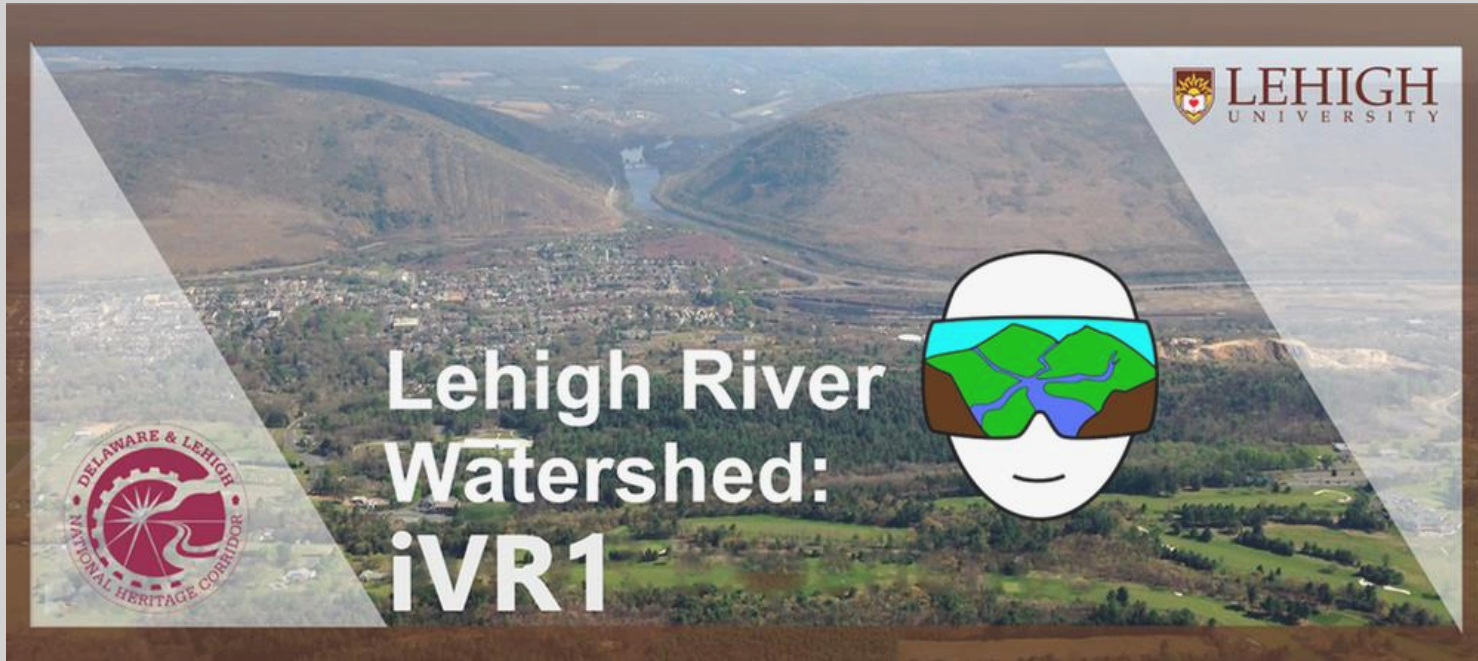


IMMERSIVE VIRTUAL REALITY (IVR) GAME OF THE LEHIGH RIVER WATERSHED, PA



*D8. Distance Learning and
Computer-based Educational
Techniques in the Geosciences*

