



1-1990

## Beef Cattle Production on Surface-Mined Land in Central Appalachia

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### Repository Citation

Thom, William O.; Rice, H. B.; Adams, David; May, Charles; and Absher, Curtis, "Beef Cattle Production on Surface-Mined Land in Central Appalachia" (1990). *Agriculture and Natural Resources Publications*. 38. [https://uknowledge.uky.edu/anr\\_reports/38](https://uknowledge.uky.edu/anr_reports/38)

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ID-96

## BEEF CATTLE PRODUCTION

### ON SURFACE-MINED LAND IN CENTRAL APPALACHIA

ISSUED: 1-90

REVISED:

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Extensive acreages of reclaimed surface-mined land in Central Appalachia are currently producing forages that can be used in beef cattle production. During reclamation, after these areas were graded, they were seeded with grass and grass-legume mixtures to form a ground cover and to reduce soil loss. Usually in the past these areas have not been managed to provide forages for beef cattle, but they can economically support beef cattle production when managed correctly.

#### Soil Conditions

##### General Qualities

- Most of the soil on these reclaimed fields is high in coarse fragments. Consisting primarily of sandstone, siltstone and shale, these fragments are in various phases of weathering to smaller fragments.
- These soils usually have lower organic matter and water holding capacity than do other agricultural soils. This lower capacity intensifies the effects of summer rainfall deficits by lowering both production and plant quality.

##### Uses Under Varying Conditions

- Land areas that have been mechanically "rock picked" can be clipped or mowed for hay.
- Areas too rocky or steep for hay production can have cattle grazing on them.
- Areas where acid-forming pyrites are present can continue to be productive when this material is buried deep enough to prevent loss of forage growth or development of bare spots.

#### Production Considerations

##### Fertilizer

Fertilizer may be needed to maintain and increase forage productivity. Research in Kentucky has shown these mine soils generally require annual phosphate ( $P_2O_5$ ) applications before seeding and during the first few years after seeding. Annual potash ( $K_2O$ ) applications may not be needed on some reclaimed areas since the soil materials can release significant quantities of plant available K from mineral sources. Grass yields are increased by applying nitrogen (N) fertilizer. Topdressing N in late winter or early spring before growth begins increases growth so that grazing can start up to 2 weeks ahead of grass receiving no nitrogen. Another topdressing after the mid-summer grazedown stimulates fall growth and can extend the grazing season.

Lime may be needed to (1) offset acidity from the oxidation of any remaining pyrite; (2) neutralize acidity from N fertilizer applied to increase grass production; and (3) increase the availability of added phosphorus when soil pH is less than 6.0. To determine needs for lime, phosphorus and potassium, get a soil sample from the area each year for the first 3 years after seeding. Then resample at 3-year intervals for analysis and recommendations.

##### Legumes

Either adding legumes through pasture renovation or maintaining existing legumes increases total forage yield, improves forage quality and increases available forage in summer when production from grasses is usually low. More total forage is produced with grass plus legumes than with N fertilized grass. Cattle's daily gain is higher for animals on a grass-legume mixture than for grass alone, and total animal production per animal and per unit of land area is higher for grass-legume pastures than for N fertilized grass.

## Beef Cattle Programs

### Cow-calf Operations

A beef cow-calf herd with a March-April calving season is well-suited to forage production on reclaimed surface mined land. Spring forage production is high and high quality feed is provided for the lactating cow and calf since rainfall and stored water will support a high rate of regrowth. This productivity level is generally sustained long enough to provide good nutrition for a cow herd so that rebreeding can occur in early summer to maintain a relatively short calving season.

Fall-calving on these reclaimed areas is not as well-suited and is generally less economical than spring calving, according to research in Virginia. For a lactating cow which calves in the fall, the nutrient requirements occur when forage growth and quality are often low. This can lead to problems of rebreeding during the winter.

### Pasture for Steers and Heifers

Grazing steers or heifers during spring and summer can give good results. Pasture growth is highest at this time. The heaviest cattle may need to be marketed in early to mid-July to avoid overgrazing during the summer when stocking rates are based on expected spring growth. Stocking rates based on the full season growth with continuous grazing will under utilize early spring growth. Large amounts of forage are not utilized unless larger animals can follow younger ones in a rotational grazing system.

