Beaver Creek Fish Kill Event August 2023

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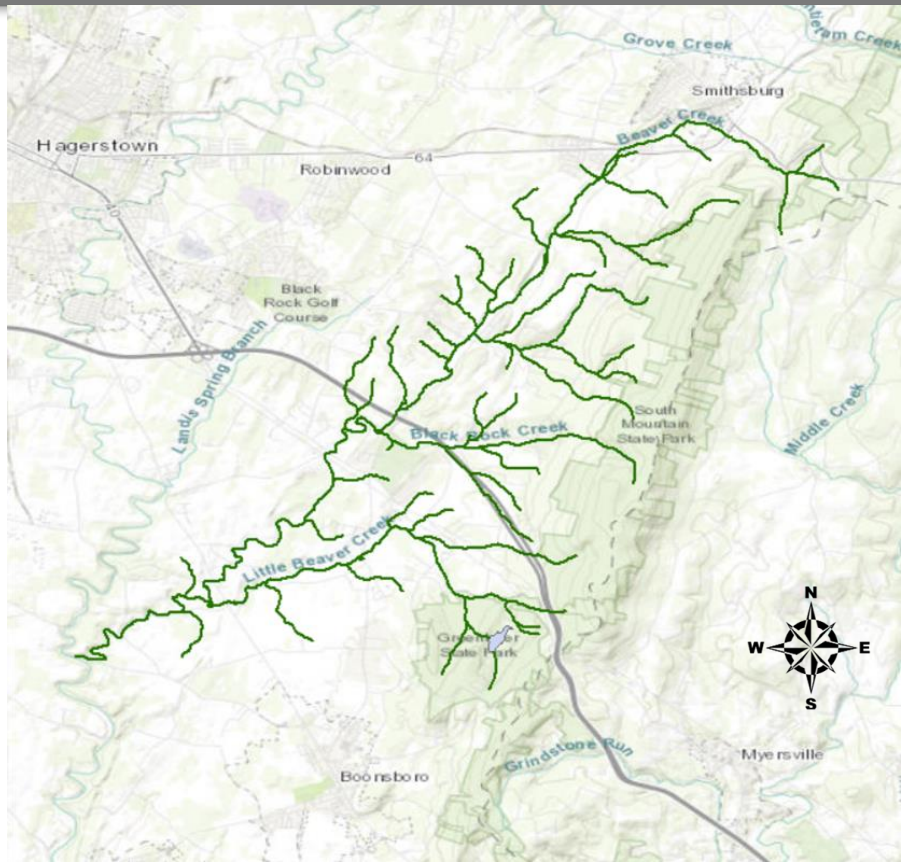
Seneca Valley Trout Unlimited January 22, 2024

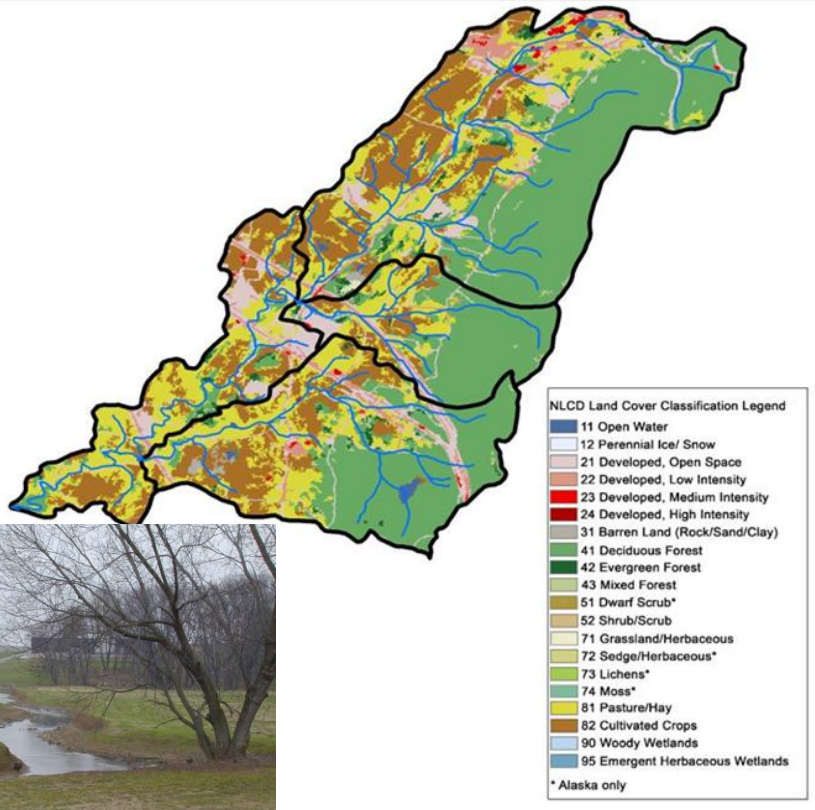
Beaver Creek - Background

- 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.



