

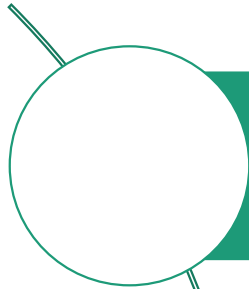


Crooked Run, Stony Creek & Pughs Run Clean Up Study *Community Kick Off Meeting*

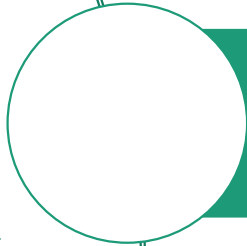
Nesha McRae
TMDL Coordinator, Valley Regional Office
Virginia Department of Environmental Quality
June 18, 2024



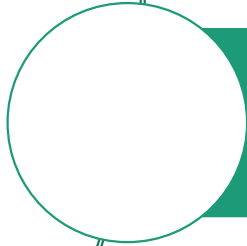
GOALS FOR OUR MEETING



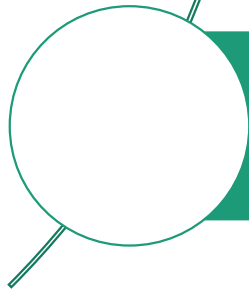
Share what we know about these streams:
Summarize monitoring data, discuss pollutants



Describe process we will use to identify and
address pollution in the streams

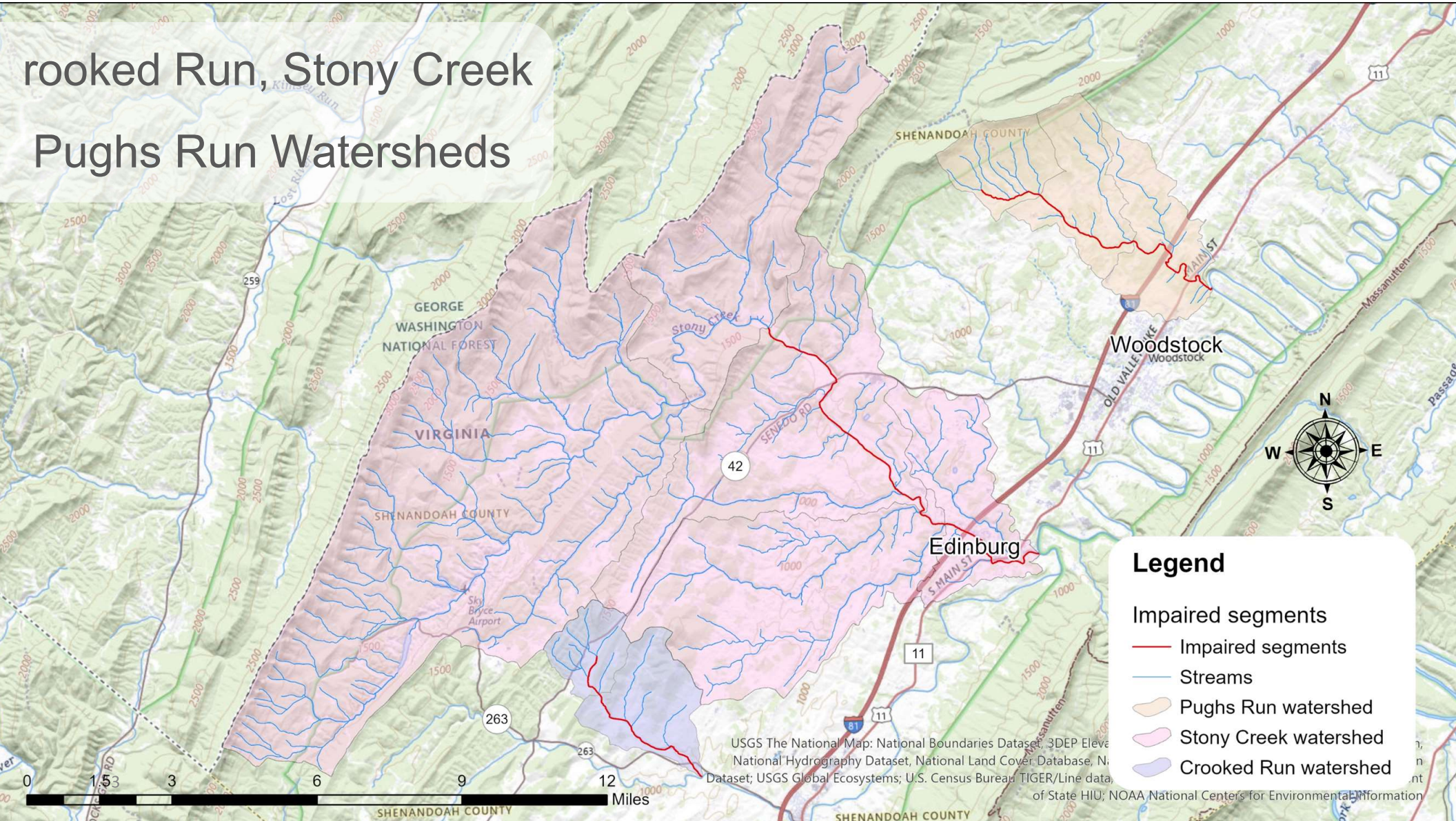


Describe how you can get involved in this process



Answer your questions about this effort

crooked Run, Stony Creek Pughs Run Watersheds



Legend

- Impaired segments
- Streams
- Pughs Run watershed
- Stony Creek watershed
- Crooked Run watershed

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Dataset, National Hydrography Dataset, National Land Cover Database, National Wetlands Inventory, National Wetlands Inventory Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; Virginia Department of Transportation; Virginia Department of State HIU; NOAA National Centers for Environmental Information

