

Beaver Creek Fish Kill Event

August 2023



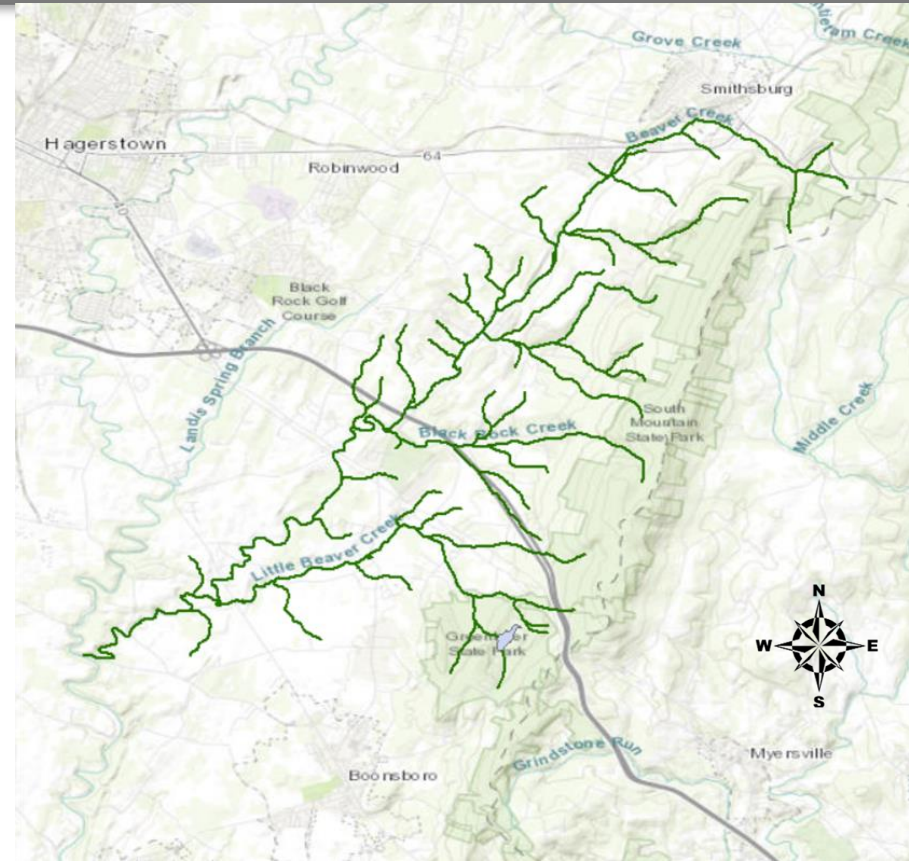
Michael Kashiwagi

Antietam Fly Anglers, November 16, 2023

Beaver Creek - Background

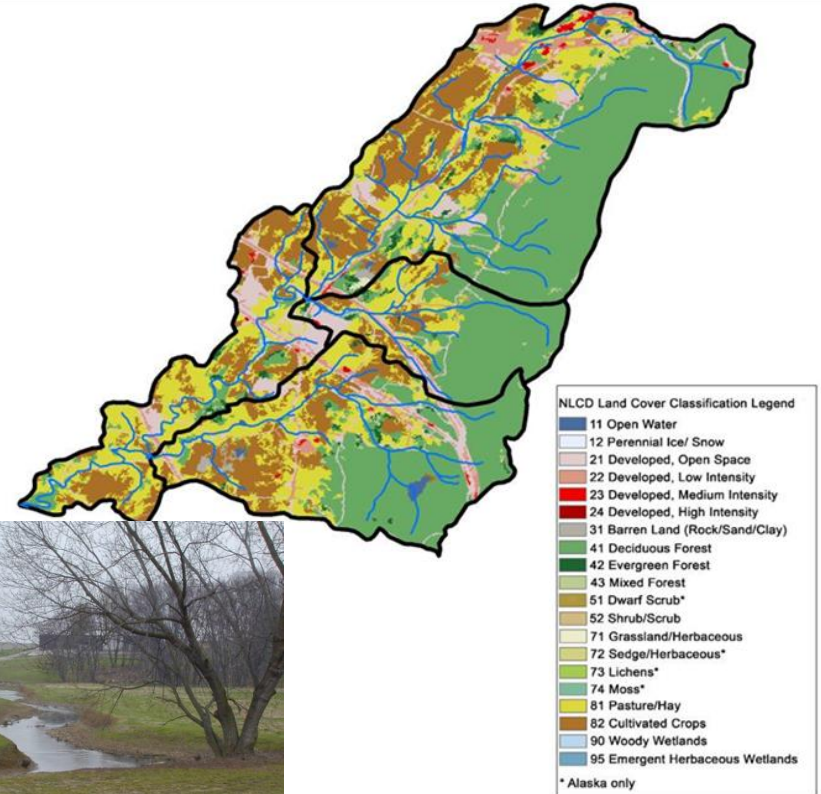
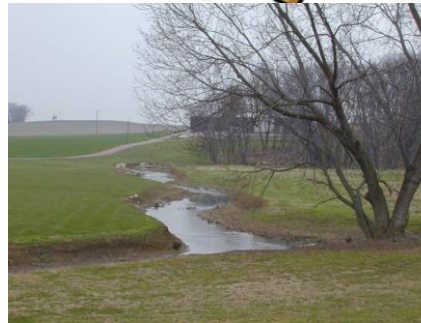


- Located in Washington County.
- Tributary of Antietam Creek.
- Influenced by karst geology.
 - Flows underground at some times of the year.
 - Influenced by the many springs in the valley.
 - Limestone influences water chemistry.



