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A study of the status of strip mine lands in St. Clair County

James G. Bridwell
Southern Illinois University Edwardsville

A STUDY OF THE STATUS OF STRIP MINE LANDS IN ST. CLAIR COUNTY

By

James G. Bridwell

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PREFACE

Because surface mining scars the landscape, the question of what to do about it frequently arouses more emotional reaction than sober appraisal.

The purpose of this study is to take an impartial look at the coal strip mined lands of St. Clair County in order to make a "sober appraisal" of the status of those lands. The appraisal is made on the basis of the degree to which the mined lands have been returned to some form of usefulness to man.

The writer is deeply indebted to those who assisted and cooperated in making this research possible. Specifically, Mr. L. S. Weber, of the Mid-West Coal Producers Institute, provided valuable time, information and background materials. Fred Buckner and Alten Grandt, of Peabody Coal Co., were most cooperative. The employees of the St. Clair County Soil Stablization and Conservation office willingly made their office materials available. The St. Clair County conservation agent, R. R. Irwin, and his assistant, Grover Carr, were helpful. Other notable contributors were, Dr. W. D. Klimstra, Southern Illinois University Wildlife Research Laboratory, and J. Donovan Larson, from the office of Supervisor Open Cut Land Reclamation.

The advisor and members of the thesis committee, Dr. Harry Kircher, Dr. Melvin Kazeck, Dr. James Collier, Dr. Robert Koepke and Mr. Ronald Yarborough have offered valuable advice, information and assistance.

A special not of thanks is reserved for my daughter Gina for her typing assistance and for my wife Maxine for her encouragement and patient understanding.

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CHAPTER I

INTRODUCTION

Nothing is more characteristic of twentieth century civilization than the rapidly multiplying use of energy. Modern living demands far more energy per capita than our fathers used, and there are more of us to use it. Total consumption of energy in the United States more than doubled from 1941 to 1965. The cause was not only a growing population but a rising standard of living, including a galaxy of new gadgets that require energy to make and operate.[1]

To meet the rising demand for energy now and in the years ahead, the American economy is relying more and more on a fuel that has been one of its mainstays for more than two centuries: bituminous coal. But one of the modern mining techniques, strip or surface mining, has created a storm of public resentment and protests. For example, Harry Caudill of Kentucky, one of strip mining's severest critics, wrote in 1962:

> Coal has always cursed the land in which it lies. When men begin to wrest it from the earth, it leaves a legacy of foul streams, hideous slag heaps and polluted air.[2]

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[1]National Coal Association, Bituminous Coal Facts 1966, a biennial report prepared by the National Coal Association (Washington, D. C. National Coal Association, 1966), p. 5.

[2]St. Louis Post Dispatch, Nov. 10, 1966, p. 1[4], b.

On the other hand, the coal mining industry has another view of its stripping operation.

> Operation Green Earth is the . . . land use and conservation program for developing mined coal lands to their best possible uses. It is carefully coordinated with the work of local and state conservation officials. This self-initiated program has been in existence for many years and will continue to develop new family recreation areas such as lakes, camping, hunting and fishing sites. New forests are developed, farms are needed and put into useful production.[3]

These opposing views of strip mining dramatically present the controversy with which this study concerns itself.

The dilemma arose when man discovered the expedient of removing coal from its resting place without having to go underground for it. This milestone in coal mining technique occurred in 1866 in Vermillion County, Illinois, near the city of Danville.[4] At that point in time the ability of man to lift coal from the earth's surface was much more limited than now by the capability of the mining machinery. Simple horse-drawn, man-held scrapers with a capacity of one cubic yard were the standard surface mining equipment. Not until the turn of the century, near Marion, Illinois, was the large scale mechanized surface mining equipment introduced. At that time surface mining (strip mining) produced about one half of one percent of the seventy two and one

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[3] Power for Progress, and informational brochure prepared by the Peabody Coal Co. to explain how Peabody's operations work (St. Louis: Peabody Coal Co., 1963), p. 4.

[4] St. Louis Post Dispatch, Nov. 10, 1966, p. 14, b.

half million tons mined in the state of Illinois.[5] Advances in technology have stimulated a phenomenal growth in strip mining activity. Coal beds formerly inaccessible to stripping operations are now easily mined. When strip mining made its humble appearance on the mining scene the operators were limited to stripping only those areas with a very shallow, unconsolidated overburden. With today's gigantic earth moving equipment and the more sophisticated techniques of the industry it is no task to remove 150 ft. of overburden, regardless of its composition. Ironically, the very fortuitous technological advances of the industry have focused attention on its activities and have given birth to a rising tide of public sentiment against the manner in which coal strippers carry on their enterprise.