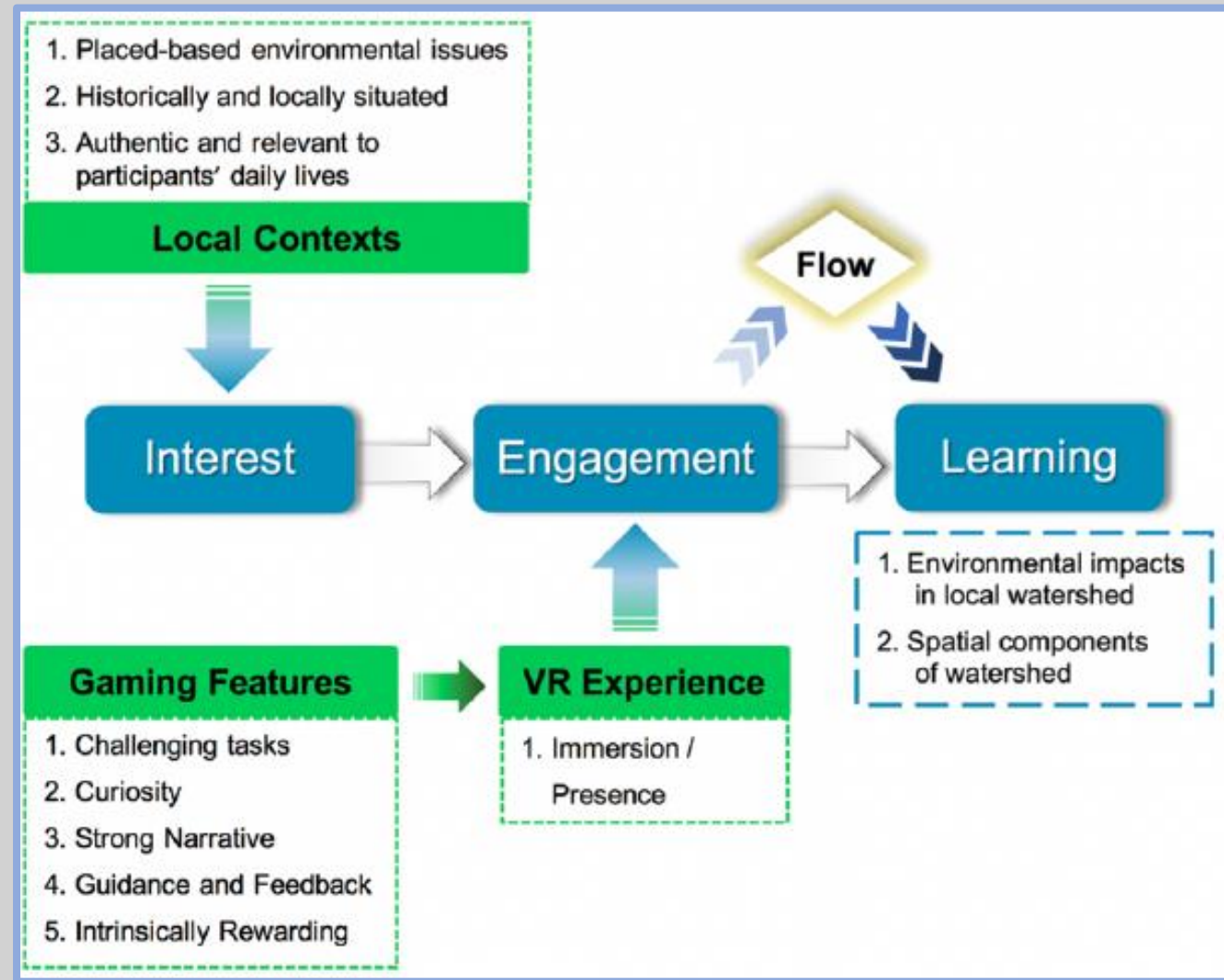
Dave Anastasio, Department of Earth and Environmental Sciences
Al Bodzin, Tom Hammond, Robson Araujo-Junior,
Department of Education and Human Services
Beigie Lam, Department of Computer and Electrical Engineering
Lehigh University, Bethlehem PA 18015 USA

