

The response of passerine species to a new resource: reclaimed surface mines in West Virginia

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Proving that the changes occurring in the new grasslands in Kentucky are also taking place in West Virginia

Introduction

IT IS WIDELY KNOWN that bird species select habitats based on, among other things, the structural character of the vegetation. West Virginia surface mine operations cause drastic alterations in the structural character of avian habitats. What was once a mixed hardwood forest supporting 40-50 breeding passerine species becomes a sparse grassland supporting 1-8 species.

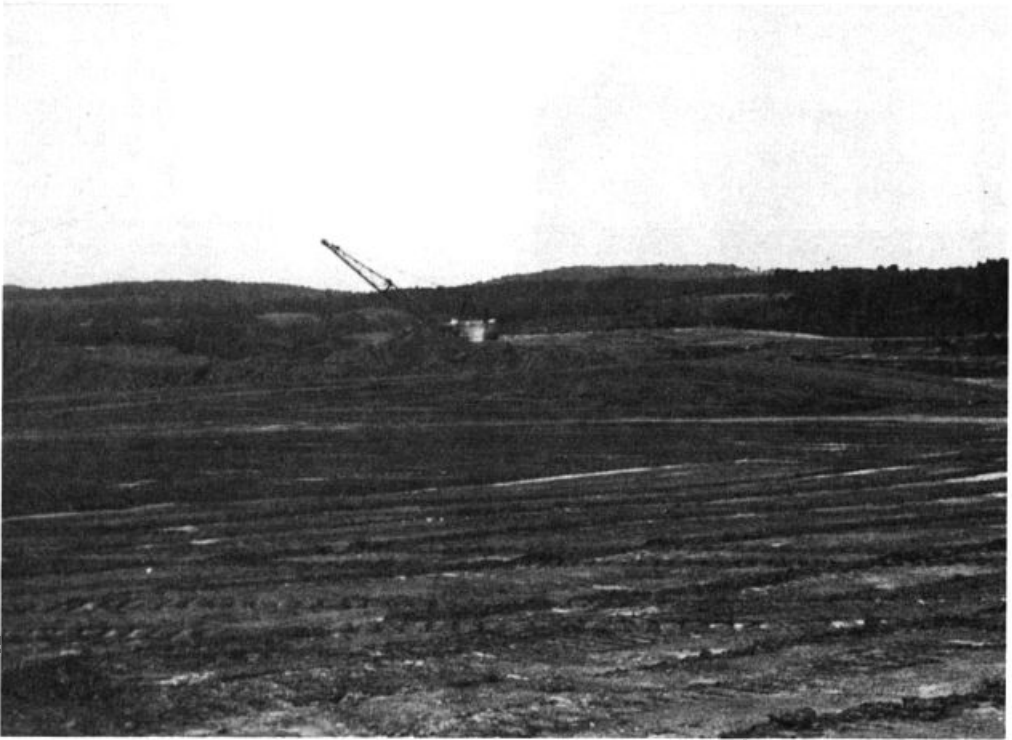
When the existing coal seam is either too narrow or too near the surface to be economically "deep mined," surface mine operations are undertaken. Basically the procedures for surface mining are: (a) all vegetation from the mine site is removed, (b) the earth above the coal seam (over-burden) is piled nearby, (c) the coal is removed, (d) the over-burden is spread back over the mine site. What remains is usually a bare, very rocky, and highly acidic surface.

Largely owing to public pressure, surface mine operators have been forced to regrade strip-mined sites, bury toxic materials, and revegetate the site. Revegetation in some regions, particularly in Ohio and Pennsylvania, is accomplished by planting trees, but, in West Virginia the objective is to stabilize the area as quickly as possible. The usual method, called hydroseeding, is to apply fertilizer, lime, soil stabilizers, and various grass and legume seeds in an aqueous slurry to the regraded site. The most widely planted species are Tall Fescue (*Festuca arundinacea*), Birdsfoot Trefoil (*Lotus corniculatus*), Red Top (*Agrostis alba*), Timothy (*Phleum pratense*), and Oats (*Avena sativa*).