Unfortunately, for the consumer as well as the coal mining industry, the technique of extracting coal by removing the overburden from the top is exceedingly disturbing to the natural orientation and composition of the land. In some cases the soil is literally turned "upside down". That is, the top soil with its humus and nutrients is removed, deposited and covered by the underlying strata of materials covering the layer of coal. The topography of the land is altered from its natural configuration to one of ridges and valleys or closely grouped conical piles,

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[5]Illinois, Department of Mines and Minerals, 1965 Annual Coal, Oil and Gas Report, (Springfield: Ill. Department of Mines and Minerals, 1965), p. 23.

depending on the type of equipment used to remove the overburden. Some writers have described the result as a "miniature badlands" (Fig. 1). The description is normally applied to that type of strip mining which is called "area stripping". The two basic types of strip mining are the above mentioned, area stripping, and contour stripping. Contour stripping refers to the technique of removing coal from land that is not flat. As the name implies, the earth is removed from hill sides and the coal seam is mined from the hillside around the contour of the land. While this method and area stripping have some common problems, this study concerns itself with the problems created by the latter.

As strip mining has grown in significance and scope, it's opponents and proponents have become more numerous and more vociferous. The views range from those of the Malthusian scholar, who would unequivocally ban strip mining, to the sportsman who only asks for access to the newly created lakes and woods, to the mining industry which points to its economic productivity. The industry, aware of it's unfavorable public image, has taken some steps to pacify its critics. Individual coal companies have initiated reclamation programs and the industry has formed a voluntary organization called "Mined Land Conservation Conference".[6]

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[6]Mined Land Conservation Conference, Surface Mine Land Conservation, (Wash., D.C., 1964), p. 1.

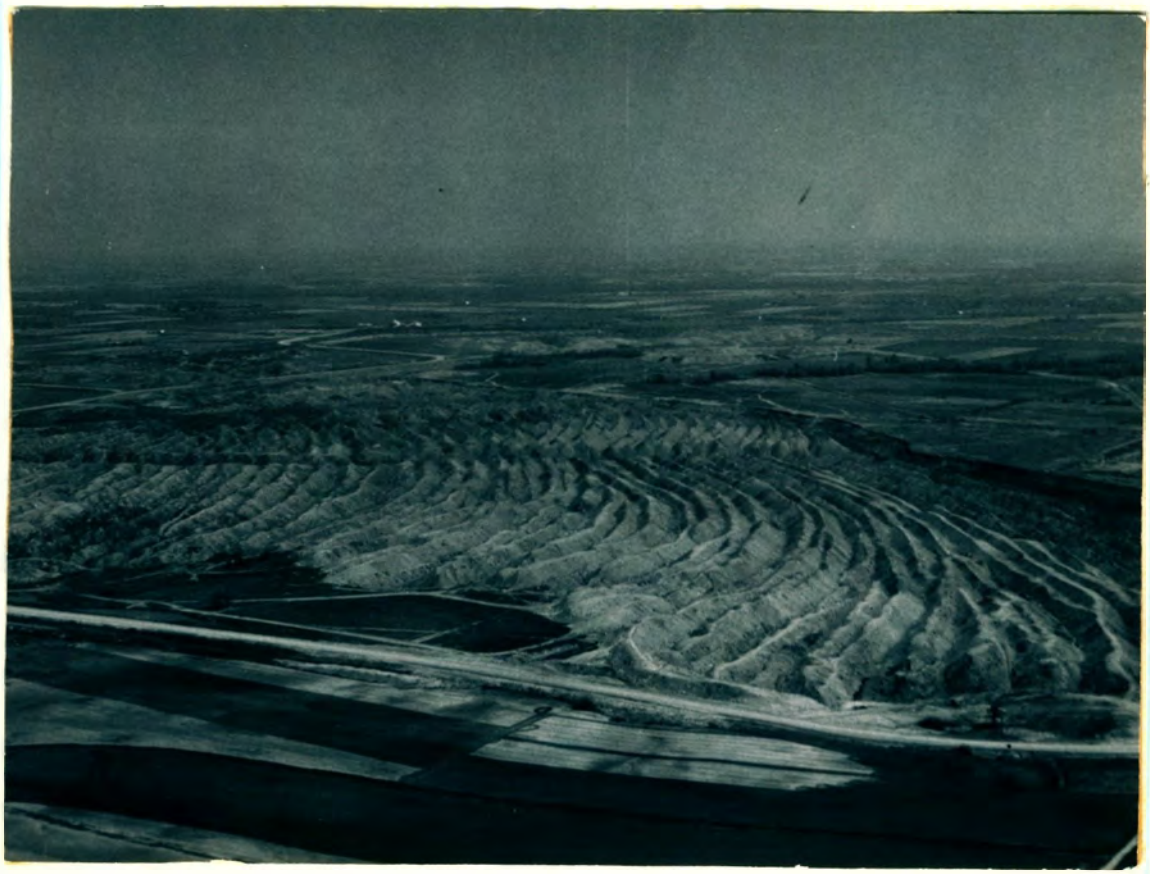

Fig. 1.--The so-called "saw tooth" profile of area strip mining is very evident here. This is an active mining area west of Marissa, Illinois, which has not noticeably been affected by reclamation. Under provisions of the Illinois reclamation law these ridges will be leveled and seeded (Area K). This picture was made from approximately 1000 feet altitude facing northwest. Length of visible road in foreground is approximately one mile.

Their objective is to encourage and coordinate reclamation activities and presumably to insure that the public is aware of these activities.

