Watershed Inspector Training

PFAS, Herbicides, and Agricultural Properties

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Stewards of the Environment™

Expanding Source Protection Efforts

- PFAS Vulnerability – assessments are an essential part of a comprehensive watershed survey.
- Herbicides – identification of aquatic treatments may be useful
- Agriculture and Open Space – Work to build positive relationships through outreach and partnerships. Collaboration is key - NRCS, DEEP, other utilities, municipalities, private landowners, land trusts, and regional groups

Aquarion PFAS Vulnerability

- Summer 2018 Goal: Assessment of all systems to determine potential at risk sites.

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What are PFAS?

- Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes PFOA, PFOS, GenX, and many other chemicals. PFAS have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s. PFOA and PFOS have been the most extensively produced and studied of these chemicals. Both chemicals are very persistent in the environment and in the human body – meaning they don't break down and they can accumulate over time. There is evidence that exposure to PFAS can lead to adverse human health effects.

Source: United States Environmental Protection Agency, Basic Information on PFAS. https://www.epa.gov/pfas/basic-information-pfas

Why are PFAS a Health Concern?

- **Certain PFAS can accumulate and stay in the human body for long periods of time.**
- **Evidence of adverse health affects**
  - **Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have caused tumors in animals.**
  - **Increased cholesterol**
  - **low infant birth weights**
  - **effects on the immune system**
  - **cancer (for PFOA)**
  - **thyroid hormone disruption (for PFOS).**

Source: United States Environmental Protection Agency, Basic Information on PFAS.

They are everywhere!

- Fire-fighting foam
- Metal plating and finishing
- Landfills
- Textiles
- Paper and cardboard packaging
- Industrial and household cleaning products
- Surface coating, paint, varnish, and inks
- Plastics, resins, and rubber
- Adhesives
- Antifogging
- Cement additives
- Oil industry
- Mining industry
- Photographic industry
- Electronics industry
- Semiconductor industry
- Etching
- Cosmetics and personal care
- Pesticides
- Medical uses
- Oil spills

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Identification Strategy

- **Identify potential generators or users.**
- **Consult with CT DPH on PFAS research, information, identification, awareness, etc.**
- **Review Watershed and Aquifer mapping to locate sites within these areas.**
- **Determine need to identify additional sites outside of Watershed and APA areas.**

Site Ranking

- **Tier 1 Risk**
  - **Manufacturing Facilities, Military Base, Airport, Fire Training, and Landfills.**
- **Tier 2 Risk**
  - **Smaller Scale Manufacturing, Fire Site, Car Wash, Gas Station, Auto Repair, Fire Dept., Other, Past History(fire, spills, former land uses, etc.)**

DWS Circular Letter #2018-20

- Requirement to Update an Evaluation of Source Water Protection Measures and Request to Sample Drinking Water Sources for PFAS
- CT AWWA Source Water Protection Committee worked to develop reporting form.

Source Water PFAS[1] Vulnerability Assessment Form

This form is intended to be used to assess and inventory land use activities that are of immediate concern to water quality, or have a significant potential to contaminate a public drinking water supply, for delineated source water protection areas, as required by section 25-32d-3(i)(3) of the Regulations of Connecticut State Agencies (RCSA).

SYSTEM: Whoville

PWSID#: 987654321

LOCATION: 1000 Main Street Wells 1, 1a, and 3

☐ NO POTENTIAL PFAS SOURCES IDENTIFIED

AQUIFER/WATERSHED: APA 321

SANITARY RADIUS: Zone I 400 Feet

DATE FORM COMPLETED: 2/20/2020

FORM COMPLETED BY: J. Welsh

Potential Contaminant Source (insert additional rows as needed)	**Site Address**	**Description**	**Distance to Drinking Water Source[2]**	**Past History**
Tier 1 Risk	High risk potential; Sites that use AFFF firefighting foams; Landfills (all types); Industries that use PFAS[3] (metal plating, etching, textiles/leather/carpeting, paper and cardboard products, wire manufacturing, industrial cleaning products, surface coatings/paints/ varnishes/inks, plastics/resins/rubber, adhesives, electronics, semiconductors, photolithography, cosmetics/personal care).			
Military Base				
Airport				
Fire Training Area				
Landfill	Mega Landfill	2010 Contamination Street MSW not lined	.6 miles	
PFAS Industry[3]	New England Plating	50 Old Railroad Ave permitted haz waste generator	.25 miles	no longer there
Tier 2 Risk	Moderate risk potential; Fire Departments that store AFFF firefighting foams; Wastewater discharges from car washes; Groundwater discharges from major septic systems permitted by DPH or DEEP; Water Pollution Control Facility (WPCF - public sewer system); Sites of significant fires where AFFF firefighting foams were applied (car crash, tanker truck roll-over, gasoline/diesel released to the ground, etc.); AFFF fire suppression systems (possible in large industrial buildings, oil terminals); Application or use of biosolids on agricultural fields.			
Fire Department	Whoville Fire Dept Engine 5	999 Main Street	.25 miles	
Car Wash	Super Foam Car Wash	10 Leaky Sewer Pipe Drive	1 mile	
Major Septic System (> 2,000 gal) or Institutional Septic				

