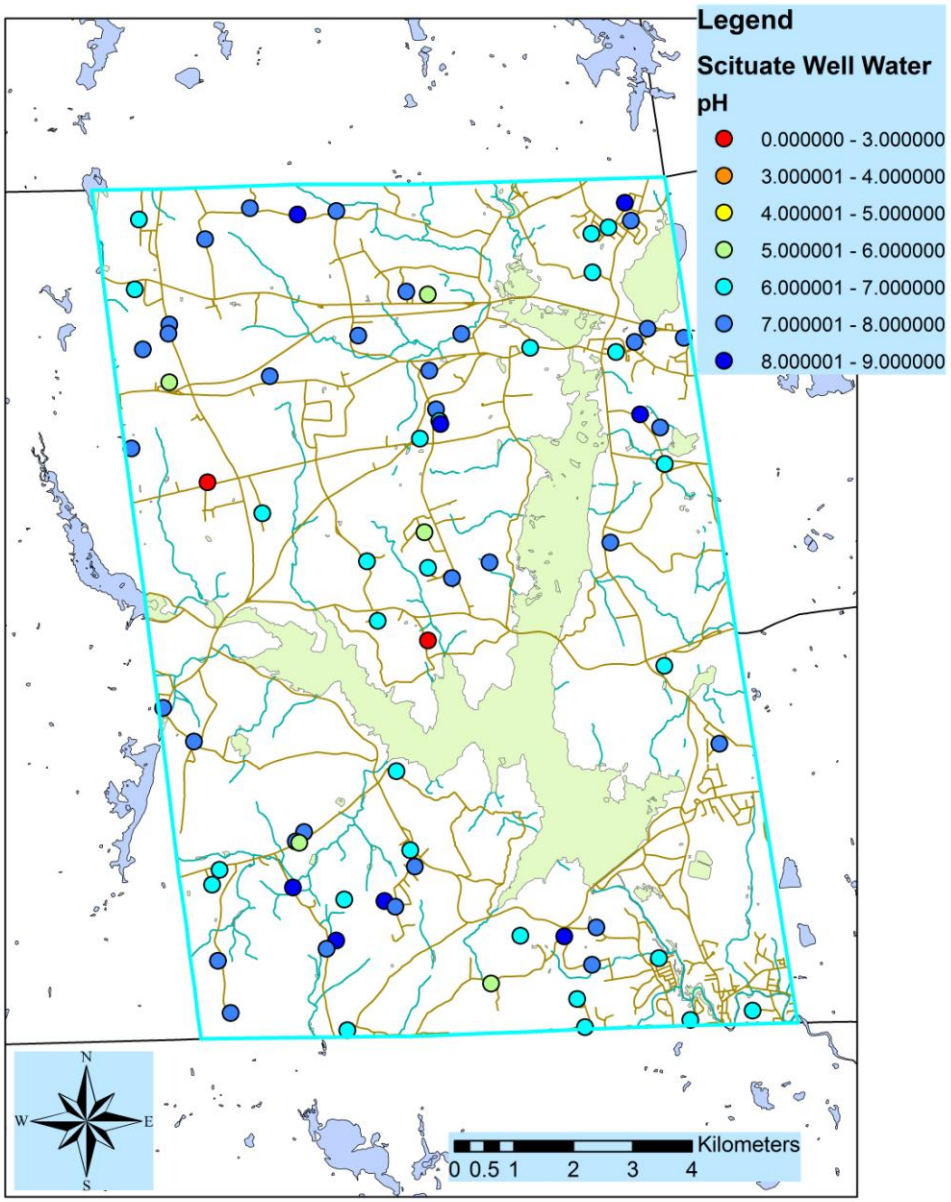
- The pH level of your drinking water reflects how acidic it is. pH stands for “potential of hydrogen,” refers to the amount of hydrogen found in a substance (in this case, water). pH is measured on a scale from 0 to 14. Seven is neutral, meaning there is a balance between acid and alkalinity. A measurement below 7 means acid is present and a measurement above 7 is basic (or alkaline).



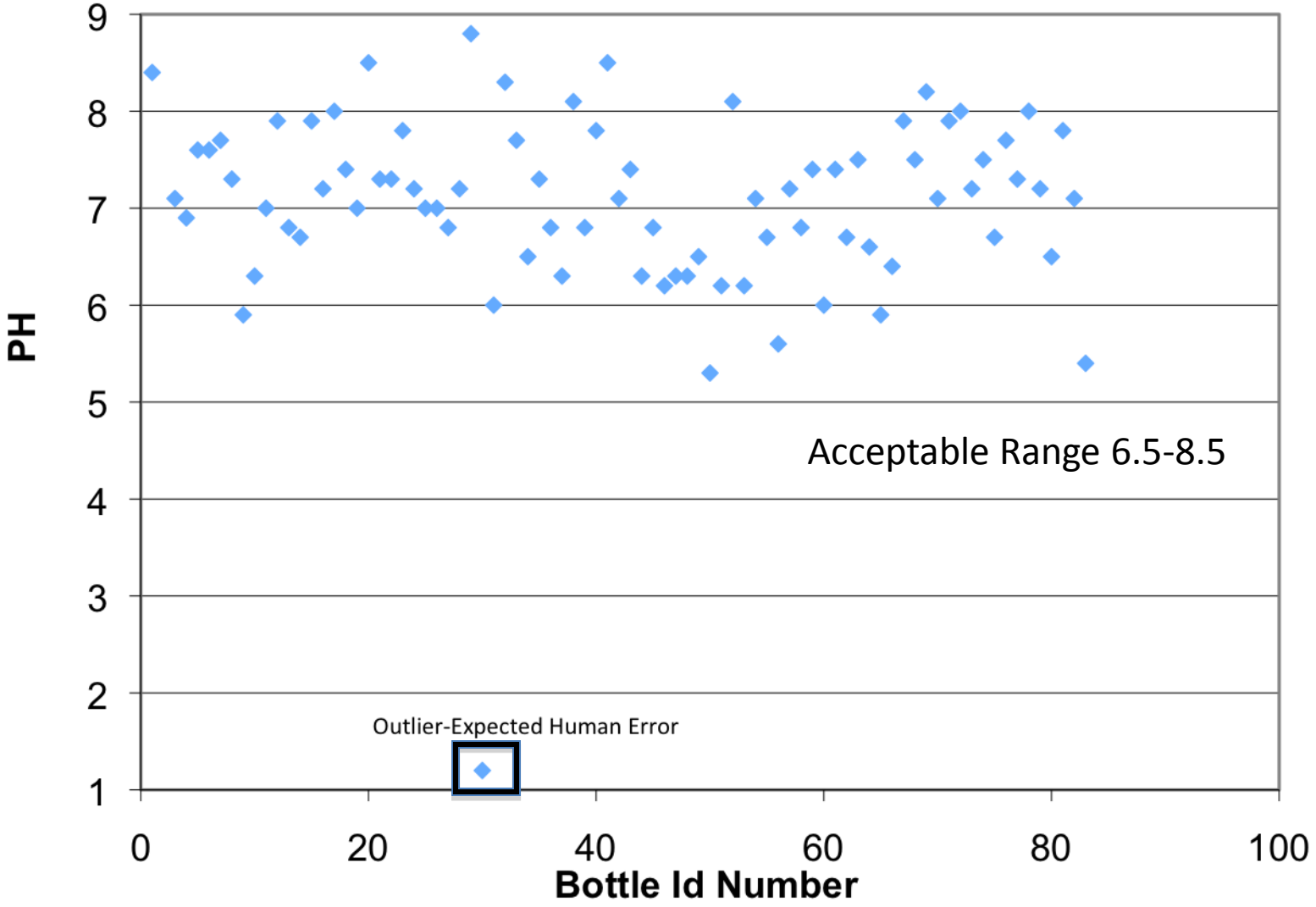
pH and your Health

- Water with a low pH can be acidic, naturally soft and corrosive. Acidic water may cause leach metals from pipes such as zinc, copper, lead,and other metals. Damage metal pipes and cause aesthetic problems, like a metallic or sour taste, laundry staining/blue-green stains in sinks and drains.
- Water with a pH of 8.5 means there is a high level of alkalinity minerals. Not a health Risk. Can cause aesthetic problems, such as an alkali taste to the water that makes coffee taste bitter; scale build-up in plumbing.

