



Upper Goose Creek, Cromwells Run and Little River Implementation Plan



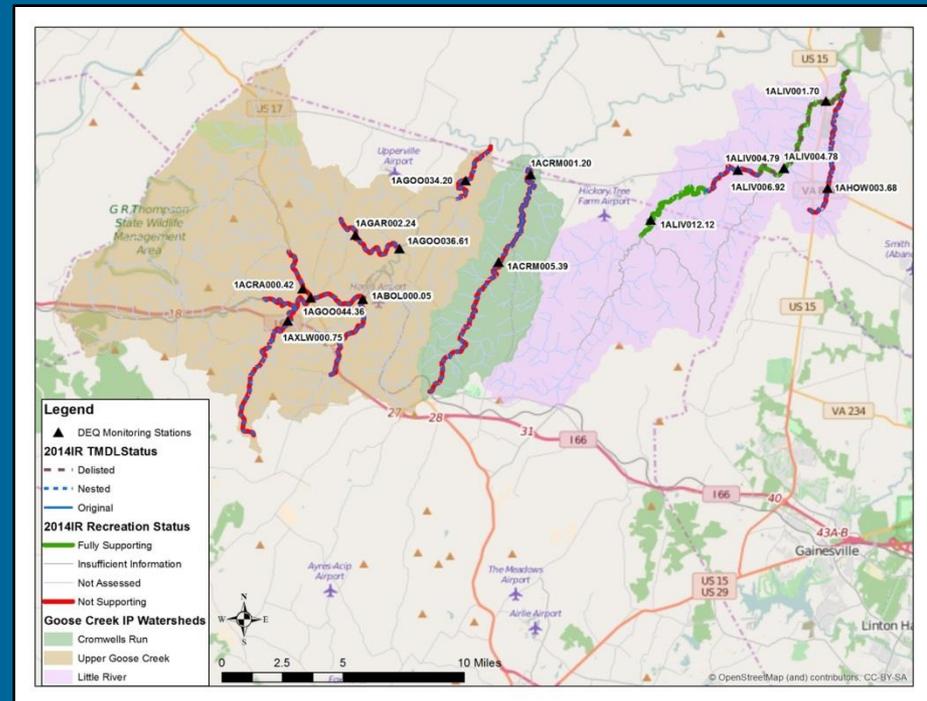
Photo taken in the Goose Creek IP area, Feb 29, 2016

June 21, 2016
First Public Meeting

Why are we here?

Virginia Department of Environmental Quality has measured excessive bacteria levels in:

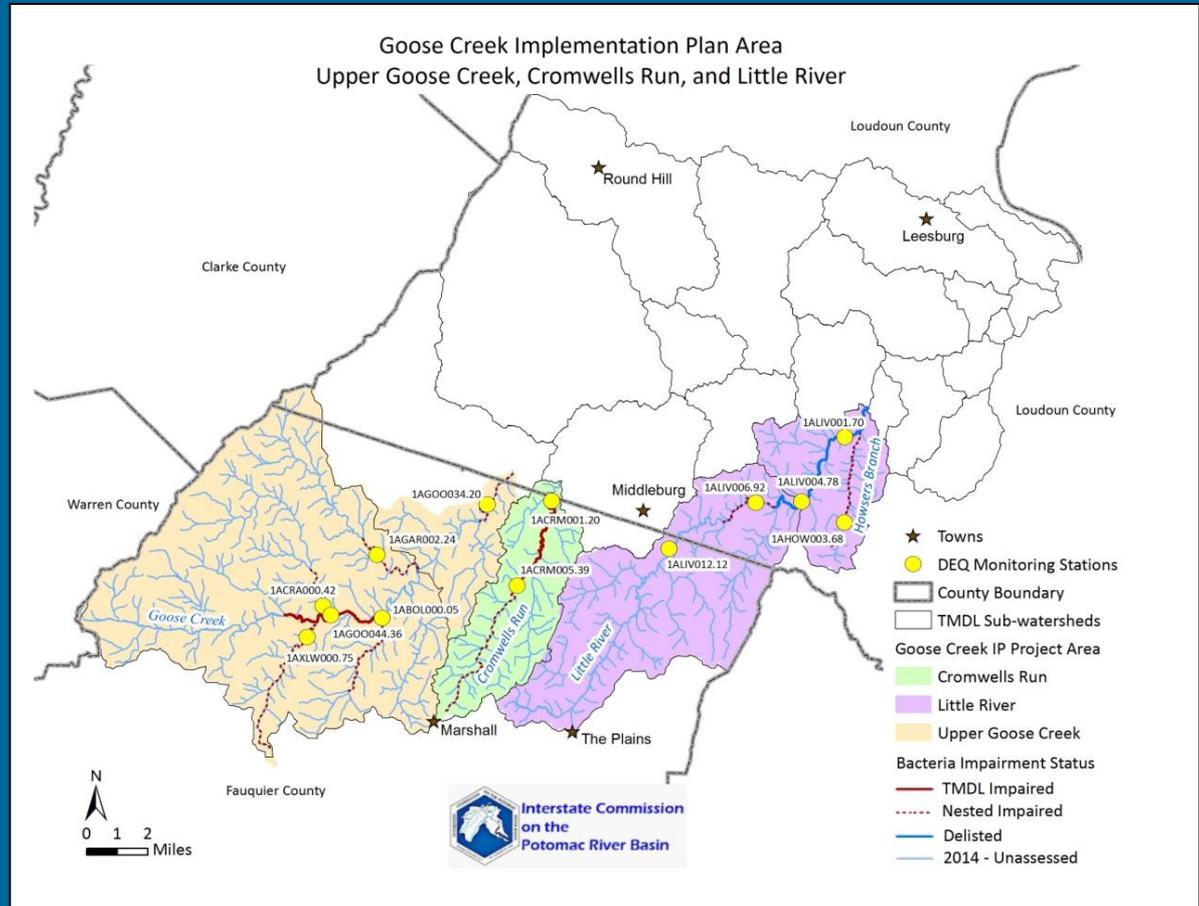
- Goose Creek
- Goose Creek UT
- Gap Creek
- Bolling Branch
- Crooked Run
- Cromwells Run
- Little River
- Howsers Branch



We are here to discuss a process to clean-up these streams and improve water quality

Background

- Placed on VA list of impaired waters due to elevated bacteria levels
- TMDLs developed for impaired segments in 2003
- Implementation Plan (IP) covers Upper Goose Creek, Cromwells Run, and Little River
- Loudoun and Fauquier Counties
- 165 sq. mi. (42% of Goose Creek Watershed)



A TMDL is a “pollution budget”, or the maximum amount of bacteria a stream can assimilate without exceeding water quality standards

What are fecal bacteria?