Beaver Creek - Background

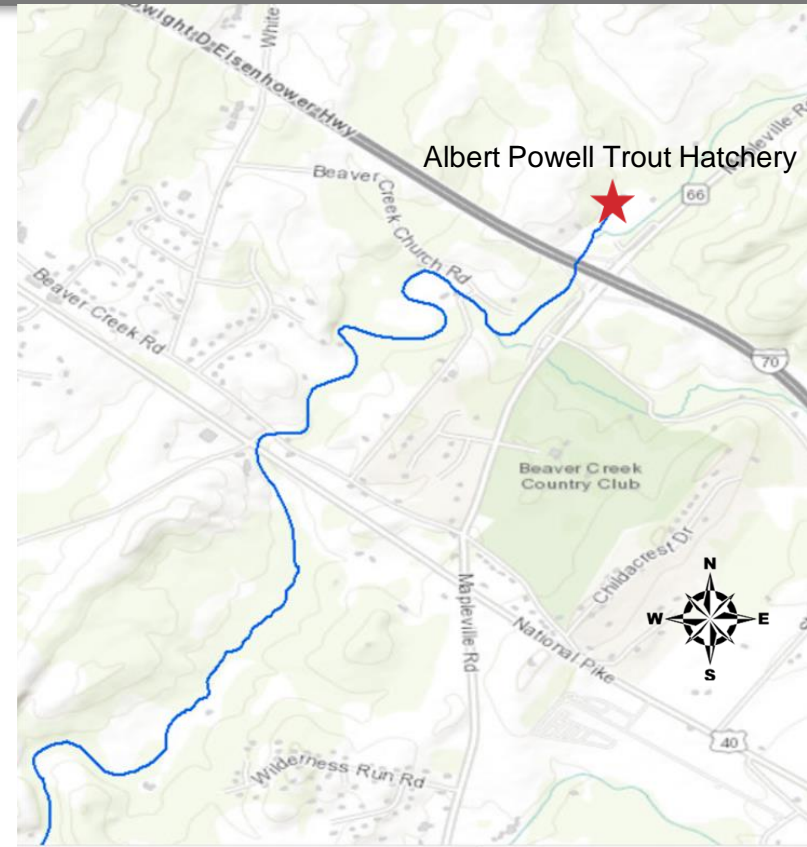
- Historically impacted by agricultural practices.
 - Land use includes extensive row crop and pasture.
 - The riparian buffer has been cleared throughout much of the watershed, particularly above Route 70.
 - Erosion and embedded substrate are common throughout the watershed
 - Development on the rise.



Beaver Creek - Background



- Springs are a consistent source of coldwater.
- Largest spring located at the Albert Powell Trout Hatchery just above I-70.
 - $\sim 12^{\circ}\text{C}$ ($\sim 54^{\circ}\text{F}$)
 - 3500 gallons/min
- The cold water temperatures and stable flow below the hatchery became the focus of stream restoration efforts.



Beaver Creek - Background



Restoration efforts included many partners and projects throughout the watershed.

- Streambank stabilization
- Reduce width:depth ratio
- Improve riffle:pool ratio
- Natural channel design
- Add in-stream habitat features such as large rocks and woody debris
- Riparian buffer planting
- Cattle exclusion fencing



Beaver Creek - Background



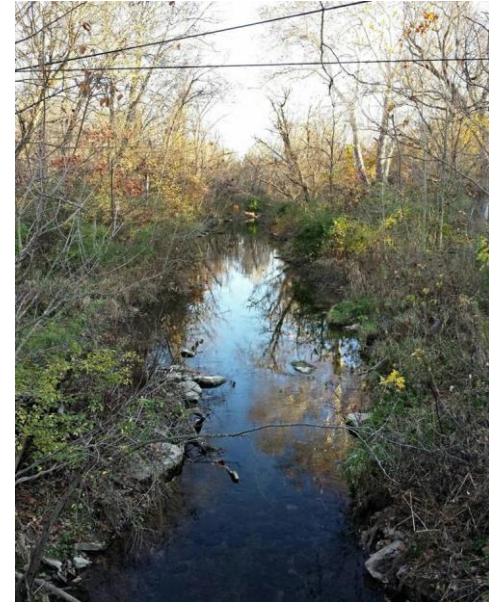
- Stream restoration efforts were a success.
 - Highly popular fishing destination.
 - One of the highest densities of brown trout in the state.



Beaver Creek - Background



- Efforts to improve access for anglers have been on-going.
- In 2018, a 6.5 acre property was purchased by the state to maintain public access for angling. The property secured 0.4 miles of stream for public use.



Beaver Creek - Management Areas



Beaver Creek - Fish Kill Event



- The department planned annual Beaver Creek electrofishing surveys on August 8, 2023.
- Surveys are conducted annually to monitor the brown trout population.
- Multiple pass depletion surveys. Trout are collected, counted, measured for total length and weight, and returned to the stream.
- Population estimates are calculated from results.



Beaver Creek - Fish Kill Event



- Dead trout were observed at the start of the first survey at the Beaver Creek Fishery Management Area.
 - 40 dead trout were counted in 100 meters from the start of the survey station.
 - Most of the mortality was adult brown trout, though other fish species were observed.
 - Survey activities were canceled and Maryland Department of the Environment was contacted.
- A plan to conduct qualitative electrofishing surveys was developed.