pH


Legend
Scituate Well Water
pH
0.000000 - 3.000000
3.000001 - 4.000000
4.000001 - 5.000000
5.000001 - 6.000000
6.000001 - 7.000000
7.000001 - 8.000000
8.000001 - 9.000000
N
W
E
S
Kilometers
0 0.5 1 2 3 4

Scituate High School
PH
2009-2010



Statistics pH

mean	7
median	7.15
mode	6.8
standard deviation	0.99
range	5.3 - 8.8 (outlier (1.2))
NORMAL RANGE	6.5-8.5

Water Hardness

- Hardness of water refers to the mineral content in the water, higher hardness equates to higher mineral content.
- Calcium and magnesium are the two most prominent minerals found in drinking water which cause water hardness.
- Having hard water can cause some issues at home such as spots on dry dishes, films on your shower glass and tub, and harsh feeling clothing.

http://www.rayneoffullerton.com/images/effects_of_hard_water_img.gif

Health Risks/Safe Water Levels

- Hard water does not cause any health problems.
- Hard water can aid in daily mineral intake.
- Soft water can be classified as 0-17.1 mg/l
- Very hard water 180+ mg/l
- A good water level is between 60-120 mg/l
- http://www.water-research.net/hardness.htm#sources

http://www.artscape.us/aquaculture/aquaculture_facility/aquaculture_lab_12.jpg

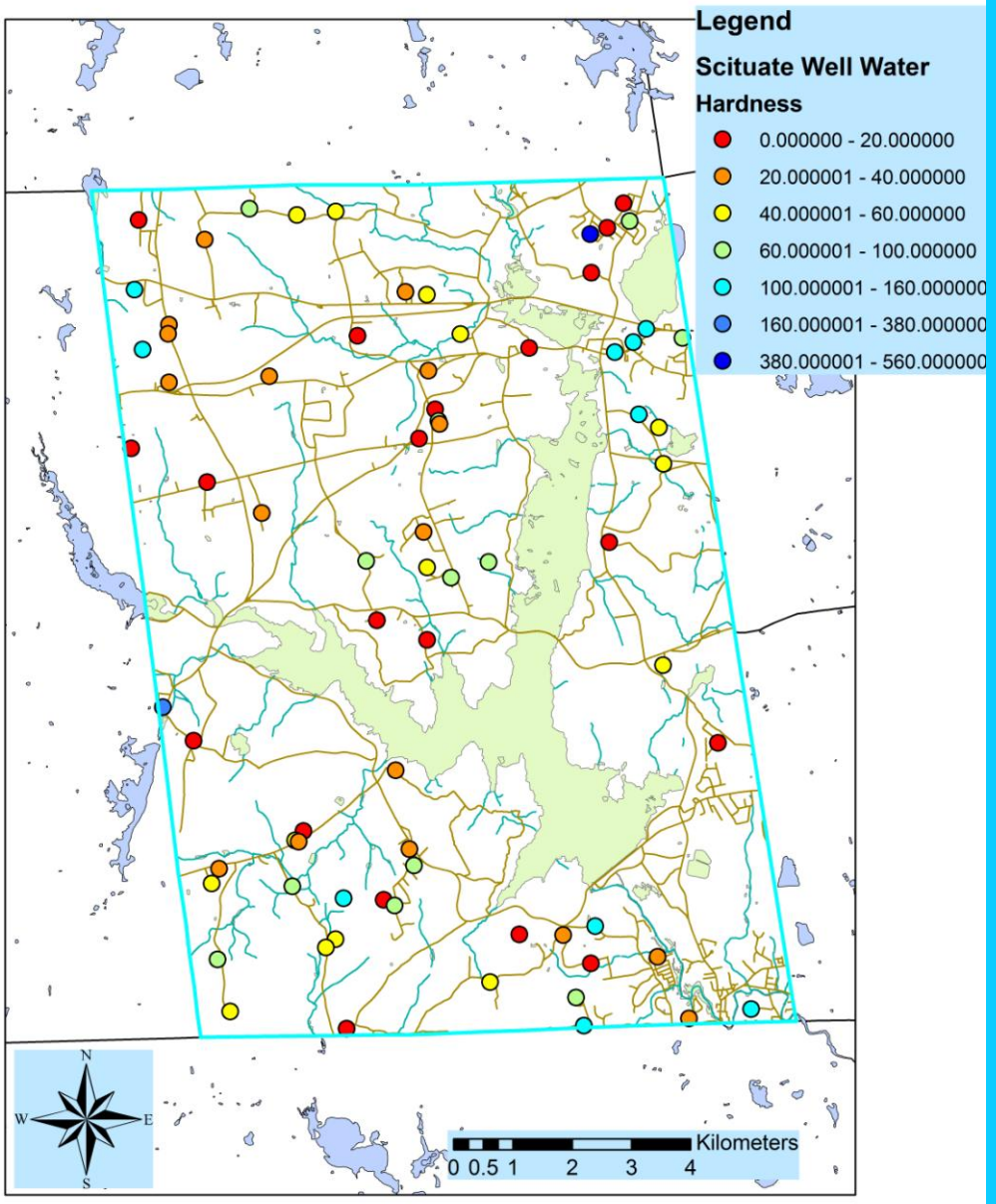
Testing

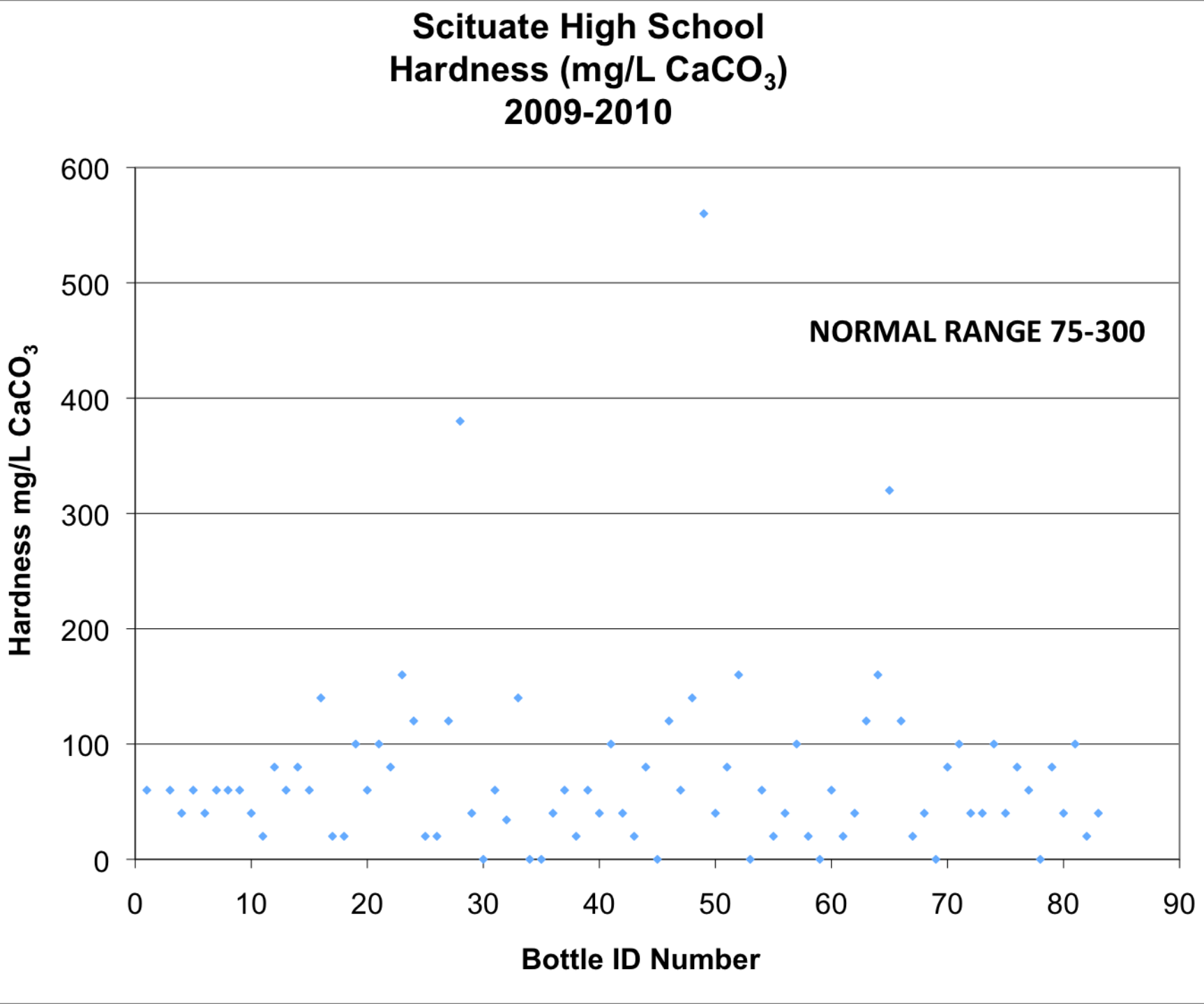
- Open your tap water faucet and fill up a bottle having a cap with about a half-cup of water;
- Add 10 drops of dish washing detergent;
- Shake well;
- If the soapy solution foams up quickly you are good and the water is not hard;
- If it does not foam up but instead creates a milk-curd-like or soapy film on the water then the water is likely hard.