Water Pollution Control Facilities (WPCFs)				
Historic fires	Major warehouse fire	51 Railroad Ave	.25 miles	fire in 2017, foam used
AFFF Fire Suppression System				
Bulk Fuel Storage				
Agricultural areas with biosolid application				
Undetermined Risk	The risk of PFAS contamination is undetermined. Land uses identified and listed below may require further investigation and information.			
Other	Residential septics and sewers			
COMMENTS:				
[1] Per- and Polyfluoroalkyl Substances				
[2] Distance to Drinking Water Source - Distance to closest reservoir, tributary, or wellhead				
* PFAS Industry - Refer to ITRC fact sheets for more information on known industries/manufacturers that may use PFAS				

Site Identification Resources

- **Knowledge of watershed and aquifer areas from past inspections**
- **SIC Code List types of manufacturing processes that MAY use PFAS**
- **Fire Training/Burn Building List**
- **DEEP landfill / spill info**
- **Technology Regulatory Council fact sheets on PFAS**
- **GIS data, Google maps and searches, locals/old timers**

Utilizing GIS

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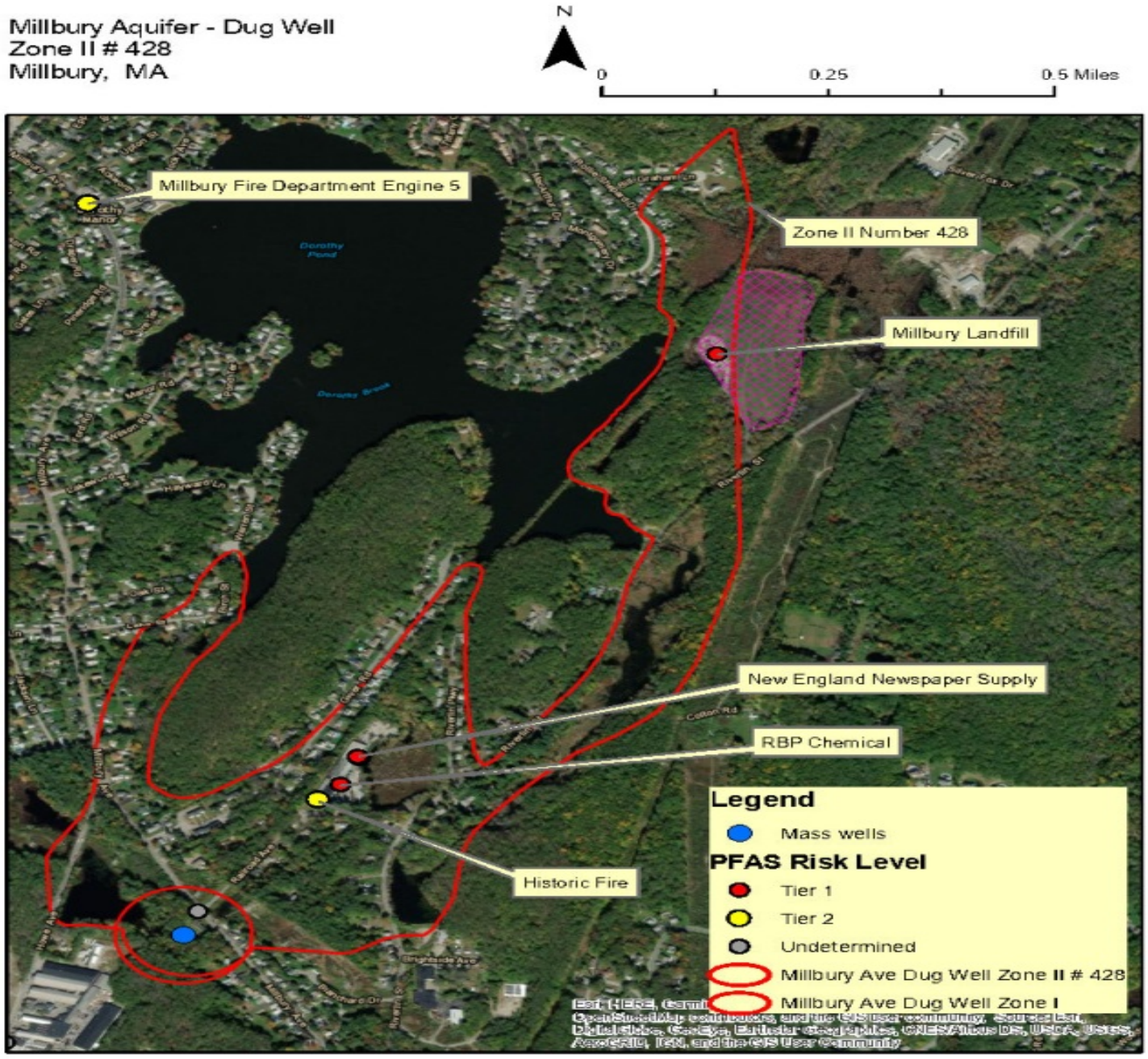
Millbury Aquifer - Dug Well
Zone II # 428
Millbury, MA



