



Crooked Run, Stony Creek, & Pughs Run Clean Up Study

Final Community Meeting

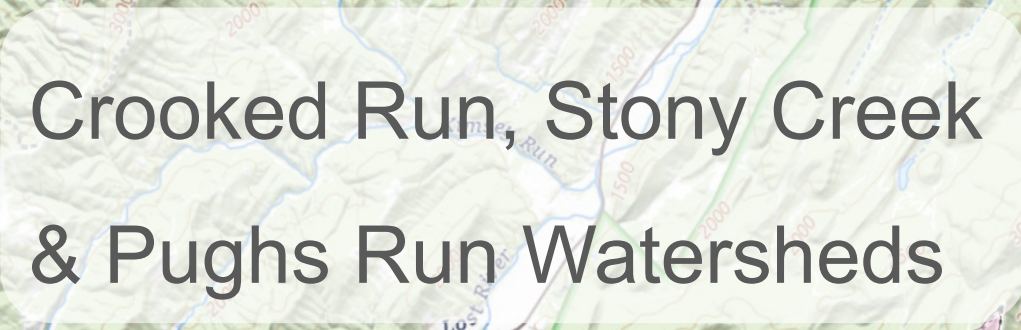
Nesha McRae

TMDL Coordinator, Valley Regional Office

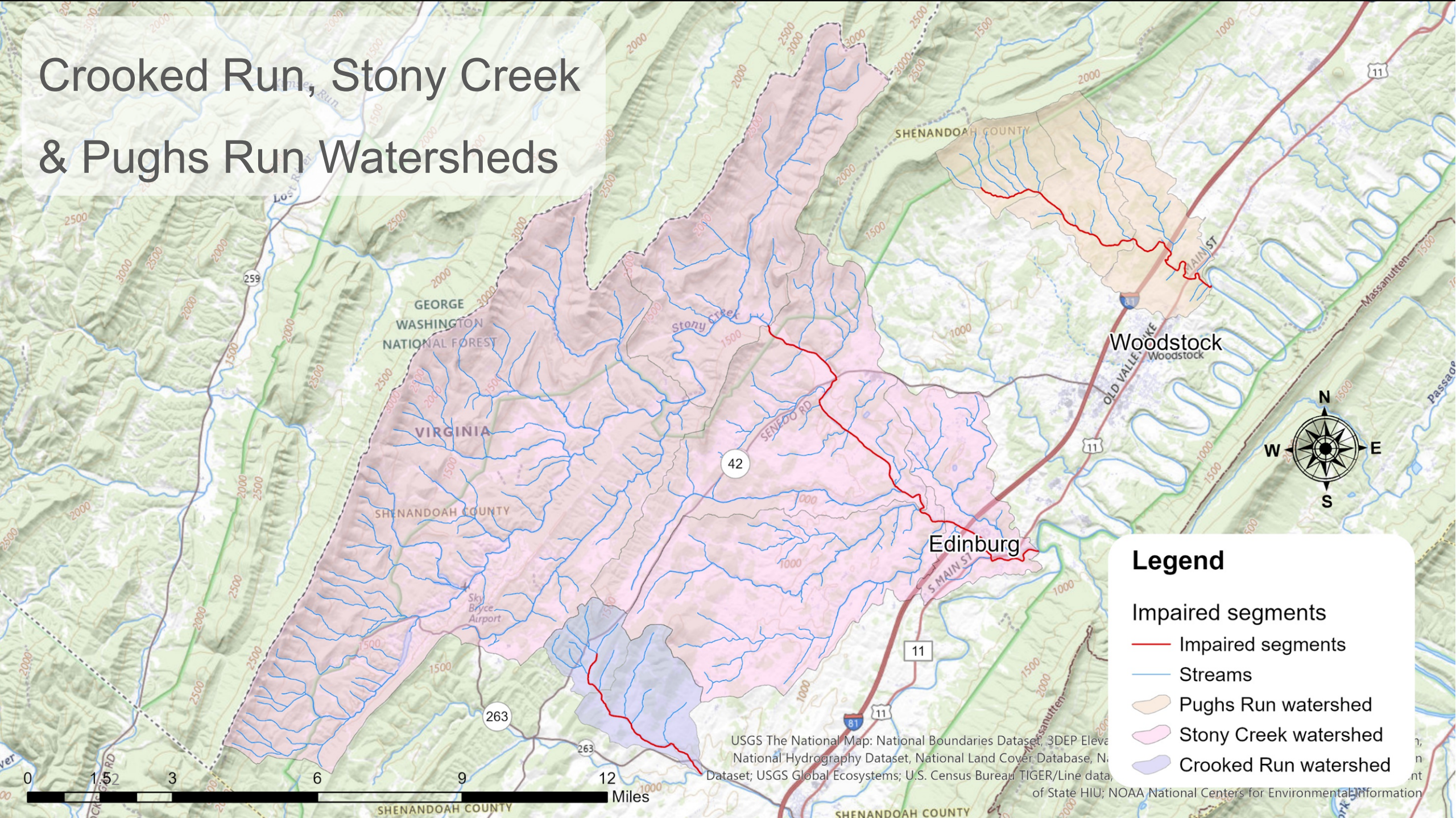
Virginia Department of Environmental Quality