DESIGN

PARTNERS



AUDIENCE: Outreach Informal Education
Adolescent to adult learners



LEHIGH WATERSHED EXPLORATION



START

QUIT

OPTIONS



GAME THEORY TO ENHANCE LEARNING

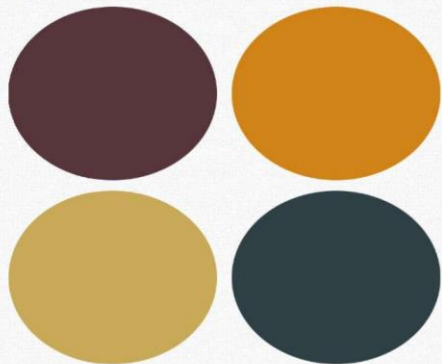
Most common

Green-weak

Drag and drop or paste your file in the area below or: [Choose File](#) | [ColorTest_D&L.png](#)

Trichromatic view: Anomalous Trichromacy: Dichromatic view: Monochromatic view:
☐ Normal ☐ Red-Weak/Protanomaly ☐ Red-Blind/Protanopia ☐ Monochromacy/Achromatopsia
☐ Green-Weak/Deuteranomaly ☐ Green-Blind/Deuteranopia ☐ Blue Cone Monochromacy
☐ Blue-Weak/Tritanomaly ☐ Blue-Blind/Tritanopia

