

Houston Ball Field Erosion Study

A 3RQ GAPS Project with the Upper Chartiers Creek Watershed Association

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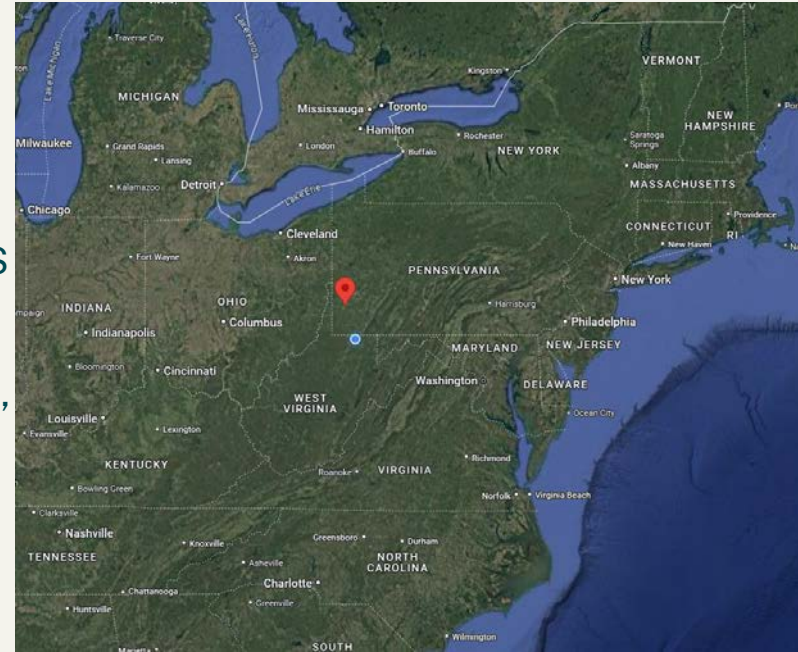
1/16/2025
WVWRI Seminar Series

Background

Goal:

- Address severely eroding bank along Chartiers Creek adjacent to public baseball field
- Use evidence gathered through the 3 Rivers QUEST GAPS program assisted study to apply for funding

Area of interest: A 1,035 ft reach of Chartiers Creek in Houston, PA (Washington County)



Summary:

- The West Virginia Water Research Institute (WVWRI) conducted a small-scale erosion study with the assistance of Upper Chartiers Creek Watershed Association (UCCWA) volunteers
- WVWRI installed erosion pins, conducted initial measurements, trained volunteers to collect monthly measurements, and compiled results

Pin Installation and Methodology

Pins were installed within 3 subsections representing the bank conditions within the study area.



