

Cazenovia

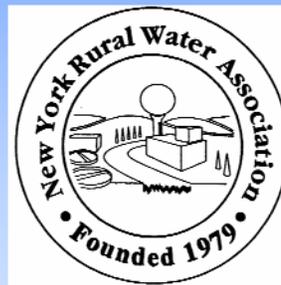
Groundwater Protection Plan:

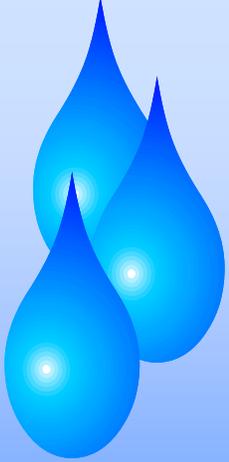
An Introduction

By

Steven Winkley

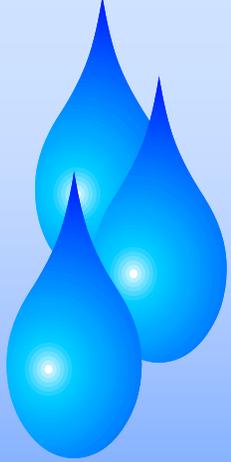
New York Rural Water Association





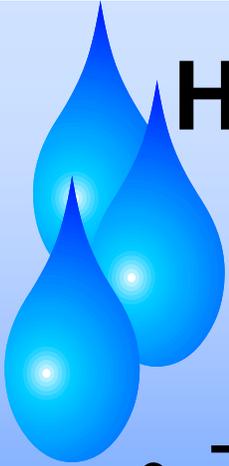
New York Rural Water Association (NYRWA)

- We are a not-for-profit organization founded in 1979 composed of:
 - Smaller communities or rural water and wastewater systems that typically serve < 10,000 population (~ 1,200 total).
 - Interested individuals.
 - Consultants, suppliers, and contractors (~150 in total).



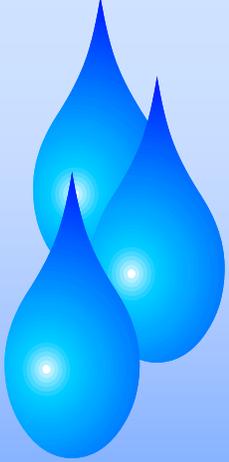
What Do We Do?

- We assist communities and water/wastewater systems to comply with regulations and to protect public health and the environment.



How Are NYRWA's Ground Water Protection Initiatives Funded?

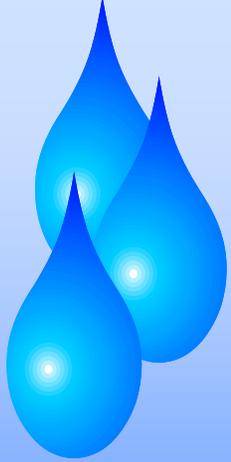
- Through a grant assistance agreement between USEPA and the National Rural Water Association.
- To ensure continued funding of this program, please write your congressional representatives.



Steven Winkley

Technical Background

- 1986 B.S. Geology - Rensselaer Polytechnic Institute
- 1989 M.S. Geology - Syracuse University
 - Thesis: The Hydrogeology of Onondaga County*
- 1989 to 1995 Hydrogeologist with consulting firms
- 1995 to 2007 Groundwater Specialist, NYRWA
- Licensed Professional Geologist



Groundwater Protection Plan Steps

1. Form Planning Team



2. Define the Area to Protect



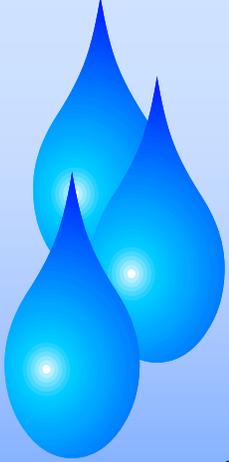
3. Identify Areas at Risk



4. Design and Implement Protection
Measures



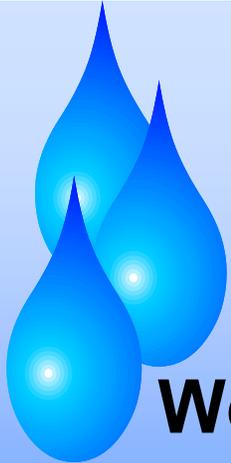
5. Plan for the Future



Cazenovia Groundwater Protection Planning Team

- Comprehensive Plan Committee
- Other Village & Town officials
- Water and public works officials (already contacted)
- County officials (already contacted Madison Co. Planning Dept.)
- Others (?)