Deuteranomaly is the most common type of red-green color blindness. It makes green look more red. This type is mild and doesn't usually get in the way of normal activities.

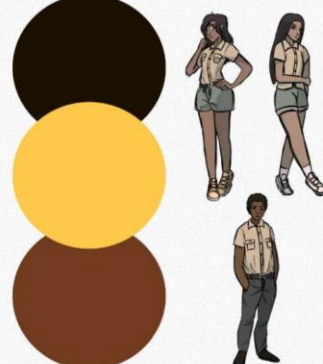


Drag and drop or paste your file in the area below or: [Choose File](#) | [ColorTest_eu...avatars.png](#)

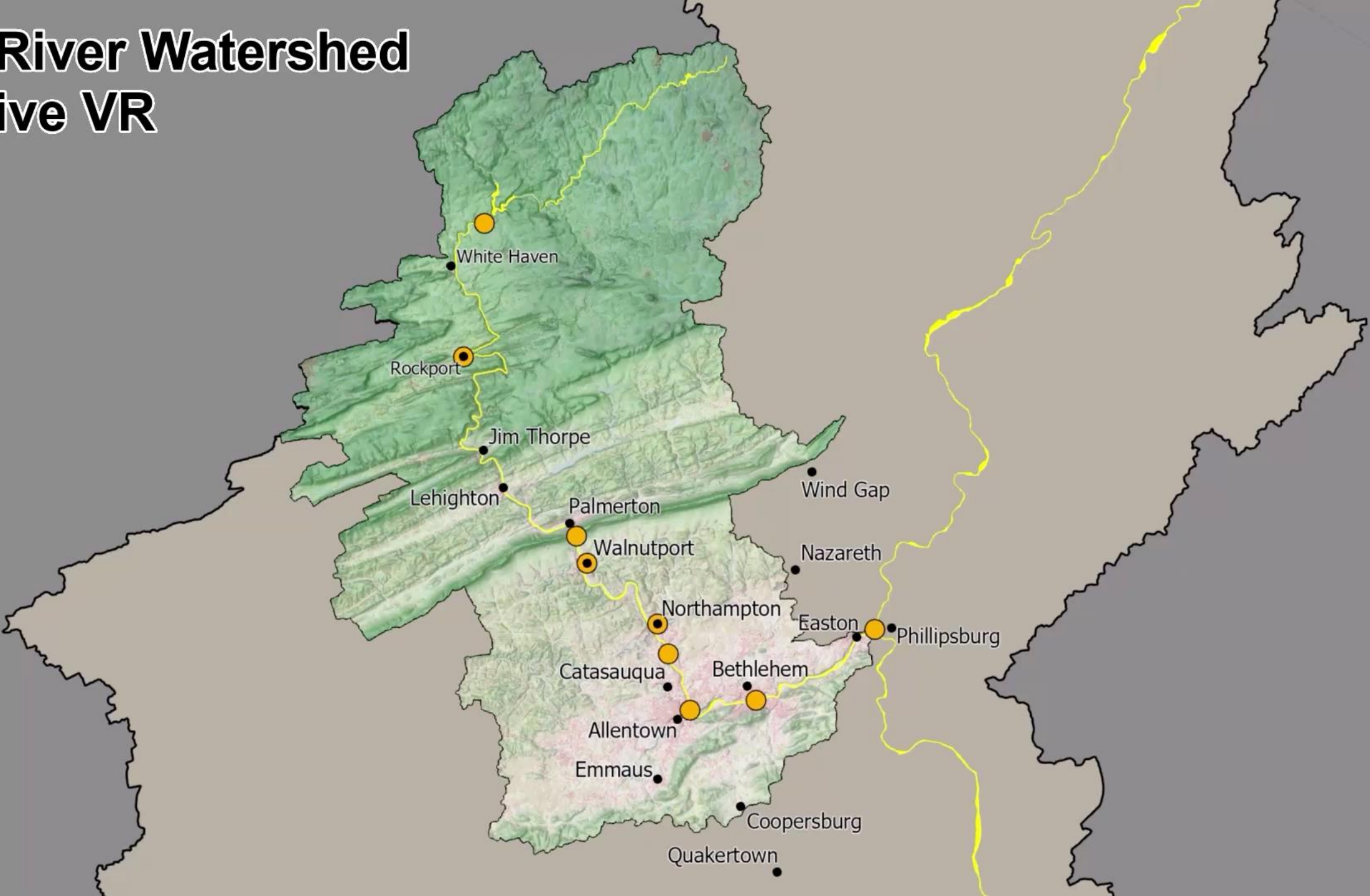
Trichromatic view: Anomalous Trichromacy: Dichromatic view: Monochromatic view:
☐ Normal ☐ Red-Weak/Protanomaly ☐ Red-Blind/Protanopia ☐ Monochromacy/Achromatopsia
☐ Green-Weak/Deuteranomaly ☐ Green-Blind/Deuteranopia ☐ Blue Cone Monochromacy
☐ Blue-Weak/Tritanomaly ☐ Blue-Blind/Tritanopia