State legislators are also responding to the clamor created by strip mining. Seven of the twenty three states affected by strip mining now have laws requiring some form of reclamation on the disturbed lands.[7] Illinois is one of the states having enacted such legislation. The Illinois law, which is known as the "Open Cut Land Reclamation Act", became effective on January 1, 1962 and applies only to lands mined after the effective date of the law.

Purpose

The intent of this study is to determine the degree to which the stripped lands of St. Clair County, Illinois, regardless of mining date, have been restored to some form of usefulness to man.

The term "usefulness to man" as used in this study is interpreted to mean any form of practical, valid land use. The analysis does not concern itself with the priority of usefulness of various categories of land. The study takes note of and reports on the nature of land use. It does not attempt to evaluate present land use in comparison to former use.

It is not the purpose of this study to render judgment

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[7]Kentucky, Department of Natural Resources, Strip Mining in Kentucky, The Strip Mining and Reclamation Comm., 1965, p. 24.

on the strip mining industry. Stripped areas are surveyed and their present condition and status reported. In sum, the end objective of this study is to report to what extent mined lands of this county have been restored to some form of usefulness to man.

Methodology

The study procedure involved eight steps, which will now be described. The first step was to select the area of study. In addition to St. Clair County two other Southern Illinois counties, Perry and Williamson were considered. Perry County was seriously considered because of the extensiveness of the stripping operations in that county. With 16,035 acres having been disturbed in Perry County, it ranks second only to Fulton County for the most total area stripped.[8] Perry County was further considered because of the conspicuousness of its spoil areas. One cannot fail to be impressed by the stark evidence of the strip mining industry as he passes through Perry County.

A personal interest and personal knowledge of the area stimulated the investigator to consider Williamson County for study. Furthermore, Williamson County was the site of the first modern strip mine in the state and has been quite extensively stripped. Some of the early spoils still stand bare and unclaimed. It is also currently undergoing

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[8]Illinois, Department of Conservation, Annual Report on Open Cut Land Reclamation, (Springfield: Ill. Dept. of Cons., 1966), p. 8.

stripping operations.

St. Clair County was finally selected as the area of study on the basis of it's mining history, its current mining status, and its apparent future as a strip mining area. Strip mining, in the modern mode, has been practiced in this country for over forty years and it is presently the scene of intensive stripping operations. The county now ranks fifth in the state for most acreage stripped.[9] And, the underlying strippable reserves[10] suggest that this ranking will be raised in the near future and that it will be an active strip mining area for many years. Its proximity to the campus of Southern Illinois University, Edwardsville, was convenient to the writer and makes it a likely area for classroom field trips and an area for future study.

After the decision was made to study St. Clair County, the next step was to determine the areas and extent of stripping operations in the county. Various maps were examined to locate the stripped areas. The first type of map examined, the 1:62,500 topographic chart, proved to be woefully out-of-date. County Agricultural Stablization and Conservation Service aerial mosiacs proved to be relatively current and most useful.[11] However, even these photographs

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[9] Ibid.

[10] Illinois, State Geological Survey, Strippable Coal Reserves of Illinois, Cir. 260, part 2, (Urbana, 1958), p. 14-17.

[11] St. Clair County, Agricultural Stablization and Conservation Service, Aerial Photographs, (Belleville, 1967).

are rapidly outdated since they are re-accomplished at approximately five-year intervals, and at present about 5,000 acres of land are mined in the state of Illinois each year.[12] County plat maps provided essential ownership information and County highway maps were most useful in finding access roads into the spoil areas. The county maintains in the courthouse a large, relatively current, aerial photo mosaic of the entire county, which was extremely useful as an aid to checking the accuracy of the location and extent of the stripped areas as plotted on the working maps. From these sources of information a series of maps were made with the approximate size, shape and location of all stripped areas identified. These data were then checked in the field and revised.

The next step was to interview knowledgeable experts in order to confirm the data collected, to determine the current situation, and to obtain their views on conservation practices they had observed.

The Director of Information for Peabody Coal Company, Fred Buckner, was a particularly helpful source of information. According to Mr. Buckner and the Mid-West Coal Producers Institute, Peabody Coal Company operates most of the mines in this county. Through Mr. Buckner, Alten F. Grandt, the Director of Conservation for Peabody, and Louis S.

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12 Annual Report on Open Cut Land Reclamation, p. 8.

Weber, the Assistant Director of Conservation for the Mid-West Coal Producers Institute, were contacted and they proved to be very knowledgable and cooperative in helping correct and/or confirm the reclamation data collected. Both Mr. Grandt and Mr. Weber maintain current maps on the location and extent of stripped lands in the county. These maps were very valuable as a cross check on the field maps being constructed for the study.

The location of the spoils areas in the county, having been determined and plotted on the field maps, the next step was to conduct an intensive field survey for personal observation of land use and state of reclamation in the spoils. Beginning in September of 1966 and continuing for a period of ten months, every stripped area in the county was visited, studied, photographed, additional data plotted, and previously plotted data updated on the working maps and charts. People in the areas were interviewed for their reaction to the mining operation and for their comments and thoughts on the state of reclamation or the present usefulness of the stripped lands. The spoil factors were checked and recorded on a field chart (Table 1).