- Organisms associated with feces from warm-blooded animals (fecal coliform, *E. coli*)

Why should we care?

- Fecal matter can contain bacteria, parasites, and viruses
- Examples: *E. coli*, *Cryptosporidium*, Hepatitis
- Acute effects (diarrhea and infections)
- Chronic or ultimate effects (ulcers, arthritis, death)
- The bacteria themselves are indicators of the potential for pathogens



How are excessive fecal bacteria determined?

- DEQ collects and sends water sample to laboratory
- Results compared to water quality standard for recreation in fresh water (235 cfu/100ml)

After the TMDL: What's Next?

TMDL



What pollutant reductions are needed to meet water quality standards?



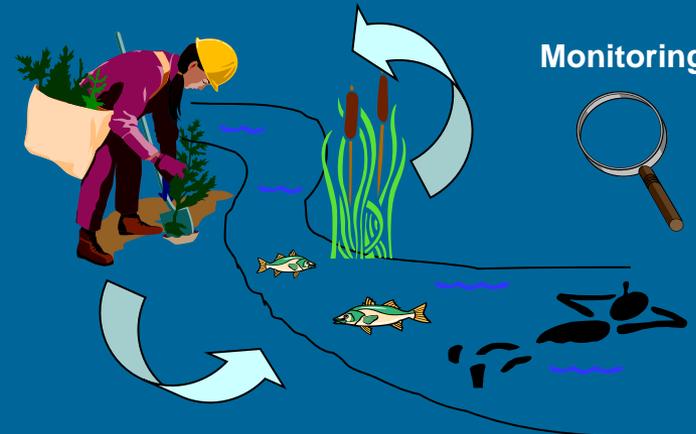
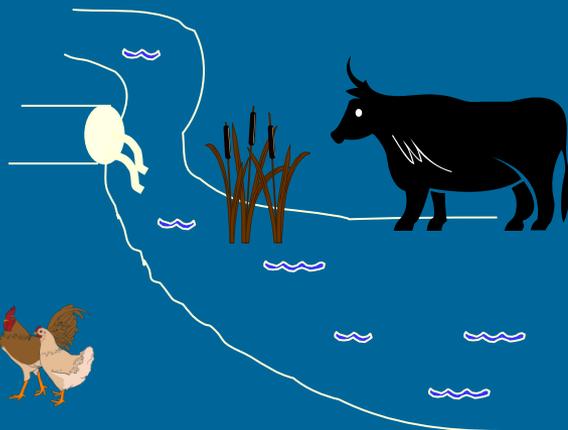
What will it take to restore water quality and how can fixes be implemented?

Implementation

Getting BMPs on the ground

Monitoring

Water quality standards not met



TMDL Implementation Plan Contents

Needed bacteria reductions

- Review and update of TMDL study
- Implementation actions quantified
- Cost and benefits

IP implementation strategy

- Measurable goals/milestones
- Stakeholders' roles
- Integration with other plans
- Potential funding sources

Determining inputs/outcomes

- Public participation



Pasture lands in the Goose Creek IP area, Feb 29, 2016

Updates: 2003 TMDLs

- 13 years old
- Revised methods:
 - Reporting bacteria loads
 - Pet waste
- Updated data:
 - Land use
 - Population
 - Point sources
 - Livestock, wildlife, pets
 - Water quality conditions