April 9, 2025





Crooked Run, Stony Creek & Pughs Run Watersheds



Why a study?

- Aquatic life designated use
 - All waters should support “*the propagation and growth of a balanced, indigenous population of aquatic life*”
- What does this **mean**?
 - Waters should be free of substances harmful to aquatic life
- Monitor benthic macroinvertebrates (the bugs on the stream bottom) to determine if the standard is met



Why should we care about bugs?

- Consume algae and organic matter → nutrient cycling
- Aquatic food chain
- Our “canary in the coal mine”
- Chemical monitoring = a snapshot in time
 - Long lived
 - Relatively immobile



Determining a biological impairment

- DEQ biological monitoring data (spring and fall)
- VA Stream Condition Index is our barometer
 - Diversity, pollution tolerance, feeding group
 - Target score of ≥ 60
- Crooked Run, Stony Creek and Pughs Run have scores under 60
- Conduct benthic stressor analysis
 - Biological monitoring data
 - Chemical monitoring data
 - Habitat monitoring data



Evidence of sediment as a stressor?

- Community composition
 - Fewer predators and shredders in impaired streams, more filterers and collectors
 - Sediment tolerant organisms more prevalent in impaired streams, sensitive organisms present in lower abundance



Photo: Jan Hamsky; www.lifeinfreshwater.net

More evidence of sediment as a stressor?

- Habitat measurements
 - Nearly all measurements in Crooked Run fell within the suboptimal range
 - Poor riparian vegetation in Pughs Run and significant deposition of sediment on the stream bottom
 - Stony Creek lacking good vegetative cover in riparian areas



What is a TMDL?