Beaver Creek - Fish Kill Event



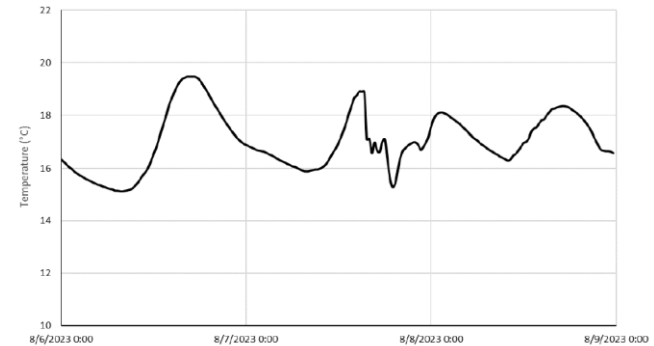
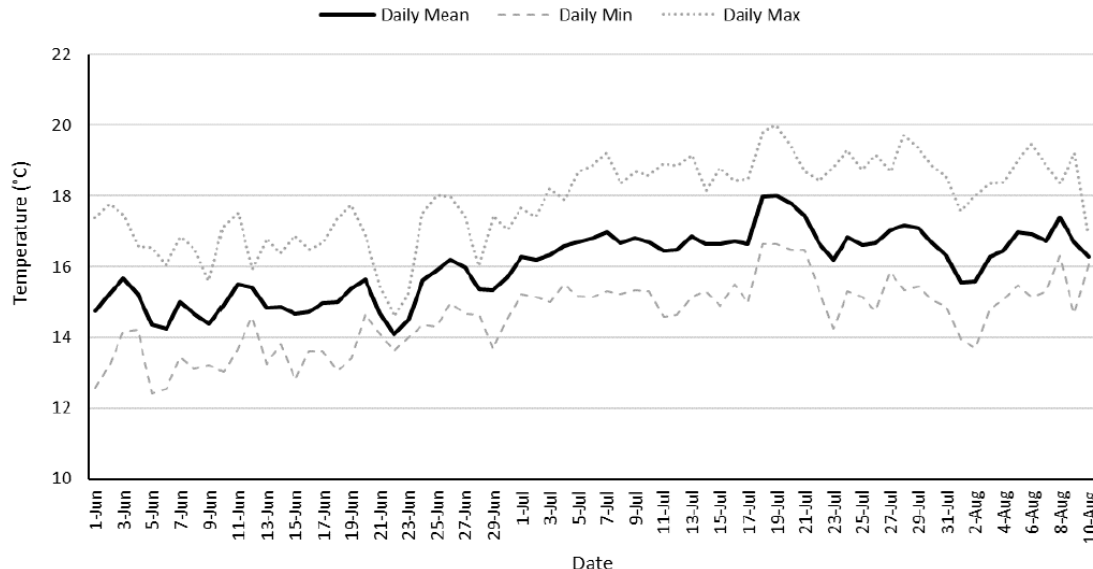
- Initial investigation attempted to determine extent of impacts and identify possible cause.
 - Dead trout were observed from Route 40 upstream to the spring channel at Albert Powell Trout Hatchery.
 - They were not observed in or above the spring channel or in Black Rock Creek.
 - Live trout were captured below Route 40.
 - Water quality parameters were consistent with historical data.
 - Fish health staff at the Oxford Cooperative Laboratory found no evidence of infectious disease.
- Full extent of loss could not be determined due to high flows and turbidity from storm on August 7. ~ 400 dead trout were observed.



Beaver Creek - Fish Kill Event



- Temperature Data
 - Temperature data logger placed in the Catch-and-Return section in spring, 2023.
 - Logger retrieved after event to determine if stream temperature played a role in the event.



Beaver Creek - Fish Kill Event



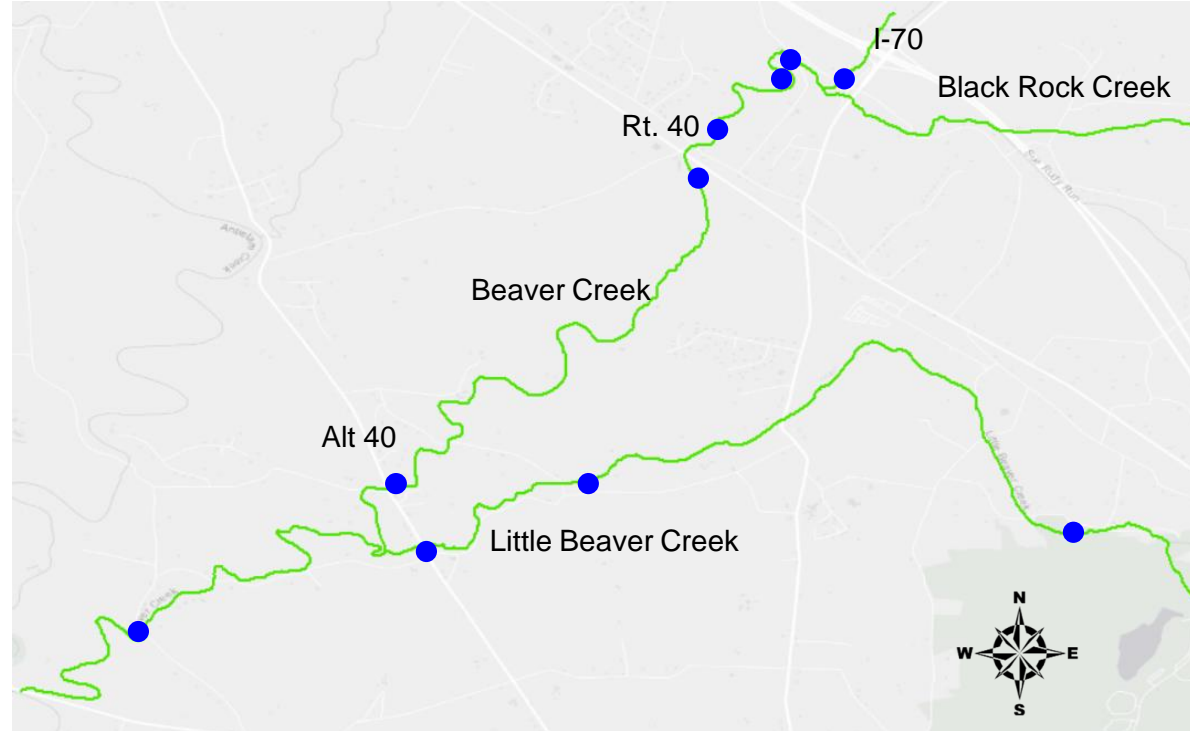
- Maryland Department of the Environment Water and Science Administration, Compliance Program and Fish Kill Investigation Section conducted a series of inspections, interviews, and sample efforts to identify a cause.
 - Laboratory analysis of water samples collected on August 8 did not identify toxic levels of chlorinated pesticides, chlorine, or nitrogen and phosphorus fractions.
 - Preserved trout were collected but tissue analysis has not been performed.
 - Inspections were conducted at possible discharge locations, with connection to the fish kill identified:
 - Construction area on I-70
 - Park and Ride lot
 - Beaver Creek Quarry
 - Asphalt Plant
 - Albert Powell Hatchery wastewater discharge
 - A farm located upstream
 - Beaver Creek Golf Course