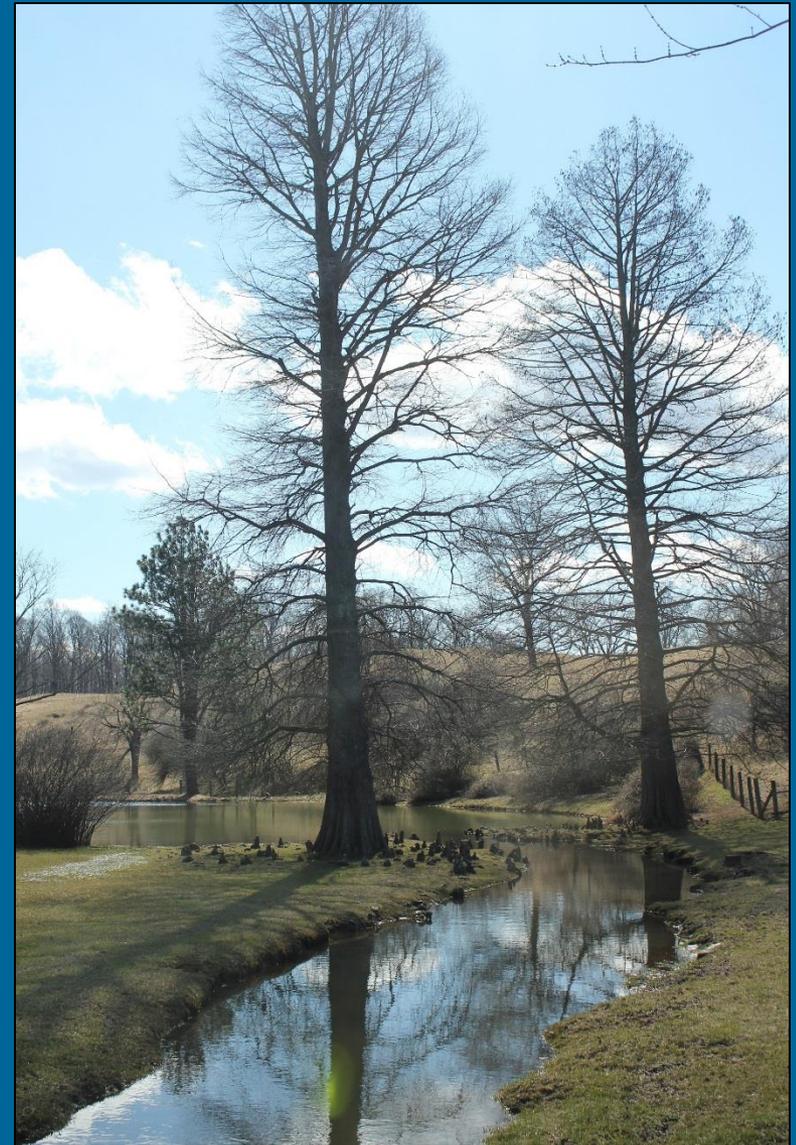
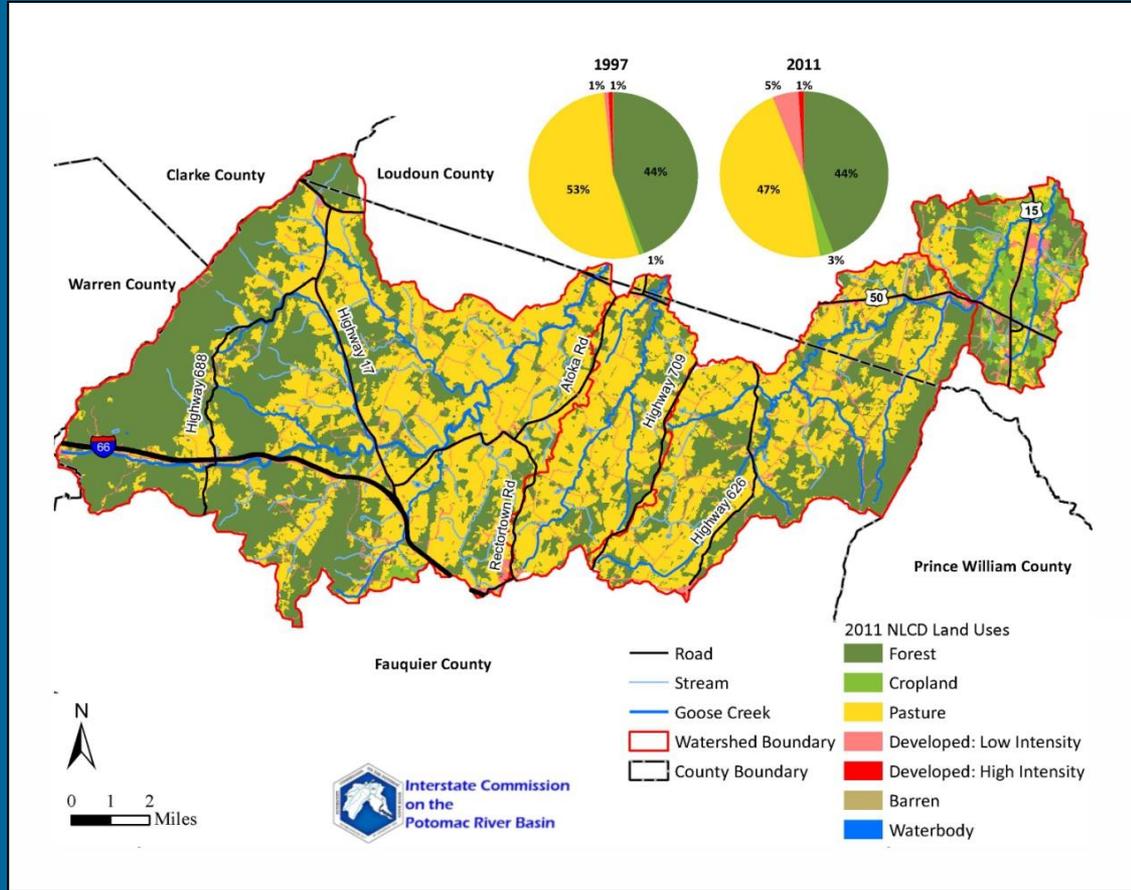


Photo taken in the Goose Creek IP area, Feb 29, 2016

TMDL Update: Land Use

- Compared 1997 to 2011 data by 7 major land use classes
- Largest change found in developed lands
- Majority of residential and commercial development in northeast Little River sub-watershed
- The IP area remains predominately forest and pasture





TMDL Update: Land Use



Land Use Type		Land Use Percent Change by Sub-Watershed 1997-2011		
		Upper Goose Creek	Cromwells Run	Little River
Pervious	Forest	3	4	-5
	Cropland	-47	-100	420
	Pasture	-9	-6	-17
	Developed (Pervious)	458	362	523
Impervious	Developed (Impervious)	3	56	87
	Barren	-100	-100	-85



TMDL Update: Bacteria Sources

Permitted Sources

- Virginia Pollution Discharge Elimination Systems (VPDES)

Residential

- Straight pipes, failing septic systems, pets
- Direct to stream; residential landuse runoff

Agricultural

- Dairy, beef, horse, sheep
- Direct to stream; pasture & cropland runoff

Wildlife

- Deer, turkey, goose, ducks, muskrat, raccoon, beaver
- Direct to stream; forest & agricultural landuse runoff