REGULATIONS ADOPTED IN 1972 in West Virginia state that areas cannot be considered reclaimed until after the second growing season (spring and fall are considered two growing seasons). If reclamation is considered satisfactory (according to the 1972 regulations) bond is lifted. If it is not, then the operator may be required to continue revegetation efforts until successful. Defined by the 1972 regulations, satisfactory reclamation means at least an 80% ground cover for legumes and perennial grasses or a 60% survival for woody plants and perennials, with no bare area to exceed ¼ acre in size or total more than 20% of the area seeded. These requirements are more stringent than pre-1972 regulations. As a result of present surface mine reclamation procedures since 1972, 43,225 hectares of new grassland have been created. This is an ecosystem unique to West Virginia, but not unlike the Great Plains, and covers much of the northern section of the state.

Study Areas

OBSERVATIONS WERE MADE during the spring and summer of 1976 and 1977 on several reclaimed surface mines in Monongalia and Preston Counties, West Virginia. The vegetational structure of the mines changes with time and for this reason mines of varying age were selected. Generally, the early stages of succession on the mines are characterized by rapid growth of grasses until the chemicals applied to fertilize the soil and neutralize the acid are used up. Subsequently, there is a



Surface mine reclamation in progress, June 1976. Photos/Robert C. Whitmore.

period of several years during which time the grasses die off, bare spots, (or burns) become present, and the vegetation is generally sparse. As natural succession begins other grass species, including Orchard Grass (*Dactylis glomerata*), Poverty Grass (*Danthonia spicata*), Velvet Grass (*Holcus lanatus*), and Rye Grass (*Lolium perenne*), as well as forbs and shrubs, principally Black Locust (*Robinia pseudo-acacia*), invade and vegetational diversity increases. On some mines, usually those over eight years old, the grass and its occupying litter become so thick that further invasion by pioneers is inhibited, resulting in scattered Black Locusts (3-5 m in height) in a sea of dense grass.

Species Response

SEVERAL SPECIES OF PASSERINE birds have benefitted from the new West Virginia surface-mine-reclamation procedures. The following is a brief discussion of the present and historical aspects of each of the species with regards to distribution, breeding status and general habitat requirements.

It is doubtful if most of these species occurred in primeval West Virginia. It is true that the forest cover was interrupted in places by small areas of grassland (called "sods," "Indian old fields," "glades," etc.) but a few of these individual areas were large enough to support appreciable populations of grassland birds.

The Horned Lark (*Eremophila alpestris*) entered the state about 1900 and rapidly spread throughout the region in suitable habitat. This was most frequently heavily grazed hilltops. In recent years the lark has found suitable nesting areas on airports, golf courses, and even in some cases on median strips of super-highways. In the last five years in northern West Virginia Horned Lark populations have declined but whether this is from habitat deterioration or other causes is not known.

This species has been sighted on many reclaimed surface mines in Preston and Monongalia counties and is generally associated with the more open areas of the grassland, either recently reclaimed mines or bare spots on older mines. Since Horned Larks often overwinter in northern West Virginia, arrival dates



Reclaimed surface mine Preston County, West Virginia; 2-3 years old, showing acid burn, June 1976.

on the breeding grounds are difficult to determine. However, singing, territorial males have been observed on reclaimed surface mines before April and nests with eggs have been located from early June to late July.

With the clearing of extensive areas for farmland, particularly grazing land, the Eastern Meadowlark (*Sturnella magna*), arrived very early and soon became quite common in all open lands, including reclaimed surface mines. Meadowlarks are associated, as are Horned Larks, with the more open areas, although generally, they accept a wider range of grass densities than Horned Larks. Singing males have been observed in mid-March although active territorial defense has not been recorded until the first or second week of April. Nesting records indicate approximately the same breeding time as the Horned Lark.