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

Photo: Jan Hamrsky: lifeinfreshwater.net



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www.lifeinfreshwater.net

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



Sensitive to pollution: Stoneflies



Photo: Jan Hamrsky: lifeinfreshwater.net

Sensitive to pollution: **Mayflies**



Photo: Jan Hamrsky: lifeinfreshwater.net

Sensitive to pollution: **Caddisflies**



Photo: Jan Hamrsky: lifeinfreshwater.net

Moderately Sensitive: Dragonflies

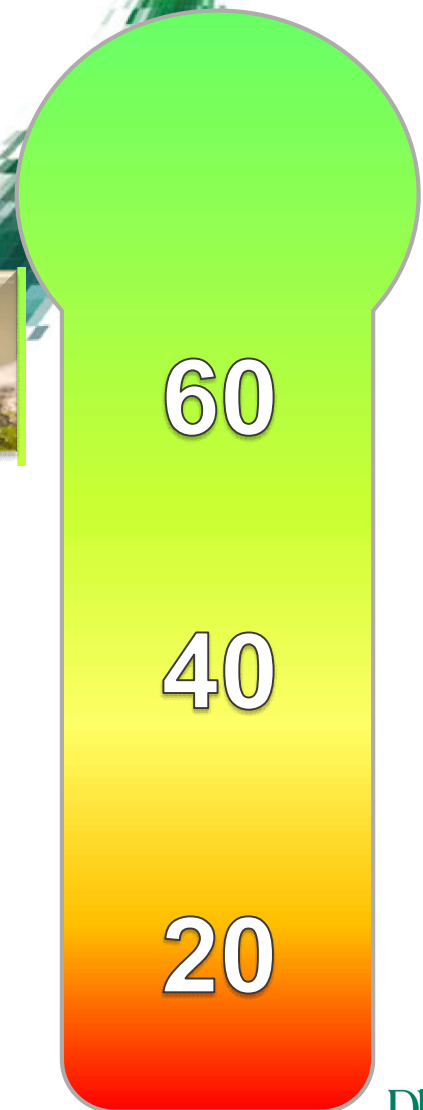


Photo: Jan Hamrsky: lifeinfreshwater.net

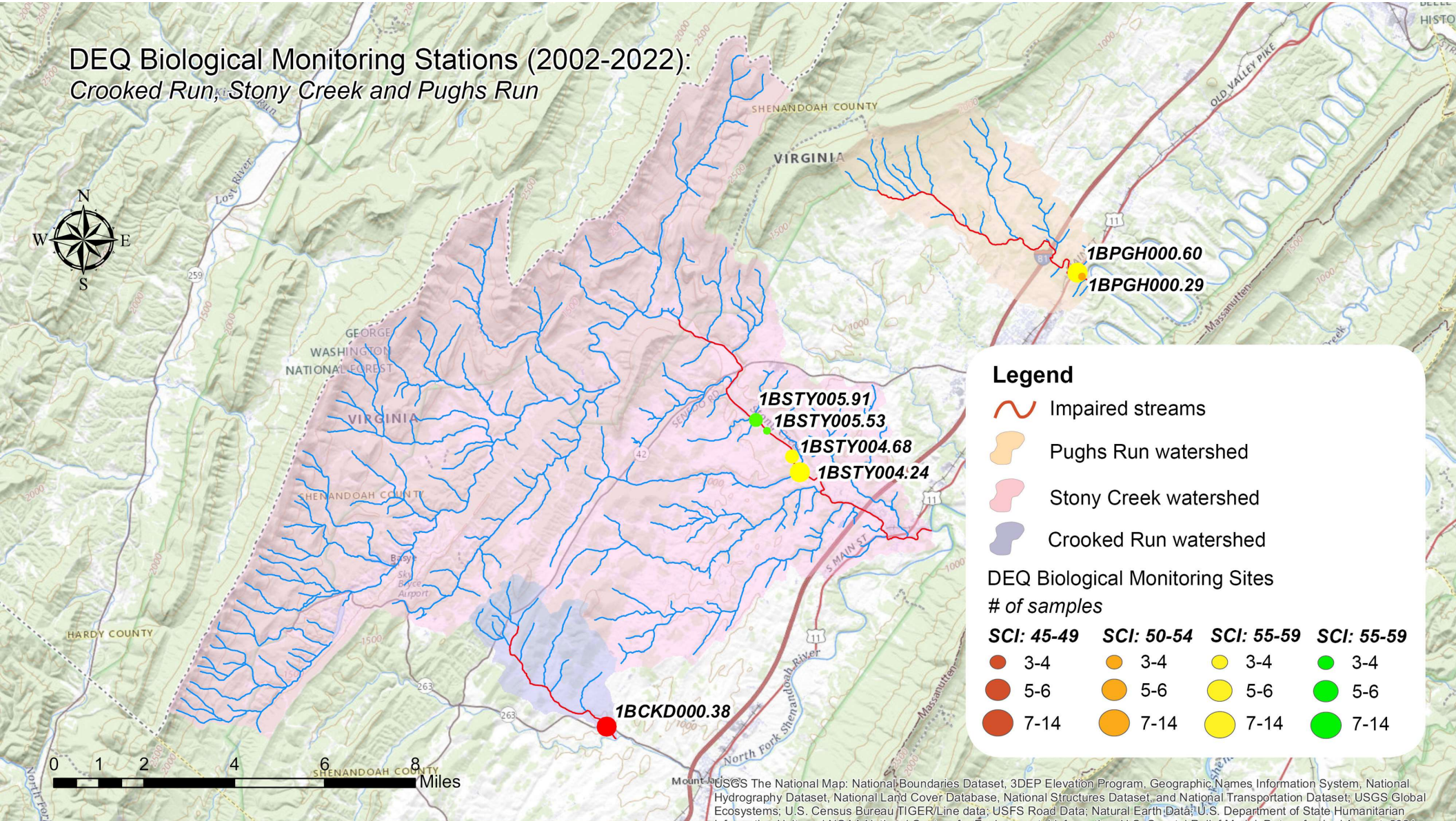
Insenstive to Pollution: **Blackflies**



Virginia Stream Condition Index



DEQ Biological Monitoring Stations (2002-2022): Crooked Run, Stony Creek and Pughs Run