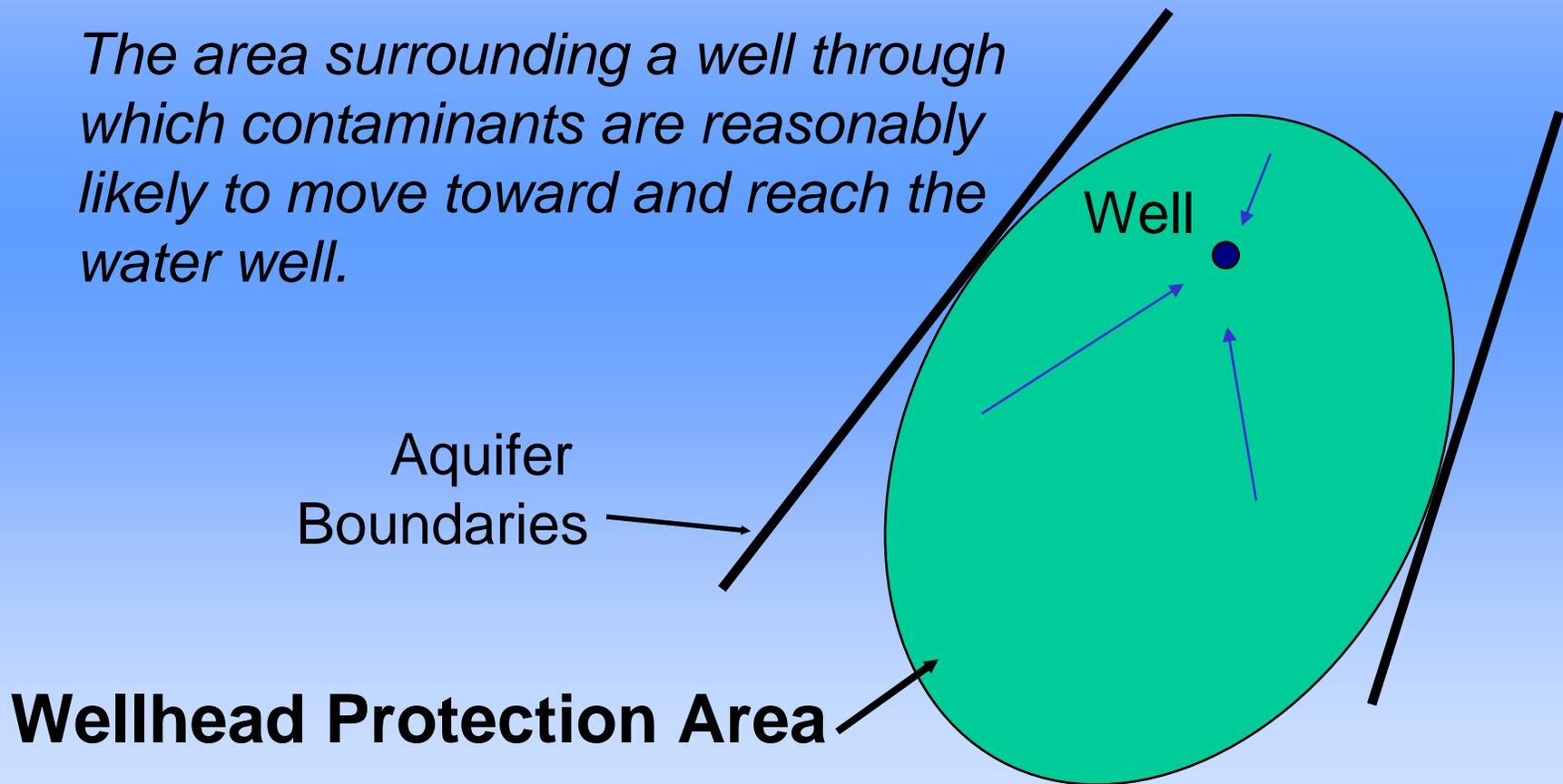


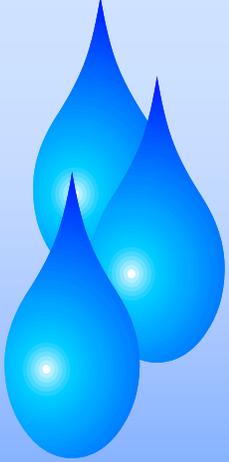


Step 2: Define the Area To Protect

Wellhead Protection Area:

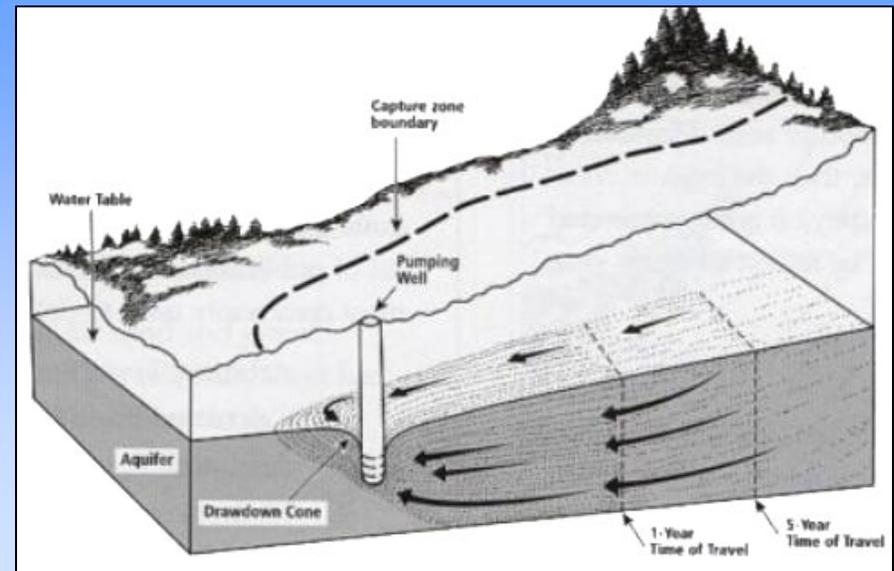
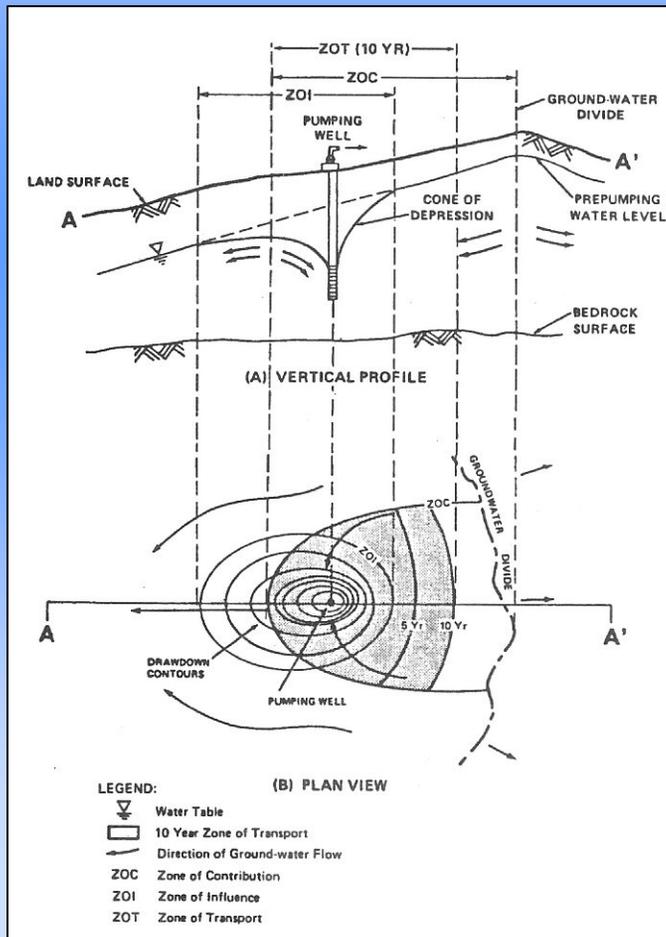
The area surrounding a well through which contaminants are reasonably likely to move toward and reach the water well.

