JACK'S CREEK / SITKIN SMELTING AND REFINERY
Wetland Remediation / Restoration / Vernal Pool Creation

Background

Encompassing 105 acres, the Jacks Creek site is located in the village of Maitland in a rural farming area of Mifflin County, Pennsylvania. The site is a former smelting and precious metals reclamation facility, with Sitkin Smelting Company operating at the site from 1958 until 1977. Currently, a portion of the site property is used for a metal scrap yard and an aluminum recycling facility. Residential and agricultural land uses surround the site with Jacks Creek forming the northwest property boundary.

A complex assortment of buildings, waste piles, and large areas of soils were contaminated. Soils contained high levels of lead, copper, zinc, cadmium, and PCBs. Floodplain wetlands on the site were contaminated with runoff from the waste piles and upland soils.

The sediments of Jacks Creek near the site contained similar contaminants as the soils. A consumption advisory based on PCB contamination was issued for multiple fish species by the Pennsylvania Department of Health for Jacks Creek adjacent to and down stream of the site.

EPA's selected remedy for soils included contaminant stabilization, on-site consolidation, and capping of the waste piles and soils. The clean up numbers for lead at the site were 1000 ppm for the active industrial area, 200 ppm for the floodplain soils, and 110 ppm for sediments in the tributaries and creek. The floodplain remediation required the removal of vegetation in a segment of the riparian corridor.

It was imperative to restore the floodplain using techniques that would reduce stormwater sheet flow to the creek and prevent soil migration. Because soil excavation activities impacted the existing wetlands on site, we recreated wetlands in the riparian corridor along Jacks Creek.

Objectives

Restore wooded corridor along the creek
Recreate floodplain wetlands
Reduce stormwater flow to the creek

Approach

Grade the area with clean soil to create vernal pools within the floodplain
Plant trees and shrubs throughout the remediated floodplain
Use live stakes along the banks of the tributaries and creek
Seed with a mixture of herbaceous annuals and perennials
Eliminate invasive species that will overwhelm native plantings
Monitor to ensure success of wetland and stream bank restoration

Methods

Vernal pools - Following soil excavation, the floodplain was graded using uncontaminated off site soils. While the plan called for two interconnected pools, the final topography resulted in 8 depressions varying in size and depth. The more shallow pools are likely to become completely filled with sediment over time. The remaining pools are deep enough to accommodate sediment and still retain water seasonally. Coarse woody debris that was stock-piled during the remediation phase was placed in the pools to provide additional habitat for the invertebrate and vertebrate community.

Vegetation - To stabilize the soil and to restore the vegetative community, we planted a wet meadow seed mix with clover and annual rye over the entire remediated floodplain. This mixture provided enough diversity in plant requirements to address wet to dry conditions over the entire remediated area. We planted sapling trees and shrubs similar in composition to the surrounding riparian forest within the remediated area with emphasis on the perimeter of each vernal pool. We used live stakes along Jacks Creek and the onsite tributaries.

Monitoring

The objective of the monitoring plan for the Jacks Creek site is to document the effectiveness of the ecological enhancement in successfully creating functioning vernal pools, stormwater control, and riparian corridor restoration. We monitor hydrology, vegetation, and biota each year during early spring and early fall.

Progress

In its 6th year since the remediation, the floodplain of Jack's Creek provides riparian habitat including wet meadow, fruiting shrubs, and vernal pools. Although canopy closure is still 5-10 years away, the planted trees are maturing and seeds of volunteer species carried by annual high waters are increasing the diversity of the future forested floodplain. The pools already serve as breeding areas for early spawning amphibians such as wood frog and American toad that complete their metamorphosis before the unshaded water heats up. Three of the 8 pools are still deep enough to retain water to support minnows and painted turtles. All of the pools support an increasingly diverse macroinvertebrate community and two of the pools have abundant fairy shrimp. The nest boxes that we put in the wet meadow surrounding the pools are consistently occupied by tree swallows and bluebirds.

For additional information on this project, contact Kathleen Patnode (kathleen_patnode@fws.gov).