Beaver Creek - Post Event Surveys



Quantitative surveys were conducted at historic stations on August 15 and 16 to determine impacts to the population.

- 10 surveys in Beaver Creek and Little Beaver Creek.
- Multiple pass depletion surveys in 75+ meter stations.

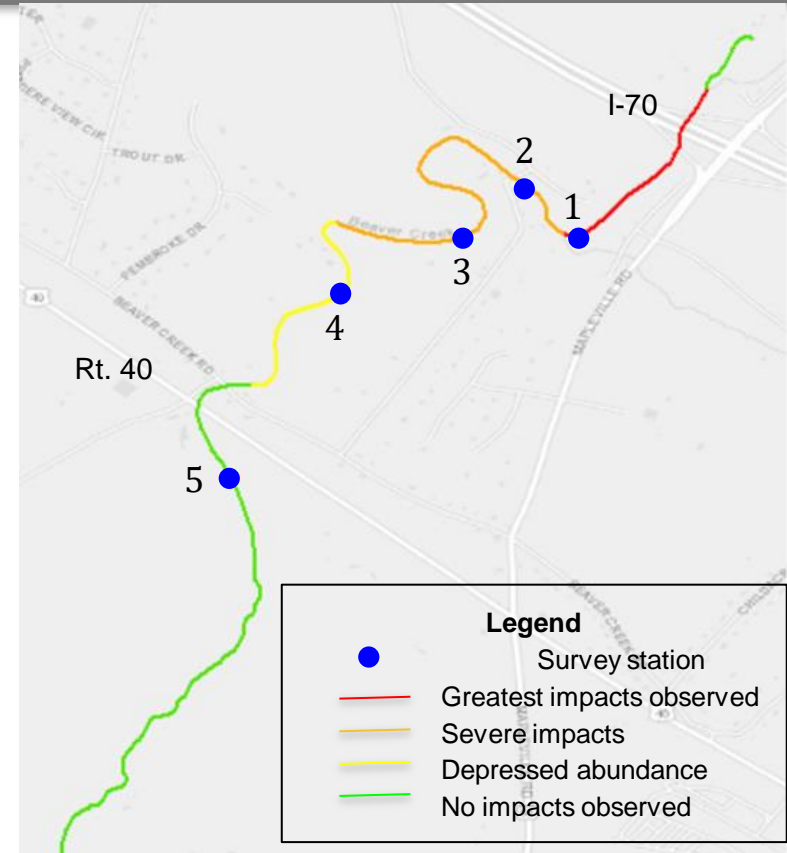


Beaver Creek - Post Event Surveys



Electrofishing survey results.