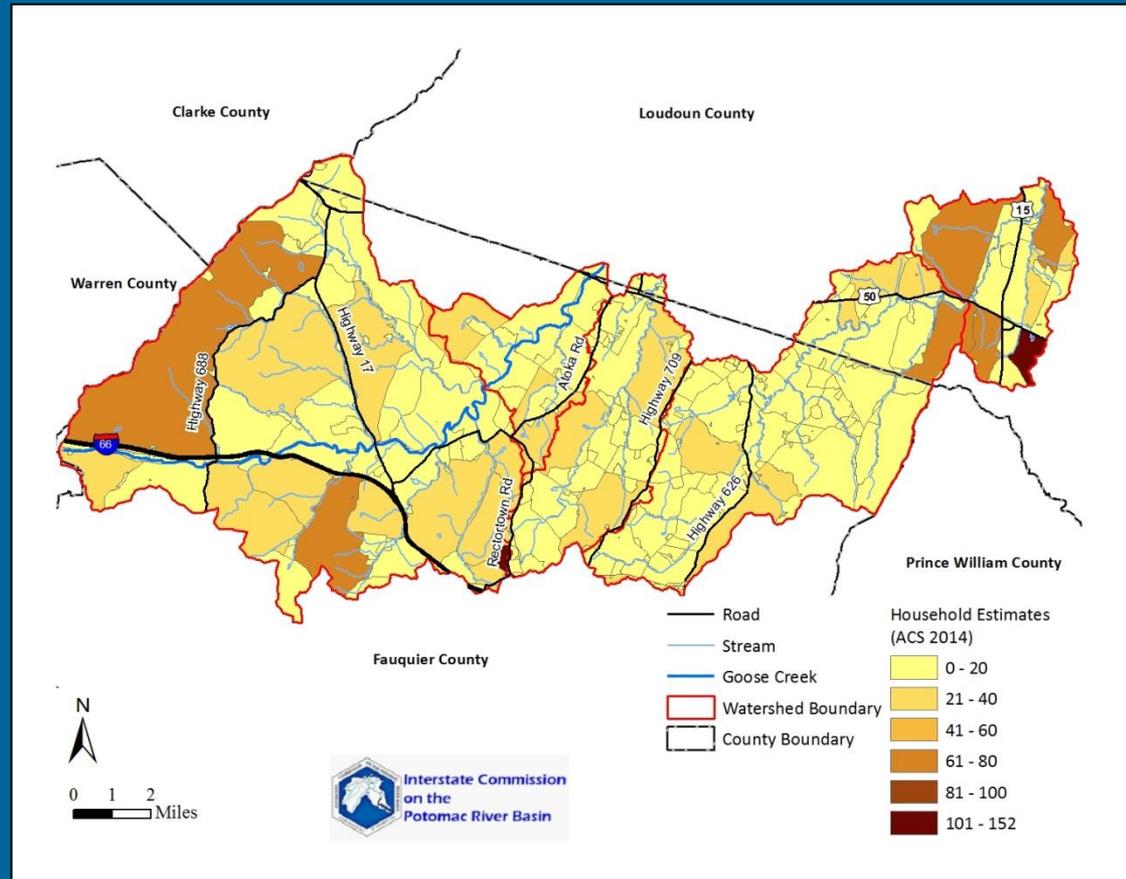
Biosolids application data was also updated though it is not considered to be a source for bacteria when applied according to permit requirements (adequate buffers, etc)



TMDL Update: Population & Households



- Compared population and household information from 2000 census and 2014 American Community Survey
- IP area experienced a population increase of 12% (2000-2014)
- Number of households increased 9.5%

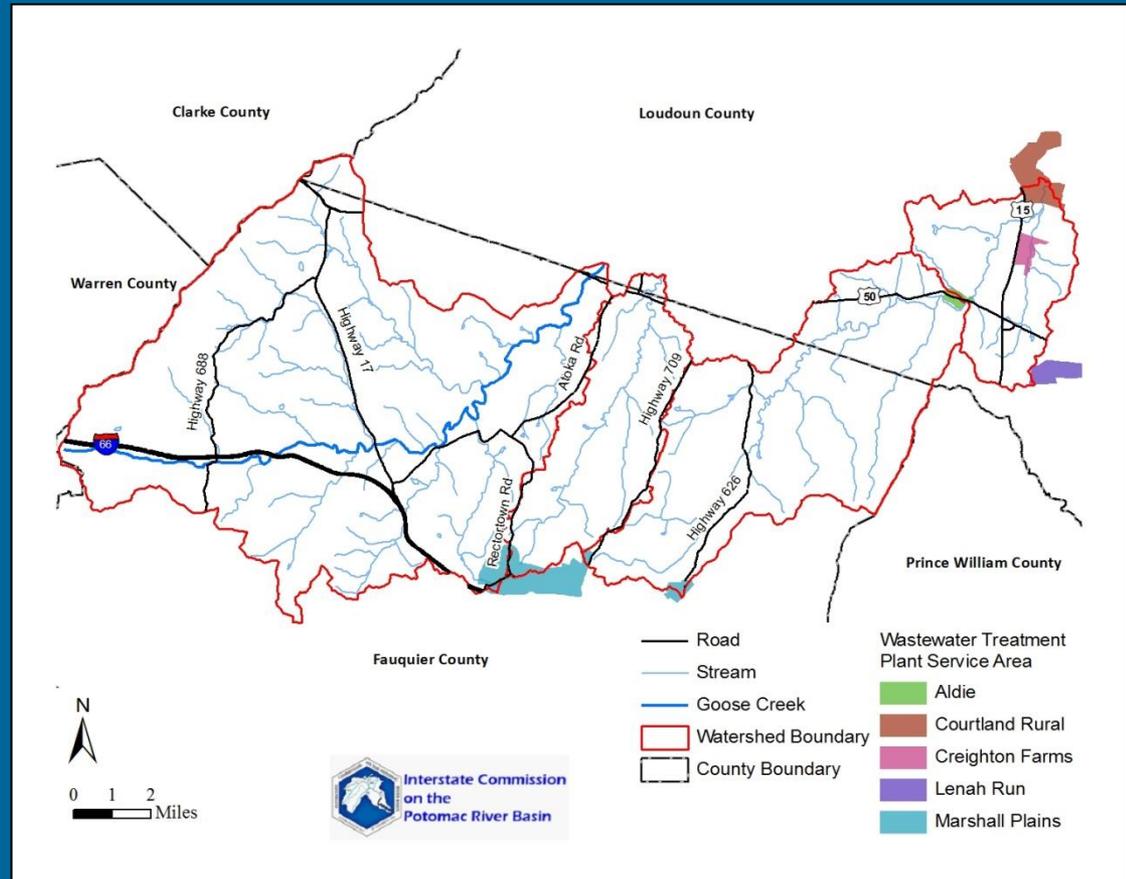




TMDL Update: Wastewater Treatment Plants



- Five systems
- Aldie Wastewater Treatment Plant discharges directly to Little River
- Lenah Run and Courtland Rural will be decommissioned - communities will be linked to Loudoun Water primary treatment facility