http://www.instructables.com/files/deriv/FTA/8Y19/FVDC31QX/FTA8Y19FVDC31QX.MEDIUM.jpg

http://homerepair.about.com/od/plumbingrepair/ss/testhardwater_2.htm

Hardness


Legend
Scituate Well Water
Hardness
0.000000 - 20.000000
20.000001 - 40.000000
40.000001 - 60.000000
60.000001 - 100.000000
100.000001 - 160.000000
160.000001 - 380.000000
380.000001 - 560.000000
N
W
E
S
Kilometers
0 0.5 1 2 3 4


Scituate High School
Hardness (mg/L CaCO3)
2009-2010
NORMAL RANGE 75-300
Hardness mg/L CaCO3
Bottle ID Number
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
80
90

Statistics Hardness

($CaCO_3$ mg/L)

mean	72.9
median	60
mode	60
standard deviation	81.9
range	0 – 560
ACCEPTED RANGE	75- 300

Total Iron

- Iron (Fe) is classified as a transition metal
- Fresh iron surfaces are lustrous and silvery-gray in color, but oxidize in air to form a red or brown coating of ferric oxide(rust).
- Iron is rarely found in its metal form because it oxidizes readily in the presence of oxygen and moisture.

Iron: Health Information

- Your body naturally has the ability to store iron, but too much iron in the body can link to heart disease, cancer, diabetes, and other diseases.
- It is the essential part of the hemoglobin(the red coloring agent of the blood that transports oxygen through the body.
- Average amount a man should intake is 7mg and 11mg for women.

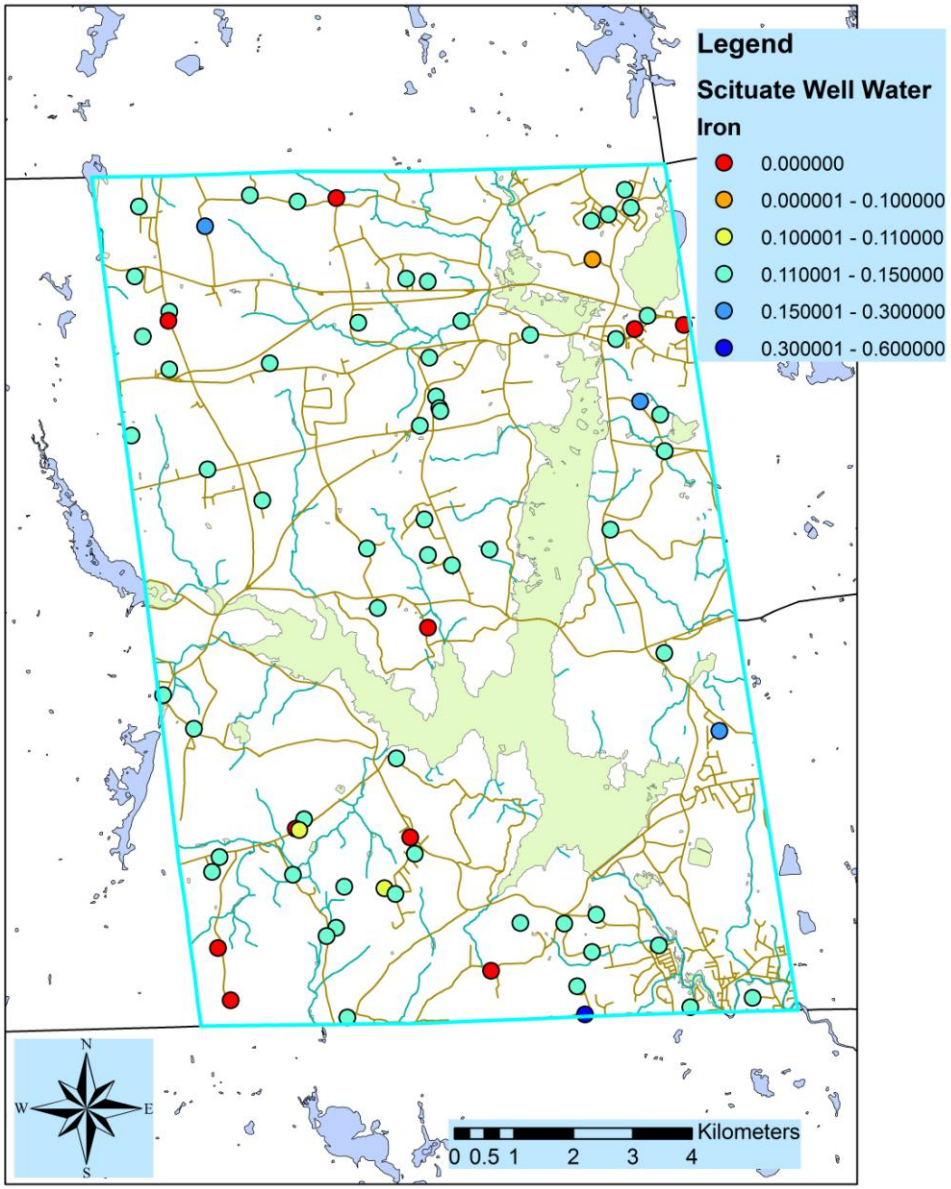
Iron: Testing Procedure

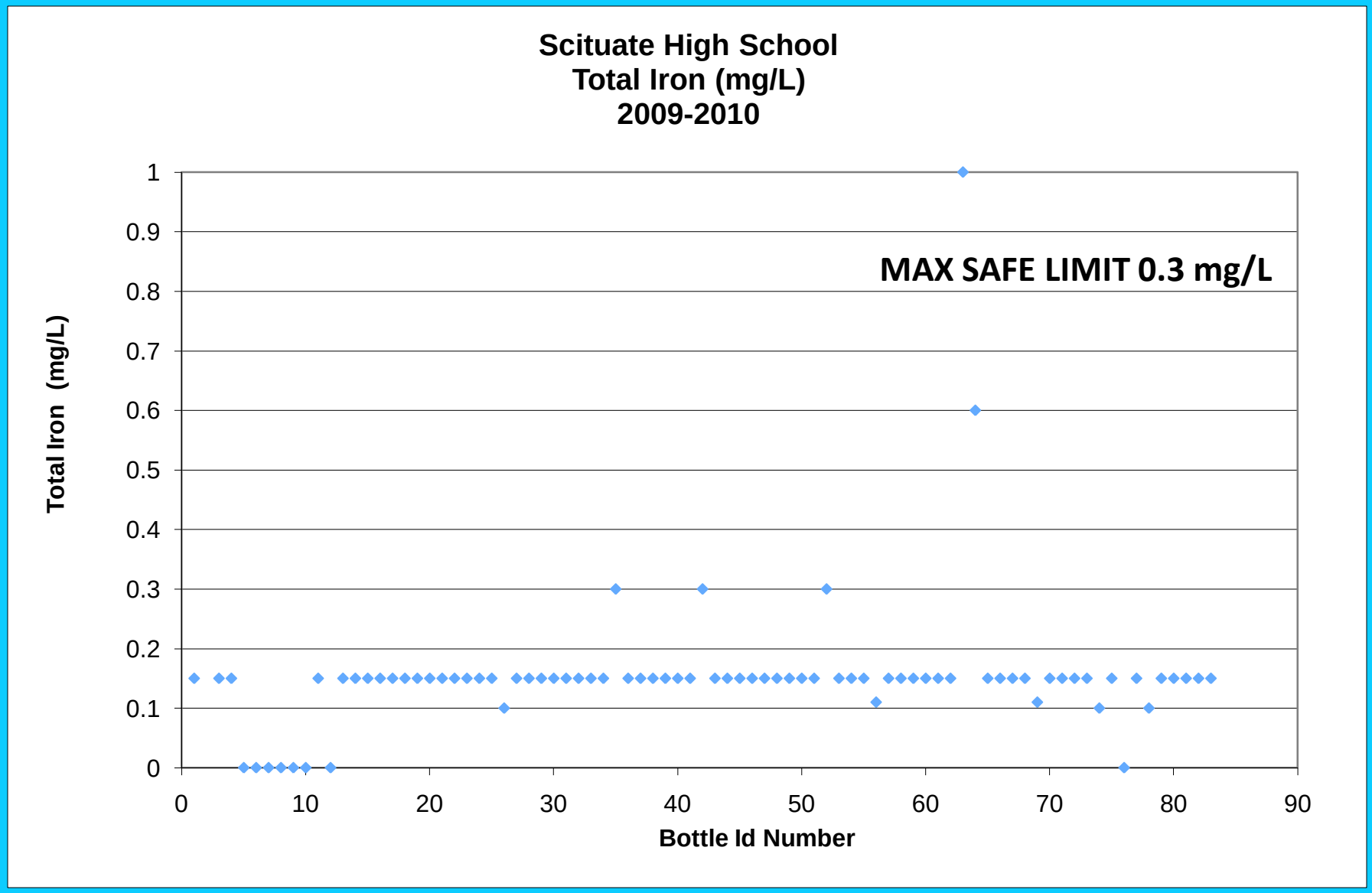
After pouring some of the well sample water into a separate vial, one packet of Iron Reducing Powder Pillows is added to the water.