Legend

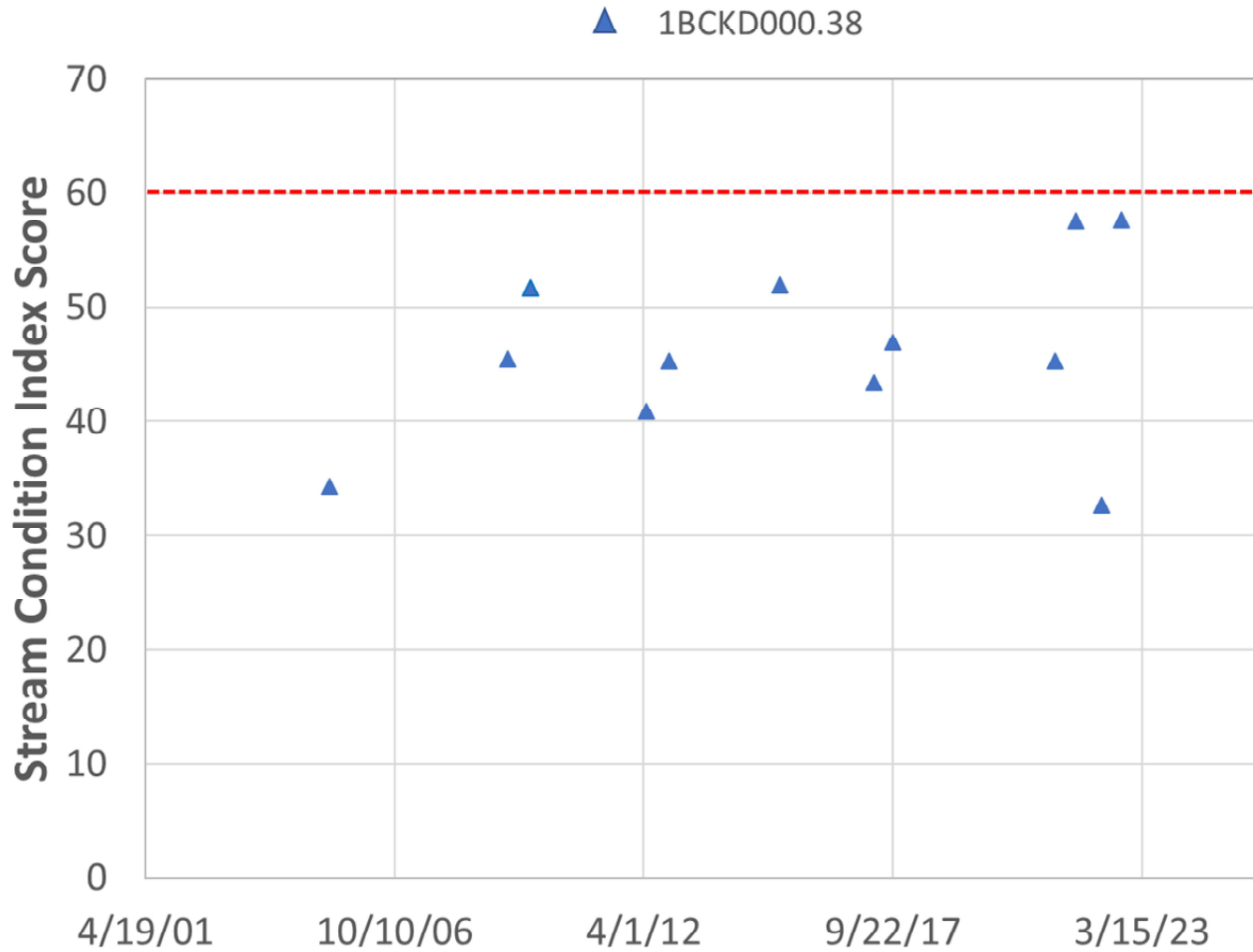
- Impaired streams
- Pughs Run watershed
- Stony Creek watershed
- Crooked Run watershed