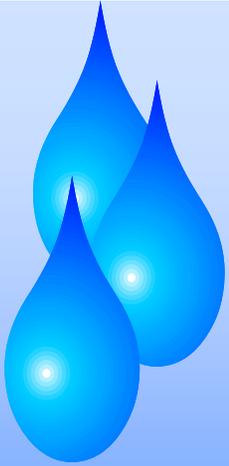




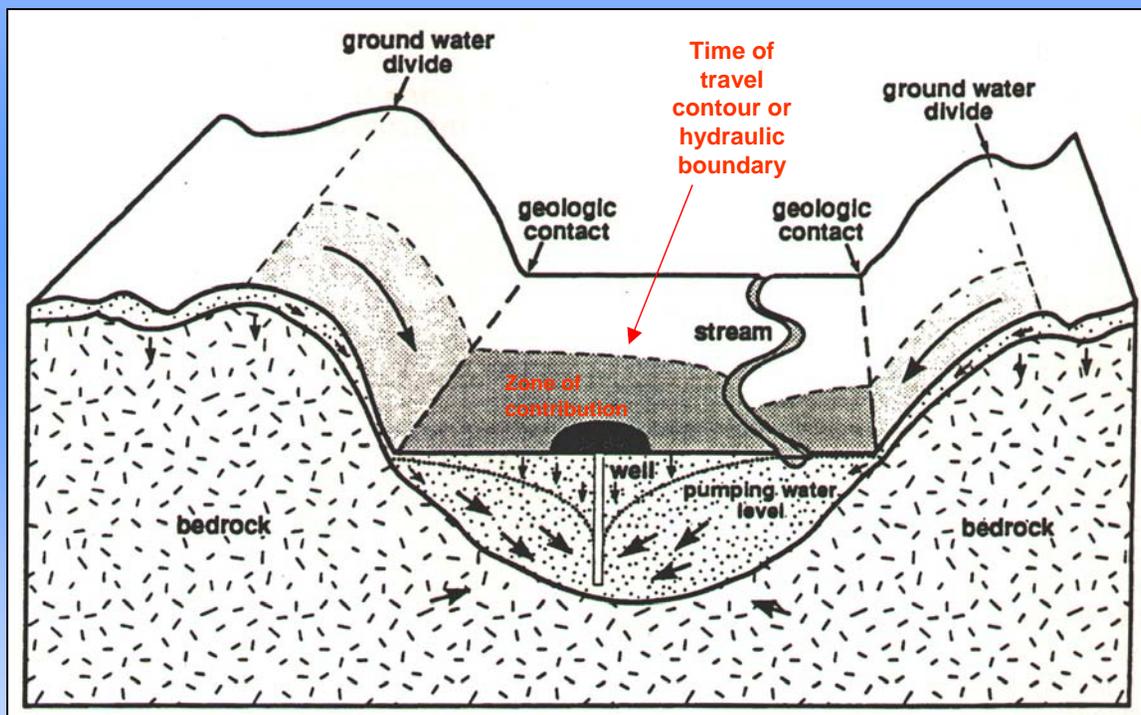
Step 2: Define the Area To Protect

The wellhead protection area consists principally of the well's zone of contribution (that portion of the aquifer contributing groundwater flow to the well).