AS WITH THE MEADOWLARK, clearing of farmland helped the Red-winged Blackbird (*Agelaius phoeniceus*) extend its range throughout most of the state. This species is common on the more mesic areas of reclaimed surface mines in northern West Virginia, and since cattails or other suitable rushes are not commonly found on these mines, this species is often associated with large patches of Birdsfoot Trefoil. Flocks of Red-winged Blackbirds have been seen on the grasslands and in the surrounding forested tracts in early to mid-March but individual territories are not defended until late April or early May. Several nests with eggs were located in patches of Birdsfoot Trefoil during the second week of June.

The Savannah Sparrow (*Passerculus sandwichensis*) was the last of the grassland birds to arrive in the state. As late as 1912, the pioneer ornithologist E. A. Brooks could find only one record for the state. Oddly this record was of a bird found in the stomach of a presumed resident Sharp-shinned Hawk shot in Upshur County in 1888. By the 1930s and '40s Savannah Sparrows were to be found in the lightly grazed grasslands on the Allegheny Mountains, and on a few grass-covered hilltops in the Northern Panhandle, where the first nesting record was established. Since the 1950s this species has expanded its range westward and downslope so that is now of regular, although not abundant, occurrence in the lower country in Monongalia, Preston, Barbour, Randolph, and Upshur Counties. It has also been found in Raleigh County. This species inhabits reclaimed areas where the percent of ground cover is higher than for all of the species above. Singing males were observed in mid-to-late April but peak territorial behavior was not observed until mid-to-late May. Nests with eggs were seen in early June.

THE GRASSHOPPER SPARROW (*Ammodramus savannarum*) arrived early and was soon common throughout the eastern part of the state, although less so in the high country. It was especially abundant, and still is, in the open farmland in the Potomac drainage. It is less common to the southwest. Since the 1950s this species has shown a slow decline throughout much of the southern Appalachian area. The results of two Breeding Bird Survey (hereafter, BBS) routes, one in Morgan County, and one in Preston County, show statistically significant population declines since 1966. A BBS route in Berkeley County, where the species is particularly common, also shows a decline. Three other BBS routes with lower populations also show similar declines. These data, together with the high populations on reclaimed mine areas suggest that much of this decline is owing to habitat deterioration. However, the species has also disappeared from much of the farmland in northern West Virginia and southwestern Pennsylvania where superficial examination would reveal no habitat deterioration. No quantitative population data are available for these areas. By far, this was the most abundant species on the reclaimed surface mines studied in northern West Virginia. One grassland approximately 10.63 hectares in size had 17 pairs of Grasshopper Sparrows. This species preferred



Reclaimed surface mine in Preston County, West Virginia, 3 years old, May 1976.

areas of tall grass (about 1 meter in height) and defended territories in the densest grasslands of all birds mentioned in this paper. They were first observed during the first week in April and began active singing about three weeks later. Nests with eggs were located in early June.

The Vesper Sparrow (*Pooecetes gramineus*) entered the state quite early and spread throughout the eastern and mountainous part of the state. As some of the hill country farms on steep slopes became abandoned and grew up to brush this sparrow thrived. It did not penetrate to the southwest and even today is not found there as a nesting species. Populations have remained fairly static, but not high, for the last ten years or so. This species is common in open grasslands which are bordered by forested areas. These trees provide tall song perches not frequently used by other species. For nesting, this species prefers the more open sections of grassland with low ground cover. Vesper Sparrows were first observed the last week in March, while males began singing during the first week in April. This species almost certainly double nests on reclaimed surface mines since a nest with eggs was located in late April and

another nest with eggs was seen in the same general area in early July. On May 16, 1977, two fledglings were observed food begging to an adult

Another northern grassland species, the Bobolink (*Dolichonyx oryzivorus*), which has a very limited distribution in West Virginia, has been sighted during June and July on one surface mine in Preston County. However, it is not known if they have bred on this mine.

Since 74% of the land area of West Virginia is forested, the major areas available to grassland bird species were farm fields left fallow or lightly grazed. As small farming became less feasible economically these fields were abandoned and succession quickly changed the structural character of the vegetation. The grown-up fields became unsuitable for these grassland species, hence their decline. New areas of grassland produced by surface mine reclamation represent an important, if perhaps temporary, addition to the habitat of the state.

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