The next step in the study was aerial reconnaissance of the area. The most current aerial photographs of the United States Agricultural Stablization and Conservation Service were acquired and studied. Then, the entire county was flown over and surveyed from the air by the author.

Most of the spoil areas were photographed from low altitude at varying angles. This exposure of the stripped areas revealed previously unknown or unviewed facets of the spoils, which prompted revisitation on the surface to some sites, and revision of land use or reclamation data plotted on the working maps and charts.

TABLE 1

SPOILS FEATURES AND RATING SCALE

Physical

Features	Factors		
Ground Cover	Good	Fair	Poor
Type of Cover.	Grass	Trees	Mixed
How Covered.	Natural	Planted	Both
Erosion.	Negligible	Moderate	Severe
Water.	Abundant	Adequate	Sparse
Slopes	Graded	Settled	Eroded

Cultural Activities

Agriculture
Recreation
Mining
Residence
Industrial
Municipal
Other

The factors in Table 1 are used in arriving at an overall usefulness rating. This scale was devised originally as a field check list to record the status of the spoils as determined by the writer during numerous visitations. The information recorded on the scale is consulted when the final usefulness rating is being complied. An examination of the spoil features and rating factors as

used in the scale reveals that "Ground Cover" is closely inspected. The cover is inspected and recorded for type and method of cover as well as for extent. "Good" ground cover indicates that the surface is well vegetated with quality grasses and/or trees or other growth. "Fair" cover indicates that some areas of the spoils may not be vegetated or that vegetation in growth may be sparse or of inferior quality. An area rating "Poor" coverage has considerable exposed spoil banks and some evidence of sterile ground. A combination of sparse coverage and inferior quality vegetation would also be rated as poor.

In checking erosion, the rating of "Severe" is assigned to an area which has been dissected by gullies to the extent that the area is not useful for any practical purpose. "Moderate" erosion is considered to be some obvious washing of soils and gully formations, but not of a nature that it could not be retarded with corrective grading and seeding. "Negligible" erosion indicates that no gullies are evident and that the spoils are usually well covered with vegetation. Of course, it is conceivable that negligible erosion would be recorded in an area which was recently mined and had not been exposed to sufficient weather for erosion to commence.

The rating factors under water simply refer to the availability of impounded water for agriculture, recreation or some other conceivable use.

In awarding a final usefulness rating to the various areas, all the factors in Table 1 are combined and weighed along with the land use, appearance, community acceptability and utility of the area. An area with good grass cover, abundant water and negligible erosion, which is being used for grazing, receives a better over-all usefulness rating than an area with less favorable attributes.

The use to man is evaluated on a subjective basis, using a percentage figure to indicate the degree of usefulness. This is not a rating arrived at by totaling acreage figures (these figures are reported in the section following and in Table 6). Rather, it is the author's estimate of the usefulness to man, based on his knowledge of and acquaintance with the areas. In the detailed description of each area, the author endeavors to indicate the factors he found significant in the evaluation. The rating given the area is added with the intent to provide some convenient method to show the author's evaluation. The rating also enables one to see how the author would rate areas relative to one another, and would evaluate the entire stripped area. This is a pioneering effort to cover a relatively broad territory. Those who would prefer an objective report on land use may want to disregard the percentage ratings, use this section purely for its descriptive value, and refer to the following section detailing actual land use.

In general, the percentage rating may be taken to mean, 100-80 percent, good usefulness to man; 79-50 percent, fair usefulness to man; 49-0 percent, poor usefulness to man.

By now, as a result of the various surveys, a knowledge had been gained of the extent of stripped lands in the county and areas of the different kinds of land uses had been estimated. The areas in each land use were determined by checking the maps of the various agencies against each other and against the aerial photographs. These areas were further checked against the data collected during ground and aerial surveys. If any doubt existed relative to the size of an area, or segment thereof in use, it was resolved by use of a grid scale constructed for that purpose, or in some cases by use of a planimeter provided by the County Conservation Office. In this manner the areas of land use or reclamation work were accurately determined. With the size of the mined areas determined and the areas of land use computed it was a simple task to convert the land use figures into percentage figures. The question still remained, however, as to classification of the spoils with regard to state of reclamation.

In an attempt to determine the extent of agreement on the state of spoils reclamation, and to gain insight from different and sometimes opposing viewpoints, the next step was to solicit the opinions of various experts and laymen of the area. The opinion poll of experts included, W. D.

Klimstra, Chief of Southern Illinois University Wildlife Research Laboratory; R. R. Irwin, St. Clair County Conservation Agent, and his assistant, Grover Carr; the staff forester of the Supervisor of Open Cut Land Reclamation, J. Donovan Larson; the assistant Director of Conservation for Mid-West Coal Producers Institute, Louis S. Weber and A. L. Grandt of Peabody Coal Company. Also numerous sportsmen, farmers and residents of the area were interviewed.