TMDL Update: Septic Systems



- Estimated using 2014 household data outside of wastewater system service areas
- Septic system data provided by Health Departments used to verify methodology
- Estimated septic system failure rate is 1.6%
- No known straight pipes in the IP area

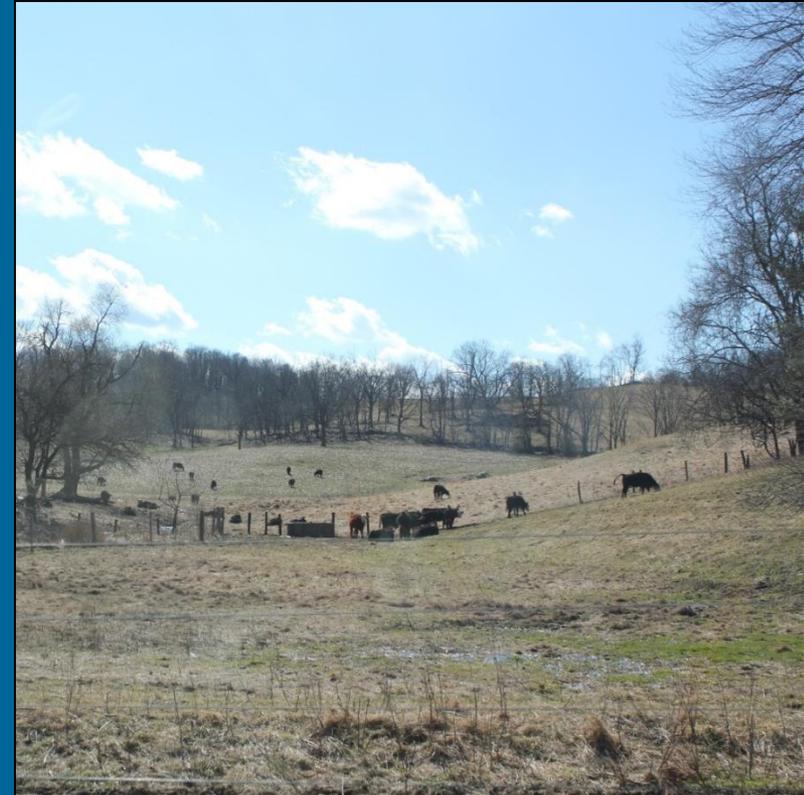
Sub-watershed	Septic Systems % Change (2003-2014)
Upper Goose Creek, Segment 210	-18
Upper Goose Creek	6
Cromwells Run	-21
Upper Little River	0
Little River	94
Total	9

TMDL Update: Livestock

- Compared livestock numbers between 2002 and 2012 Ag Census
- Assumed equal spatial distribution across the pasture land use class

Livestock Percent Change by Sub-watershed (2002-2014)

Sub-watershed	Beef Cattle	Dairy Cattle	Sheep	Horses
Upper Goose Creek	5%	-31%	-31%	-11%
Cromwells Run	9%	-29%	-29%	-8%
Little river	13%	-68%	13%	37%
Total	8%	-35%	-13%	3%



Cattle grazing in the Goose Creek IP area, Feb 29, 2016

TMDL Update: Wildlife

Original wildlife population numbers are being used due to limited updated data



Photo courtesy of USDA NRCS

Sub-watershed	Deer	Raccoon	Muskrat	Beaver	Turkey	Goose	Duck
Upper Goose Creek, Segment 210	622	232	540	76	29	149	59
Upper Goose Creek	2,743	1,812	4,677	487	231	1,014	406
Cromwells Run	1,012	467	1,368	121	45	242	97
Upper Little River	1,403	1,011	3,487	243	110	517	207
Little River	777	375	1,147	98	38	187	75
Total	6,557	3,897	11,219	1,025	453	2,109	844

TMDL Update: Pets

- Pet population tied directly to human population and number of households
- Estimated 20% increase in number of dogs since 2002
- Largest increase in Little River sub-watershed



Photo by ICPRB, April 17, 2016



Reductions Required for Delisting



Load Reductions (%)	Bacteria Sources					
	Failing Septic Systems	Residential	Cattle Direct	Pasture	Cropland	Wildlife Direct
Upper Goose Creek, Cromwells Run and Little River Watersheds	100	75	100	75	75	10