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Fieldstone Ridge System
Donna Drive
New Fairfield, CT

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Historic Fire Sites

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Woodland Fire

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Communication and Outreach

- Discussions with Fire Departments and others
  - Can be tricky
- Municipal outreach – POCD comments
  - Encourage towns to learn about and limit types of land uses that may contain PFAS substances – provide resources to help educate

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Aquatic Herbicide Use in the Watershed

- DEEP – aquatic permit notification
  - multiple chemicals / applications
- Applicator notification
- Will Aquarion notice any impacts from this?
  - Positives – better upstream quality, reduction of invasive plants or other algae
  - Negatives – effects on water quality, algae blooms
  - Unknowns

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Aquatic Herbicide Tracking

- Developed spreadsheet
- Geocoded locations
- Plotted in GIS on watershed layer
- Helpful in gaining a better understanding of watershed

Permit Number	Vendor	Location	Address	Town	Chemical 1	Amount	Times Applie	Chemical 2	Amount	Times Applie	Chemical 3	Amoun	Times Applie	Chemical 4	Amount	A e
AQUA-2019/039ws	Solitude Lake	Thornwood Pond	25 Bittersweet Lane	Stamford	Alum	61 gallons	2	Copper TEA (liq	8 Gallons	3	Fluridone (pellet	32 pounds	1			
AQUA-2019/083ws	Solitude Lake	Quail's Trail Pond	25 Quail's Trail	Stamford	Alum	69 gallons	2	Copper TEA (liq	9 gallons	3	Fluridone (liquid	3.65 gallons	1			
AQUA-2019/052ws	Solitude Lake	Windermere on the Lake	Lake Windermere Drive	Stamford	Copper EDA/TEA (liquid)	4.34 gallons	2	Copper TEA (liq	49.1 gallons	4	Fluridone (pellet	199.46 poun	1	Imazamox (liqui	1.88 gallons	
AQUA-2018/197wsrev	Stahl Holdings	Cascade Pond	Off Cascade Road, West of	Stamford	Copper EDA/TEA (liquid)	60 gallons	3	Copper Sulfate	19.5 gallons	3	Copper TEA (liqu	27 gallons	3	Imazamox (liqui	5 gallons	
AQUA-2018/361ws	Connecticut P	Amen Pond	105 Wildwood Road	Stamford	Copper TEA (liquid) 26.49	1.15 gallons	1	Fluridone (liqui	0.38 quarts	1						
AQUA-2018/391ws	Stahl Holdings	Indursky Pond	862 Riverbank Road	Stamford	Copper EDA/TEA (liquid)	4.8 gallons	3	Copper Sulfate	6.2 gallons	3	Copper TEA (liqu	8.6 gallons	3	Fluridone (liquid	1.2 quarts	
AQUA-2018/301ws	Stahl Holdings	Drive Pond	108 North Lake Drive	Stamford	Copper EDA/TEA (liquid)	3.7 gallons	3	Copper Sulfate	2.9 gallons	3	Copper TEA (liqu	4 gallons	3	Flumioxazin (gra	0.69 pounds	