DEQ Biological Monitoring Sites # of samples

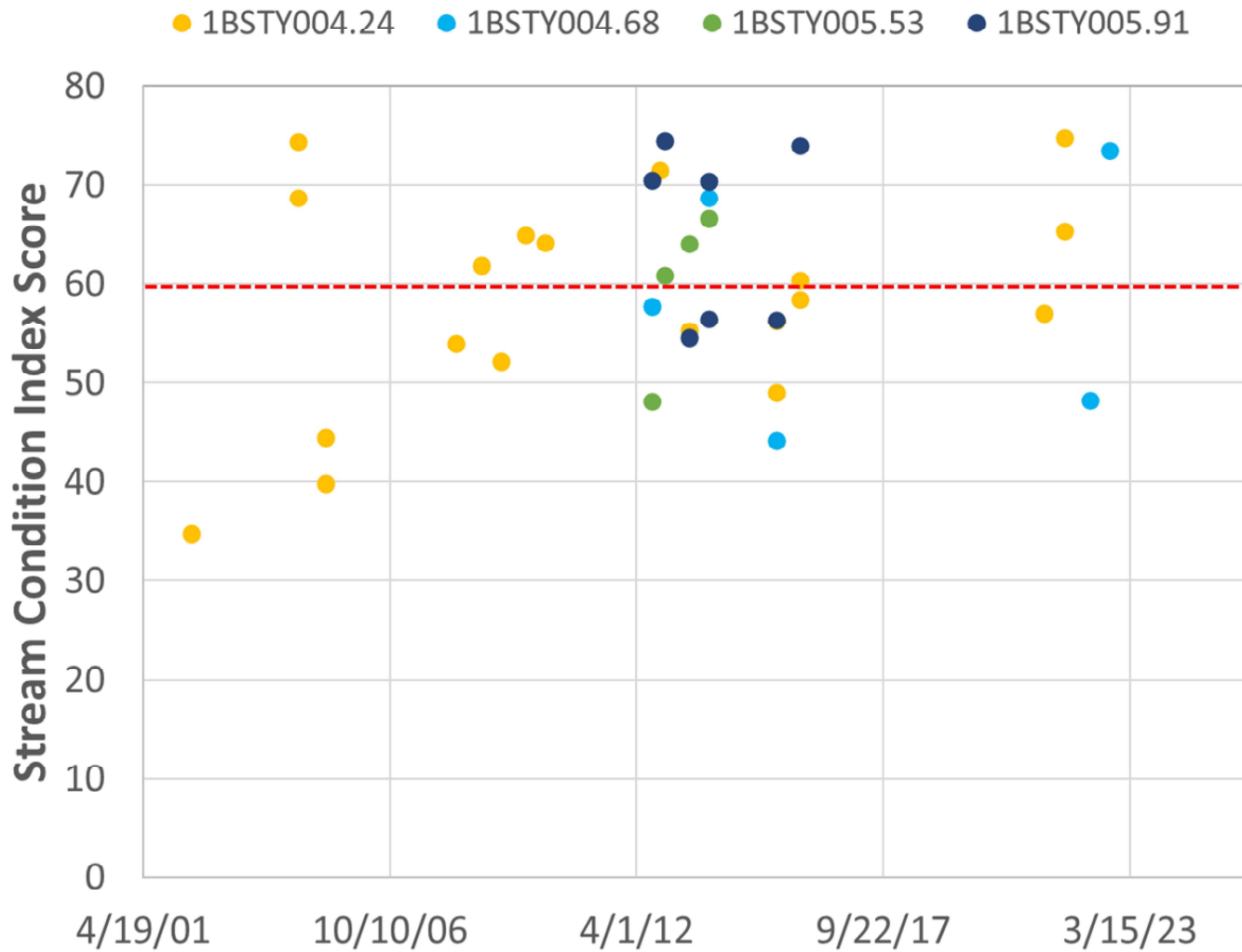
SCI: 45-49	SCI: 50-54	SCI: 55-59	SCI: 55-59
3-4	3-4	3-4	3-4
5-6	5-6	5-6	5-6
7-14	7-14	7-14	7-14