The vial is capped and shaken for 5 seconds and then a test strip is dipped into the vial.

After 15 seconds, the test strip is compared to a chart which tells how high the iron is.

Iron


Legend
Scituate Well Water
Iron
0.000000
0.000001 - 0.100000
0.100001 - 0.110000
0.110001 - 0.150000
0.150001 - 0.300000
0.300001 - 0.600000
N
W
E
S
Kilometers
0 0.5 1 2 3 4


Scituate High School
Total Iron (mg/L)
2009-2010
MAX SAFE LIMIT 0.3 mg/L
Total Iron (mg/L)
Bottle Id Number
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
10
20
30
40
50
60
70
80
90

Statistics Total Iron
(mg/L)

mean	0.15
median	0.15
mode	0.15
Standard deviation	0.12
range	0-1.0
MAX SAFE LIMIT	0.3

Conductivity

- Conductivity of a substance is defined as '*the ability or power to conduct or transmit heat, electricity, or sound*'.

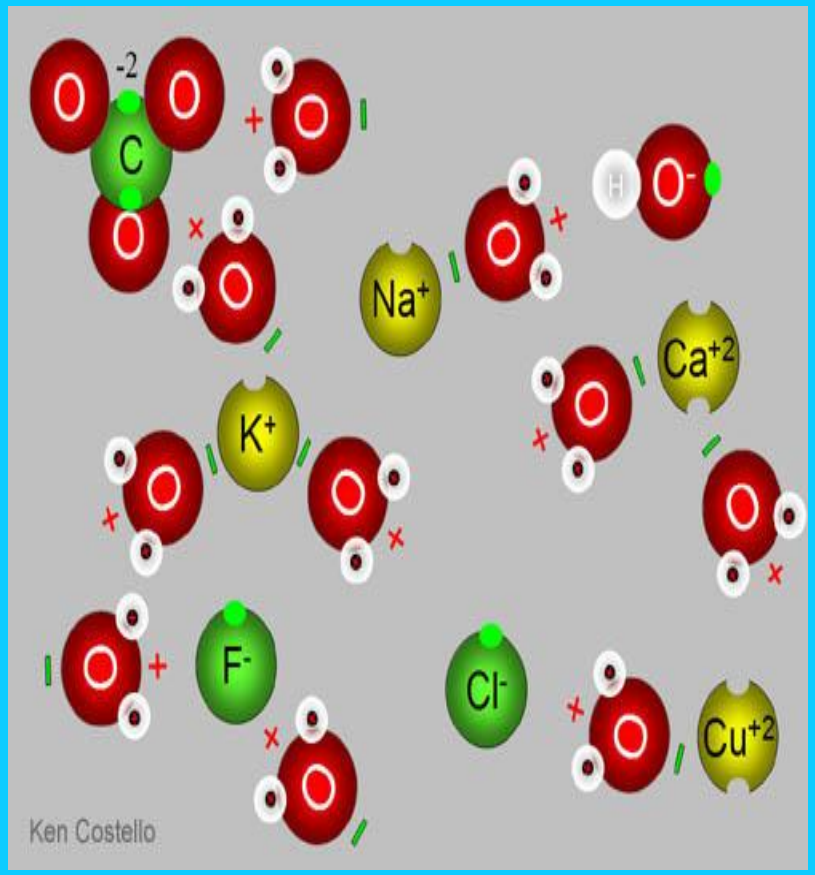
- Typical conductivity levels
  Pure water - $5.5 \cdot 10^{-6}$ S/m
  Drinking water - 0.005 – 0.05 S/m
  Sea water - 5 S/m

http://www.lenntech.com/applications/ultrapure/conductivity/water-conductivity.htm

Sean DeWaele & Joe Nap

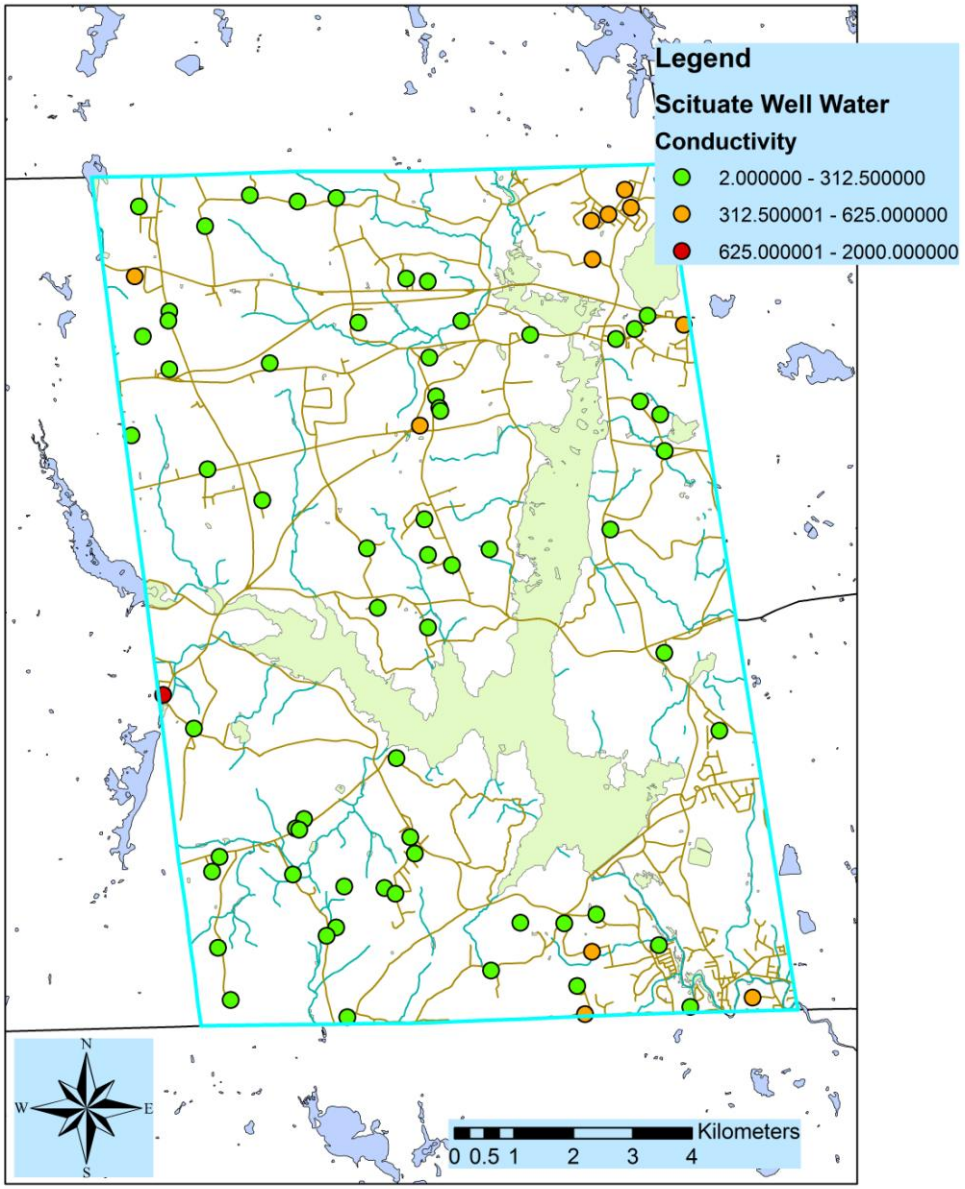
Conductivity Cont.