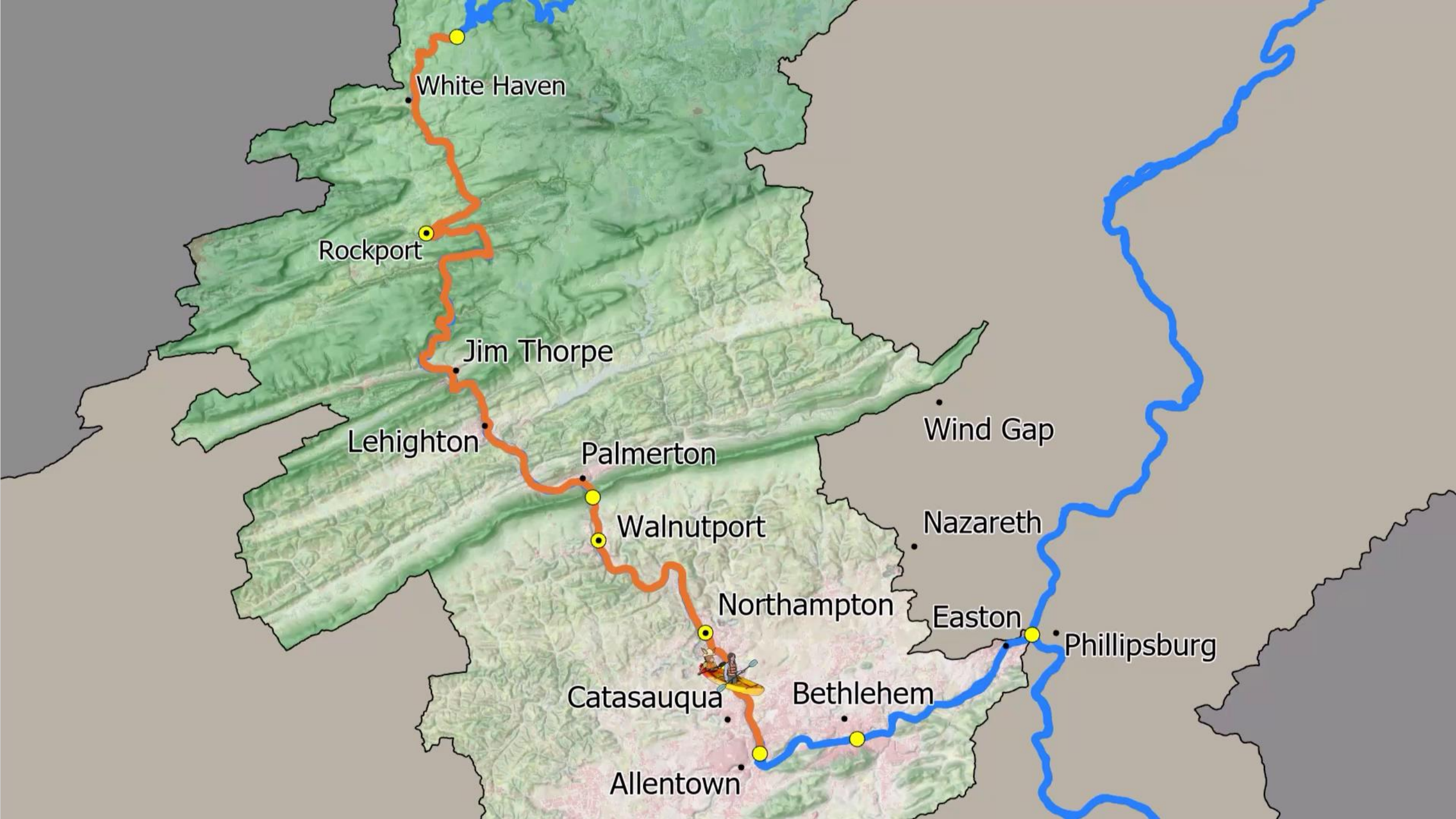
Use lens to compare with normal view: ☒ No Lens ☐ Normal Lens ☐ Inverse Lens