Another step in the investigation, which was actually conducted throughout the entire study period, was library research. Numerous reports and other studies on this subject were consulted regardless of their purpose or viewpoint. These included Federal, State and local reports cited in the bibliography.

The final step was selection of the various maps to be prepared for illustration of the reclamation land use. All areas were considered with regard to the various land uses revealed during the study. Since a comprehensive coverage of the area with detailed land use maps for each mined area would be impractical to accomplish in a reasonable time without a substantial budget for additional help and since this is not a primary purpose of this study, three representative areas were selected and maps prepared of their land use from the working maps, charts, aerial photographs and the supplemental information that had been gathered.

Limitations

As previously stated the area of study for this report

is limited to St. Clair County, Illinois. It is a study of the status of strip mined lands in that county. It is not an attempt to evaluate the practice of strip mining. It is not intended to consider the question of condemnation or approval of this method of mining. Neither is this study attempting to pass judgment on reclamation techniques. Rather, the object is to attempt to determine what is being done with strip mined lands. Are these lands as reclaimed actually useful to man, and what constitutes reclamation? If no reclamation effort is made, what happens to the land?

The study does not presume to suggest what type of reclamation should be employed or to what type of use the land should be directed. Land use is categorized in this study and representative areas are mapped. While a detailed comprehensive land use mapping of all areas is beyond the scope of this study, all land use is coded and overall figures computed. To standardize the land use classification, the land use categories of the Standard Land Use Coding Manual published in 1965 by the Urban Renewal Administration are considered and in so far as they apply to this study are used.

CHAPTER II

STRIP MINING IN ST. CLAIR COUNTY

St. Clair County, the first county in the state of Illinois[1], is located in southwestern Illinois (Fig. 2). The northern boundary of the county forms an eastern extension of an east-west line running through the city of St. Louis. The county is bounded on the west by the Mississippi River and Monroe County, on the north by Madison County, east by Clinton and Washington Counties. It is thirty miles wide from east to west and thirty miles long at its greatest length from north to south. It contains 653 square miles or 429,000 acres. The county is situated between parallels thirty-eight degrees and thirty-three minutes North latitude and thirty-eight degrees and ten minutes, forty-five seconds North latitude and dissected by the ninety degree West longitude meridian.[2]

The surface of St. Clair County is classified as rolling prairie with slight relief and gentle slopes. The soil of the county has for the most part been derived from

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[1] Atlas of St. Clair County Illinois, (Belleville: St. Clair Title Co., 1956), p. 3.

[2] Bateman & Shelby, Historical Encylopedia Of Illinois, Vol. 2, St. Clair County, (Chicago: Munsell Publishing Co. 1907), p. 804.

MAP OF ILLINOIS SHOWING EXTENT OF COAL FIELD

Source: Illinois State Geological Survey, Circular 260, Urbana, 1958

Figure 2

loess. In places it is derived chiefly from the glacial till and in a few small tracts it is made up largely of detritus of the underlying bedrock. The streams of the county are bordered by alluvium transported from the interstream areas, and as those areas are mantled almost completely by loess the alluvial soil is largely derived therefrom. In its general geographic and geologic relation the county forms a part of the Glaciated Plains Province, which extends from the Appalachian Province on the east and southeast to the Great Plains Province on the west and from the Ozark Province on the south to and beyond the northern boundary of the United States (Fig. 3).[3]

The southwestern boundary of the Eastern Interior coal basin passes through St. Clair County on a general southeast to northwest line (Fig. 4). The thick coal seam outcropping along this line accounts for the ideal suitability of this area for strip mining. About three-fourths of the entire county is underlain with coal, but it is only relatively close to this outcrop line that the coal is accessible by modern stripping technology. At present only coal covered to 150 feet or less is considered strippable. Since the coal seam dips gently to the east with the underlying Pennsylvania rock system it is apparent that only a

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[3]J. A. Udden and E. W. Shaw, Geological Atlas of the United States, Belleville-Breese Folio 195, Department of the Interior, (Washington, D. C.: U. S. Geological Survey 1903), p. 1.

PHYSIOGRAPHIC PROVINCES

EASTERN INTERIOR COAL FIELD

Source: Geological Atlas of the United States, Belleville-Breese Folio 195, Washington D.C., 1903

Figures 3 & 4

relatively small portion of the total coal deposits of the county are available to surface mining (Fig. 5).

History

The abundance and importance of coal in St. Clair County has long been recognized. The St. Clair County volume of the Historical Encyclopedia of Illinois, published in 1907, states: "Bituminous coal is by far the most important mineral resource of the county. The seams already partly developed will doubtless supply the demand for many years". At this time the impact of strip mining had not yet been felt.

Governor John Reynolds, a resident of Belleville and Illinois Governor from 1830 to 1834, in a sketch written in 1857, observes that coal was discovered in St. Clair County in the following manner:

> A citizen of the American Bottoms discovered smoke issuing from the ground for weeks together, which attracted his attention. He saw the coal in the bluff on fire, and supposed it had caught from the dry roots of a tree ignited by a prairie fire. The fire had communicated to the coal from the burning wood. Soon after this in 1826, the coal trade commenced.[4]

While the official records of the coal industry and the Illinois State Department of Mines and Minerals have no record of strip mine production in St. Clair County prior to 1926, this was apparently one of the very earliest methods of mining coal in this county.