Note: Delisting requires <10.5 % exceedance of the bacteria standard

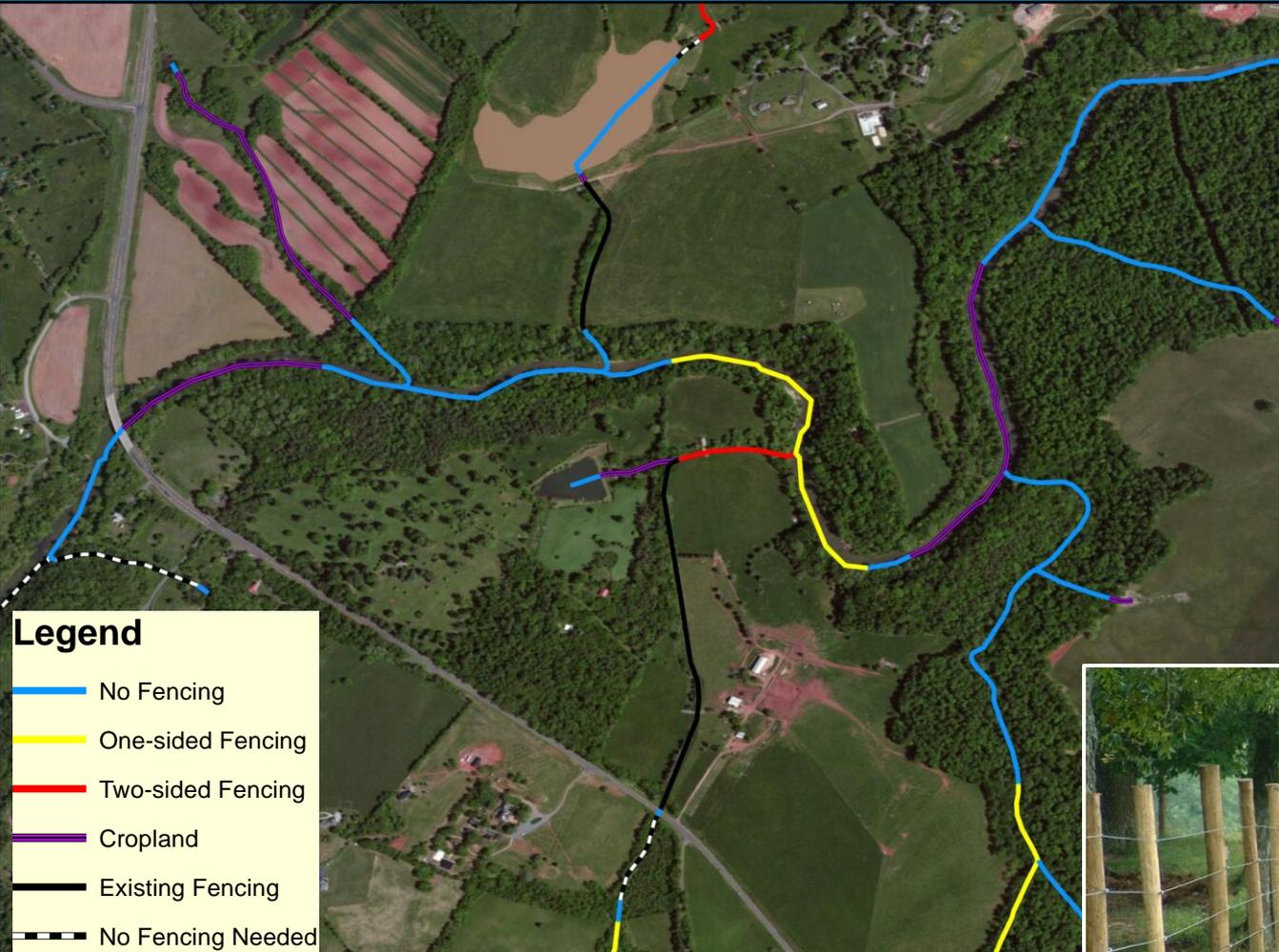


Implementation Actions

- Identify control measures to reduce bacteria
 - Quantify control measures and technical assistance needed to implement actions
 - Estimate cost to implement
 - Determine benefits of implementation
 - Environmental, economic, human, and herd health
- > 50% of cattle diseases in the Mid Atlantic are transmitted through the fecal oral pathway*