[Reset View](#) [Green simulated \(space or new window\)](#)



Lehigh River Watershed Immersive VR





White Haven

Rockport

Jim Thorpe

Lehighinton

Palmerton

Walnutport

Northampton

Catasauqua

Allentown

Wind Gap

Nazareth

Easton

Phillipsburg

Bethlehem

LANCE

Historian

Between 1855 and 1874, six furnaces were built. The Thomas Iron Company was very successful until the 20th century,

Continue

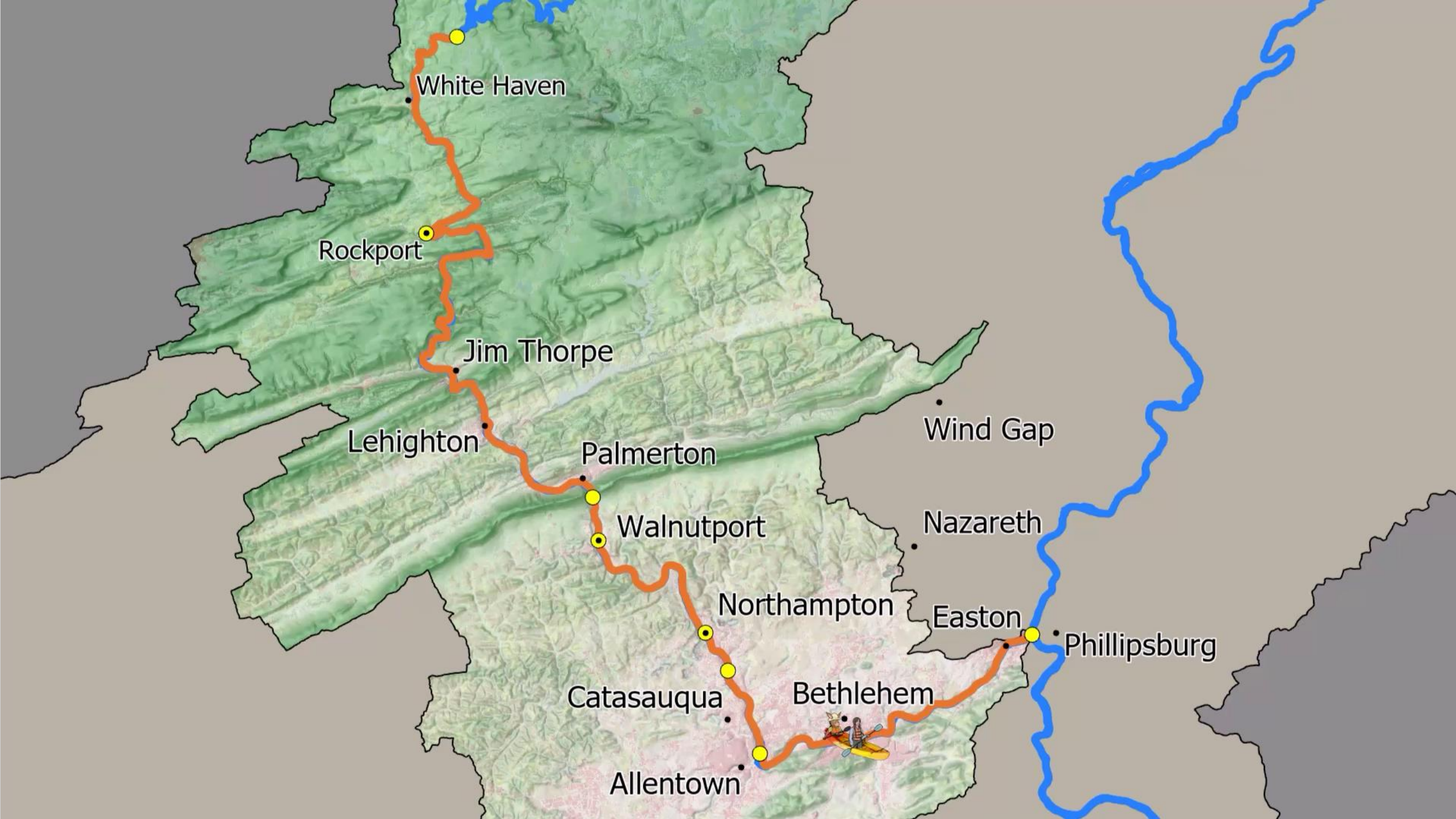


Looking **SE** Downstream

THOMAS IRON WORKS

Hokendauqua, PA





White Haven

Rockport

Jim Thorpe

Lehigh

Palmerton

Walnutport

Northampton

Catasauqua

Allentown

Bethlehem

Wind Gap

Nazareth

Easton

Phillipsburg



MIRA

Environmental Guide

This structure allowed migrating fish to bypass the dam and travel up the Lehigh River.



Close



Looking **SE**
where the Lehigh River
meets the Delaware River

FORKS OF THE DELAWARE

Easton, PA





Multimedia Gallery



Watershed Fly-By

Francis Walter Dam

Rockport

Lehigh Gap

Walnutport

Cementon

Thomas Iron Works

Hamilton Street Dam

Bethlehem Steel

Forks of the Delaware



Looking **SE**
where the Lehigh River
meets the Delaware River

FORKS OF THE DELAWARE

Easton, PA





DELLA THE MULE

D&L Mascot

Now, let's select your three top choices to recommend to the D&L to place a boat access on the river for people to stop, get out of their kayak or canoe, and explore.

Continue

CONCLUSIONS

- iVR activities offers interactive control and increased engagement over traditional methods
- The watershed focus is a motivating learning tool that can motivate people of all ages.
- The iVR technology allows for supports and is designed to provide improved access for STEM-related content for both non-native English speakers and those with mobility disabilities or transportation issues who are physically unable to visit watershed locations because they are either inaccessible or dangerous.
- Immersive VR provides a sense of immersion and the presence of being physically at specific geographic locations.
- Our polling data shows users experienced a flow state while playing the game.



Thank you!