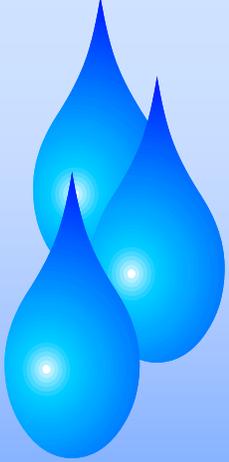




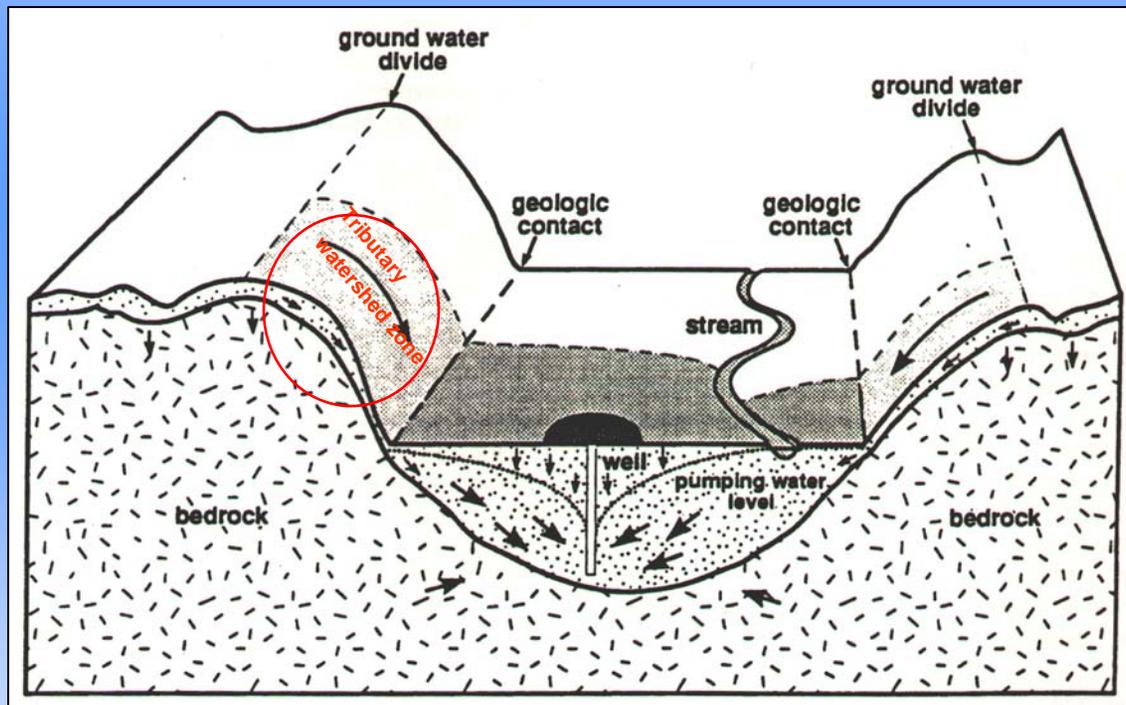
Step 2: Define the Area To Protect



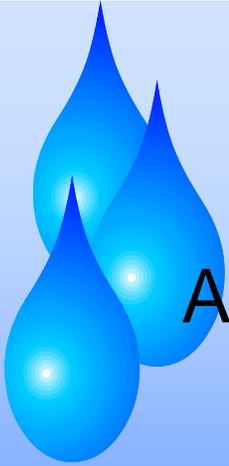
The boundaries of the zone of contribution are based upon geologic contacts, groundwater divides, and/or groundwater time of travel contours (2-years, 5-years, etc).



Step 2: Define the Area To Protect



A secondary zone of the wellhead protection area is the tributary watershed zone. These are non-aquifer areas that contribute surface water runoff to the zone of contribution.



Step 2:

Define the Area To Protect

A. Compile Surficial, Subsurface, and Well Data
(ongoing)



B. Map Aquifer Boundaries (ongoing)



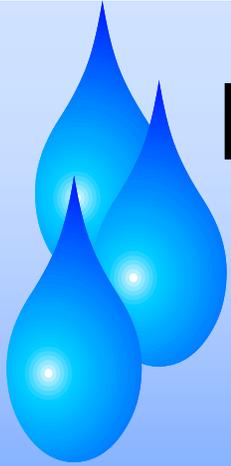
C. Calculate the Zone(s) of Contribution
(analytical and computer tools)



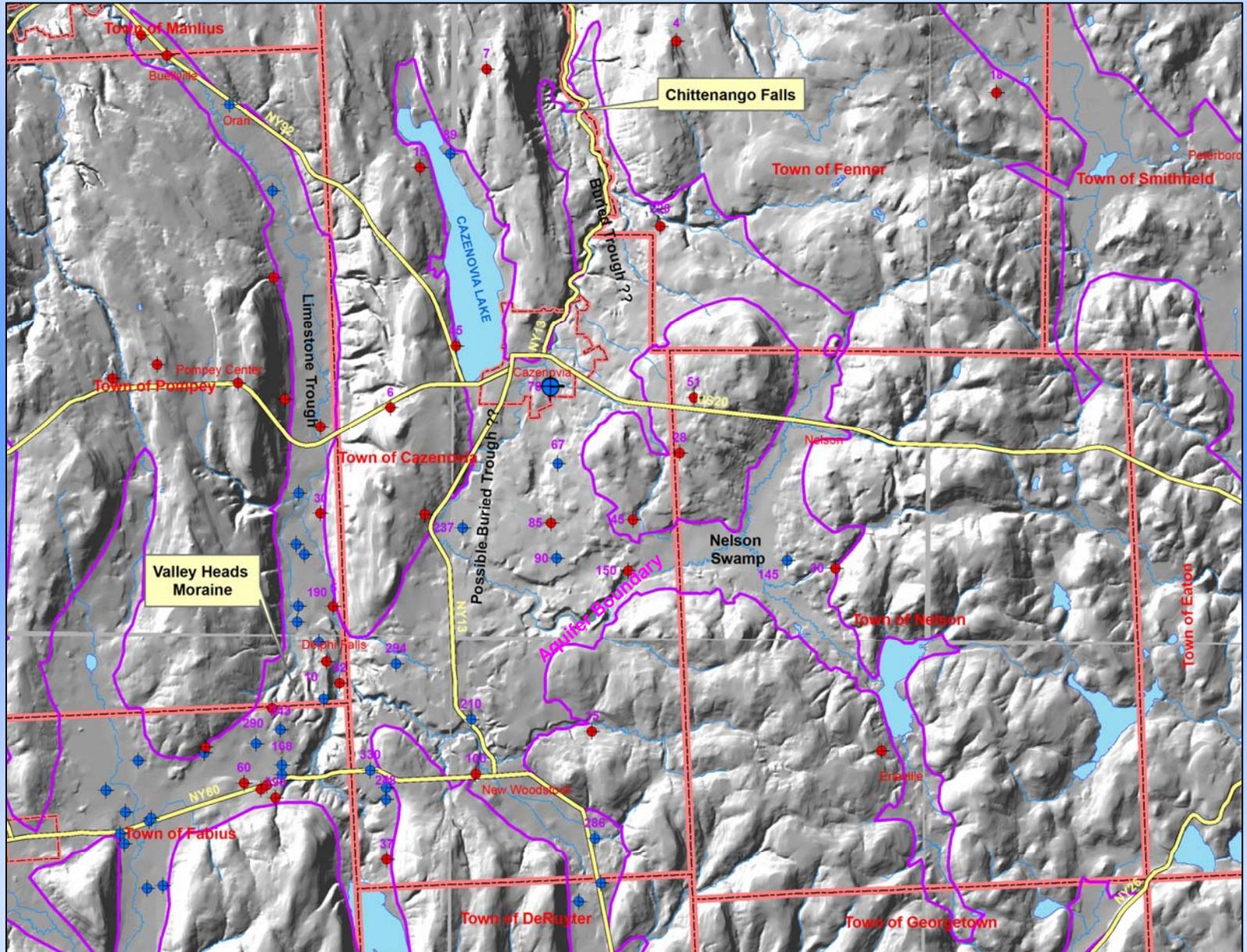
D. Determine the Tributary Watershed Zone
(topography)

