



Overview

Hatchery Creek is the outlet for the Wolf Creek Trout Hatchery located immediately downstream of the Wolf Creek dam, which forms Lake Cumberland. Water level fluctuations below the dam impaired trout spawning. Using in-lieu fee funding, the Kentucky Department of Fish and Wildlife Resources hired the Design-Build team of EcoGro/Ridgewater/Stantec to design and build a one-mile extension downstream to create one of Kentucky's first self-sustaining trout stream capable of supporting spawning. Stantec's responsibilities included completing a geomorphic assessment, preliminary and final design, permitting, hydraulic modeling, jurisdictional waters determinations, construction observation services, as-built survey, and post-construction monitoring. The project design focused on supporting all trout life stages and included a variety of stream types including A, C, and D channels. In the braided D-channel sections, a variety of wetlands and vernal pools were constructed to provide rearing habitat. The lower portion included a step pool system designed to promote fish passage from the Cumberland River up into Hatchery Creek. A fish migration barrier on the upper portion of the project was also designed to separate areas with different fishing restrictions. The design consisted of approximately 6,000 linear feet of channel with dozens of oxbow features, and numerous in-stream structures including toe wood, lunger structures, step pools, and a variety of riffles. Wood harvested from the site was used throughout to help create a natural looking stream system and provide habitat.

Project Details	X
Lead Entity: Kentucky Department of Fish and Wildlife Resources Lead entity types: - Governmental Body Partner Organizations: US Fish & Wildlife Stantec Consulting Services Inc. EcoGro Inc. Ridgewater Adaptive management Describe adaptive management processes and mid-course corrections taken to address unforeseen challenges and improve outcomes in each of the following categories: Other: Due to weather conditions and on-site coordination challenges, construction took place over two construction seasons, which created some challenges and resulted in excavations for the project being left open longer than originally intended. State of Progress: - Monitoring & Evaluation	

Project Start:

2013-08-01

Project End:

2015-12-01

Global Regions:

- Americas
- Northern America
- World

Countries:

- United States of America

Ecosystem Functional Groups / Biomes:

- Rivers and streams biome

Extent of project:

- Other

Extent of restoration:

- Other

Degradations:

- Drainage and hydrologic changes
- Fisheries & Aquaculture
- Mining & Resource Extraction
- Urbanization, Transportation & Industry

Description:

This project was funded through the need to mitigate for roadway construction and mining impacts through an In-Lieu Fee Program. Under an In-Lieu Fee Program, mitigation funding is pooled together to pursue larger more comprehensive funding. Prior to restoration, the site was subject to erosion, resulting in sedimentation to the Cumberland River.

Planning and Review**Goals and Objectives****Was a baseline assessment conducted:**

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Was a reference model used:

OTHER

Other reference models used::

The reference ecosystem is based on <u>diverse sources of information</u> (e.g. multiple extant reference sites, field indicators, historical records, predictive data).

were_goals_identified:

YES

Goals and objectives:

- Other

Goals Description::

 Create a sustainable trout stream Generate stream mitigation credits Stream stability Enhance aquatic and

terrestrial habitat Enhance surrounding wetlands and create new wetlands

Stakeholder Engagement



Were Stakeholders engaged?:

unsure

Description of Stakeholder Involvement:

Kentucky Department of Fish & Wildlife US Fish and Wildlife US Army Corps of Engineers Public Numerous stakeholder meetings were held before and during the project to address issues/concerns. Since the project has been completed, numerous field tours of the site have been completed.

Ecosystem Activities and Approaches



1) eliminate existing threats to the ecosystem: The project focused on eliminating a sediment source to the Cumberland River and elimination of invasive plants. 2) reinstate appropriate physical conditions (e.g. hydrology, substrate): The project raised groundwater in the vicinity of the site, which enhanced existing and restored wetlands. The project also significantly increased riffle habitat. 3) achieve a desirable species composition : Habitat features worked into the project were designed for three species of trout. Terrestrial habitat features for a variety of mammals were also included in the project. 4) reinstate structural diversity (e.g. strata, faunal food webs, spatial habitat diversity): The project greatly increased complexity within the channel bed and added to diversity within the stream channel and surrounding areas. 5) recover ecosystem functionality (e.g. nutrient cycling, plant-animal interactions, normal stressors): Ecosystem function was greatly enhanced over the impaired channel which previously existed. This was achieved through added complexity, raising the groundwater, increasing the quality and amount of fringe habitat around the channel, creating macro-invertebrate habitat, etc. 6) reestablish external exchanges with the surrounding landscape (e.g. migration, gene flow, hydrology): The project focused on reestablishing hyporheic flow within the channel and overall ground water/surface water interaction. What activities were undertaken to address any socio-economic aspects of the project?: The project resulted in a robust fishery which has increased tourism to the community.

Project Outcomes



Eliminate existing threats to the ecosystem: Erosion has been successfully eliminated by the project. Reinstall appropriate physical conditions: Based on groundwater readings at the site, the project has raised groundwater in the vicinity of the stream, which has enhanced existing and restored wetlands. The project also significantly increased riffle habitat. Achieve a desirable species composition: Vegetation throughout the restoration project is in the process of being monitored. Results indicate a diverse composition of species is being established at the site. With respects to diversity of species of trout at the site, over time the restored reach is exhibiting an increase in rainbow trout, which is also occurring in areas outside of the restoration. Reinstall structural diversity: The project greatly increased complexity within the channel bed and added to diversity within the stream channel and surrounding areas. Recover ecosystem functionality: Ecosystem function was greatly enhanced over the impaired channel which previously existed. This was achieved through added complexity, raising the groundwater, increasing the quality and amount of fringe habitat around the channel, creating macro-invertebrate habitat, etc. Reestablish external exchanges with the surrounding landscape: The project focused on reestablishing hyporheic flow within the channel and overall ground water/surface water interaction. Results of ground water monitoring indicate that the overall interaction has been enhanced. Economic vitality and local livelihoods: The project has increased tourism to the area. The project continues to attract trout fisherman, which has increased tourism to the area. Provision of basic necessities such as food, water, timber, fiber, fuel, etc.: N/A Cultural dimensions including recreational, aesthetic and/or spiritual values: The project has increased recreation in the watershed. Regulation of climate, floods, disease, erosion, water quality, etc.: The project has eliminated a source of erosion and has improved water quality. Has the project had any negative consequences for surrounding communities or given rise to new socio-economic or political challenges?: No

Monitoring and Data Sharing



Does the project have a defined monitoring plan?:

YES

Monitoring Details:

The stream restoration and wetland restoration components of the project are being monitored for 5 years. Monitoring includes geomorphic data collection, photographic documentation, groundwater level readings, vegetation surveys, hydric soil surveys, and wetland delineations. The site is also being monitored over a three year period for macroinvertebrates and fisheries. Duration Start: 2015-12 Duration End: 2021-12

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