A

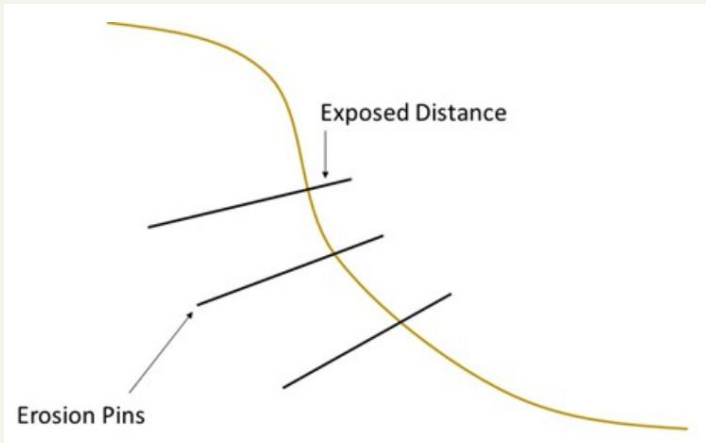


B



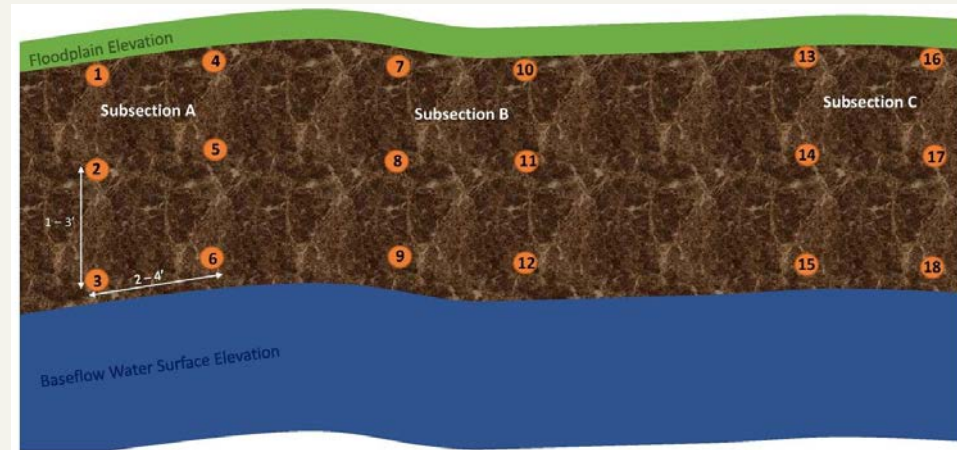
C

Pin Installation and Methodology



- Within each subsection, pins were installed in 2 rows of 3 pins each with horizontal spacing of 2–4 feet
- 6 pins were installed within each subsection, for a total of 18 pins
- Pins were installed on April 20, 2023 and their exposure was recorded monthly by UCCWA volunteers

- One-foot length stainless steel tubing (3/16" diameter) were utilized for the pins and were installed perpendicular to the bank surface
- Initial exposed distances were 3-6 centimeters
 - Exposed distances were greater where there was dense vegetation so that the pins could be found
- Pins were situated above baseflow surface water elevation to allow for pin measurement during normal streamflow conditions
 - Vertical distance between the pins varied (1-3 feet) due to bank height



Measurement Protocol



- UCCWA volunteers began collecting measurements one month post installation with great care to minimize soil disturbances
 - Pin measurements were recorded with a Fisher Scientific 15 centimeter digital caliper
 - Weather conditions and notes regarding any mass failures/disturbances to the pins were also recorded
- After measurements were taken, the pins were reset to their original length indicated in the field data sheet
 - If pins experienced a change of less than 10 millimeters, they were not reset to minimize disturbance and error
- Photos and notes were taken in the event of a mass failure or other cases of pin displacement
 - Pins were reset in a location as close to its original position as possible

