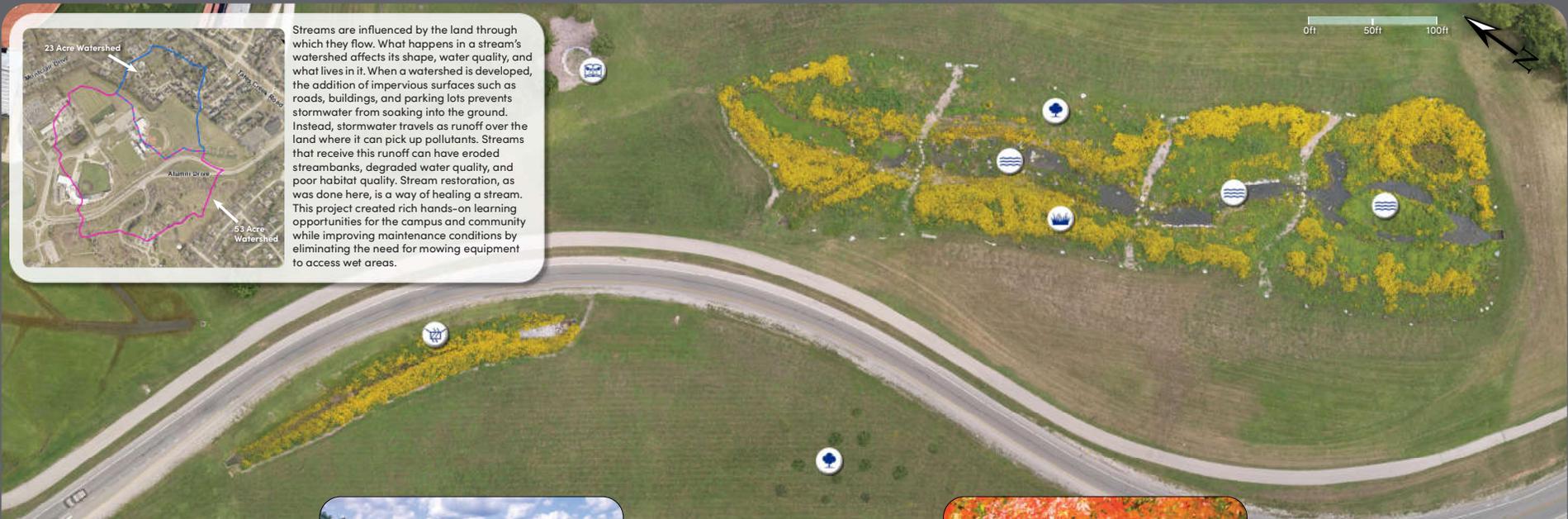


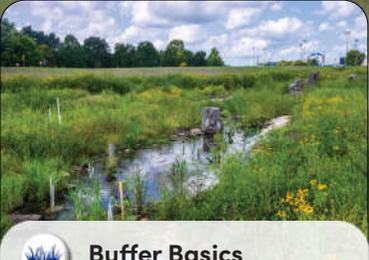


Streams are influenced by the land through which they flow. What happens in a stream's watershed affects its shape, water quality, and what lives in it. When a watershed is developed, the addition of impervious surfaces such as roads, buildings, and parking lots prevents stormwater from soaking into the ground. Instead, stormwater travels as runoff over the land where it can pick up pollutants. Streams that receive this runoff can have eroded streambanks, degraded water quality, and poor habitat quality. Stream restoration, as was done here, is a way of healing a stream. This project created rich hands-on learning opportunities for the campus and community while improving maintenance conditions by eliminating the need for mowing equipment to access wet areas.



Outdoor Learning

Outdoor learning spaces or classrooms are places where students can learn about the natural and human-created worlds while in an outdoor or natural setting. In these spaces, instructors can use engaging, hands-on curriculum to lead students through lessons and encourage exploration. While often utilized for natural and physical sciences and agricultural studies, outdoor learning spaces are useful for teaching all subjects or content areas including mathematics, social sciences, communication, and art and creativity. Outdoor learning spaces help students connect theory to application.



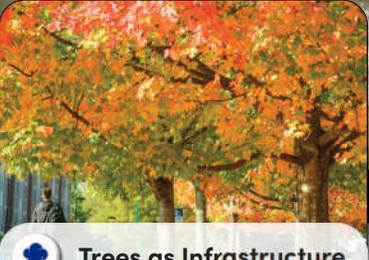
Buffer Basics

Riparian or streamside buffers are a great way to reduce the impacts of urbanization on streams. Buffers are transitional areas linking adjacent lands to aquatic environments like streams, rivers, ponds, and lakes. Healthy buffers are diverse with many types of plant communities that include trees, shrubs, and herbaceous species. The different vegetation types provide different benefits. Grasses are effective at filtering sediment from runoff while trees help improve aquatic habitat through water temperature regulation and introduction of leaves, twigs, and small logs that serve as food and shelter sources. Healthy buffers provide many ecosystem services such as nutrient cycling, water storage, and wildlife habitat.



Multiple Stream Types

Stream restoration is the re-establishment of the structure and function of a degraded stream as closely as possible to pre-disturbance conditions. Each stream restoration project has its own unique characteristics, but most share the same main components such as reconnecting the stream to its floodplain and using native vegetation to create a buffer zone around the stream. This project uses three different stream types, based on other projects in Kentucky, to show learners different design techniques without leaving campus. The uppermost portion of each stream type is denoted by a woodchip walking path that crosses the stream.



Trees as Infrastructure

Trees are a cost-effective means of reducing stormwater runoff. A tree's branches and leaves form its canopy which intercepts rainfall (hundreds to thousands of gallons annually depending on the tree). This captured rain evaporates to the atmosphere or falls to the ground. On the ground, it soaks into the soil or becomes runoff. Once in the soil, rainfall is available for uptake by the tree's root system where it is subsequently transpired back to the atmosphere. Trees also provide many other ecosystem services that benefit humans, including improvements in air quality, carbon sequestration, biodiversity, microclimate regulation, noise attenuation/reduction, human health, and property values. Trees were planted along the stream and in the median as part of this project.



Bioswale

Bioswales are often thought of as elongated rain gardens. These structures consist of shallow, wide, low-sloped channels, which are lined with vegetation and/or rock. The underlying soil is amended to encourage infiltration and promote plant growth. Rainfall from small storms is often absorbed completely while flow from larger storms is conveyed to surface waters or storm sewers. Bioswales are ideal for use alongside roadways or within parking medians, in lieu of pipes or drainage ditches, because they encourage infiltration by slowing down runoff and improve water quality by filtering out pollutants.