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian

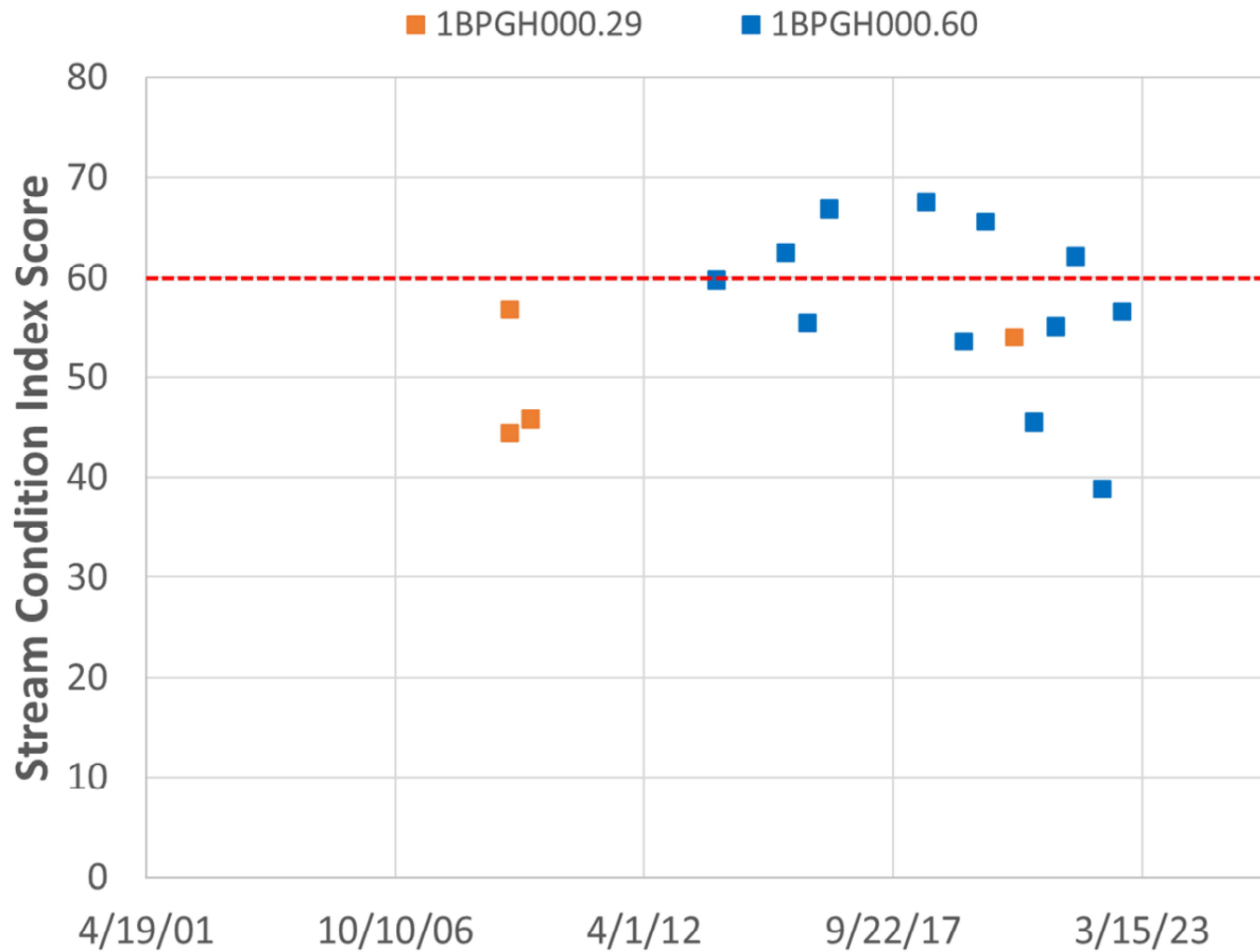
Crooked Run Stream Condition Index Scores



Stony Creek Stream Condition Index Scores



Pughs Run Stream Condition Index Scores



Biological Impairments

Determining the cause:

- Benthic stressor analysis
 - Evaluation of monitoring data
 - Comparison with healthy reference watershed data and stressor thresholds
 - Weight of evidence approach
 - Identification of most likely stressor(s)

Photo: Jan Hamsky; www.lifeinfreshwater.net



Candidate Stressors

- Suspended solids
- Deposited sediment
- Dissolved oxygen
- Phosphorus
- Nitrogen
- Ammonia
- Total dissolved ions
- Dissolved chloride
- Dissolved sulfate
- Dissolved sodium
- Dissolved potassium
- Dissolved metals
- Temperature
- Conductivity
- pH
- Organic matter
- Sediment metals
- Sediment toxics
- Pesticides
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Polychlorinated Biphenyls (PCBs)



Weighing the Evidence: Sediment example

Eroding
streambanks

Sediment
deposits

Highly
embedded

Intact
streamside
buffers



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?