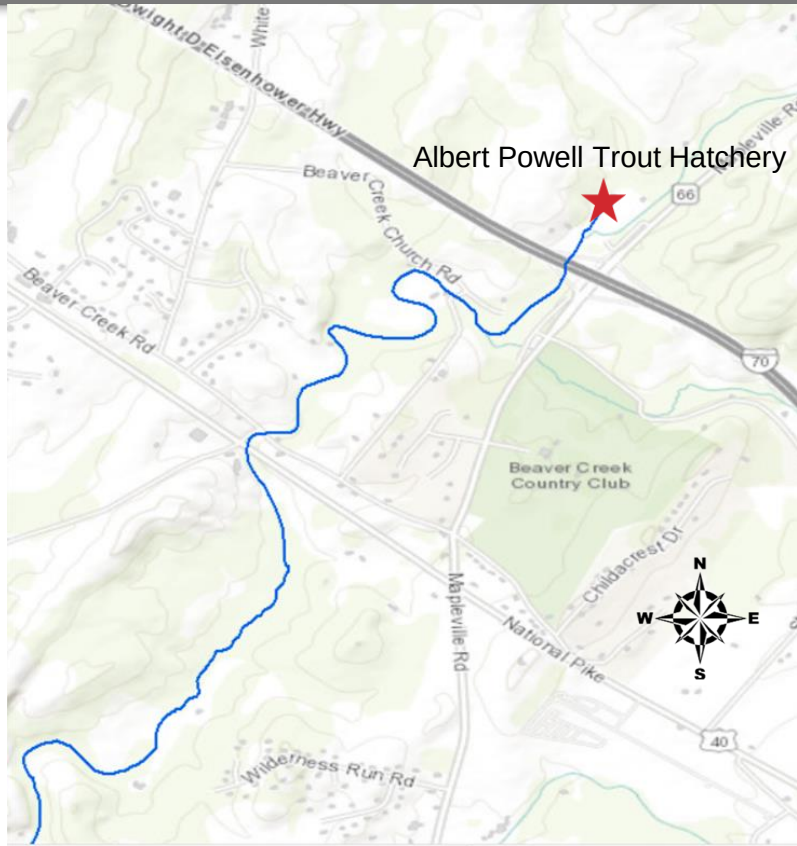
Beaver Creek - Background

- 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.
  - ~12°C (~54°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.

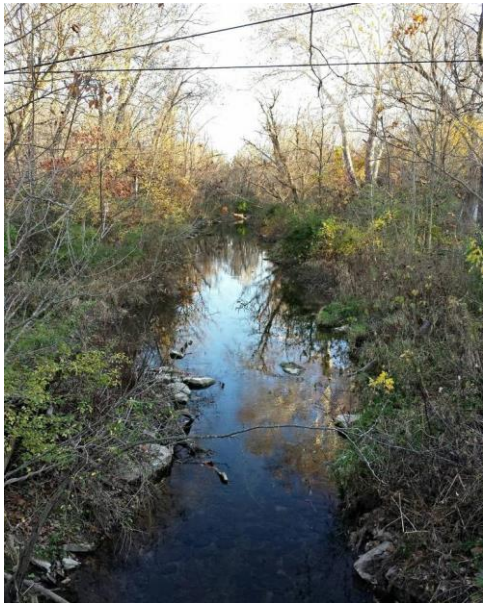
- Streambank stabilization
- Reduce width:depth ratio
- Improve riffle:pool ratio
- Natural channel design
- Add in-stream habitat features such as large rocks and woody debris
- Riparian buffer planting
- Cattle exclusion fencing

Beaver Creek - Background

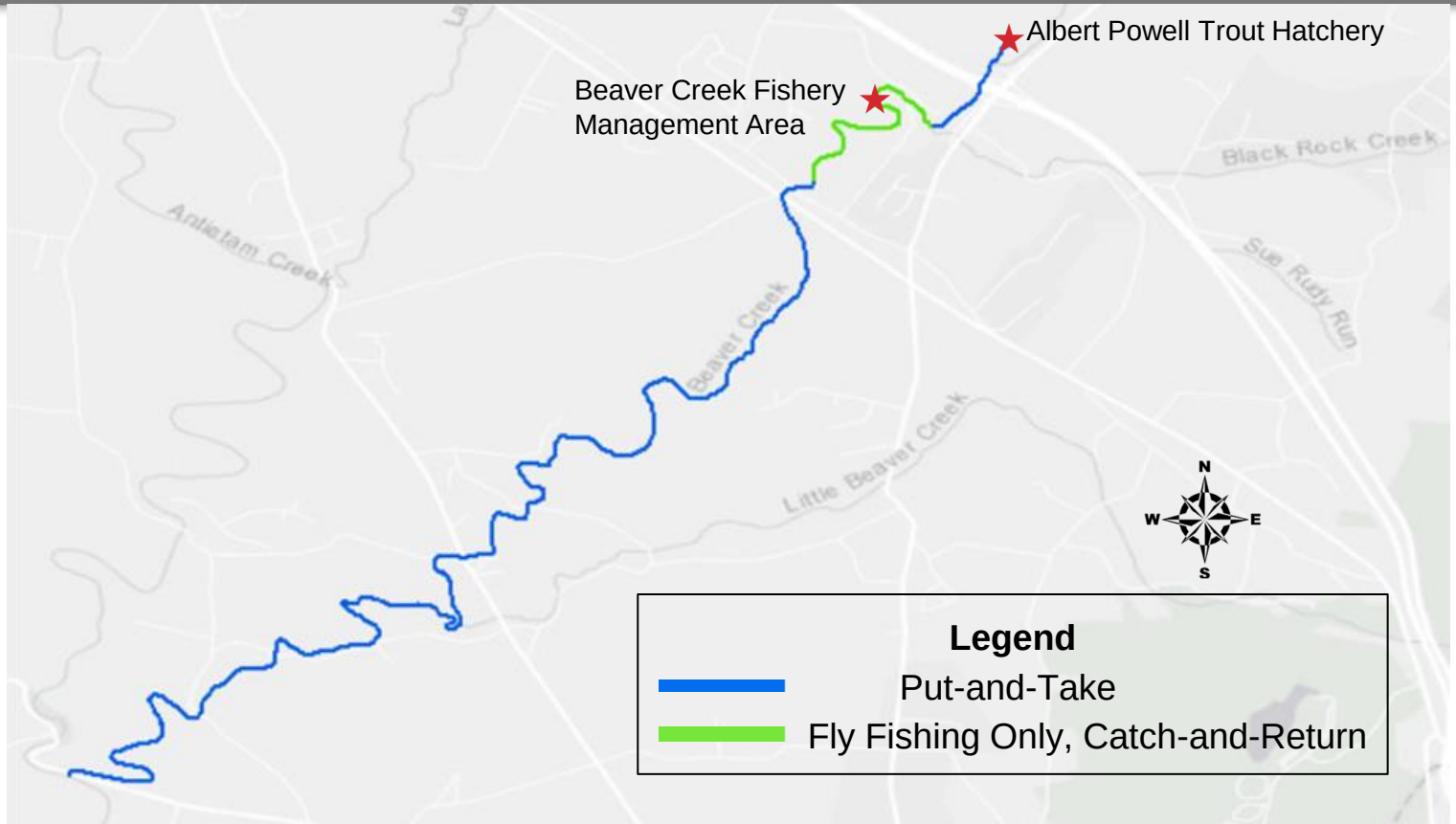
- Stream restoration efforts were a success.
  - Highly popular fishing destination.
  - One of the highest densities of brown trout in the state.