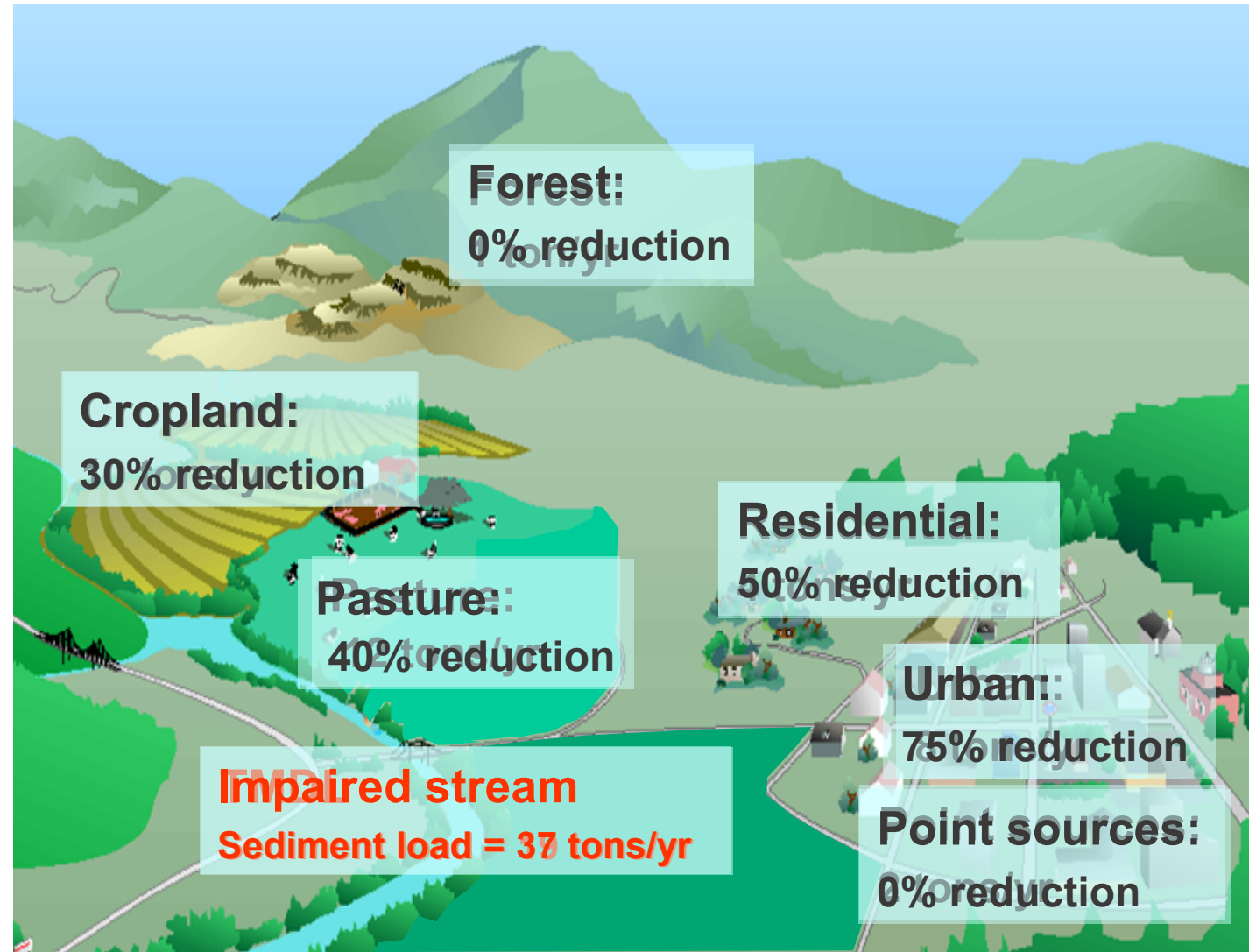
A Total Maximum Daily Load is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards.

How do we develop a TMDL?

What's the magic number?