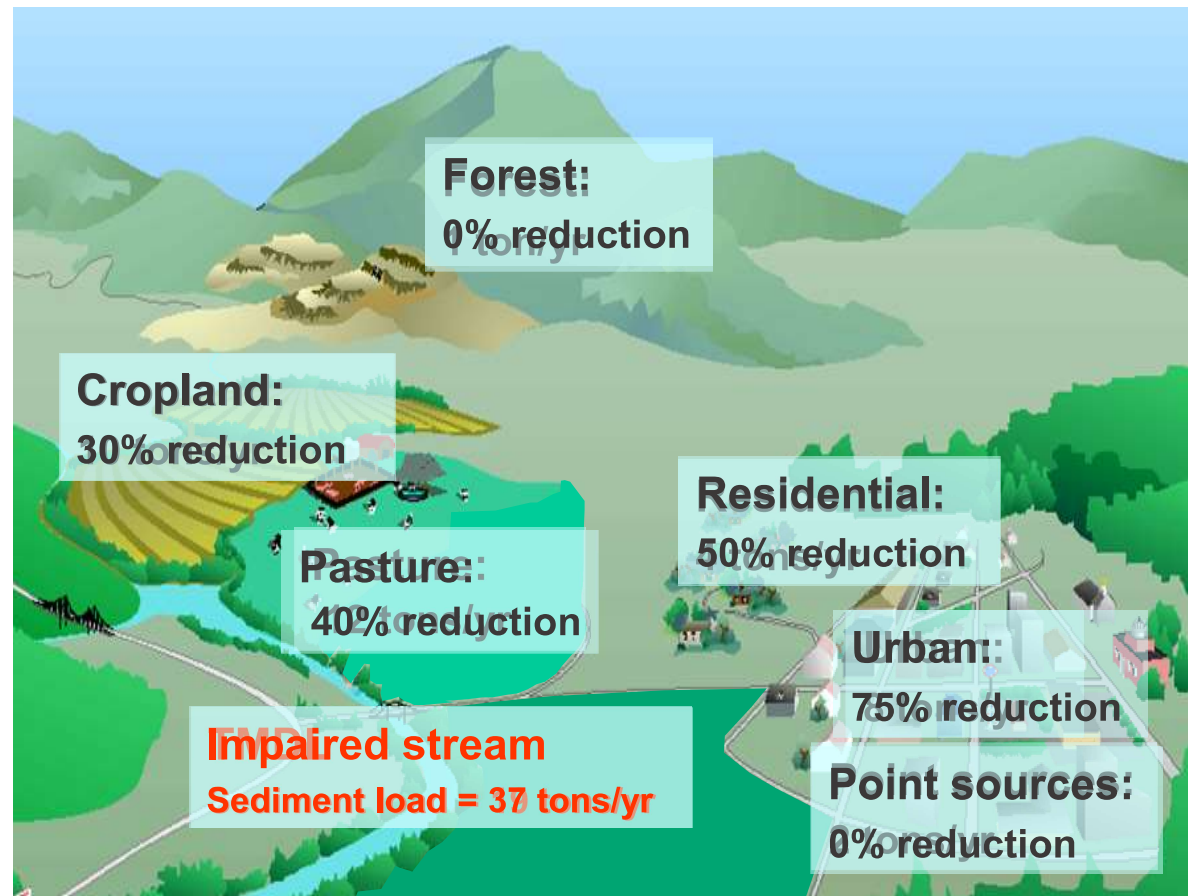
A Total Maximum Daily Load is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards.

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



More than just a number?

- Primary objective is to address pollution in our waterways
- TMDL study is the first step
- Followed by an implementation plan
- Implementation through partnerships with local organizations



Photo: Jan Hamsky; www.lifeinfreshwater.net

How can you get involved?

We need to hear from you!!!

- Participate in Stakeholder Meetings
 - Represents the local community
 - Provides feedback on
 - Stressors to the benthic community
 - Land use
 - Pollutant sources
 - Key stakeholders and community meetings



Questions & Comments

*30-day public comment period
(June 18 - July 18, 2024)*

Send comments to:

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