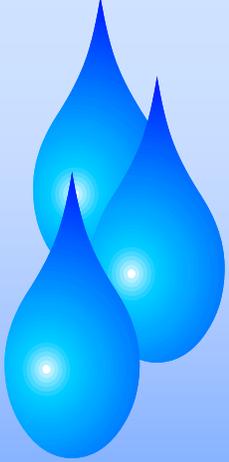


E. Map the Wellhead Protection Area
(GIS)



Regional Hydrogeologic Setting

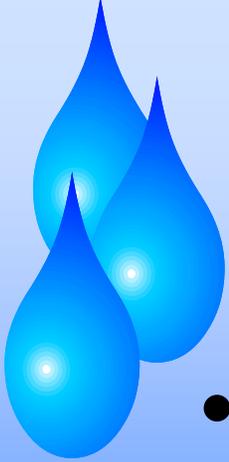




Village of Cazenovia

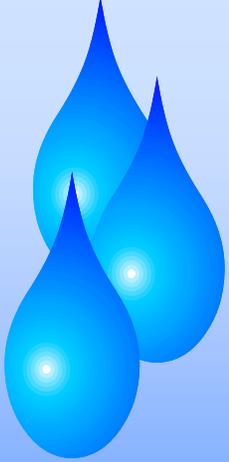


Still need to review all
NYSDEC well data,
NYSDOT data, and
public supply well data,
as well as field check.



Step 3: Identify Areas At Risk

- Inventory Existing Potential Sources of Contamination In Protection Area
 - Point sources (discrete sources)
 - Non-point sources (diffuse pollution).
- Analyze Groundwater Related Development Issues.



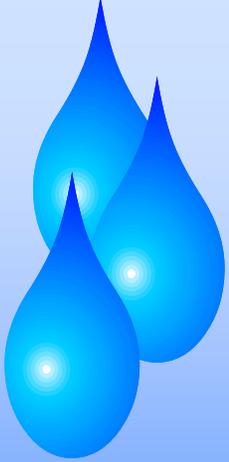
Step 3: Identify Areas At Risk

Potential Sources of Contamination

Risk Categories of Land Uses and Activities Affecting Ground Water Quality

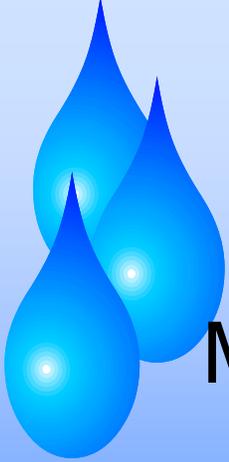
High Risk (Frequently Prohibited in High Priority Water Supply Protection Areas)

- ___ Airport maintenance areas
- ___ Animal feedlots
- ___ Appliance/small engine repair shops
- ___ Asphalt/concrete/coal tar plants
- ___ Auto repair and body shops*
- ___ Boat service, repair and washing establishments
- ___ Beauty parlors/hairdressers
- ___ Business and industrial uses (excluding agriculture) which involve the onsite disposal of process wastes from operations
- ___ Car washes
- ___ Chemical/biological laboratory
- ___ Chemical manufacturing/industrial areas
- ___ Cleaning service (dry cleaning, laundromat, commercial laundry)*
- ___ Disposal of liquid or leachable waste except for properly designed commercial and residential onsite wastewater disposal systems and normal agricultural operations
- ___ Electroplaters (metal plating and finishing) and metal fabricators*
- ___ Fuel oil distributors
- ___ Furniture and wood stripping and refinishing*
- ___ Gasoline stations
- ___ Golf courses/parks/nurseries
- ___ Graveyards
- ___ Improperly constructed or abandoned wells (perched, confined aquifers)
- ___ Junkyards and salvage yards*
- ___ Landfills and dumps
- ___ Making the surface of more than 10% of any lot impervious
- ___ Mining operations
- ___ Medical services (including dental/vet)
- ___ Military installations
- ___ Motels/hotels
- ___ Municipal sewage treatment facilities with onsite disposal of primary or secondary effluent
- ___ Oil and gas drilling and production
- ___ Outdoor storage of road salt, or other de-icing materials, the application of road salt and the dumping of salt-laden snow*
- ___ Outdoor storage of pesticides or herbicides
- ___ Parking areas of over 50 spaces
- ___ Pesticide/herbicide stores
- ___ Petroleum product refining and manufacturing
- ___ Photo processors/printing establishments
- ___ RCRA hazardous materials TSDs
- ___ Sand and gravel extraction
- ___ Trucking or bus terminals
- ___ Underground storage and/or transmission of oil, gasoline or other petroleum products
- ___ Use of septic system cleaners which contain toxic chemicals (such as methylene chloride, and 1,1,1 trichloroethane)
- ___ Wood preserving and treating*



Step 3: Identify Areas At Risk Analyze Groundwater Related Development Issues

- Water Supply
- Wastewater Treatment
- Impervious Surfaces and Storm Sewer Systems
- Improper Waste Disposal and Spills