Potential Agricultural Control Measures

Exclusion fencing

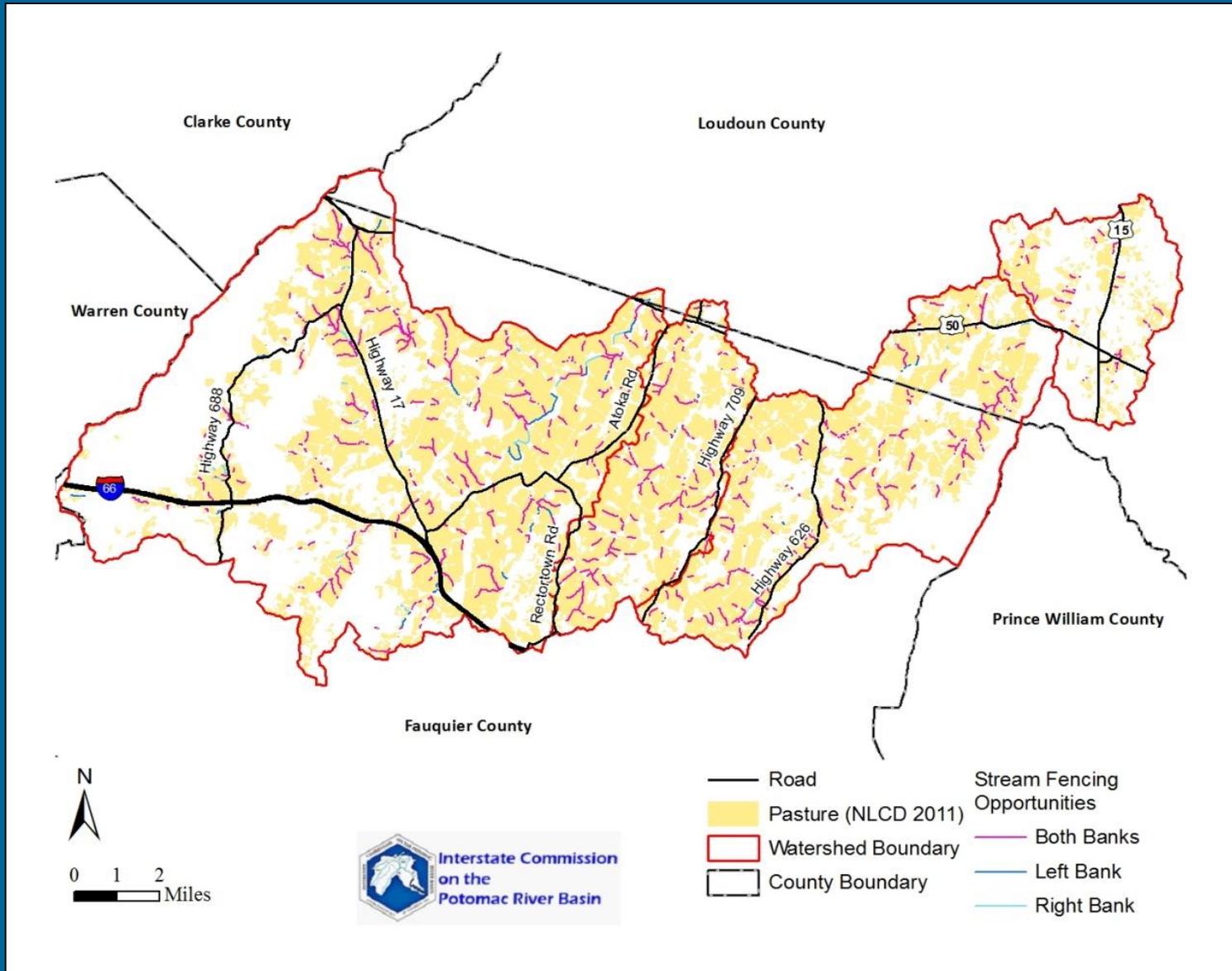


- Legend**
- No Fencing
 - One-sided Fencing
 - Two-sided Fencing
 - Cropland
 - Existing Fencing
 - - - No Fencing Needed

Example of method for identifying exclusion fencing opportunities, Upper Rapidan watershed.



Livestock Exclusion Fencing





Potential Agricultural Control Measures



Hardened Crossing



Permanent Vegetative Cover



Watering Trough



Rotational Grazing



Reforestation

Potential Residential Control Measures



Septic System Pump-out



Septic System Replacement



Septic System Repair



Alternative On-site Sewage Disposal System

Potential Residential Control Measures



Pet Waste
Composters



CCU
Waste Treatment



Vegetated Buffer



Pet
Waste
Station



Bioretention (rain garden)



Infiltration Trench

Control Measure Quantification

- Spatial analysis
- DCR Agricultural BMP Database
- SWCD, VDH, and DEQ records
- TMDL development document
- Input from working groups and steering committee



Stream fencing, Goose Creek IP Area, Feb 29, 2016

Implementation Cost

Control Measure Installation Cost

- Number of units multiplied by unit cost

Technical Assistance (TA)

- Full time equivalents multiplied by unit cost

$$\text{Total Cost} = \text{Installation Cost} + \text{TA Cost}$$



Measurable Goals & Milestones

Establish goals

- Removal from Impaired Waters List
- Meet TMDL Allocations

Create milestones

- Implementation
- Water quality

Evaluate progress

- SWCD and VDH track installations
- VADEQ monitors water quality
- Steering Committee reviews and suggests changes if milestones not being met



Exclusion Fencing with Buffer



Forested Buffer Zone



Stakeholders



Regional / Local

- Counties & Towns landowners and governments
- Soil and Water Conservation Districts
- Local Watershed Groups
- Rappahannock Rapidan Regional Commission

State

- Department of Conservation and Recreation
- Department of Environmental Quality
- Department of Health
- Cooperative Extension
- Department of Forestry
- Department of Game and Inland Fisheries
- Virginia Outdoors Foundation

Federal

- USDA – Natural Resources Conservation Service
- United States Environmental Protection Agency

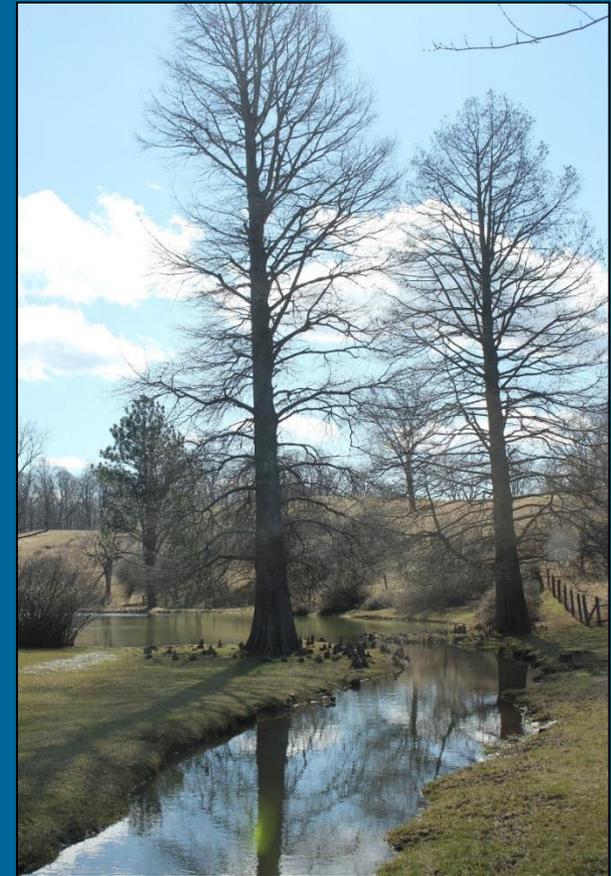


Photo taken in the Goose Creek IP area, Feb 29, 2016



Potential Funding Sources

Federal

- Federal Clean Water Act Section 319 Incremental Funds
- USDA Conservation Reserve Enhancement Program (CREP)
- USDA Conservation Reserve Program (CRP)
- USDA Environmental Quality Incentives Program (EQIP)
- USDA Regional Conservation Partnership Program (RCPP)
- U.S. Fish & Wildlife Service Conservation Grants