AQUA-2018/222ws	Connecticut P	Abt Pond	150 June Road	Stamford	Copper TEA (liquid) 26.49	5.4 gallons	1	Fluridone (liqui	1.8 quarts	1						
AQUA-2018/417ws	Connecticut P	MA Pond	28 Sawmill Road	Stamford	Fluridone (liquid) 41.7%	0.1 quarts	1									
AQUA-2018/282ws	Stahl Holdings	Wildwood Pond (Johnso	312 Wildwood Road	Stamford	Copper EDA/TEA (liquid)	14.4 gallons	3	Copper Sulfate	6.2 gallons	3	Copper TEA (liqu	8.6 gallons	3	Flumioxazin (gra	0.9 pounds	
AQUA-2018/300ws	Stahl Holdings	Patcher Pond	129 Shelter Rock Road	Stamford	Copper EDA/TEA (liquid)	5.4 gallons	3	Copper Sulfate	3.5 gallons	3	Copper TEA (liqu	4.8 gallons	3	Flumioxazin (gra	0.67 pounds	
AQUA-2018/273ws	Stahl Holdings	Rockrimmon Irrigation P	2949 Long Ridge Road	Stamford	Copper EDA/TEA (liquid)	58.8 gallons	3	Copper Sulfate	35 gallons	3	Copper TEA (liqu	48 gallons	3	Flumioxazin (gra	3.6 pounds	
AQUA-2018/277ws	Stahl Holdings	Spector Pond	3083 High Ridge Road	Stamford	Copper EDA/TEA (liquid)	0.56 gallons	3	Copper Sulfate	0.36 gallons	3	Copper TEA (liqu	0.5 gallons	3	Flumioxazin (gra	0.1 pounds	
AQUA-2018/283ws	Stahl Holdings	Weideman Pond	106 E Middle Patent Road	Stamford	Copper EDA/TEA (liquid)	0.9 gallons	3	Copper Sulfate	0.7 gallons	3	Copper TEA (liqu	0.9 gallons	3	Flumioxazin (gra	0.11 pounds	
AQUA-2018/279ws	Stahl Holdings	Hyman Pond	755 Westover Road	Stamford	Copper EDA/TEA (liquid)	26.8 gallons	3	Copper Sulfate	5.8 gallons	3	Copper TEA (liqu	8 gallons	3	Flumioxazin (gra	1.6 pounds	
AQUA-2018/227ws	Connecticut P	Bear Rock Pond	West Route 104, South Wil	Stamford	Copper TEA (liquid) 26.49	6 gallons	1	Fluridone (liqui	2 quarts	1						
AQUA-2018/223ws	Connecticut P	Lake Susan	North Rockrimmon Road, S	Stamford	Copper TEA (liquid) 26.49	3 gallons	1	Fluridone (liqui	1 quart	1						
AQUA-2019/195ws	Stahl Holdings	Doral Farms	45 Doral Farm Road	Stamford	Copper EDA/TEA (liquid)	14.8 gallons	3	Copper Sulfate	24 gallons	3	Copper TEA (liqu	33 gallons	3	Flumioxazin (gra	2.7 pounds	
AQUA-2019/286ws	Connecticut P	Sofman Pond	1222 Rock Rimmon Road	Stamford	Copper TEA	4.25 gallons	2	Fluridone Liqui	1.75 Quarts	1						
AQUA-2019/342ws	Solitude Lake	Foxwood Lake	Foxridge Road	Stamford	Alum	322 gallons	2	Copper Sulfate	45.5 pounds	3	Copper Sulfate (l	35 gallons	2	Copper TEA (liqu	42 gallons	
AQUA-2019/296ws	Connecticut P	Lake Susan	North Rockrimmon Road, S	Stamford	Copper TEA (liquid) 26.49	3 gallons	1	Fluridone (liqui	1 quart	1						