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

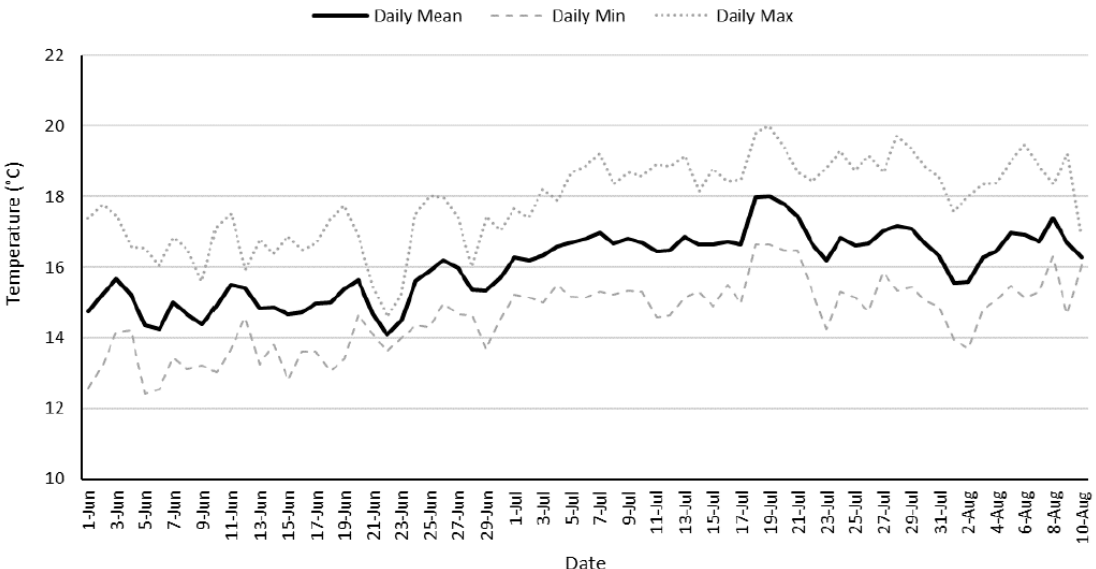
- Dead trout were observed at the start of the first survey at the Beaver Creek Fishery Management Area.
  - 40 dead trout were counted in 100 meters from the start of the survey station.
  - Most of the mortality was adult brown trout, though other fish species were observed.
  - Survey activities were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

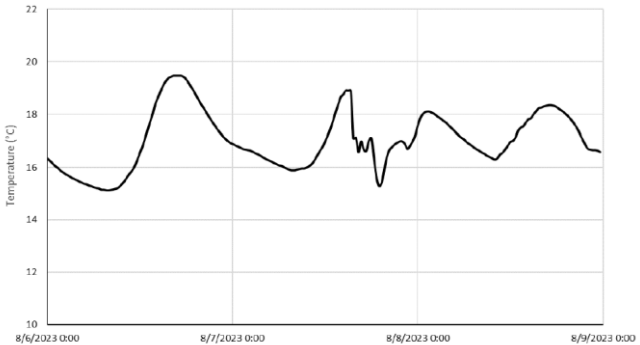
Beaver Creek - Fish Kill Event

- 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.