State

- VA Agricultural BMP Cost-share & Tax Credit Programs
- VA Water Quality Improvement Fund
- VA Forest Stewardship Program
- VA Small Business Environmental Compliance Assistance Fund
- VA Clean Water Revolving Loan Programs
- VA Outdoors Foundation
- Community Development Block Grant Program

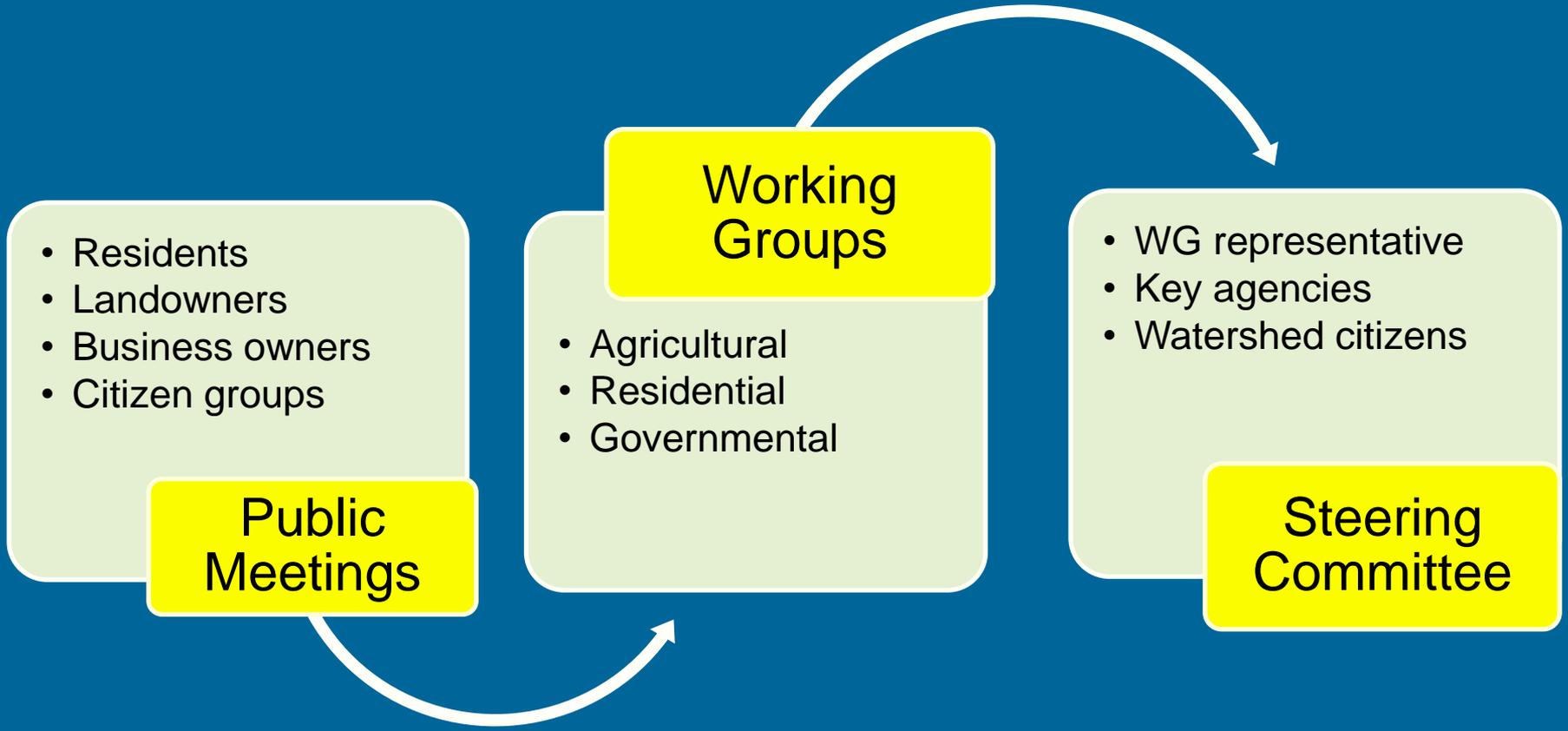
Regional, Local, Private

- Southeast Rural Community Assistance Project
- National Fish and Wildlife Foundation
- Trout Unlimited
- DOF Urban Trees





Public Participation



Public Meetings

- ▶ Provide forum for public comment
- ▶ First meeting
 - Offer overview of TMDL program
 - Kick-off implementation plan process
 - Solicit participation in working groups and steering committee
- ▶ Final meeting
 - Present draft TMDL Implementation Plan



Working Groups

- ▶ Inform Resource Team about perceived pollutant sources and on-going/needed pollution control activities
- ▶ Review possible implementation strategies from an interest-based perspective
- ▶ Discuss alternative funding sources
- ▶ Identify outreach methods for engaging peers in implementing pollution control measures
- ▶ Identify constraints to implementing pollution control measures





Steering Committee



- ▶ Provides overall oversight in IP process
- ▶ Examines recommendations from working groups and public meetings
- ▶ Reviews watershed implementation plan
- ▶ Continues oversight during implementation and revises plan if needed



Roles Citizens Can Play During Implementation Plan Development



- ▶ Provide additional detail on watershed
- ▶ Review/suggest implementation strategies
- ▶ Identify potential implementation impediments
- ▶ Identify local funding sources/partnerships
- ▶ Assist with implementation projects





Goose Creek Implementation Plan Timeline

May 2016

- ICPRB and RRRC contracts in place
- TMDL study updates

June 2016

- First Public Meeting
- AWG and RWG Meetings

September
2016

- 2nd AWG and RWG Meetings
- GWG Meeting

November
2016

- Steering Committee Meeting
- Draft document

December
2016

- Final Public Meeting
- Draft Implementation Plan

January
2017

- Final Implementation Plan
- Technical Report



And remember.....

TMDLs and IPs are a mechanism for restoring water quality and are an **opportunity** for diverse groups of people to come together to improve watershed health





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Comments requested before July 21, 2016