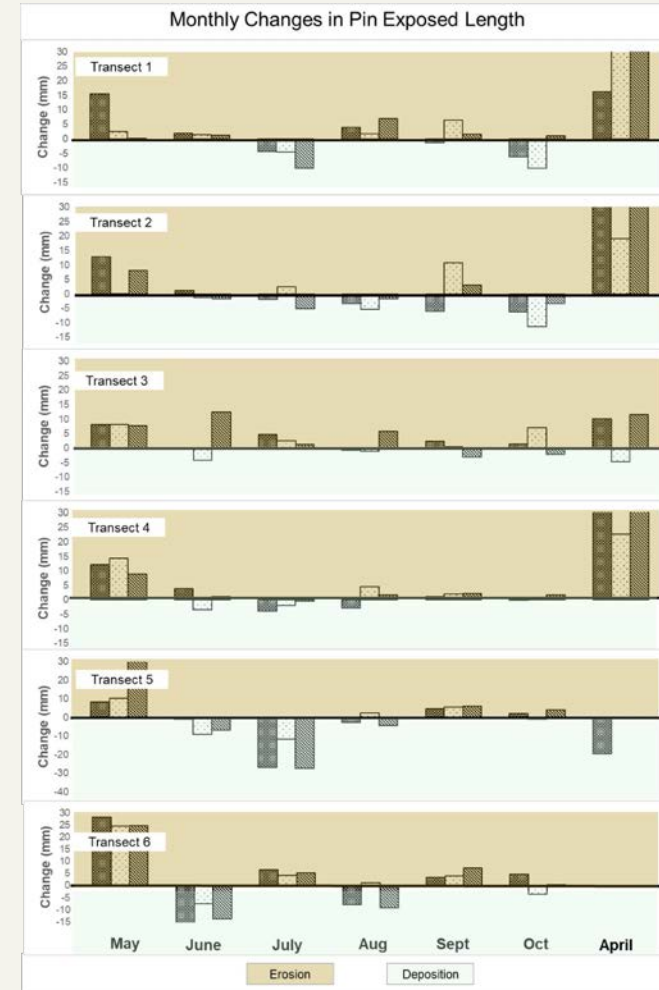
Results

- Measurements were collected monthly from May-October 2023 and repeated again in April of 2024 which offers results one year after pin installation
 - The final measurement was recorded after a winter of high flows, followed by significant flooding in early spring
 - 5 pins were washed out since the October 2023 measurement which were not used in calculating the overall study average since their final measurements were unknown
- In the figure to the right, a positive change (brown) indicates erosion, and a negative change (green) indicates deposition
- The most widespread erosion occurred in the spring (April-May 2023) and over the winter (October 2023-April 2024)

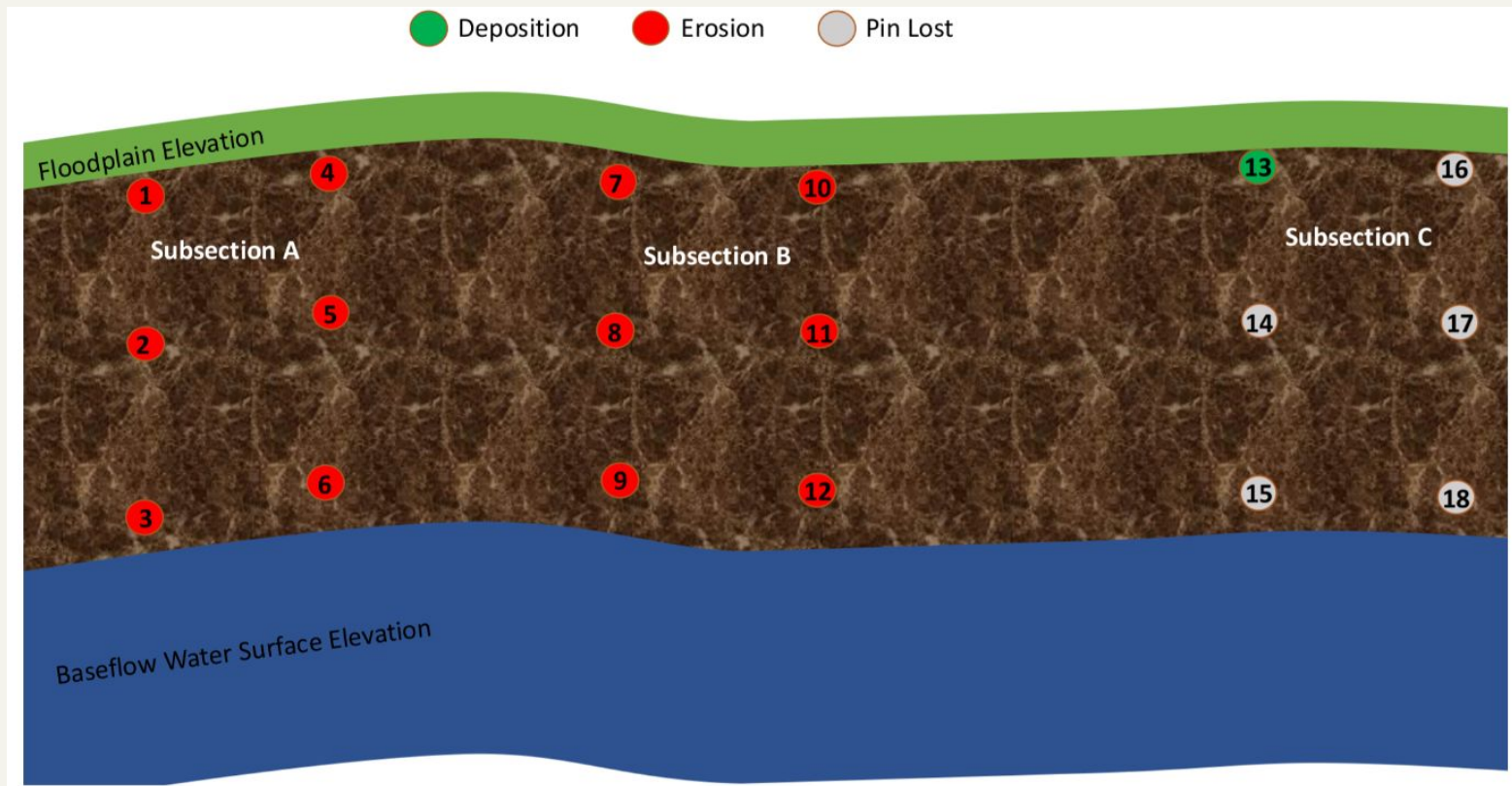
Average net erosion (first 6 months): 7.35 mm