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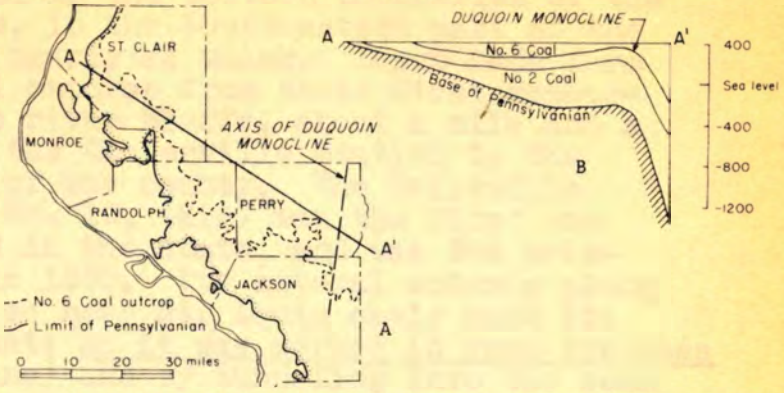
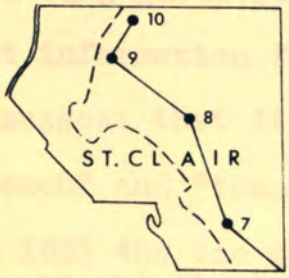
[4]Bateman and Selby, op. cit., p. 805.

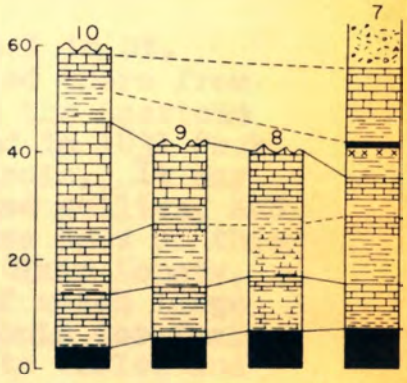
GEOLOGIC CROSS-SECTION AND STRATIGRAPH





KEY

Shale	Sandy shale
Black shale	Limestone
Coal	Underclay
Sandstone	Surface



Source: Illinois State Geological Survey, Circular 260, Urbana, 1958

Figure 5

In the Historical Encyclopedia cited above it is noted that:

> Several seams have been developed, the thickest of which - that at Freeburg - measures eleven feet. That outcropping in the river bluff and along the western boundaries of the coal fields, in the Southwestern part of the county, is nearly as thick. These beds form a continual outcrop from their first appearance in the river bluffs, about a mile and a half below the Centerville Station to the north line of the county. The Belleville coal seam, No. 1C, (Sic) was the first one ever worked in the state, and was the principle one in 1880. Its natural outcrop along the bluffs so near St. Louis early made its value evident; So it was worked in open trenches (italics mine) and by tunneling into the seam along the face of the bluffs sometime before anyone ever suspected how far to the east it extended.5

The following quotation does not specify the method of mining but information from other records of the same time period suggest that it is reasonable to assume that the "open trench" and "tunneling" methods were used.

> In 1823 the use of Illinois coal in St. Louis began and first coal was hauled there from the bluffs on the Illinois side, on the American Bottom. This trade grew rapidly and in 1831 Peck stated; 'stone coal abounds in Illinois. It may be seen frequently in the ravines and gullies, and in the points of bluffs. Exhaustless beds of this article exist in the bluffs of St. Clair County, bordering on the American Bottom, of which large quantities are transported to St. Louis for fuel. It sells in St. Louis for from ten to twelve and a half cents per bushel. From twelve to fifteen large waggons (sic) are employed most of the year in hauling it to the market, the distance of seven miles across the American Bottoms'. In 1833 St. Clair County mines hauled 6,000 tons of their product to St. Louis. Several 'Cargoes of stone

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5 Ibid.

coal from Illinois' were received in New Orleans late in July, 1833.[6]

Several references were found relating to the construction and use of railroads to transport the bluff coal to the St. Louis ferry. The coal cars were originally horse drawn but later trains became powered by steam locomotives.

These historical references to the coal industry are presented to establish that coal is, and for the most part of the county's existence, has been a prominent, significant, and well honored economic factor in the lives of St. Clair County residents. The people of this area have lived with it for many years. The coal industry itself is not something which has been foisted on the area in recent years. In fact, strip mining, though not identified as such and not using the machines and techniques of today, was one of the original methods of mining coal in this county ("open trench" mining in the bluffs).

Extent

As a coal producer St. Clair County ranks third in the state in total production since records were started in 1882.[7] Of the thirty eight counties in the state affected by strip mining, St. Clair ranks fifth in the total acreage disturbed. The 9,385 acres of the county that have been

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[6] Ibid.

[7] Illinois, Department of Mines and Minerals, 1965 Annual Coal, Oil and Gas Report, (Springfield, 1966), p. 56.

mined represents 2.18 percent of the total county land area.[8] There are six other counties in the state with a higher percentage of land area affected.