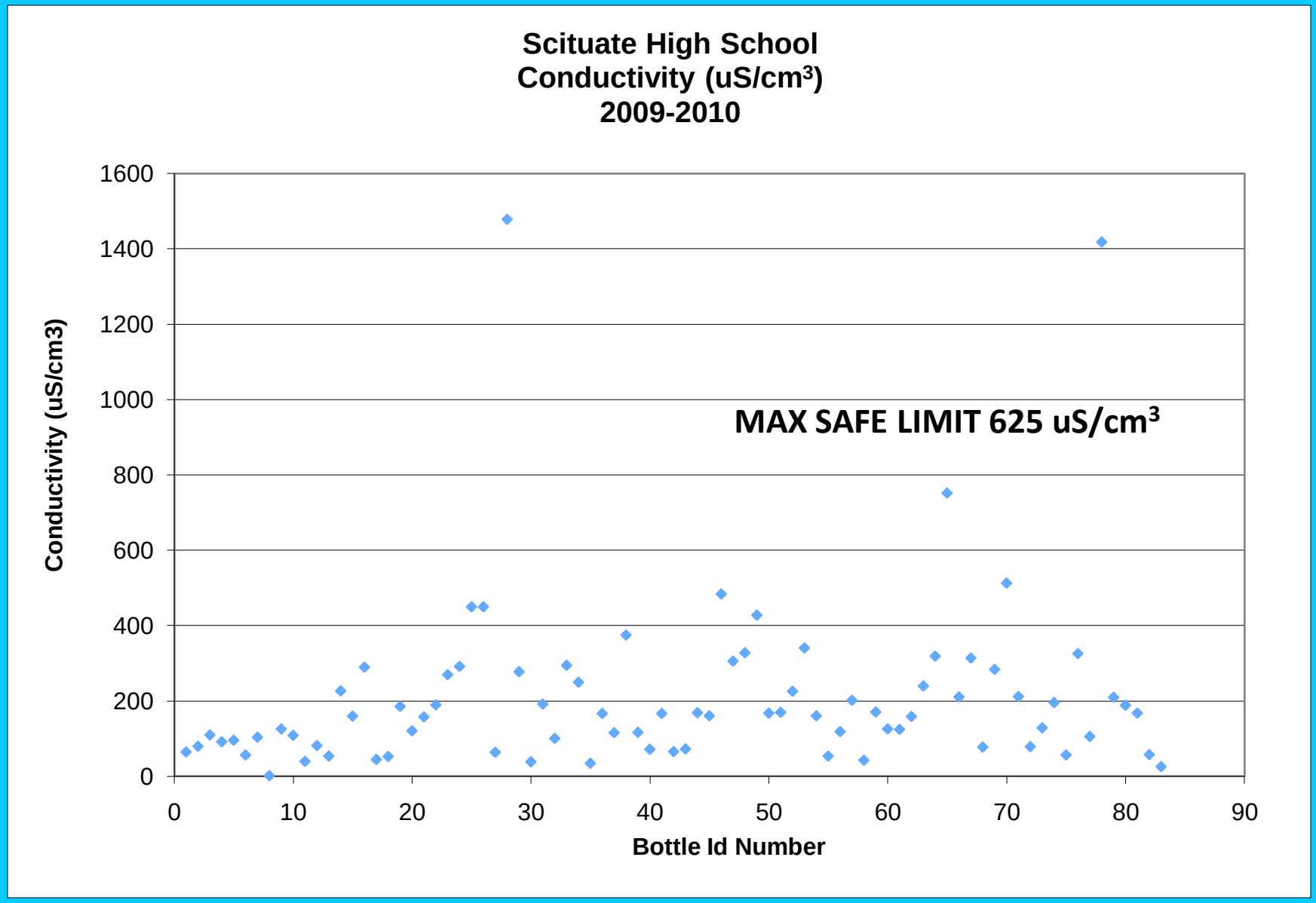
- Pure water is not a good conductor of electricity. Because the electrical current is transported by the ions in solution, the conductivity increases as the concentration of ions increases. These ions could be salt, metals, basically anything that can be diluted in water that has a charge.



http://www.chemistryland.com/CHM107Lab/Lab5/Filters/ionsInWater.jpg

Conductivity




Scituate High School
Conductivity (uS/cm3)
2009-2010
Conductivity (uS/cm3)
1600
1400
1200
1000
800
600
400
200
0
0
10
20
30
40
50
60
70
80
90
Bottle Id Number
MAX SAFE LIMIT 625 uS/cm3

Statistics Conductivity
(uS/cm^3)

mean	212
median	161
mode	57
standard deviation	235
range	2-1478
MAX SAFE LIMIT	625

WHAT WE DID

NOT

TEST FOR, BUT YOU

SHOULD!

What is Trichloroethylene (TCE)?

- Colorless or blue organic, non-flammable
- Industrial liquid with a chloroform-like odor (sweet smell)
- Abbreviations include TCE, Trichlor, trike, tricky and tri
- TCE is considered to be a solvent which is a liquid that cn disolve oily and greasy substances.
- It is commonly used to clean grease from metal especially air planes.

Health risks of TCE

- TCE mainly enters the body by drinking water. It can also be inhaled or absorbed through the skin.
- High concentrations of TCE can cause you to pass out, stop breathing or even die. It can also impair heart, nerve, kidney and liver functions.
- Low concentrations can cause an allergic reaction, skin rash, decreases coordination, experience difficulty in concentrating, headaches and dizziness. Over a long period of time, it can cause intestine, liver and kidney cancer.

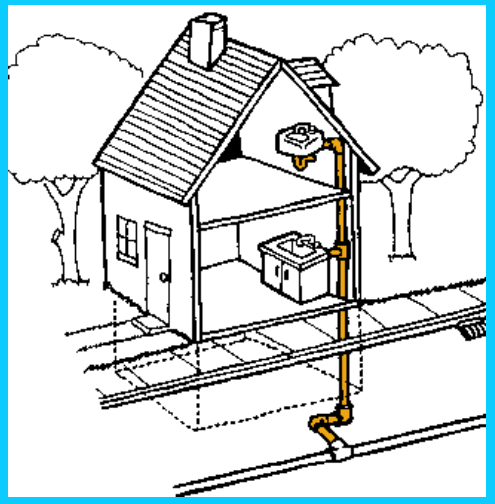
How to reduce exposure in your home

- Most importantly know the quality of your drinking water.
- Also be aware of the historical background of the area in and around your home.
- Find out if your home was built near an old industrial, dry cleaners or garbage dump site, etc.

How Does Lead Get Into Water?

- The public water system has lead pipes or lead service connection
- The home has lead pipe
- The home has copper pipes with lead solder.
- Lead does not naturally occur in Rhode Island

http://www.4water1.com/articles/aqa_leadinwater.html



What Are Health Risks of Lead

- Lead can cause damage to the brain, nervous system, and red blood cells
- Pregnant women and young children have the greatest chance of being effected
- Causes elevated blood lead levels
- Interferes with the development of the nervous system, which can cause permanent learning and behavioral disorders

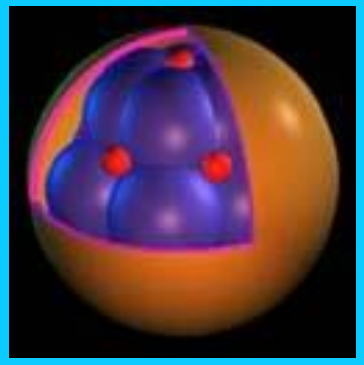
http://www.cddc.gov/nceh/lead/tips/water.htm

What can you do if you suspect lead in your water?