Average net erosion (entire year): 33.96 mm

One pin showed as much as 101.29 mm (4 inches) of erosion!



Results



Conclusions

- Erosion was measured (visually and numerically) at all three subsections
- 5 of 6 pins located in subsection C were washed out in winter/early spring, indicating that it should be prioritized for streambank stabilization



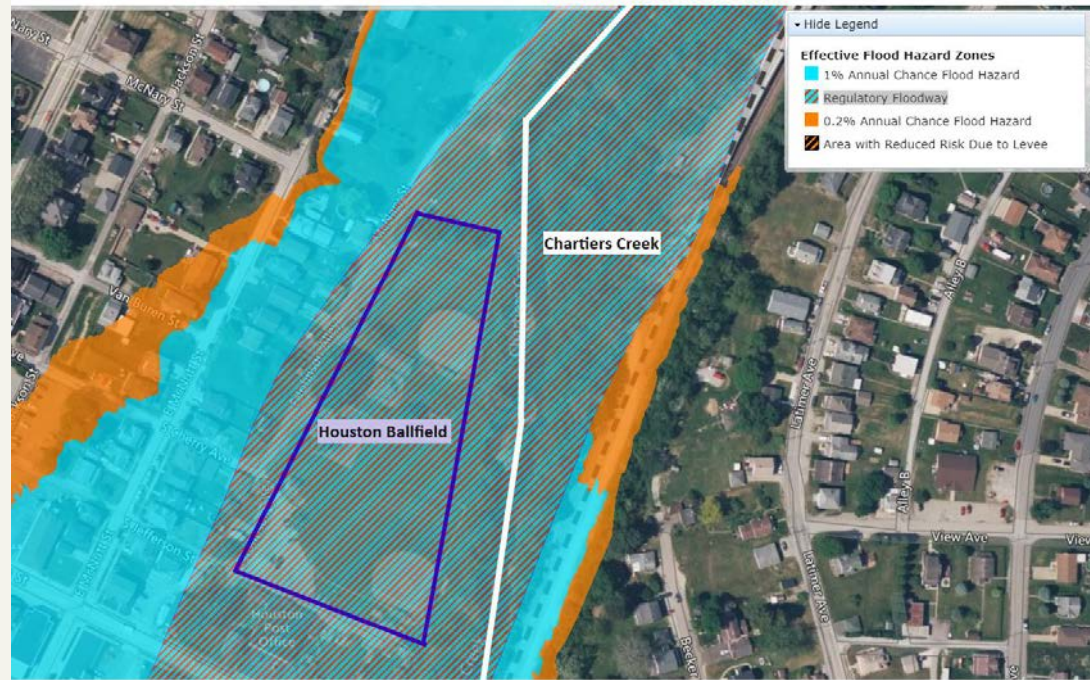
Before study (April 2023)



After study (May 2024)

Conclusions

- Significant flooding occurred at the site in early April
- Imaging from the PA Flood Risk Map shows that Houston Ball Field is a regulatory floodway
 - Regulatory floodway - the channel of a river or other watercourse and the adjacent land area that is reserved from encroachment in order to discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height
- These floodways ensure that there are no increases in upstream flood elevations
- It is **crucial** that proactive steps be taken to stabilize the stream bank since research points to an increase in severity and frequency of flooding due to climate change



References

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Questions?

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[Read the Story Map!](#)