While this study encompasses the entire county, the landscape of only eight of the twenty townships are affected by strip mining. The outcrop of the coal-bearing Pennsylvania system enters the county at the southeastern corner in Marissa township and proceeds on a northwesternly course through the townships of Lenzburg, New Athens, Freeburg, Smithton, Millstadt, St. Clair, and Stookey in that approximate order. The outcrop continues through Caseyville Township to the northern boundary of the county, but except for the original "open trench" mining along the Mississippi River bluffs, this area has not been affected by strip mining operations (Fig. 6).

The bulk of the disturbed area is rather evenly distributed, excepting Stookey and St. Clair townships. These two townships have only relatively small areas disturbed along their southern boundaries, and these areas are portions of larger operations continued from adjacent townships. The mined areas vary in size from thirty acres to approximately two sections (1,280 acres). In areas of assorted sizes and shapes along the No. 6 coal seam outcrop, some 9,400 acres of land has been disturbed by surface mining in

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[8]Illinois, Department of Conservation, Division of Open Cut Land Reclamation, Annual Report, (Springfield, 1966), p. 8.

ST. CLAIR COUNTY WITH COAL OUTCROP PLOTTED

Source: Illinois State Geological Survey, Circular 260, Urbana, 1958

Figure 6

St. Clair County (Fig. 7).[9]

Strip mining, as currently conceived, did not make its appearance in St. Clair County until 1926. According to Lou Weber, Assistant Director of Conservation for Mid-West Coal Producers Institute, Inc.:

> The first coal strip mine that we have record of in St. Clair County was opened in 1926 under the name of Solar Coal Company. Their address was Freeburg, Illinois. This mining was located primarily in Sec. 4, Township 2 South, Range 7 West, St. Clair County. Solar Coal Co. operated the property for approximately one year. The mine was then purchased by United Electric Coal Companies and was thereafter known as the Red Ray Mine. Mining was completed on this property by United Electric in 1949, at which time a total of 589 acres had been affected.[10]

From that beginning in 1926 strip mining has been continuous in St. Clair County. As evidenced by Table 2, production and the consequently disturbed acreage, has generally been increasing annually. As the disturbed acreage has increased, public reaction to this method of mining has correspondingly increased. By the time the Illinois State Reclamation Law became effective, January, 1962, there had been a total of 6,536 acres affected by strip mining in St. Clair County.[11]

The above statistics clearly identify St. Clair County

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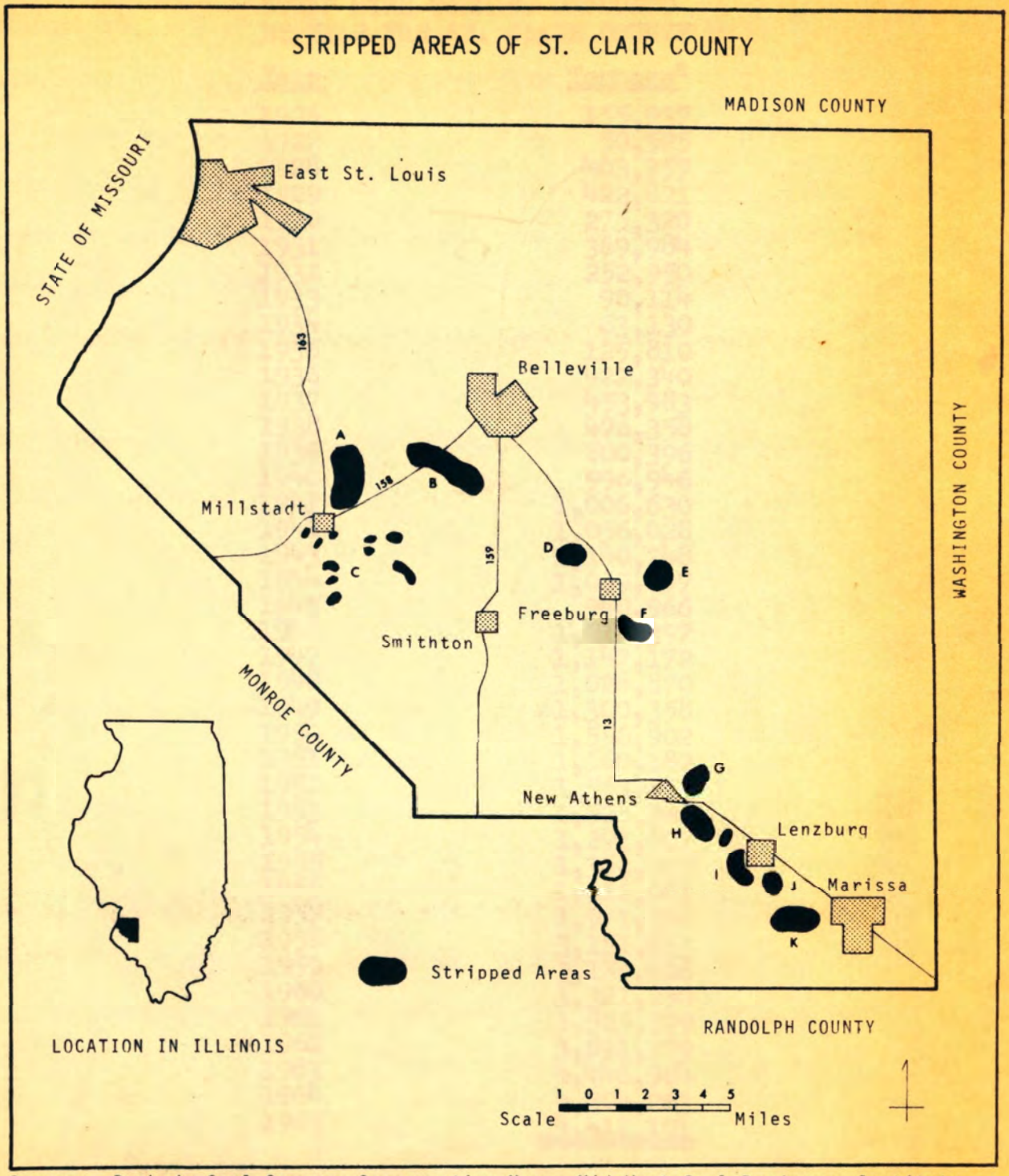
[9] Ibid.