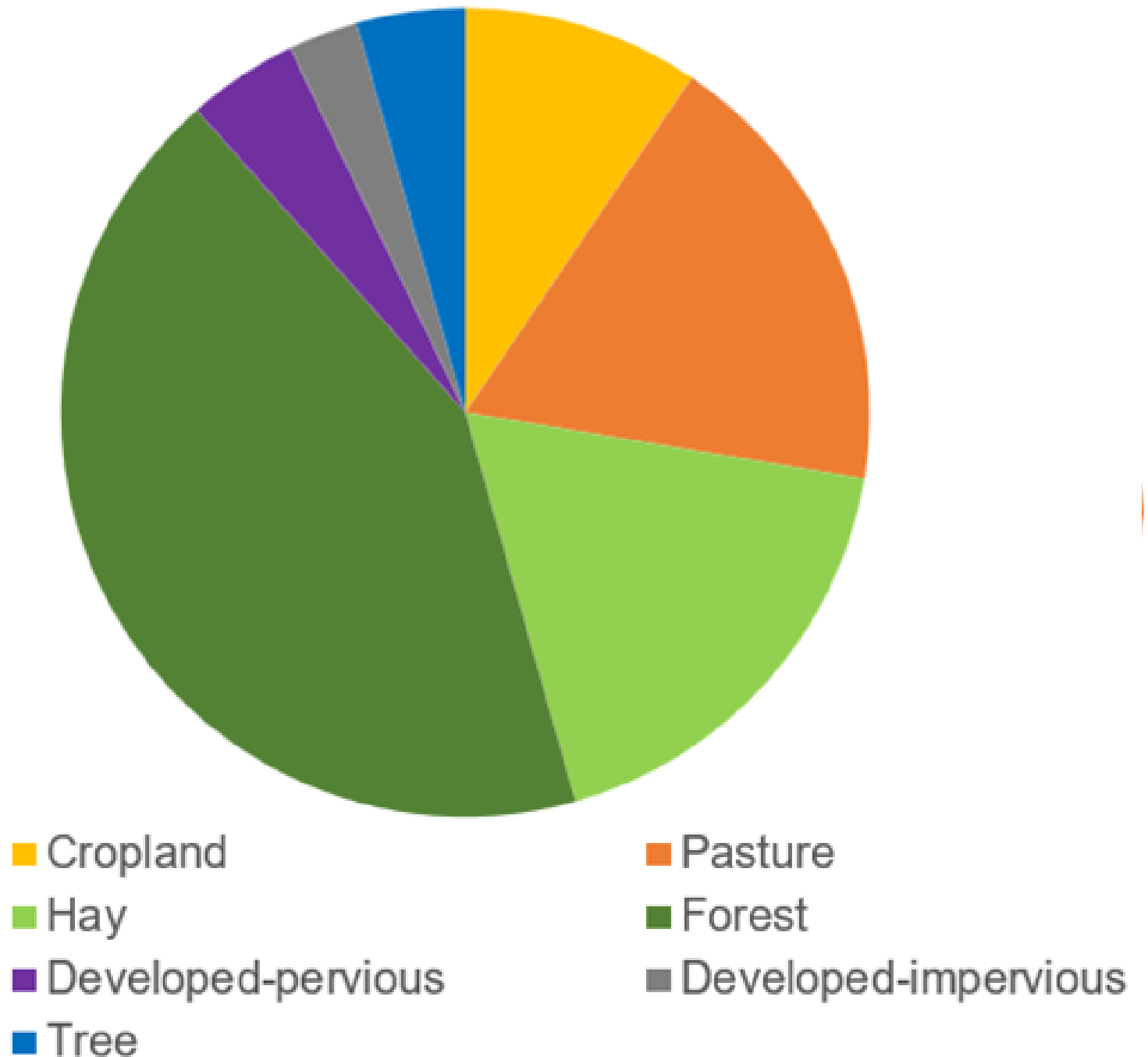
1. Identify sources of sediment
2. Model their path to the stream
3. Determine reductions needed from each source to restore aquatic life