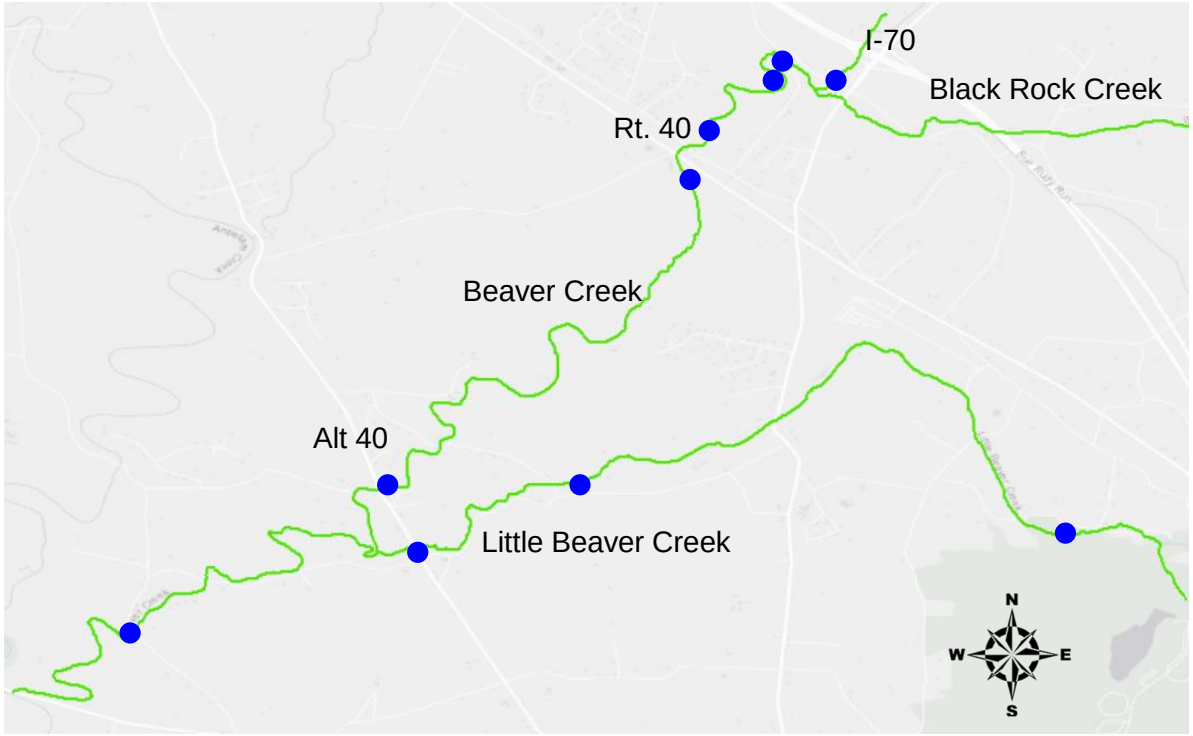
Beaver Creek - Fish Kill Event

- 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.

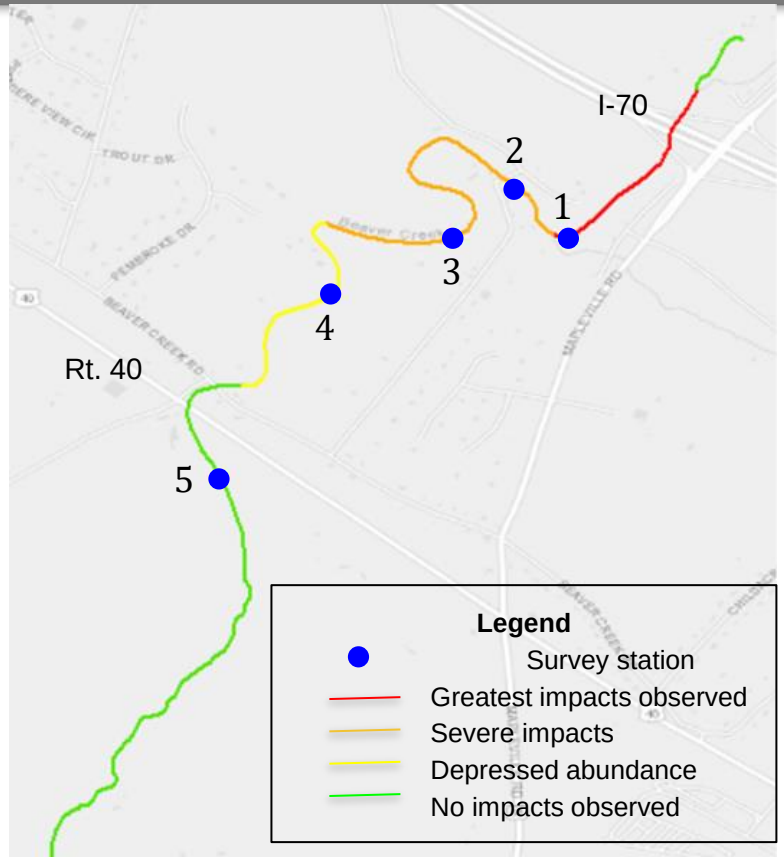
- 10 surveys in Beaver Creek and Little Beaver Creek.
- Multiple pass depletion surveys in 75+ meter stations.



Beaver Creek - Post Event Surveys

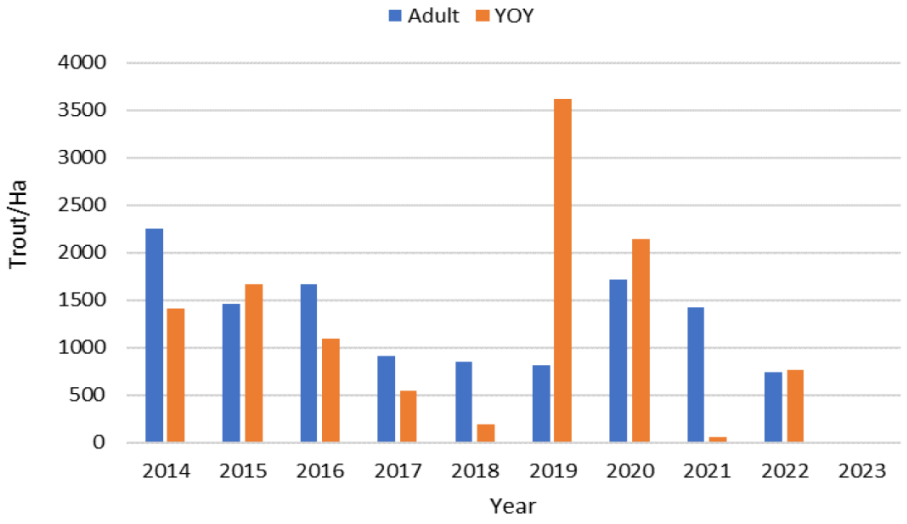
Electrofishing survey results.