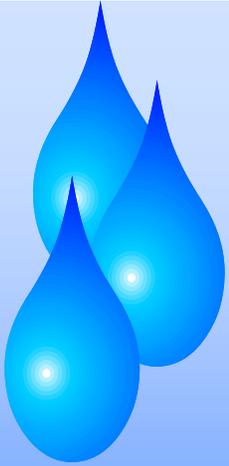


Impervious Surfaces

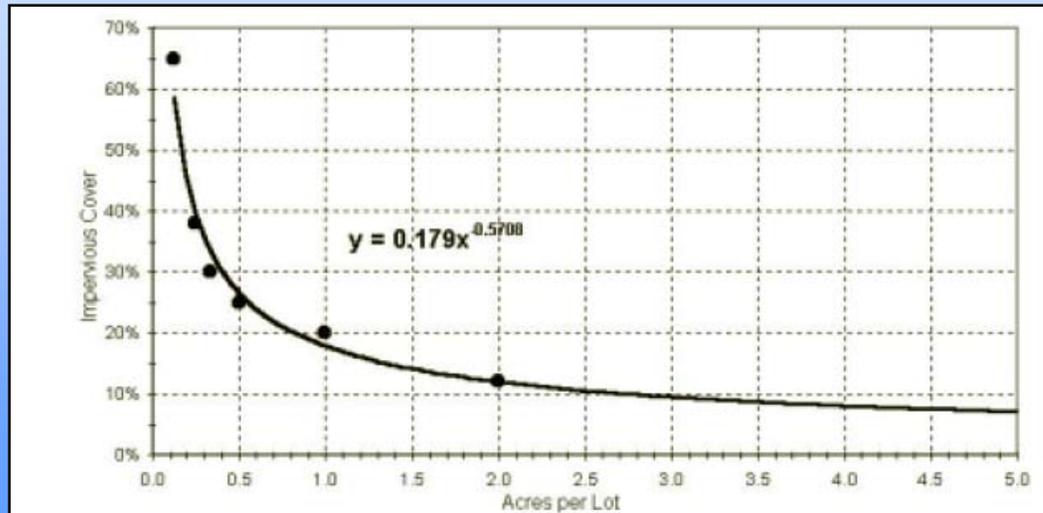
Materials that impede or prevent percolation of precipitation or runoff into the ground.

An increase in impervious surface cover can result in:

- Reduction in groundwater recharge and stream baseflow.
- Deterioration in stormwater runoff quality, receiving stream quality, and perhaps groundwater quality.
- Increase in runoff quantity, flooding, erosion.



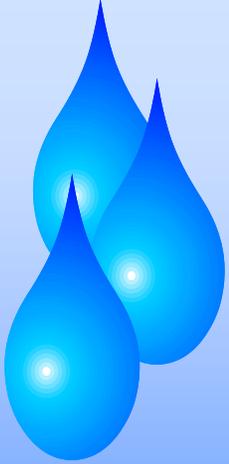
Impervious Surfaces



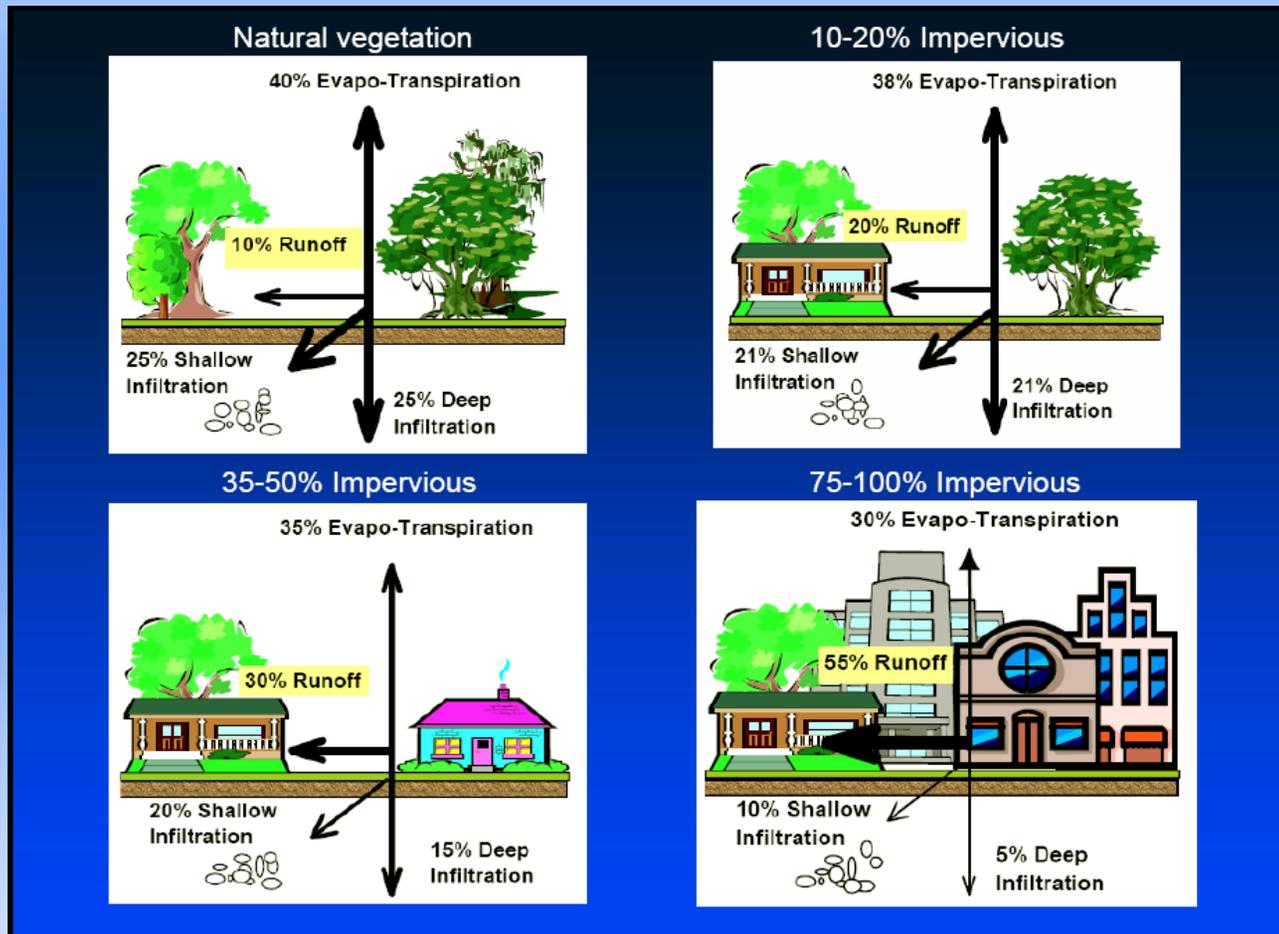
Relationship with lot size (from Technical Guidance: A Recharge-Based Nitrate-Dilution Model for New Jersey)