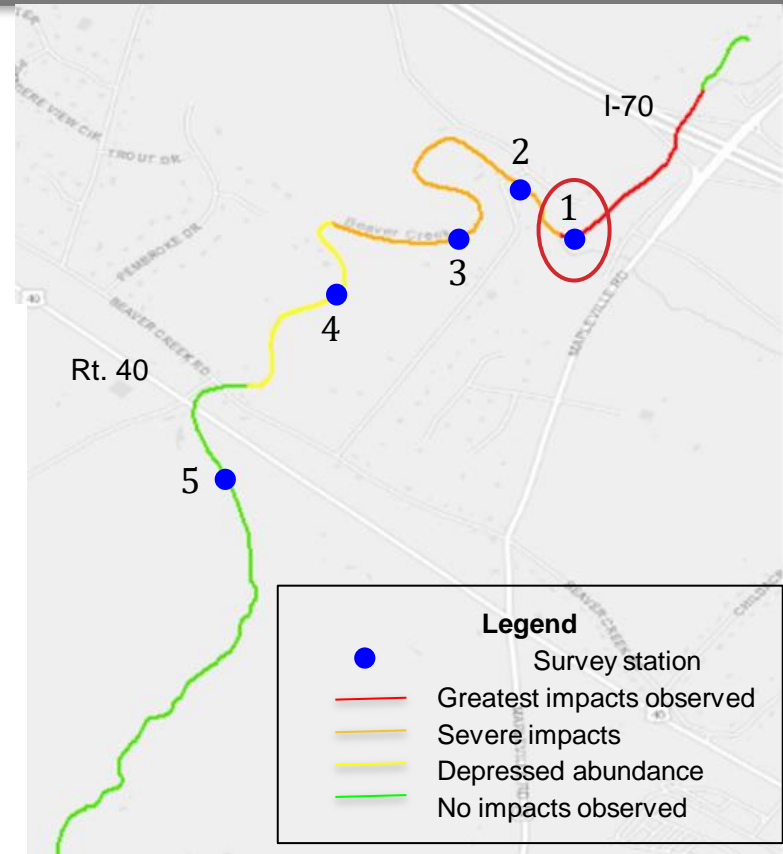
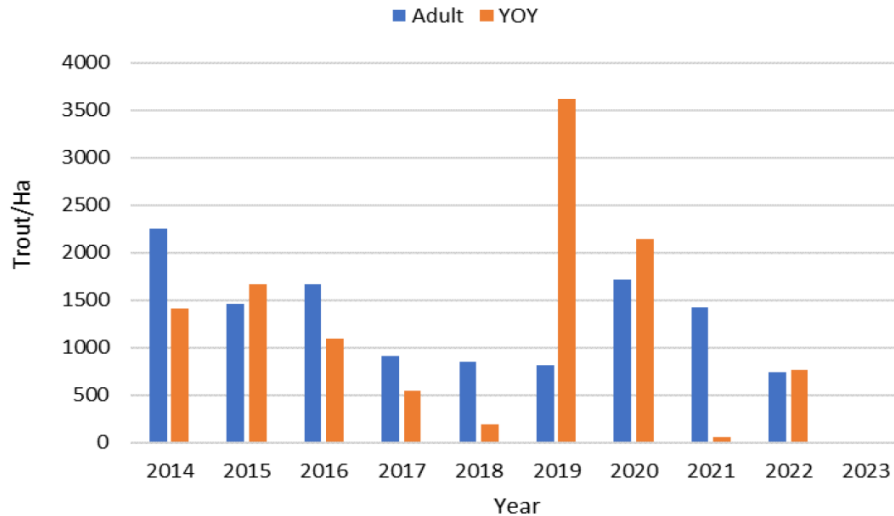
1. Upper Put-and-Take Section.
 - a. No trout observed.
 - b. Previously had highest density.
2. Upper section of Beaver Creek Fishery Management Area.
 - a. Several live trout observed.
 - b. Very low abundance when compared to historic data
3. Lower section of Beaver Creek Fishery Management Area.
 - a. Several live trout observed.
 - b. Very low abundance when compared to historic data
4. Zimmerman Property
 - a. Abundance depressed but approaching historic observations.
5. Below Route 40
 - a. Abundances comparable to historic observations.



Beaver Creek - Post Event Surveys



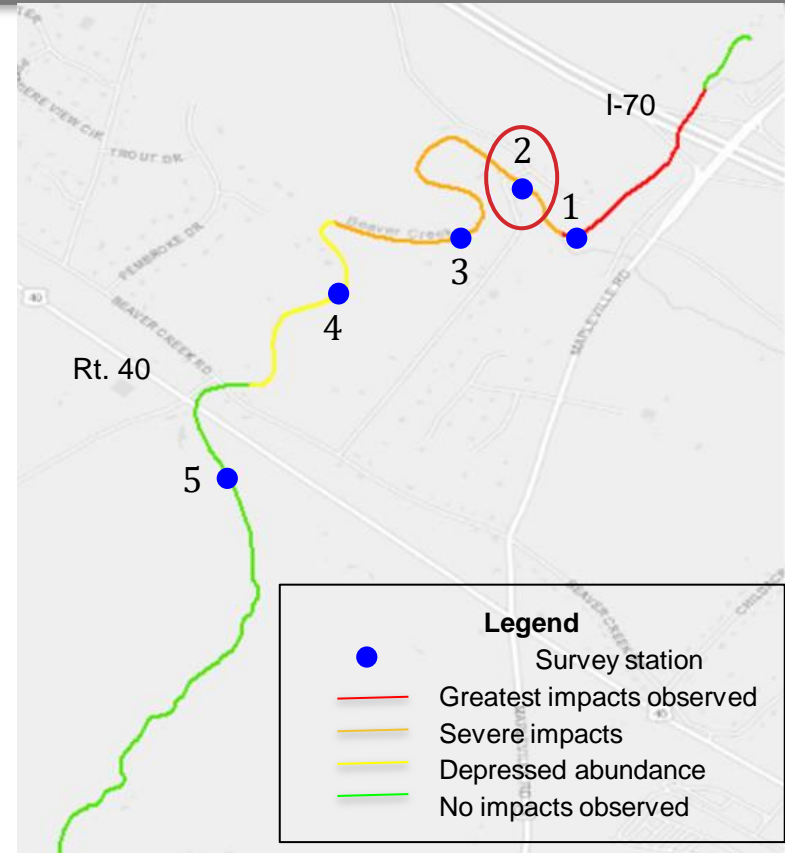
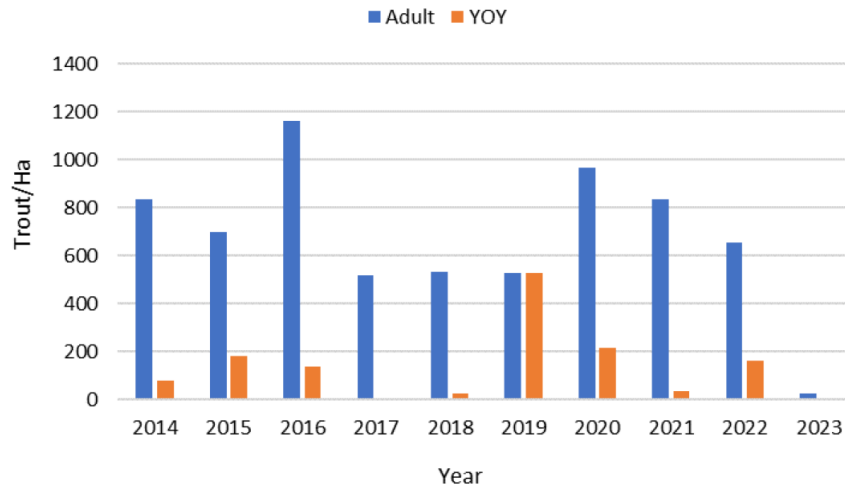
1. Upper Put-and-Take Section
 - a. No trout observed.
 - b. Previously had highest density.
 - c. Best spawning habitat.