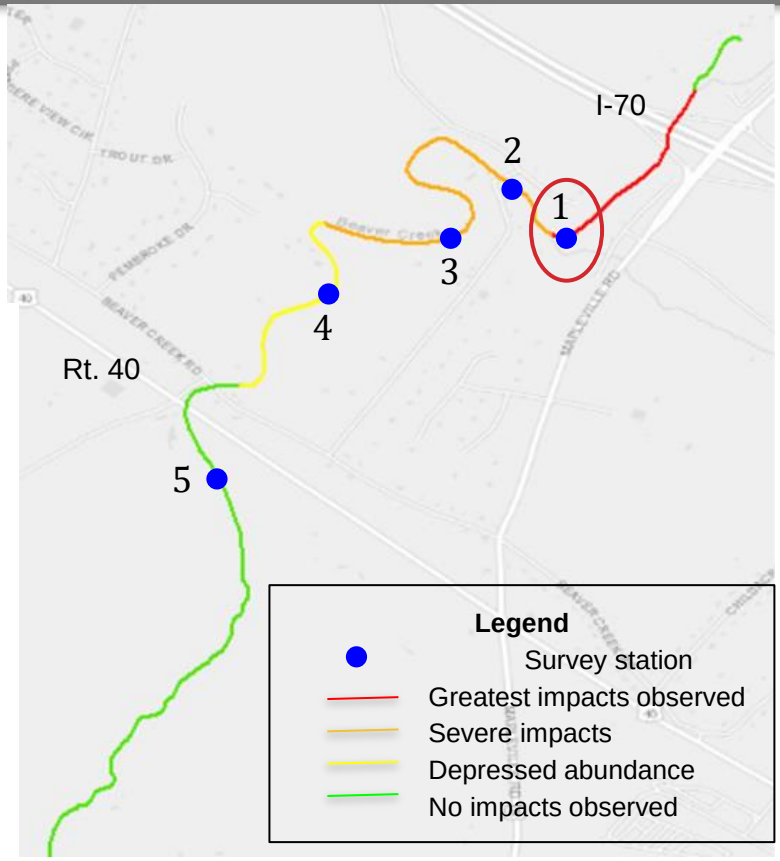
1. Upper Put-and-Take Section.
   a. No trout observed.
   b. Previously had highest density.
2. Upper section of Beaver Creek Fishery Management Area.
   a. Several live trout observed.
   b. Very low abundance when compared to historic data
3. Lower section of Beaver Creek Fishery Management Area.
   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

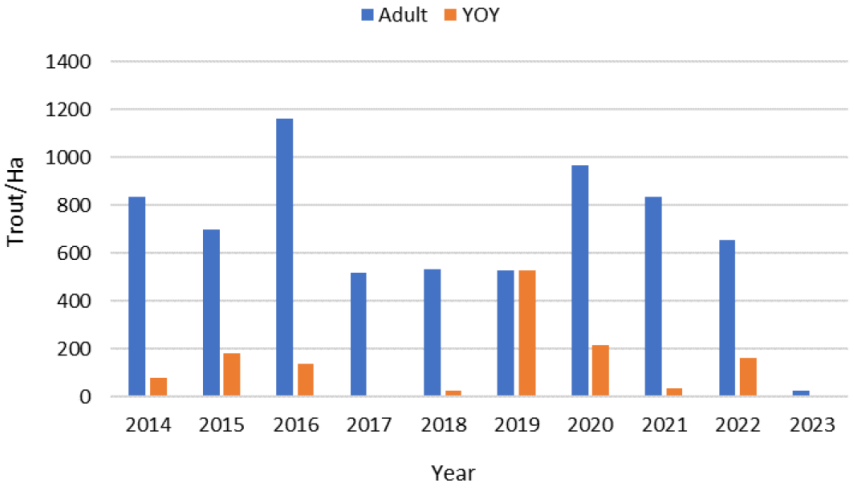
1. Upper Put-and-Take Section
   a. No trout observed.
   b. Previously had highest density.
   c. Best spawning habitat.