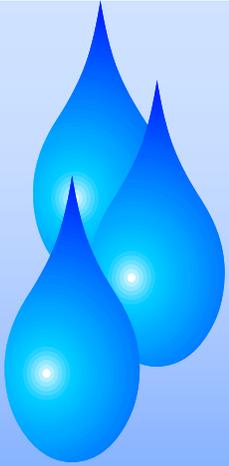
Land Use	Density (du/ac)	Source							
		Northern Virginia (NVPDC, 1980)	(USDA, 1986)	Puget Sound, WA (Aqua Terra, 1994)	Rouge River, MI (Kluitenberg, 1994)	Olympia WA (COPWD, 1995)	Holliston, MA (CRWA, 1999)	Connecticut (Prisloe, 2000)	Chesapeake Bay (CWP, 2000)
Forest	-	1	-	-	2	-	1	-	-
Agriculture	-	1	-	-	2	-	1	-	2
Urban Open Land	-	-	-	-	11	-	7-23	-	9
Water/Wetlands	-	-	-	-	100	-	-	-	-
Low Density Residential	<0.5	2-6	-	10	19	-	12	7-10	-
Medium Density Residential	0.5	9	12	10	19	-	12	7-10	11
High Density Residential	1	12	20	10	19	-	12	7-10	14
Low Density Residential	2	18	25	-	19	-	14	14-21	21
Medium Density Residential	3	20	30	40	19	40	14	14-21	-
High Density Residential	4	25	38	40	19	40	14	14-21	28
High Density Residential	>4	35	-	40	38	40	19	28	33
Multifamily	Townhouse	40	65	60	51	48	47	39	41
Multifamily	Apartment	50	65	60	51	48	47	39	44
Multifamily	High Rise	60-75	-	-	-	-	-	-	-
Industrial	-	60-80	72	90	76	86	60	53	53
Commercial	-	90-95	85	90	56	86	45	54	72

Relationship with land use (from Capiella and Brown, 2001).

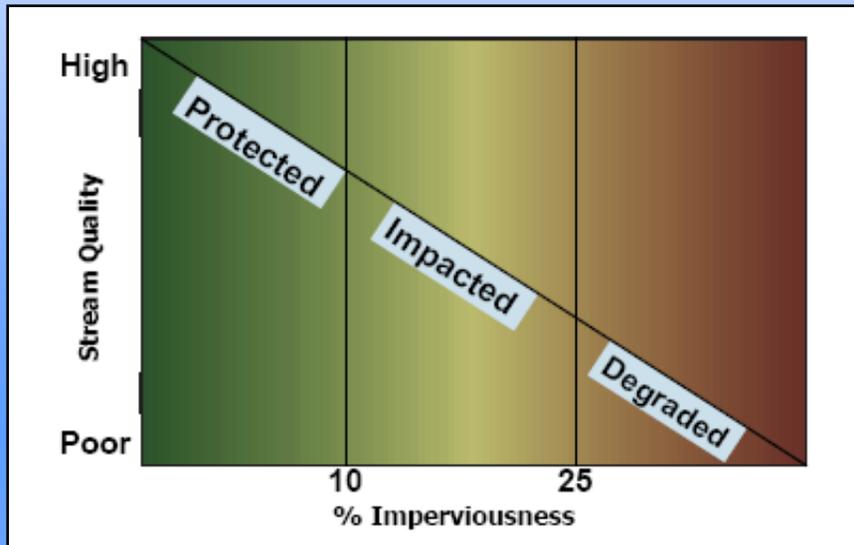


Impervious Surfaces: How Much Is OK?





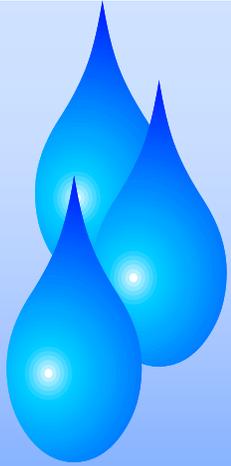
Impervious Surfaces: How Much Is OK?



From California Water and Land Use Partnership

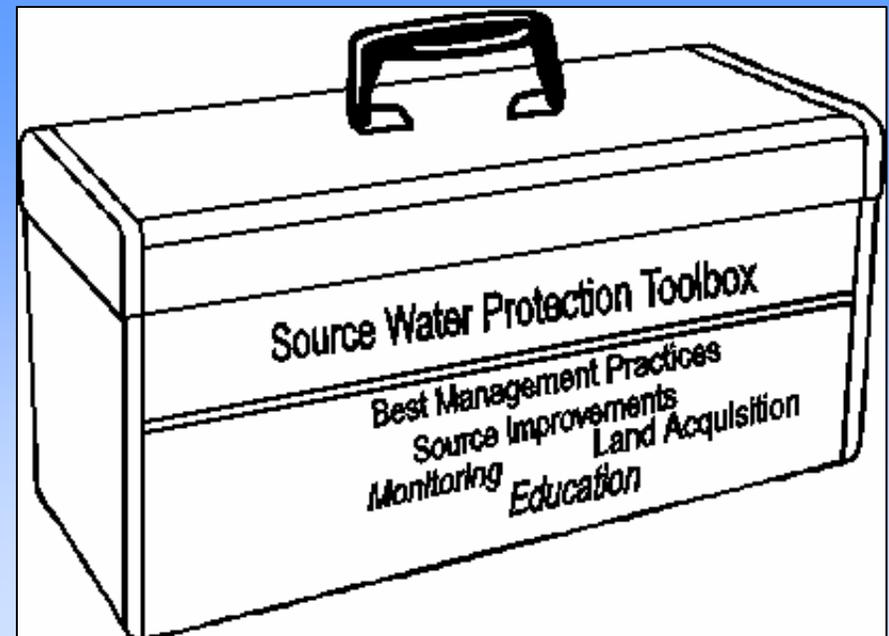
Location	Stream Condition Marker	% Impervious Area where marked change occurred	Reference
Delaware	Decline in species diversity	8-15%	Paul and Meyer, 2001
Georgia	Decline in species diversity	15%	Roy et al., 2003
North Carolina	Water quality (fecal coliform)	>10%	Mallin et al., 2000
South Carolina	Physical, chemical, and biological indicators	10-20%	Holland et al., 2004
Washington	Loss of aquatic system function	10%	Booth and Jackson, 1997
Wisconsin	Decline in species diversity	8-12%	Stepenuck et al., 2002 Wang et al., 2000

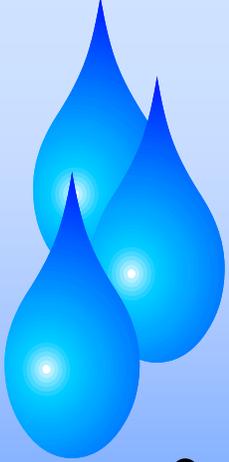
From Georgia Coastal Research Council



Step 4: Design and Implement Protection Measures

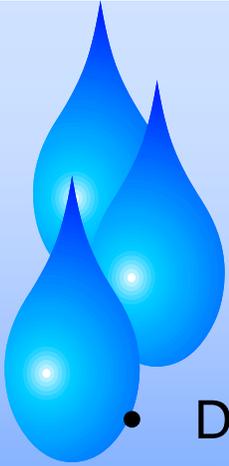
Implement measures or “tools” to help prevent the contamination and depletion of groundwater and surface water.