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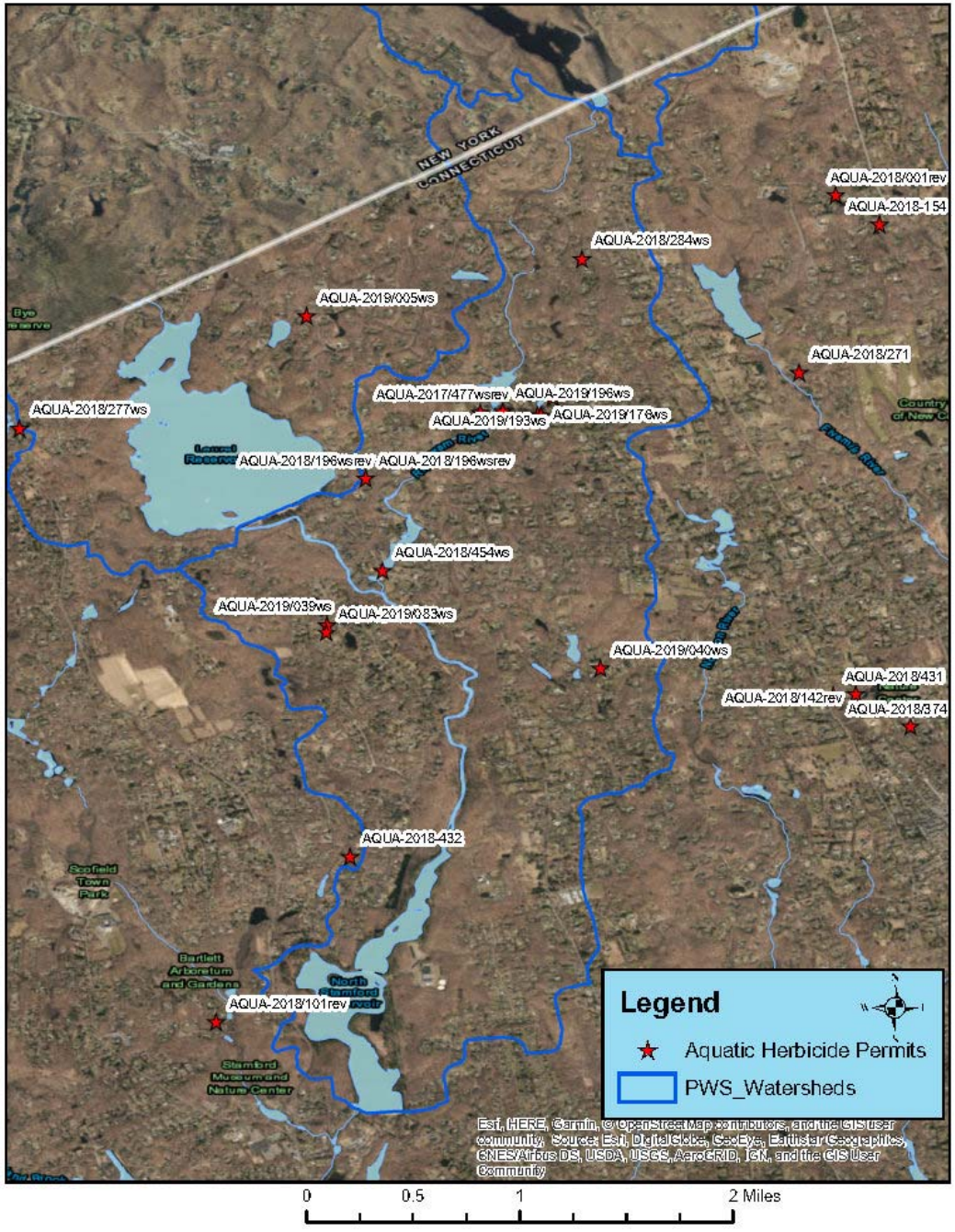
Stamford Herbicide Tracking Map



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Water Chestnut

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Cyanobacteria Bloom

Above: Photographs of past blue-green algae blooms in Connecticut

Agriculture and Undeveloped Properties

- 2018 Farm Bill – source protection funding
  - Potential for water utilities to benefit from NRCS programs
  - Program fliers available on USDA NRCS website
    - Whole lot of acronyms, RCPP, EQIP, ACEP
  - Outreach opportunities exist with both farmers and conservation groups

Land Trusts and Regional Conservation Groups

- Fairly straight forward
- Email info
- Attend their meetings
- Show you're a willing partner
- Examples include; easements to protect property or practices that stabilize soils, create buffer strips, address nutrient management, manure storage, pollinator and wildlife habitat

Farmers

- Knowledge of landowners and past history is important
  - Some family farms have been in existence just as long or longer
  - Have great memories – you sold your land, took my family's
  - Don't want to be told what to do but often appreciate advice
  - Their long term vision for their land is important to understand
  - In many ways they are impacted by similar issues drought/rain, atv's, encroachments
  - Praise them for their role in helping keep land open
  - Relationships are key – learn about their work

Most Important: Be constructive when working to resolve issues.

Photo courtesy of Warner Brothers

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Thank you!!!