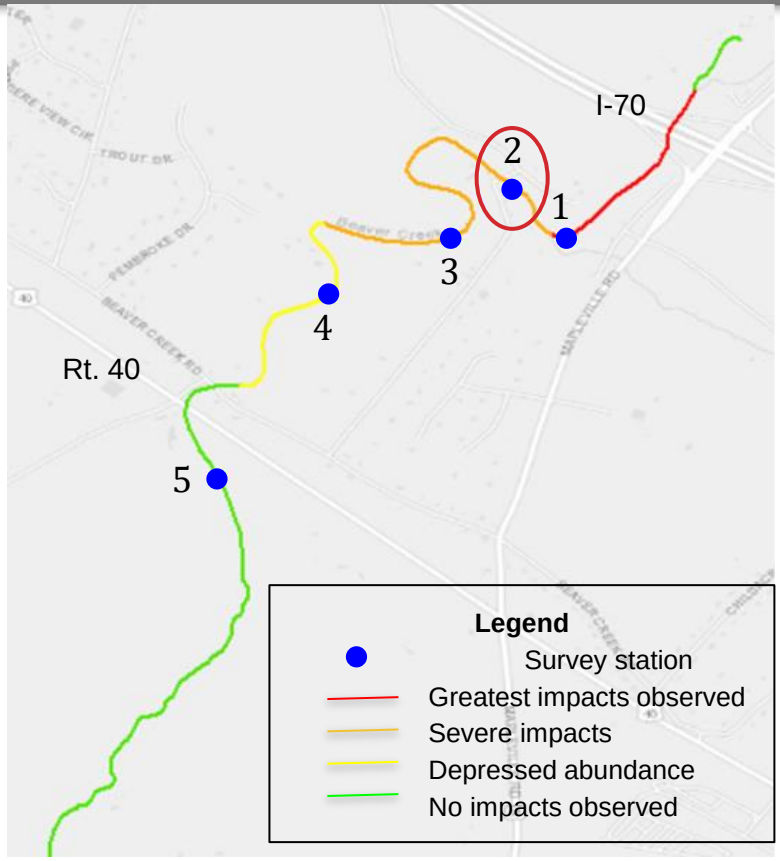




Beaver Creek - Post Event Surveys

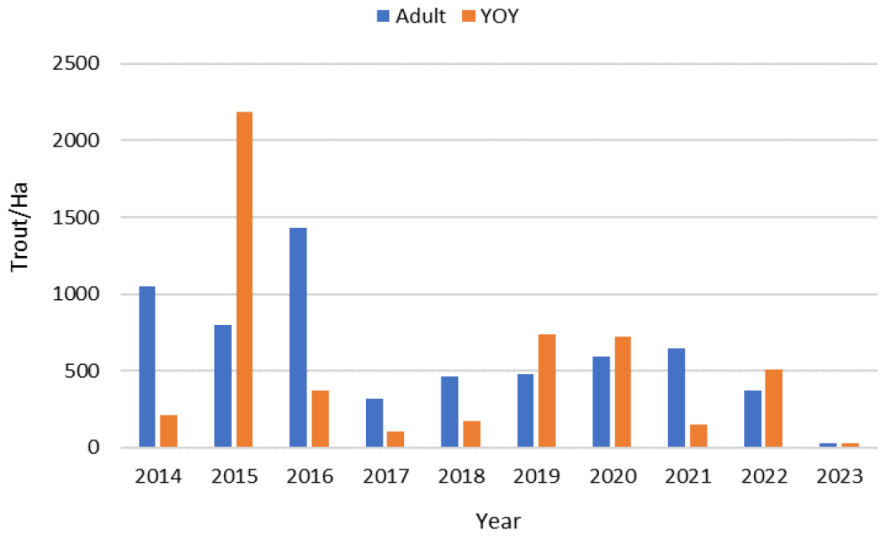
2. Upper section of Beaver Creek Fishery Management Area. .
   a. Several live trout observed (3 adults).
   b. Very low abundance when compared to historic data

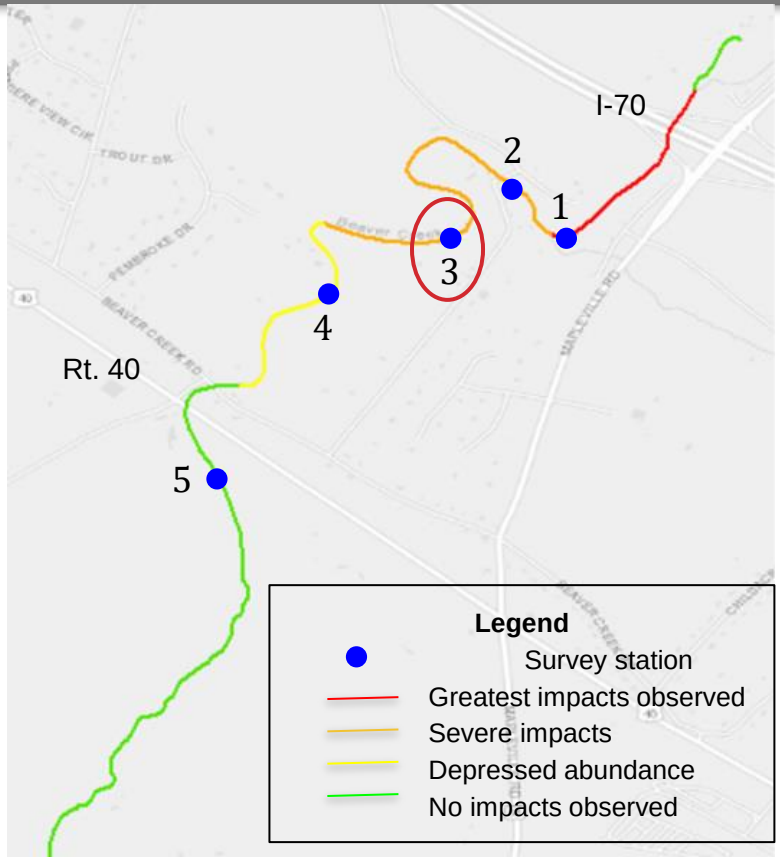




Beaver Creek - Post Event Surveys

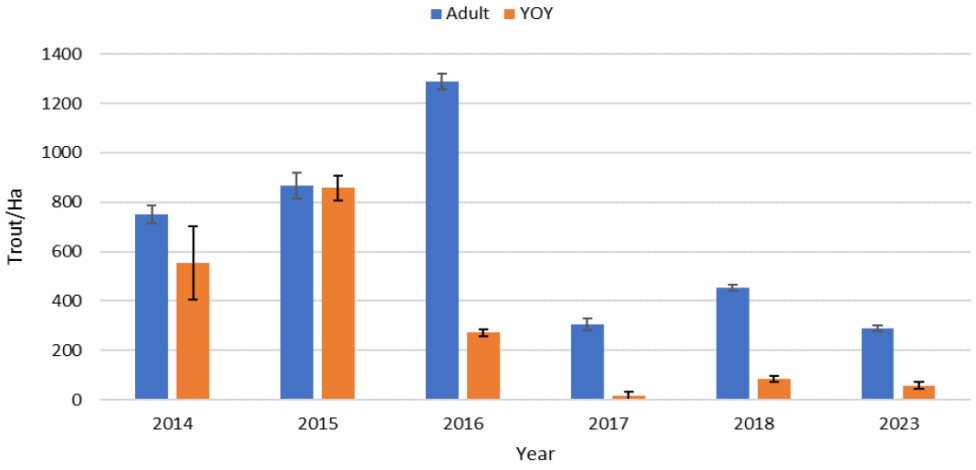
3. Lower section of Beaver Creek Fishery Management Area. .
   a. Several live trout observed (4 adults, 4 YOY).
   b. Very low abundance when compared to historic data