Beaver Creek - Post Event Surveys



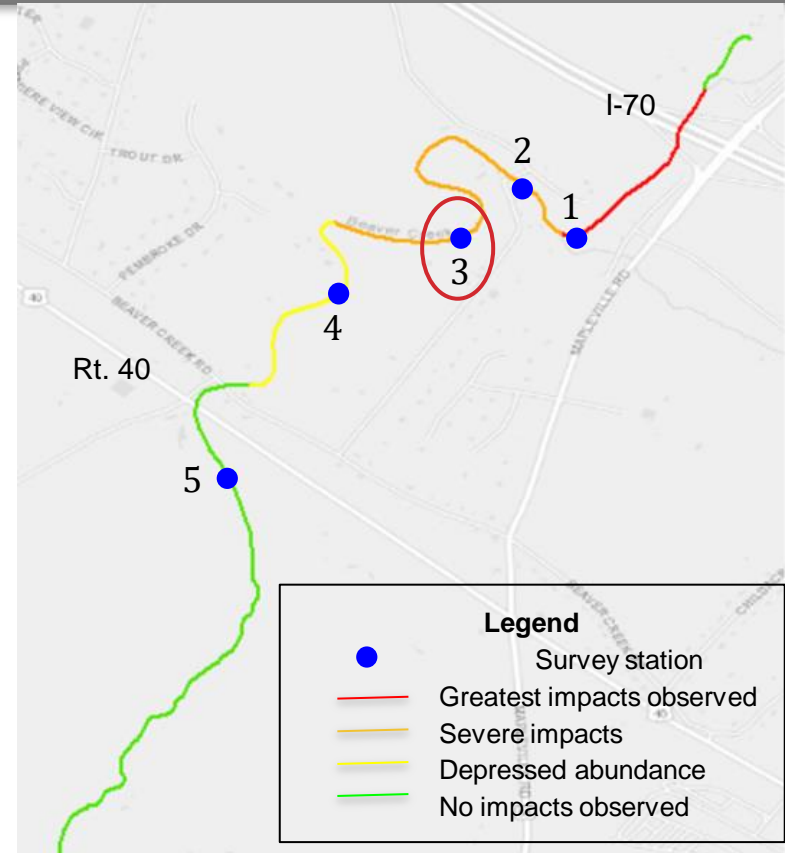
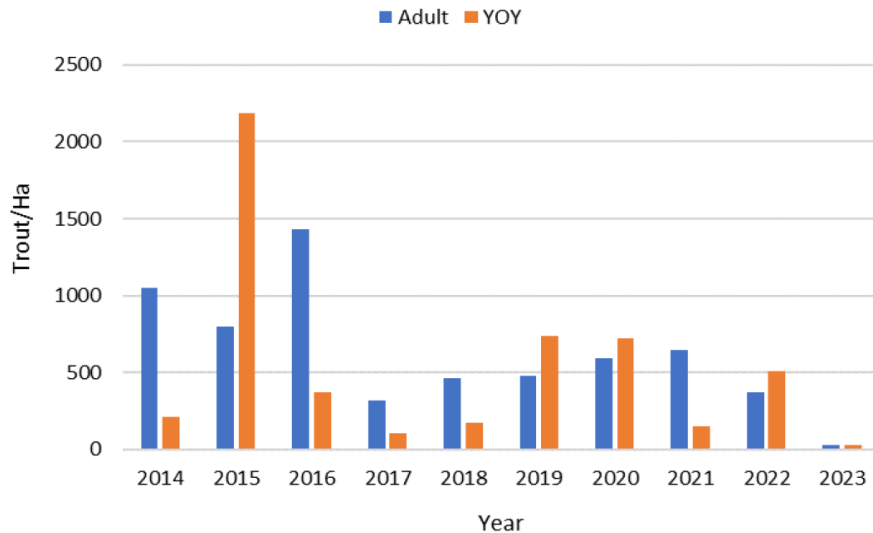
- 2. Upper section of Beaver Creek Fishery Management Area .
 - a. Several live trout observed (3 adults).
 - b. Very low abundance when compared to historic data



Beaver Creek - Post Event Surveys



- 3. Lower section of Beaver Creek Fishery Management Area .
 - a. Several live trout observed (4 adults, 4 YOY).
 - b. Very low abundance when compared to historic data