Diagram: Adapted from the Center for TMDL and Watershed Studies at Virginia Tech



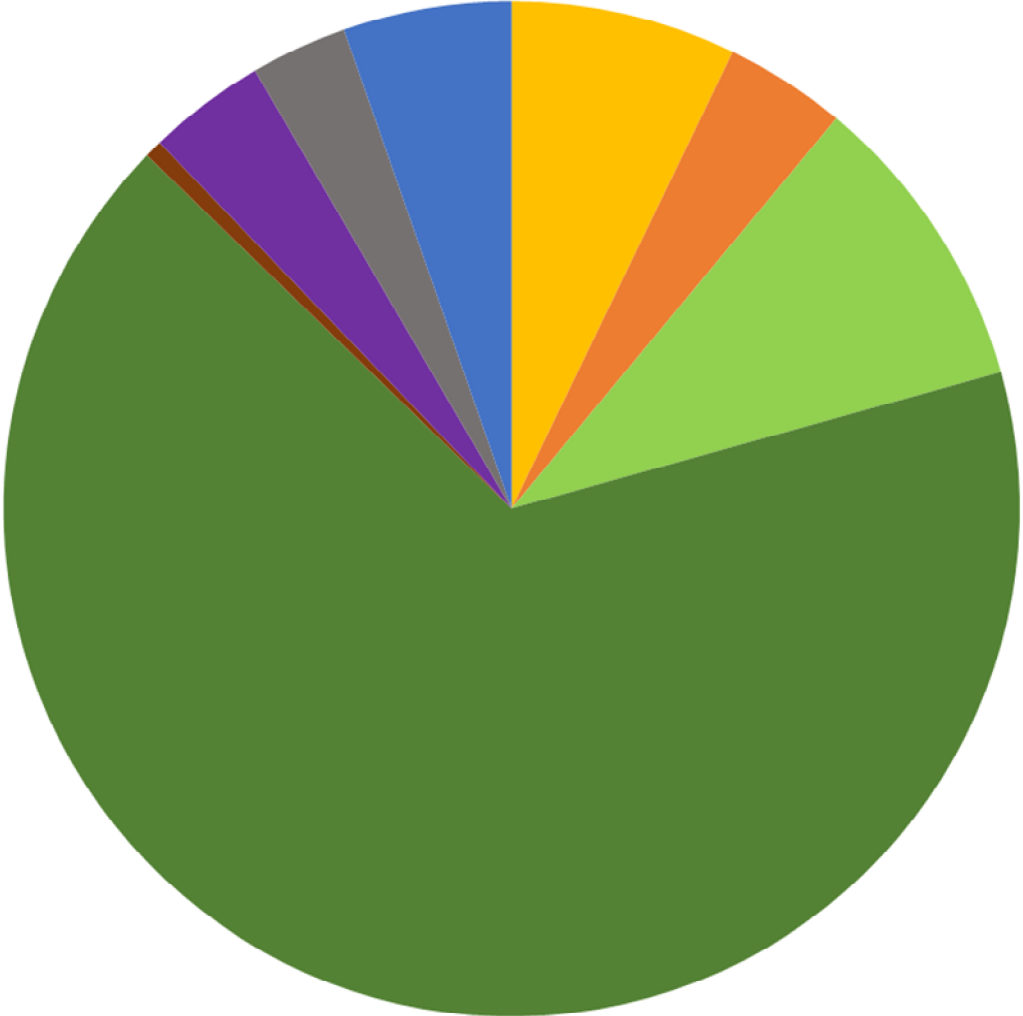
Land Cover in Crooked Run

An estimated 38% reduction in sediment is needed to restore aquatic life in Crooked Run