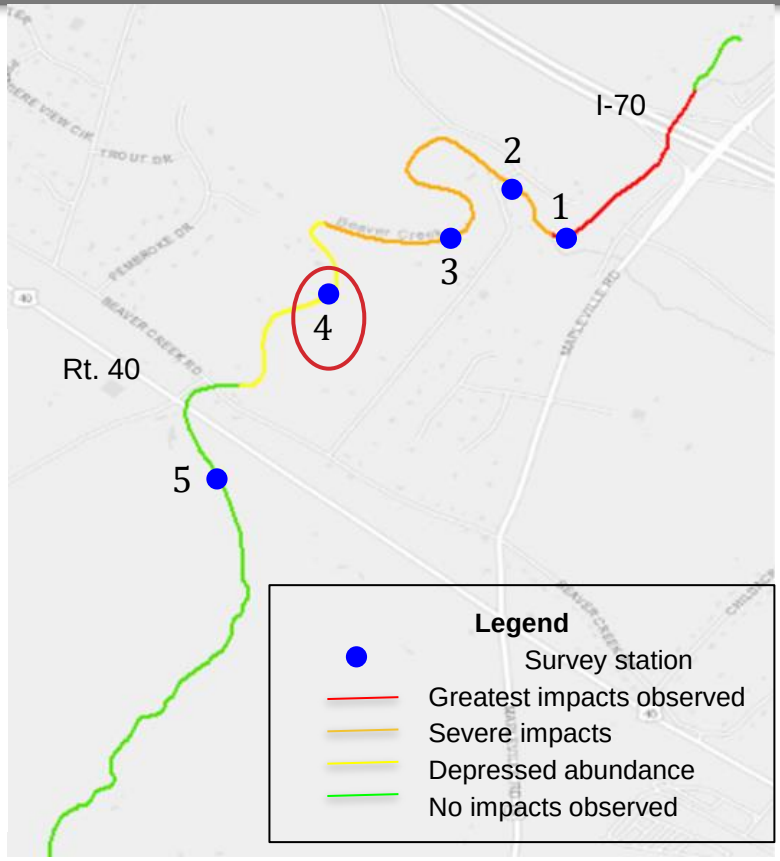




Beaver Creek - Post Event Surveys

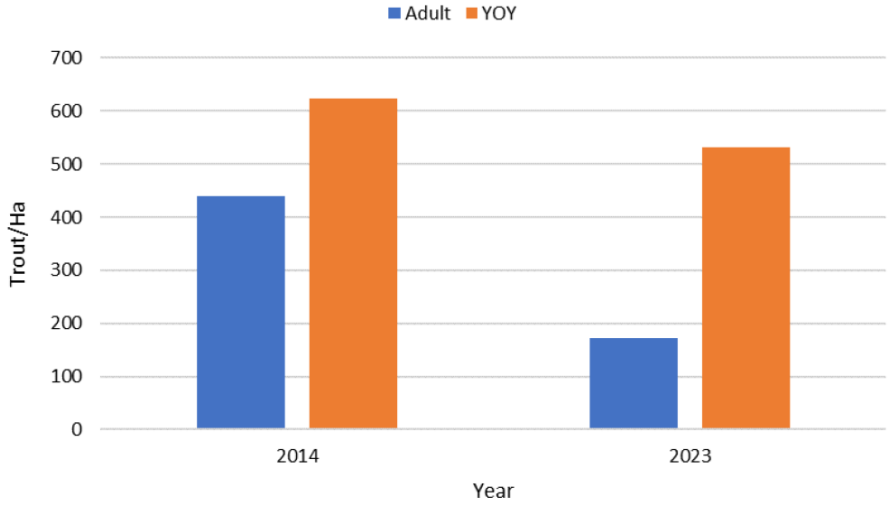
4. Zimmerman Property
   a. Abundance depressed but approaching historic observations (35 adults, 7 YOY).
   b. Abundance was within the 95% confidence intervals when compared to previous data.