- Get your water tested
- Change your pipes or what is causing the high lead levels
- Get a blood test to test your levels of lead
- Don’t use water in cooking or drinking
- If you do need water use cold and let it run for a few minutes, because hot water dissolves more lead

http://www.health.state.mn.us/divs/eh/lead/sources.html

What is Radon!?



- Radon is a cancer causing radioactive gas.
- You can not see, smell, or taste it.
- Radon is not produced as a commercial product. Radon is a naturally occurring radioactive gas and comes from the natural breakdown (radioactive decay) of uranium.

http://www.radon.com/radon/radon_facts.html

Radon:
Where does it come from?

- It is usually found in igneous rock and soil, but in some cases, well water may also be a source of radon.

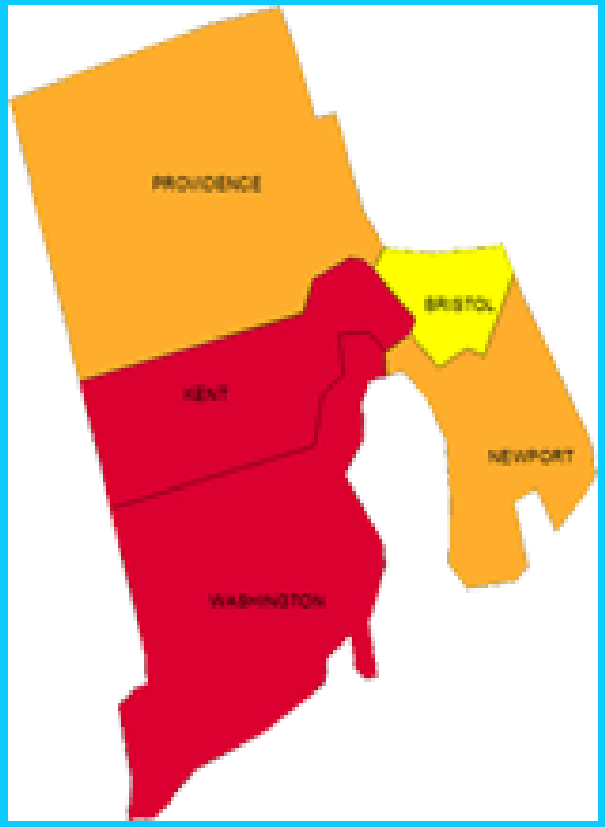
- The bedrock contribution to the radiation hazard relates directly to the uranium-bearing alum shale formation of Cambrian age and to certain Precambrian uranium- and thorium-enriched graintes.

Radon:
Health Risks

- Radon is the second leading cause of lung cancer.
- There are as many as 20,000 lung cancer deaths a year due to radon.

http://www.radon.com/radon/radon_facts.html

Radon in Rhode Island!



- **Highest Potential:** counties have a predicted average indoor radon screening level greater than 4 pCi/L (pico curies per liter) **(red zones)**
- **Moderate Potential:** counties have a predicted average indoor radon screening level between 2 and 4 pCi/L **(orange zones)**
- **Low Potential:** counties have a predicted average indoor radon screening level less than 2 pCi/L **(yellow zones)**

http://www.city-data.com/radon-zones/Rhode-Island/Rhode-Island.html

What is Arsenic?

- Arsenic is a naturally occurring element
- It is found in Granite rocks and other
- It is a poisonous substance, which is released from certain human activities and ground-water that is in contact with arsenic containing materials.
- 20th most abundant element in the earth's crust , and is naturally emitted from the crust.
- It is a metalloid that is odorless and tasteless.
- Arsenic is safe in drinking until it reaches .010 parts per million.

Arsenic and Affect on Human Health

- The U.S.EPA , the International Agency for Research on Cancer (IARC), and the National Toxicology Program (NTP) classify arsenic as a human carcinogen.
- Epidemiological studies have shown that inhalation exposure to inorganic arsenic increases the risk of a variety of forms of lung cancer.
- It has also been linked to cancers of the bladder, kidneys, nasal passages, liver and prostate.
- Ingestion of inorganic arsenic may increases the risk of developing skin cancer, most commonly squamous and basal cell carcinomas.
- Evidence exists that ingestion of arsenic may also increase the risk of certain internal cancers, including tumors of the bladder, kidney, and liver.
- Non- cancer effects can be thickening and discoloration of the skin, stomach pain, nausea, vomiting, diarrhea, numbness in hands and feet, and partial paralysis and blindness.

Arsenic in Rhode Island

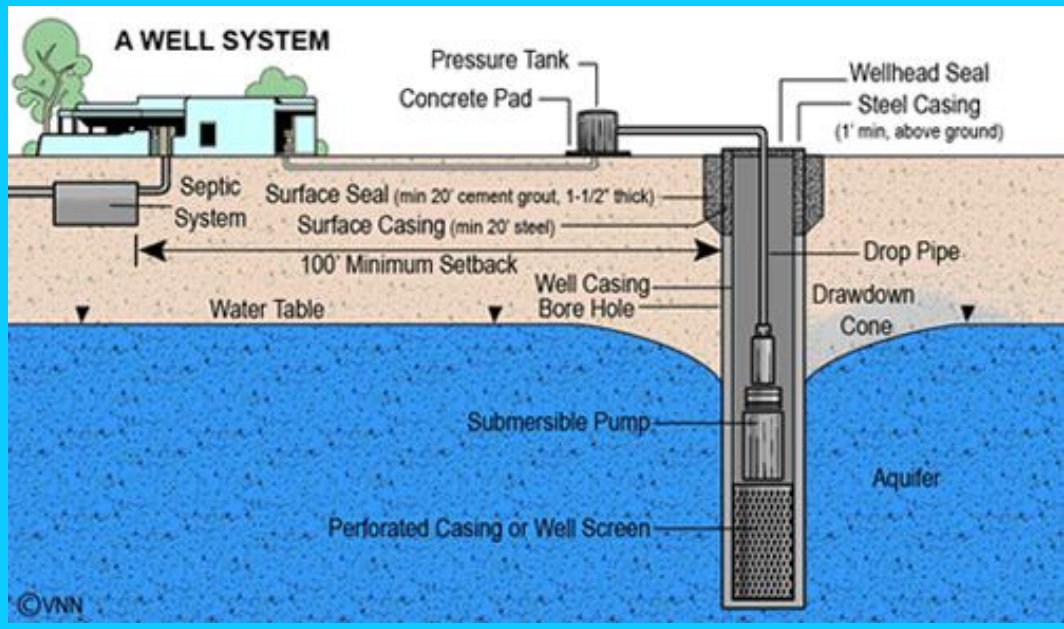
- Studies of background levels of metals in RI: the mean arsenic soil concentration is lower than the national average
- Concentration of arsenic is lower than other New England states is lower because RI isn't part of the Connecticut River Valley formation which has elevated the levels
- RI is a part of the NE Coastal geological formation, which has lower levels of Arsenic

Required vs. Recommended

Required Testing - property transfer, new well, new construction (Certificate of Occupancy)

Recommended Testing – routine maintenance, some:

- every year
- every 3-5 years
- every 5-10 years



http://www.health.ri.gov/environment/dwq/privatewell.php

Required Testing *for transfer of property:*

Recommended *for routine maintenance*

Initially, then annually:

- *Coliform Bacteria*
- *Nitrate / Nitrite* (especially in case of newborns or pregnancy)
- Color
- *Turbidity*
- *Chloride*

Initially, then every 3 to 5 years:

- *Fluoride*
- *Iron*
- *Lead*
- *Manganese*
- *Sulfate*
- *pH*

Tests for Corrosiveness

- *Alkalinity*
- Calcium
- *Total Dissolved Solids*
- *Hardness*
- *Specific Conductance*