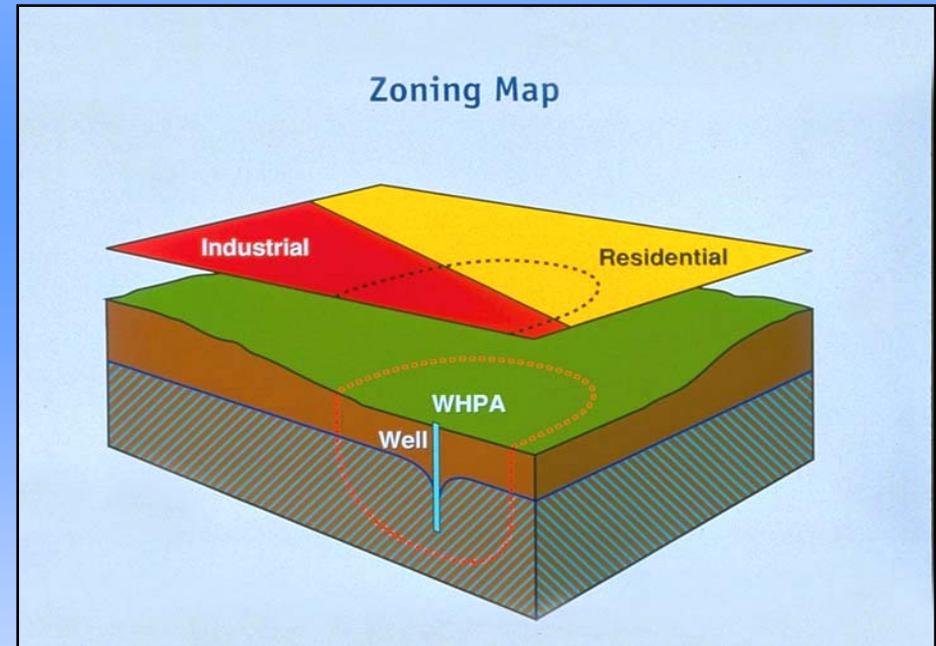
Step 4: Protection Measures Land Use Regulations

- Zoning
- Site Plan Review
- Subdivision Regulations
- Other (?)



Step 4: Protection Measures Wellhead Protection Overlay District

- Does not change underlying zoning district(s), but imposes additional requirements in the wellhead protection area.
- Could prohibit certain “high-risk” land uses in the wellhead protection area (gas stations, dry cleaners, etc.)
- Sometimes imposes limits on impervious surface %, lot size for on-site septic systems, etc.
- Could modify site plan/special use permit review and approval procedures.





Step 4: Protection Measures

Land Purchase and Development Rights

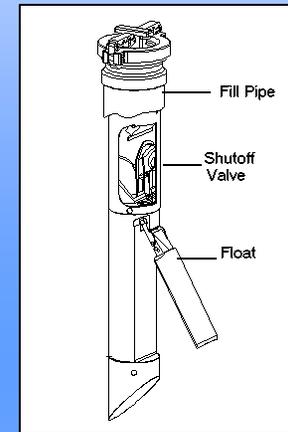
- Land purchases
- Conservation easements
- Land trusts and conservancies





Step 4: Protection Measures Best Management Practices (BMPs)

- Constructed systems or devices
- Vegetative measures
- Environmentally sound operating practices





Step 4: Protection Measures Monitoring and Testing



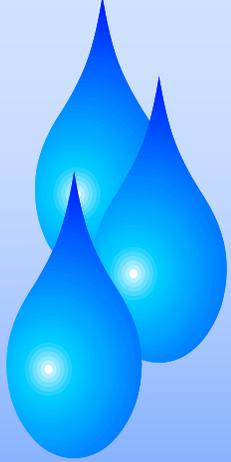


Step 4: Protection Measures

Public Education and Awareness

- Public education programs
- Bill stuffers
- Newsletters
- Newspapers, TV, Radio

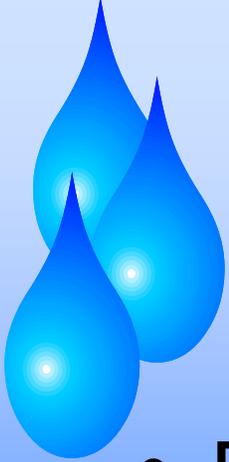




Step 5: Future Planning

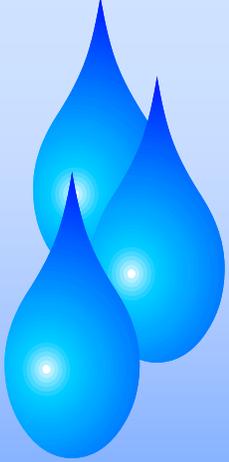
What if..?



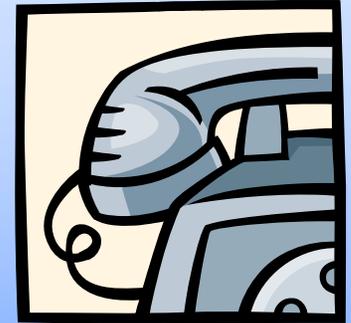


Step 5: Future Planning

- Plan for water supply emergencies
 - Emergency response plan ?
- Identify alternative water supply sources (future well sites ?)



Contact Information



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