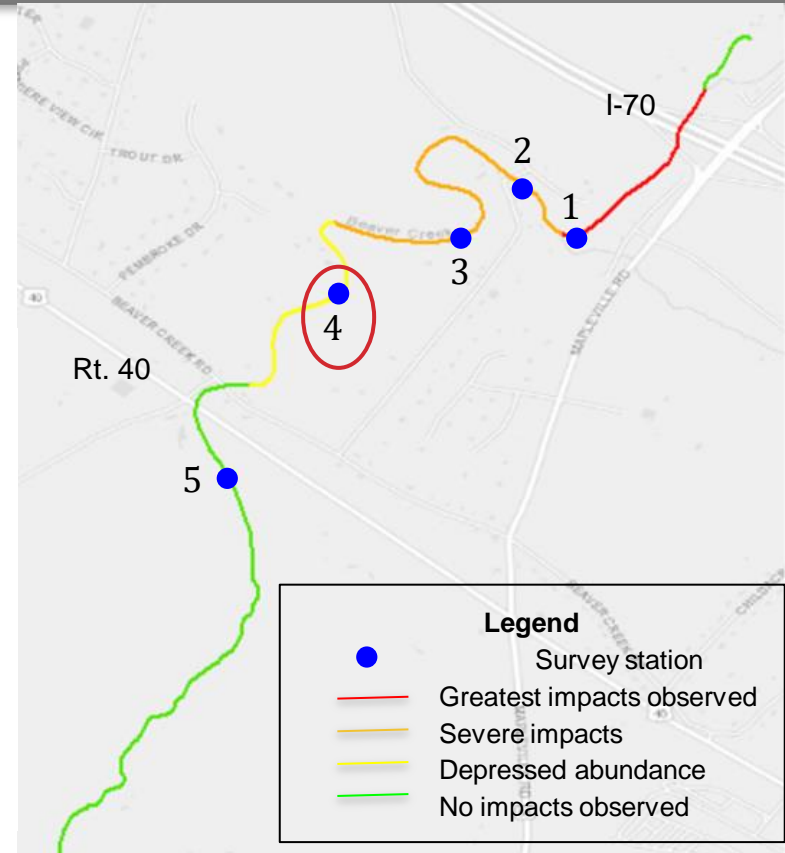
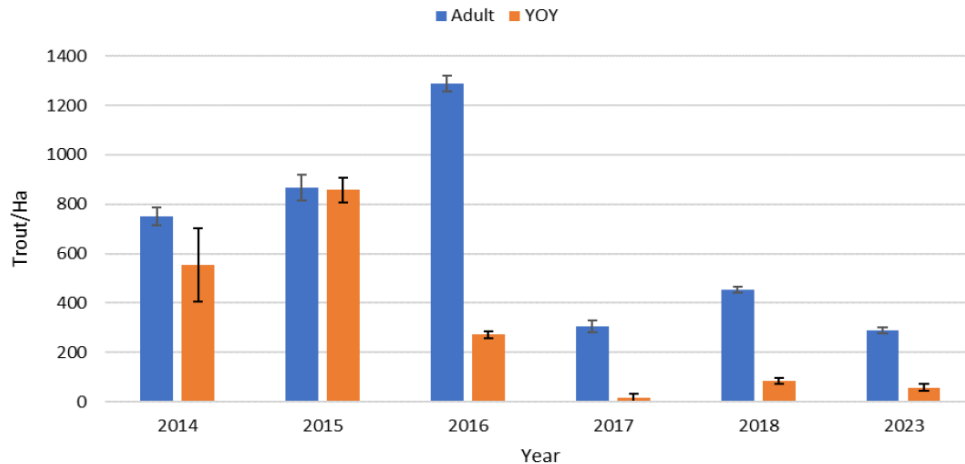


Beaver Creek - Post Event Surveys



4. Zimmerman Property

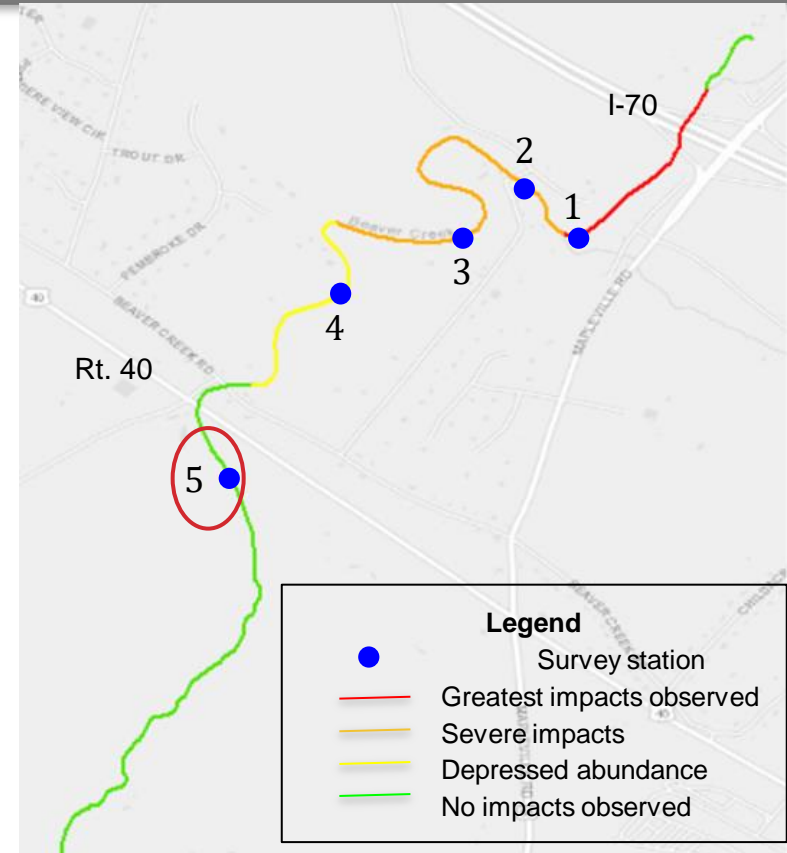
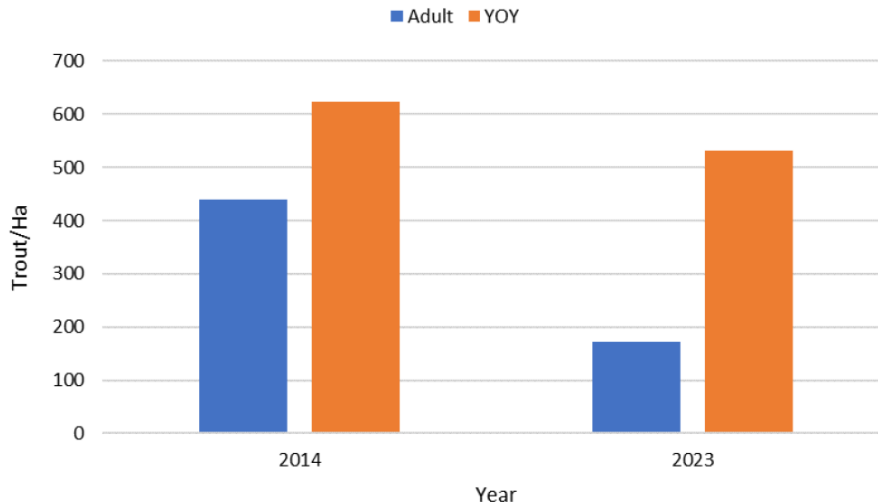
- Abundance depressed but approaching historic observations (35 adults, 7 YOY).
- Abundance was within the 95% confidence intervals when compared to previous data.