Land Cover in Stony Creek

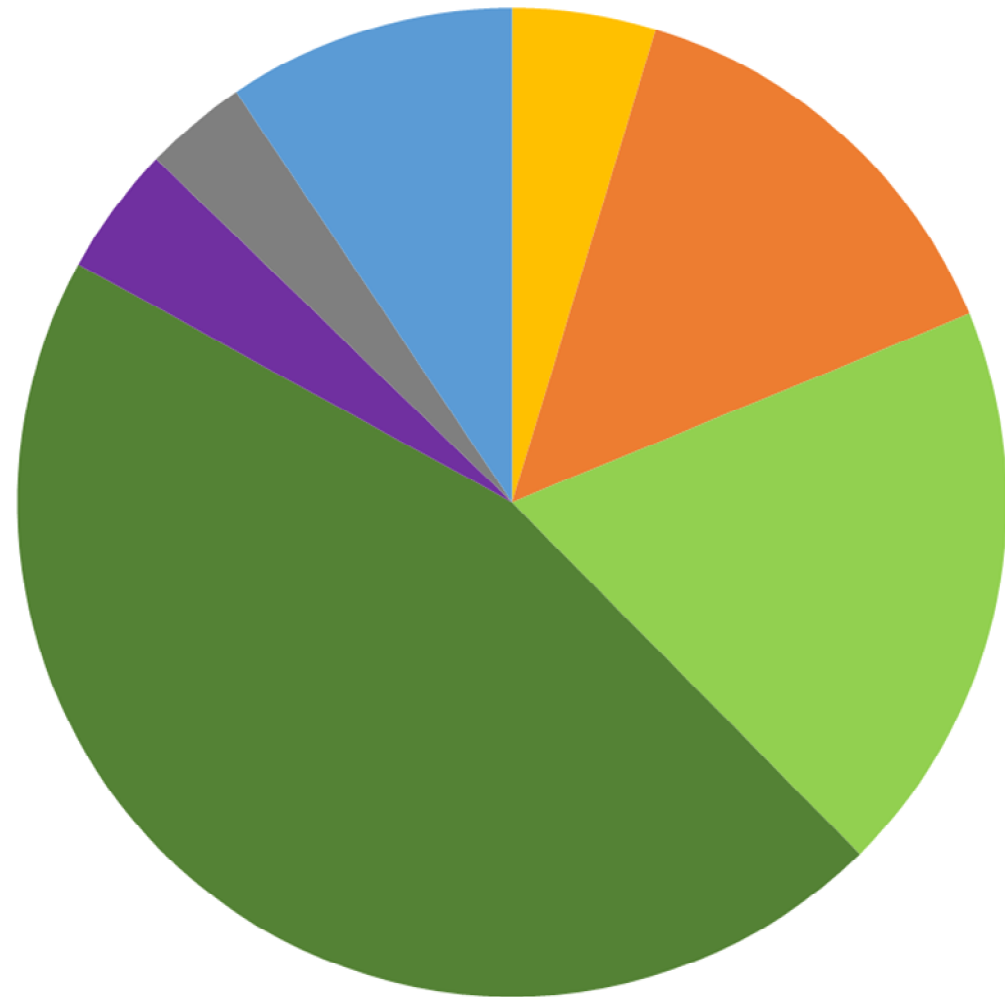
An estimated 10% reduction in sediment is needed to restore aquatic life in Stony Creek



- | | | |
|--------------------|----------------------|--------|
| Cropland | Pasture | Hay |
| Forest | Harvested forest | Barren |
| Developed-pervious | Developed-impervious | Tree |

Land Cover in Pughs Run

An estimated 10% reduction in sediment is needed to restore aquatic life in Pughs Run



- Cropland
- Pasture
- Hay
- Forest
- Harvested forest
- Barren
- Developed-pervious
- Developed-impervious
- Tree

Where do the sediment reductions come from?

Land use category	Sediment Reduction Needed (%)		
	Crooked Run	Stony Creek	Pughs Run
Cropland	56	24	32
Pasture	54	24	32
Hay	36	10	20
Forest, Tree	0	0	0
Harvested Forest	-	5	-
Barren	-	0	-
Developed Pervious	40	18	15
Developed Impervious	40	25	20
Streambank Erosion	30	25	20
Permits	0	0	0

NEXT STEP: Develop a clean up plan to meet these goals



What is in the clean up plan?

- What's already happening
- What else can be done and who can help do it
- What kind of a difference it will make in water quality
- How long it will take
- How we can pay for it
- How we can get the word out



How can you get involved?

- Let's hear from our panel!
 - Dana Gochenour: Lord Fairfax Soil & Water Conservation District
 - Kevin Tate: Alliance for the Shenandoah Valley
 - Seth Coffman: Trout Unlimited
 - Mark Frondorf: Shenandoah Riverkeeper
 - Karen Andersen: Friends of the Shenandoah River
 - Laura Bennett: Friends of the North Fork Shenandoah
 - McKenzie Allen: Shenandoah County Community Development



Questions & Comments

*30-day public comment period
(April 9 – May 9, 2025)*

Send comments to:

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