Data from continuous grazing of reclaimed mine land pastures in Perry and Knott Counties indicate that gains of 0.7-0.9 lb/head/day were easily achieved on mixed forage with younger cattle, although larger steers achieved gains of 1.3 lb/head/day during a full season.

### Grazing Management

Producers need to manage forages to assure optimum yield and carrying capacity while maintaining forage quality, animal performance and continuous plant growth throughout the grazing season. Most existing reclaimed surface mined areas have tall fescue as the dominant grass and either sericea lespedeza or clover (white or red) as the dominant legume.

### Timing

The start of grazing depends on the legume's growth, (unless the legume is less than 20% of the forage).

- Grass-clover pastures may be grazed early in the season but be sure to always leave 3 inches of top growth.
- Tall fescue and clover usually have enough growth to start grazing by mid-April.
- Pastures containing annual lespedeza should be grazed heavily in early spring to control grass, then left until the lespedeza reaches 5 to 7 inches before resuming grazing.
- Sericea lespedeza starts growth later but grazing pressure should be heavy enough to keep plants less than 8 inches high.

### Size of Herd

Provide at least 3 acres of pasture for each cow-calf unit. Steers and heifers weighing 300-550 lb need 1-2 acres/head, and those 550-800 lb need 2-3 acres/head. These requirements are higher than normally suggested because "mine soils" have a lower moisture-holding capacity and because areas of these lands fail to consistently maintain forage plants.

### Rotational Grazing

Choose a rotational grazing system over a continuous grazing system if enough good quality water is available from ponds and small streams and if you can achieve fencing requirements. To do so:

- Divide the area into 5 approximately equal pastures.
- Move the cattle each 1-3 weeks during the grazing season depending on forage availability.
- Allow 4 to 6 weeks for each pasture to recover, especially during the dry summer months.

Based on our observations, forage regrowth on strip mined land does not recover as quickly as on other agricultural soils. Also, forage on mined land is more likely to be overgrazed, which increases recovery time or may even reduce plant density.

### Results from Controlled Grazing

Controlled grazing of pastures on reclaimed mine land can increase plant density which improves forage quality and enhances the reclamation process. Positive results include:

- Grazing stimulates plant tillering, and controls grass height allowing greater legume growth.
- A more uniform distribution of manure and urine for recycling results from controlled grazing.
- Hoof action firms the soil and the slight hoof depressions can serve as small water holding areas. However, these positive effects can become negative if grazing periods are too long.
- Over-long grazing periods causes weakened plants that will not survive drought.
- Sustained hoof action compacts the soil, damages forage plants and creates "cattle trails" on sloping land.
- Increased soil erosion often results due to the decreased vegetative cover and compaction which reduces the reclamation process and significantly lowers animal carrying capacity.

### Forage Systems

If you use a cow-calf system, you need spring and summer pasture, fall pasture and hay production areas. So, manage the total area you have available for forage production so that you have adequate provisions for these three needs. Set aside about 2-3 acres of land per cow for fall and winter grazing. This should be the area with the greatest proportion of tall rescue to provide high quality fall and winter grazing, although this area could be used for rotational or controlled grazing up until early summer. The amount of "rock free" land available for hay affects the acreage needed for fall and winter grazing.

When only younger cattle (steers and heifers) are grazed, little provision needs to be made for hay production. So, use all your land area in a rotational or controlled grazing system. When you retain these younger cattle into late fall or winter, you need some land for stock-piled grazing. Also, hay areas can be harvested in the spring and then grazed by the younger cattle when they are rotated with older animals.

### Wintering Dry Cows

Producers without mined land area suitable for hay production may consider buying hay to winter dry cows. When you follow the grazing program recommended above without stockpiled grazing, 1 to 1.5 tons/cow of medium quality hay should be enough for overwintering. This could increase the total production from calves providing that increased income from the calves is greater than total hay cost.

### Other Information

Several other UK Cooperative Extension Service publications contain many recommendations discussed in this publication. The following list may be helpful. These publications are available at your county Extension office

AGR-1 Lime and Fertilizer Recommendations

AGR-16 Taking Soil Test Samples

AGR-19 Liming Acid Soils

AGR-26 Renovating Hay and Pasture Fields

AGR-62 Quality Hay Production

AGR-85 Efficient Pasture Systems

AGR-103 Fertilization of Cool-Season Grasses

AGR-116 Fertilizing Forage Legumes

ASC-50 Beef Cow-Calf Handbook: Grazing Systems

ID-5 A Beef Forage System