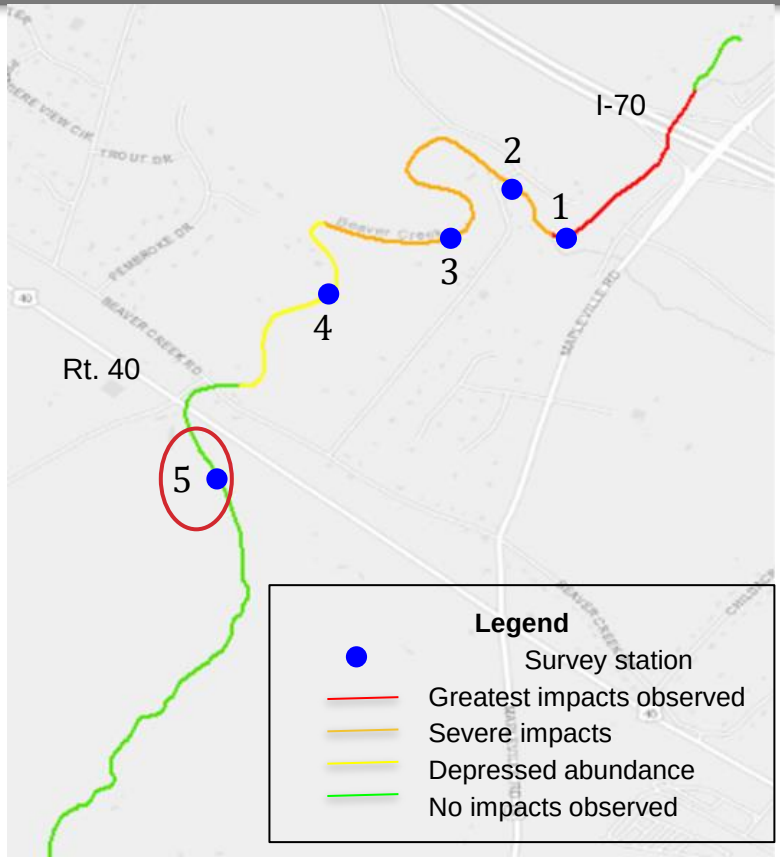




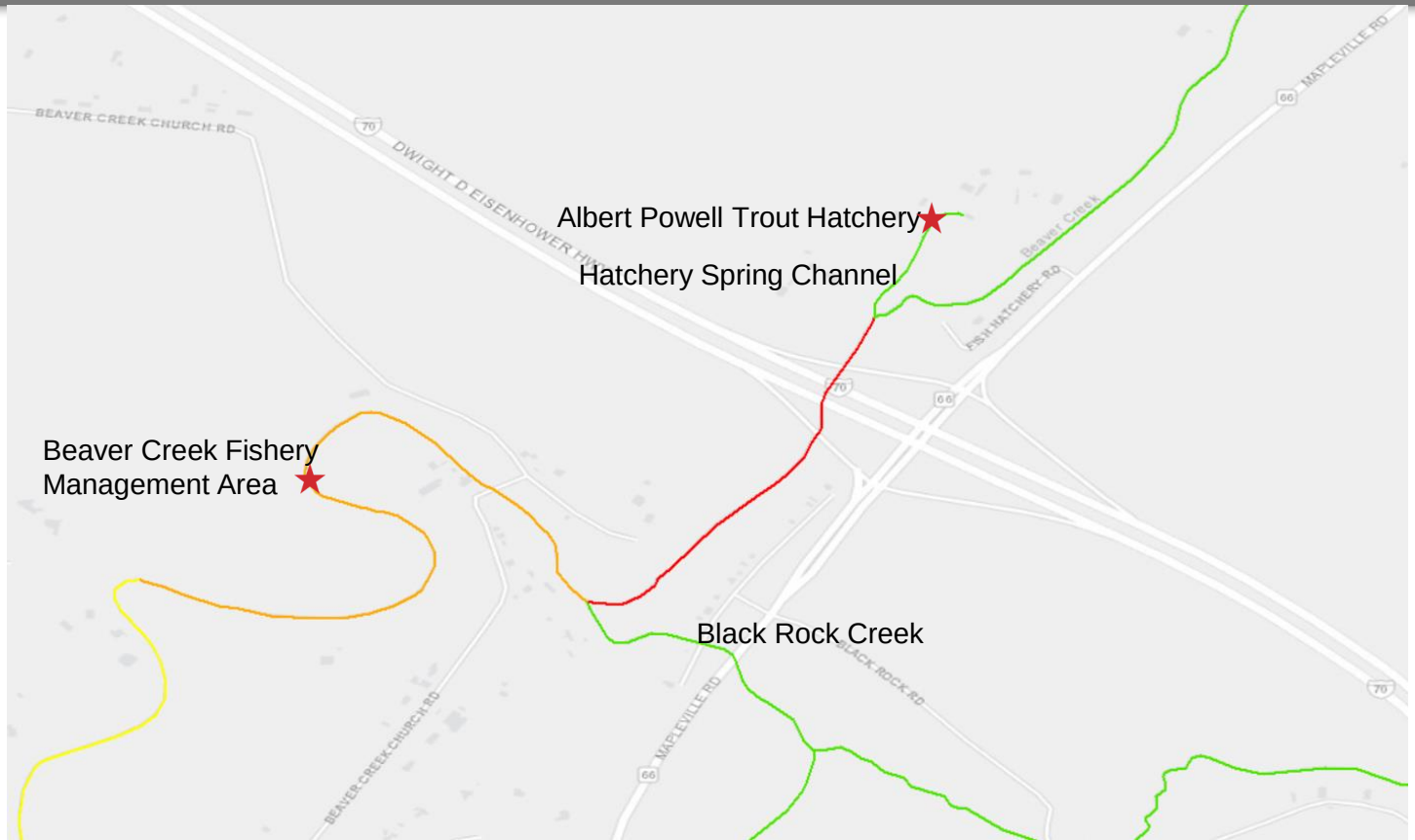
Beaver Creek - Post Event Surveys

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..
  - 18 fish collected below Route 40.
  - Released in the Upper Put-and-Take section near optimal spawning habitat.
  - Early December walked section of stream looking for redds – none observed
- 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.
  - Effective date 1/22/2024

Beaver Creek – 2024 Plans

Monitoring Surveys

- Temperature Loggers
  - Beaver Creek Fisheries Management Area
  - Black Rock Creek
- Electrofishing Surveys
  - Established stations I-70 to Route 40
  - Black Rock Creek
  - Adult and YOY numbers
- 6PPD-quinone
  - Chemical found in vehicle tires
  - Linked to salmonid mortality in Pacific NW
  - USGS Kansas Water Lab
  - Collect 2024 summer stormwater sample

Questions?

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