OSMRE National Technology Transfer Team (NTTT), **Applied Science Fact Sheet***
U.S. Department of the Interior, OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT

Evaluating the Use of Reclaimed Forests by Threatened, Endangered and Species of Concern on Appalachian Coal Mines

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Project Description and Objectives:

With the implementation of the Appalachian Regional Reforestation Initiative in the mid-2000s and adoption of the Forestry Reclamation Approach (FRA), tens of thousands of acres of forest now exist on reclaimed surface mines throughout the central Appalachian region. In addition, wetlands have been constructed on many reclaimed surface mines. These forests and wetlands may provide habitat for many forest-dependent wildlife species, including those considered threatened, endangered, and species of concern. The main objective of the project was to provide information on wildlife response to reforestation of surface mines, using the FRA, in West Virginia and Kentucky.

Applicability to Mining and Reclamation:

The results of the study provide a better understanding of wildlife response to reforestation and wetland creation on reclaimed mine lands using the FRA. Some groups (i.e., early successional birds, bats, pond-breeding amphibians) exhibited positive responses to FRA, whereas other groups (i.e., terrestrial amphibians and mature forest birds) exhibited higher species richness and abundance in unmined forests in the region. The FRA has been shown to accelerate forest succession and canopy closure; thus, species currently not occupying FRA sites will likely increase as forests mature.

Methodology:

Wildlife populations were surveyed across four land cover treatments: young (1-5 yr) FRA sites, old (8-23 yr) FRA sites, traditionally reclaimed sites, and non-mined forests in West Virginia and Kentucky. Survey techniques included point counts to detect breeding birds, dipnet surveys for pond-breeding amphibians, and coverboard surveys for terrestrial amphibians. Automated recording units were also used to detect bats, birds and frogs and motion sensitive camera traps were used to detect mammals. Water chemistry was analyzed from wetlands and environmental data loggers were deployed to measure environmental conditions. Data collected resulted in presence/absence data and abundances of individual species. Multi-species community occupancy models and binomial mixture models were used to estimate species' occupancy, richness and abundance across the four land cover treatments.

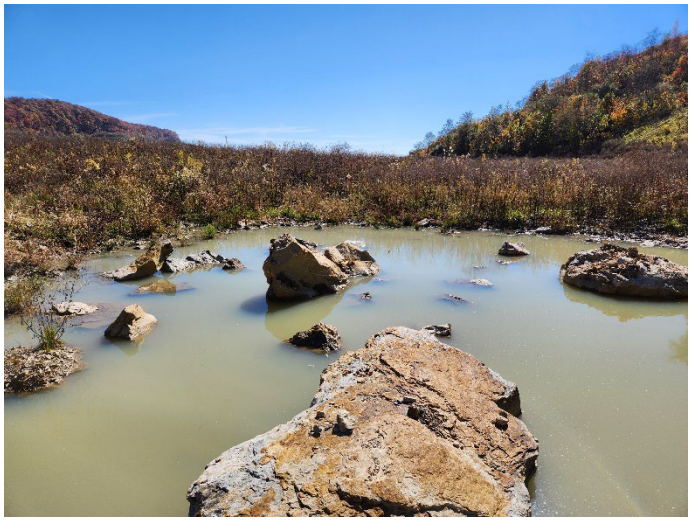

Figure 1. Created wetland on a Kentucky legacy mine restored via the Forestry Reclamation Approach.

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Highlights:

1. FRA implementation supported native bird species, particularly those species associated with young forests. The FRA avian community assemblage included avian species of concern including Grasshopper Sparrow, Blue-winged Warbler and Prairie Warbler.

2. Bats use created wetlands on reforested surface mines for foraging. Although most bats detected are considered common, the Tricolored Bat, which is currently proposed to be listed as endangered under the Endangered Species Act, was detected at FRA sites in West Virginia and Kentucky.

3. The FRA coupled with wetland creation restored habitat for pond-breeding amphibians within a relatively short timeframe (<10 years). Species considered sensitive to forest loss, such as Spotted Salamanders, had abundances in created wetlands on FRA sites equal to those in natural wetlands in mature forests.

4. Camera traps resulted in > 1500 observations of terrestrial mammals on restored surface mines. Notable species detected included Bobcat, Fisher and American Black Bear.

Results and Findings:

Major findings suggest that implementing the FRA coupled with wetland creation on active and legacy mines can help to restore habitats that support diverse wildlife communities, including species that are threatened, endangered or of concern.

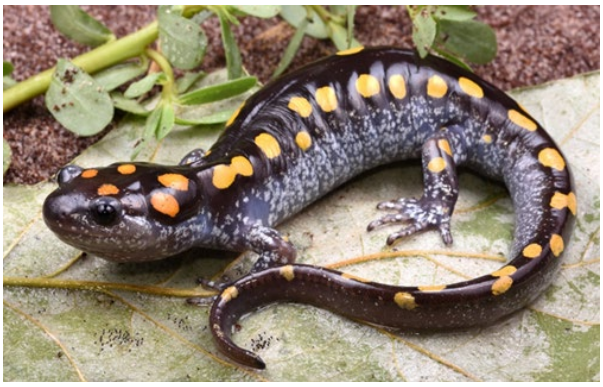

Figure 2. Amphibians, like the Spotted Salamander, used created wetlands on mines restored via the Forestry Reclamation Approach.

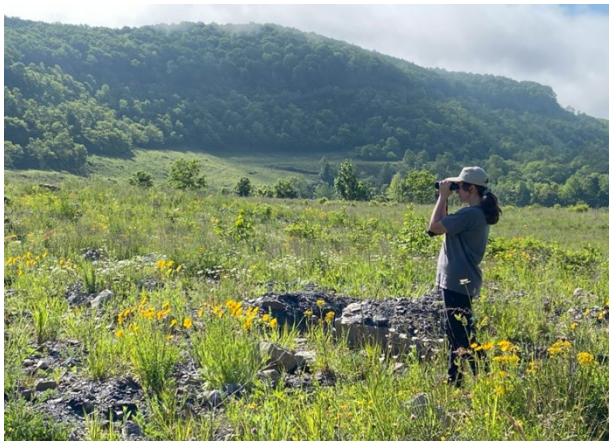

Figure 3. University of Kentucky student surveying for birds on a recently reforested mine in Kentucky.

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