

# Reclaimed surface mines: new potential for some North American birds

by Pierre N. Allaire

*Losses of forest habitat may be  
partially compensated for by increases  
in certain grassland species*

**S**TRIP-MINING USUALLY CONJURES for most people a vision of vast amounts of land being destroyed and steam shovels or bulldozers moving thousands of cubic yards of earth by the hour. However, as state and Federal laws are being strengthened and as enforcement agencies become better staffed, much is being done in reclamation and mining engineering research to contribute to reducing runoff and sedimentation, acidification and to increase the efficiency of coal extraction. This paper intends to show how new mining and reclamation techniques are changing the avifauna of Appalachia.

## Description of the Area

In March 1974, censusing began on a number of reclaimed sites in Breathitt County, part of the Eastern Kentucky coal field. Two of the study sites had been mined by the mountain top removal (hereafter, MTR) method, *i.e.*, the upper 25-30 meters of the mountain top had been decapitated and placed at the head of the hollow, exposing one or more seams of coal in the process. Essentially what remained was a large tract, 40 or more hectares, of flat land. Another study site had undergone contour stripping. By this method, an "L-shaped" cut is made into the side of a mountain creating a bench with a high rock face perpendicular to the bench. This rock face is commonly called a highwall.

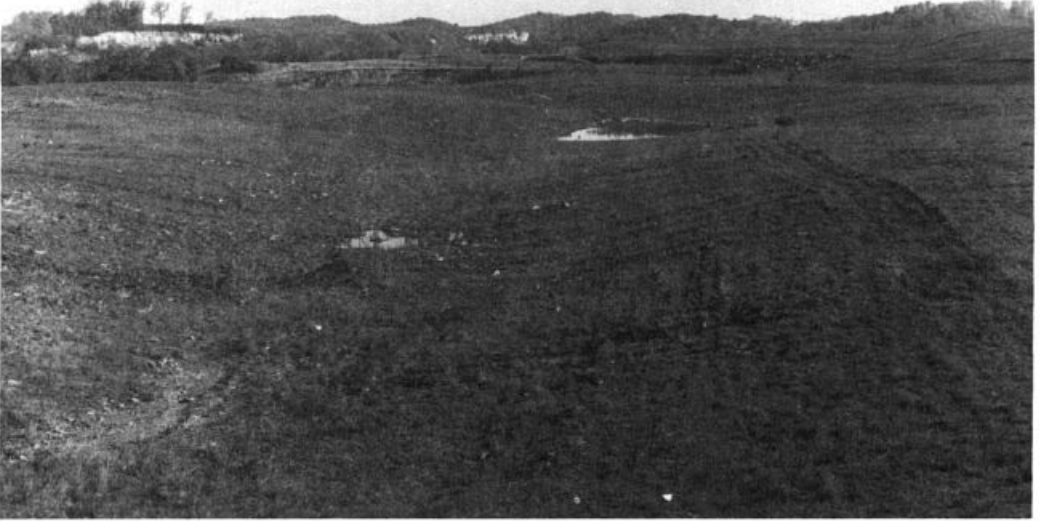
The two MTR study sites had been revegetated with grasses (*Fescue* spp.) and legumes (*Lespedeza* spp.) while the bench, also in grasses and legumes, had some additional second growth trees and shrubs averaging approximately 5 meters.

There are unique aspects concerning the topography and the vegetation existing on these areas. Historically there was originally

very little flat land in eastern Kentucky; most of it was bottomland and averaged about 5% of the total area. Today flat land is increasing daily as a result of the MTR method. Grasslands were also very scarce in the past but are presently spreading at a rapid rate. Thus "islands" of grasslands among very heavily forested areas are being created.

## Breeding Bird Results

**T**O EVALUATE THE CHANGE occurring in the bird life as a result of surface mining, a review of what one might normally expect in the eastern deciduous mountains of Appalachia at elevations of 300-500 meters during the breeding season is in order. Among the undergrowth and ground dwellers there should be healthy populations of the Ovenbird (*Seiurus aurocapillus*), Hooded Warbler (*Wilsonia citrina*), Kentucky Warbler (*Oporornis formosus*), Worm-eating Warbler (*Helminthos vermivorus*), and Black-and-white Warbler (*Mniotilta varia*). The mid-story is also a rich area containing the Red-eyed Vireo (*Vireo olivaceus*), Tufted Titmouse (*Parus bicolor*), Carolina Chickadee (*Parus carolinensis*), Acadian Flycatcher (*Empidonax virescens*), and American Redstart (*Setophaga ruticilla*). The canopy avifauna is the most difficult to observe owing to dense leafage and height of 25+ meters. Species that can be heard singing regularly and seen occasionally are the Black-throated Green Warbler (*Dendroica virens*), Scarlet Tanager (*Piranga olivacea*), Cerulean Warbler (*Dendroica cerulea*), Yellow-throated Vireo (*Vireo flavifrons*), and Great Crested Flycatcher (*Myiarchus crinitus*). The Northern Parula (*Parula americana*) and Louisiana Waterthrush (*Seiurus motacilla*) can be found along streams. Common forest picids, heard drumming and calling are Pileated Woodpecker (*Dryocopus*



Photograph of one of the mountain top removal study areas. A somewhat rugged terrain with marshes and ponds (in foreground) is typical of the reclamation in this area. In the background (upper left) a section of highwall can be seen quite clearly up against a horizon of unmined mountains. Photos/Pierre N. Allaire.