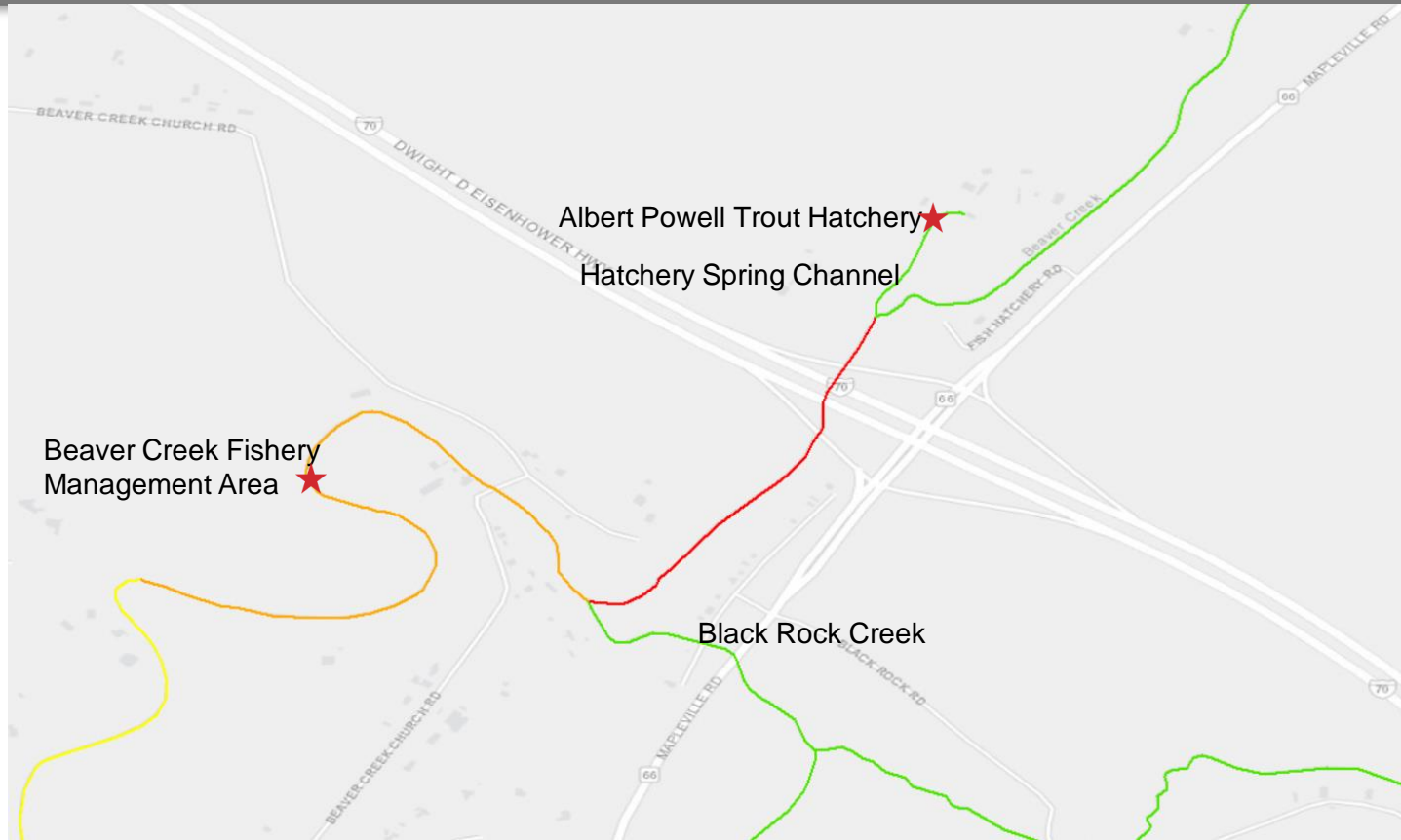
Beaver Creek - Post Event Surveys



- 5. Below Route 40
 - a. Abundances comparable to historic observations (11 adults, 45 YOY).
 - b. Lower abundance may be caused by changes to habitat in the historic survey station.



Beaver Creek - Post Event Surveys



Beaver Creek - Restoration Efforts



Restoration actions to expedite recovery of the fishery.

- A small number of brown trout were translocated from the lower sections of Beaver Creek to the impacted area in September..
 - 15 fish collected below Route 40.
 - Released in the Upper Put-and-Take section near optimal spawning habitat.
- A regulation change is being pursued to reduce the mainstem creel limit to zero from the Albert Powell Trout Hatchery to the confluence with Antietam Creek.
 - The proposed reg was supported during scoping.
 - Scheduled to go into effect 1/8/2024.



Questions?