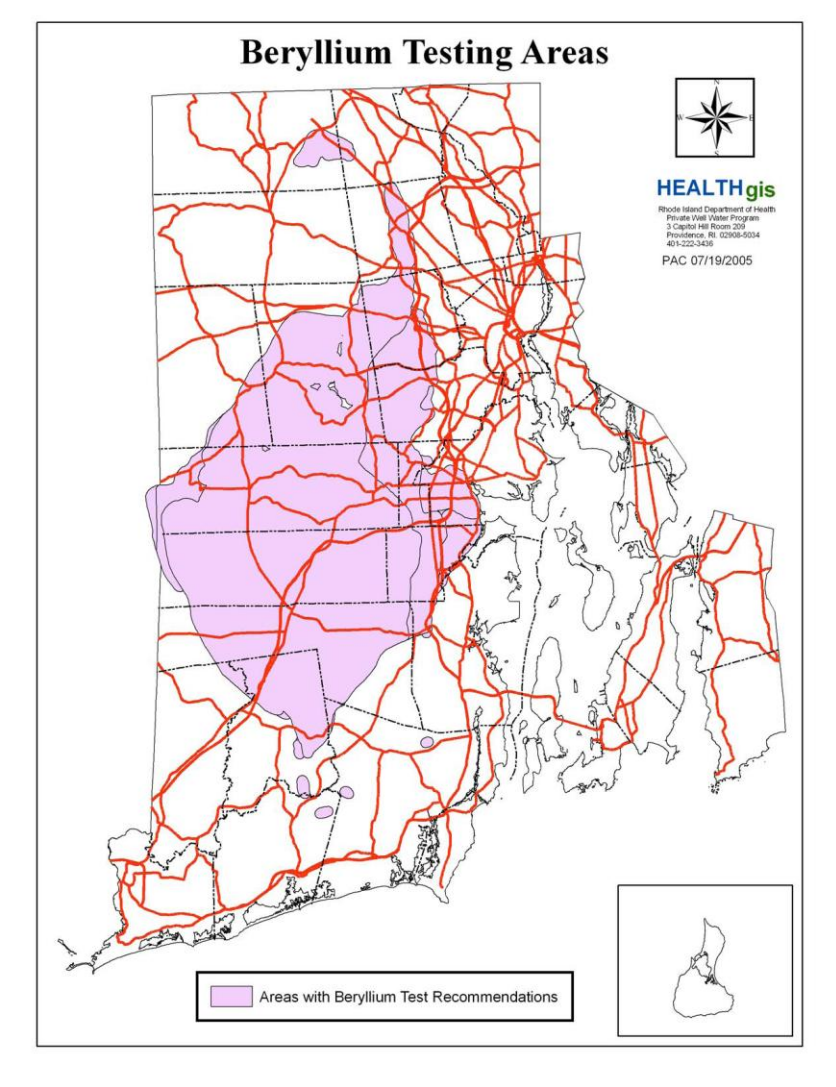
Initially, then every 5-10 years:

- *Volatile Organic Compounds*
- *MTBE*

http://**www.health.ri.gov/environment/dwq/privatewell.php**

Additional Testing

- **Additional testing may depend on:**
- local land-uses
- well/plumbing type
- underlying geology
- proximity to known sources of contaminants
- requirement by the local building official
- Examples:
- Arsenic Tests for wells near existing or old orchards (purple section on map).
- Beryllium tests for wells in certain types of bedrock (red lines on map).



http://www.health.ri.gov/environment/dwq/privatewell.php

State Certified Lab Locations

- There are quite a few Rhode Island State Health Lab locations in the state of RI.
- These labs will test your water for all sorts of things to determine if it's drinkable using high-tech equipment and tests.

Where?

- Cranston: BAL (401-785-0241), ESS Laboratory (401-461-7181)
- Jamestown: BRC (401-423-1825)
- N. Providence: NE Testing Lab Inc. (401-353-3420)
- Providence: Northeast Environmental Testing Laboratory (401-454-3400),
- Providence: RI State Health Laboratories (401-222-5600)
- Dayville, CT: Premier Laboratory, LLC (860-774-6814)
- Warwick RI Analytical Laboratories (401-737-8500)

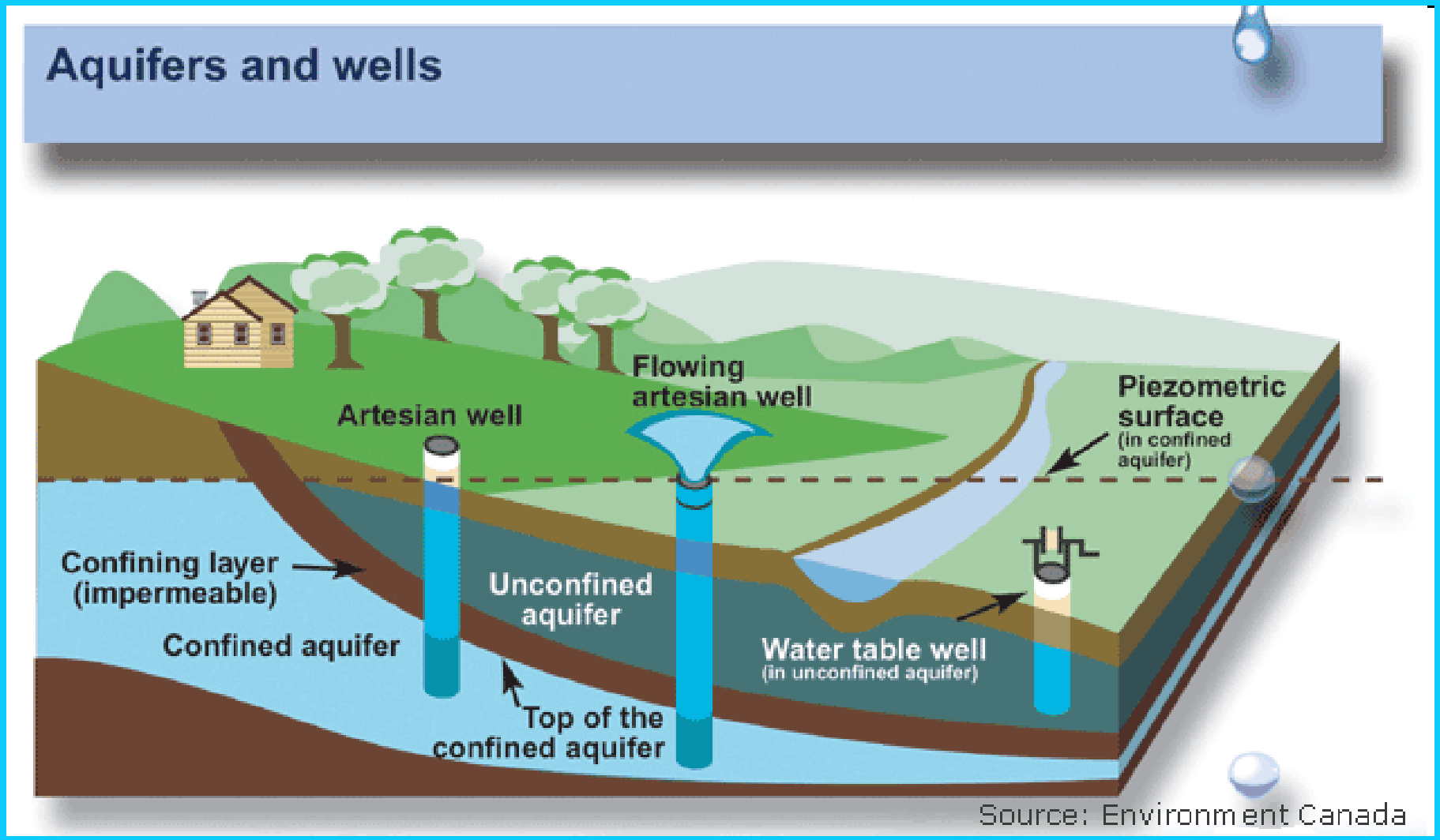
Remediation

- Connect to the community water system
- Call a licensed professional to evaluate and dig a new well
- Treat water with a filter or another water treatment devise

Prevention:

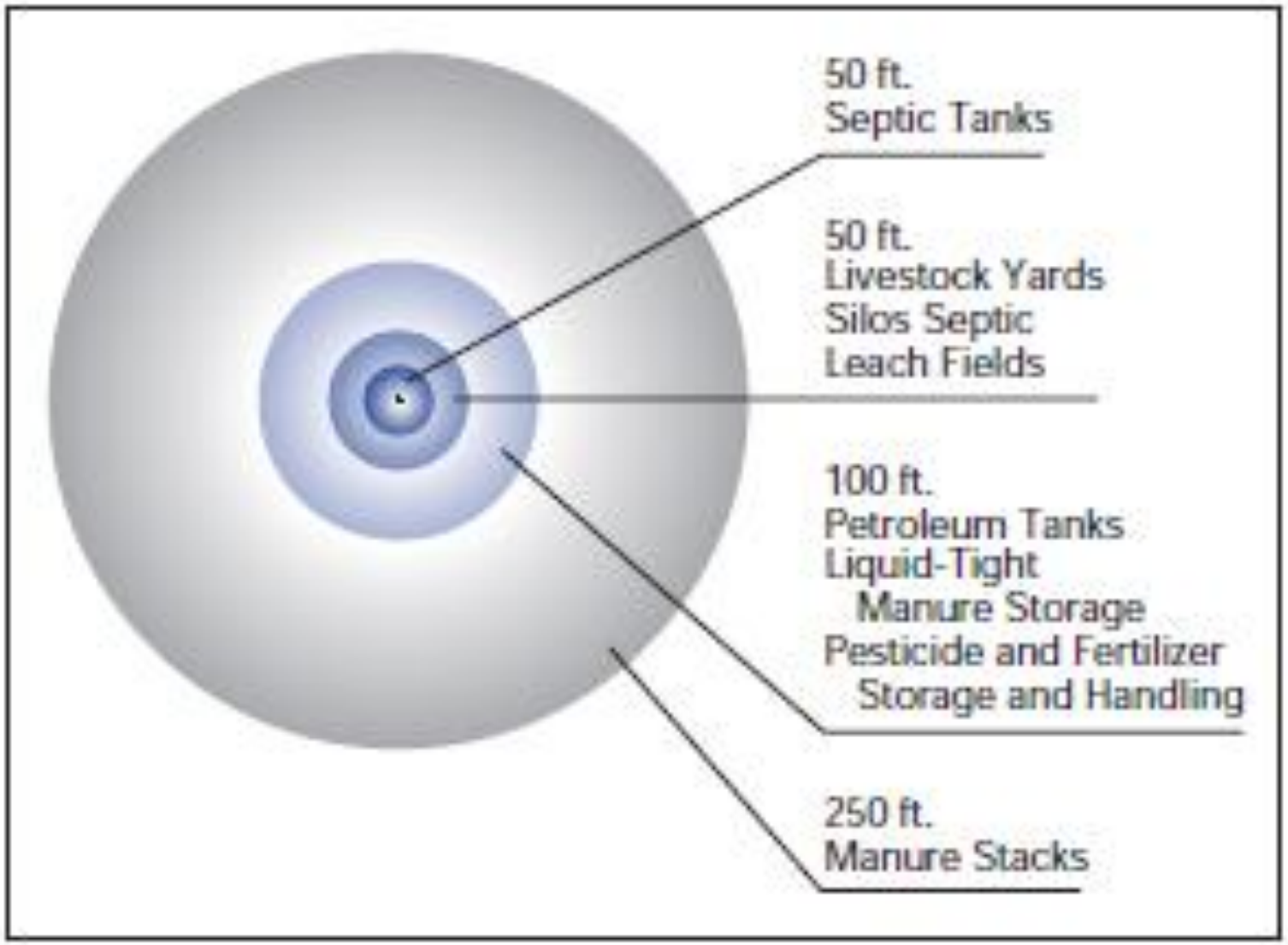
- Have the well installed by a licensed professional
- Have the water tested before installing the well
- Test well water frequently to see changes in the condition of the water
- Septic tanks should be at least 75 ft from your well
- Leach fields should be at least 100 ft from your well

Types of Wells

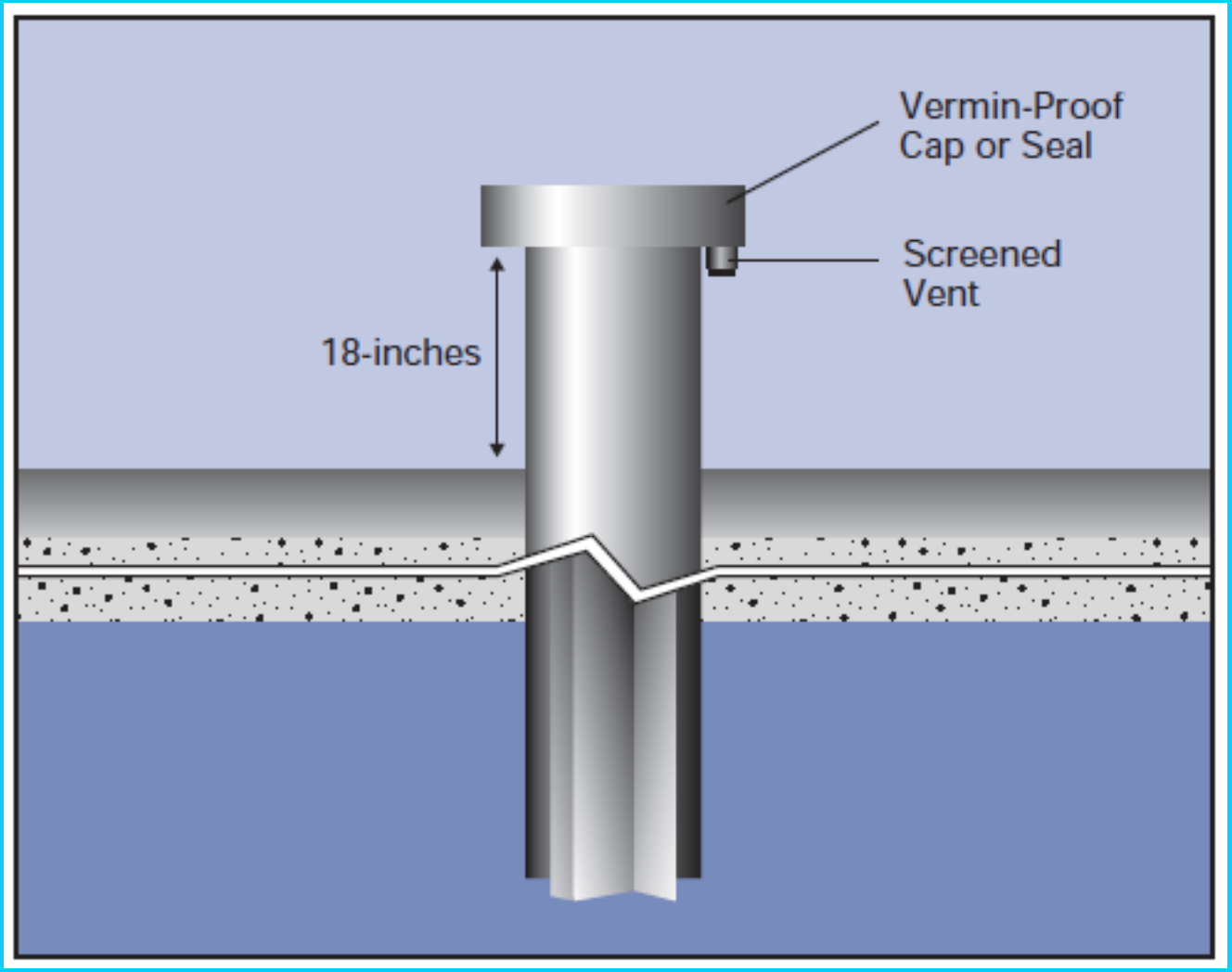


usgs private wells

Private Well Recommended Set-Backs



www.epa.gov



This is an example of a vermin cap to keep animals from entering your well. The animal could get stuck inside and die. Paving around your well prevents runoff from seeping into your well.

Summary

- Test your well water regularly!

- Monitor the your septic system to ensure proper functioning!

- For more information there is a well water workshop with URI Home*A*Syst in the Scituate High School auditorium on June 10th at 7:00 pm

Special Thanks to:

The many hardworking and diligent students at Scituate High School

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Chris Modisette	RI Resource Conservation and Development Council
Paul Dolan	Chair of NRI Conservation District and Asst State Forester
Mike Sugrue	Sugrue engineering
David Provonsil	Scituate Town Engineer
Patrick Craft	RI Health Department
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Shane White	RI State GIS Coordinator
Christopher Riley	Forest Supervisor, Providence Water
Crista Straub	Ecology & Environmental Science, UMAINE
Teresa Thornton	Senator George J. Mitchell Center , UMAINE

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The GET WET! Team
at the University of Maine, Orono

http://www.umaine.edu/waterresearch/outreach/GetWet/index.htm