*pileatus*), Red-bellied Woodpecker (*Centurus carolinus*), Downy Woodpecker (*Picoides pubescens*), and less frequently, Hairy Woodpecker (*Picoides villosus*).

One might now focus attention on what birds are using reclaimed surface mines in the study area.

**T**HE MOST INTERESTING is the Grasshopper Sparrow (*Ammodramus savannarum*), particularly in light of its decline over the past few years throughout most of its range. This species was found on almost any reclaimed grassland larger than two hectares, grazed or ungrazed. Unpublished data from field notes showed from ten to sixteen pairs per forty hectares (100 acres), which can be interpreted as a fairly dense population. The encouraging prospect is that this population has remained stable, unlike those of other regions. One theory explaining the decline of Grasshopper Sparrows elsewhere involves the presence of chlorinated hydrocarbons in the local food web. Intense agricultural practices utilizing chemical insect control was not conducted in the subject area and may explain the stability in the population.

Horned Lark (*Eremophila alpestris*) also found these areas satisfactory for nesting. The rocky terrain, gravel roads, and bald spots

where vegetation did not grow, all met its breeding requirements. With almost absolute certainty Horned Larks could be found at any time where any of the three features above occurred. The rapid creation of this kind of habitat may be an important factor in the range expansion of this species. Recently, Hurley and Franks (*Auk*, 93:108-115, 1976) showed that the Horned Lark has moved eastward. They indicated that in Kentucky the Horned Lark breeding range ended at the western edge of the eastern Kentucky mountains. This no longer holds as the birds now breed throughout the eastern half of the state where strip mining has left suitable habitat.

Eastern Meadowlark (*Sturnella magna*) found both the grazed and ungrazed areas suitable for breeding. Nests were difficult to locate but parents feeding young were recorded a number of times.

The Red-winged Blackbird (*Agelaius phoeniceus*) is another species that found its way to the strip mines. Occasionally ponds or puddles remained after mining. As a rule there was no acid problem with the water because of the low sulfur content of the coal in this area. Within a few years cattails (*Typha* sp.) emerged. Soon thereafter Red-wingeds moved in and bred. The cattails marshes were small and supported two to four males with accompanying females.

**M**OVING AWAY FROM the grasslands and looking at the bench or highwall we found some different and very interesting birds. In one study site small shrubs and trees over 5 meters along the bench, provided an edge. As expected typical edge species such as the Indigo Bunting (*Passerina cyanea*), Prairie Warbler (*Dendroica discolor*), Rufous-sided Towhee (*Pipilo erythrophthalmus*) and Song Sparrow (*Melospiza melodia*) were found. The more unusual beneficiaries of contour mining were those birds utilizing the highwall for nest sites. Barn Swallow (*Hirundo rustica*) built mud structures under large rock overhangs. Rough-winged Swallow (*Stelgidopteryx ruticolis*) was often seen entering and leaving cracks in the highwalls. Eastern Phoebe (*Sayornis phoebe*) commonly used crevices in nest-building. It is interesting to note that phoebes ordinarily nest under the natural rock formations near the creeks in the valleys. The same situation is created on the mountainside where contour stripping leaves a rock outcrop with water puddles at its base. Nest sites and a food supply of aquatic insects were sufficient to sustain a good local breeding population.

Finally, one species which maximally exploited both the grasslands and highwalls was the Eastern Bluebird (*Sialia sialis*). It adapted remarkably well to the highwall. On two occasions it was found nesting on the shaly rock ledges, one nest of which was an open nest, and very atypical for the species (Allaire, *Ky. Warbler*, 50:70-72, 1976). Nest boxes placed near ponds bordering the grasslands also attracted them. Of the six boxes inspected during the summer of 1976, all reared at least one young and one box was used twice during that summer.

**W**HAT DOES ALL THIS MEAN? Are these newly created habitats significant? Do they really offer nesting potential for certain North American birds? Our censusing demonstrated that birds are adapting to the changes in their environment as a result of surface mining activities. It is unarguable that forest avian populations, which are most diverse and productive in terms of numbers and biomass



*Open nest of Eastern Bluebird on a shaly ledge of a highwall in June 1975.*

(Brewer, *Ecology*, 39(3):543-545, 1958 and Karr, *Condor*, 70:348-358, 1968), are severely and negatively affected by mining. More specific reclamation toward accelerated reforestation of native species is appropriate. Conversely, the overall diversity of the area has increased and surface mining has had a positive effect on certain species.

Preliminary observations as the ones described here are merely the initial steps in understanding how birds utilize these particular manmade ecosystems. More work is essential to obtain requisite information to maximize these lands for secondary uses in terms of habitat suitable for game and non-game species.

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