[10] Letter from L. S. Weber, Assistant Director of Conservation Mid-West Coal Producers Institute, Inc., Springfield, Illinois, January 16, 1967.

[11] Illinois Coal Report, p. 8.



Source: Peabody Coal Company Conservation Maps; Mid-West Coal Producers Institute Maps; AMS 1:250,000 Series V501 Map; 1:24,000 Topographic Chart; Agricultural Stabilization and Conservation Service Maps, and Aerial Maps, Aerial Reconnisance, Interviews, Visitation

Figure 7

TABLE 2

STRIP MINE TONNAGE PRODUCED
BY YEAR FOR ST. CLAIR COUNTY

Year	Tonnage[a]
1926	155,937
1927	50,525
1928	403,357
1929	422,821
1930	275,320
1931	369,984
1932	252,950
1933	90,114
1934	63,130
1935	125,810
1936	422,340
1937	453,983
1938	476,358
1939	800,396
1940	996,946
1941	1,006,630
1942	1,056,028
1943	1,140,248
1944	1,069,697
1945	940,966
1946	1,018,397
1947	1,147,172
1948	1,028,870
1949	1,300,358
1950	1,556,902
1951	1,560,182
1952	1,563,533
1953	1,528,345
1954	1,291,807
1955	1,363,905
1956	1,616,061
1957	1,971,320
1958	3,151,653
1959	3,136,626
1960	3,321,250
1961	3,525,599
1962	3,691,779
1963	4,446,984
1964	4,304,263
1965	4,412,101
Total to Dec. 31, 1965	57,510,647

[a]Computed by Midwest Coal Producers Institute

as one of the leading coal mining counties of the state, both in total production and in area stripped. The coal industry has been a long and continuous economic factor in the lives of county and area residents.

Coal is not the dominant economic activity in St. Clair County that it is in counties of other coal mining districts such as those of West Virginia, some parts of Kentucky and some more southern Illinois counties. St. Clair County has one of the leading manufacturing areas of the state and its agricultural productivity is substantial.[12] While some of the best agricultural land in the county has been affected by strip mining, a comparison of stripped areas to soil types, indicates that the major portion of the mined land would fall in the "low" to "moderate" productive classification.

Future of Strip Mining in St. Clair County

Extensive areas of No. 6 coal in St. Clair County lie at depths favorable to strip mining, and the proximity to the St. Louis industrial area, the increased reliance of large electrical generating plants on coal, and the easily accessible Mississippi River has given impetus to widespread mining activity in the county. Although the most favorable areas of No. 6 coal in St. Clair County have

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[12]Harry B. Kircher, Geography Through Maps: The Southern Illinois Prairies, A Geographic Interpretation of the Belleville 1:250,000 Topographic Map, Special Pub. No. 11, (Normal, Ill.: Publications Center National Council for Geographic Education, 1967), p. 31.

been exploited, large reserves of relatively accessible coal still remain for strip mining.[13]

In the Illinois State Geological Survey Circular 260, Strippable Coal Reserves of Illinois, minable coal is defined as, "Coal beds that are eighteen inches or more thick and have an overburden not more than one hundred fifty feet thick. Evaluation of strippable reserves is based entirely upon thickness of coal and depth of overburden."[14]

Certain of the reserves will not be recoverable because they lie beneath towns, cities, highways, etc. However, the scale on which the coal is mapped does not permit their omission from the estimate. The tonnage estimate is based on an assumption of 1,800 tons of coal per acre foot, and the estimates are for total coal in place and do not allow for losses during recovery.

On the basis of these criteria the Illinois State Geological Survey estimates the following St. Clair County reserves at the indicated overburden depths:

TABLE 3

ST. CLAIR COUNTY COAL RESERVES AND OVERBURDEN DEPTHS

Overburden (ft.)	Coal Reserve (thous. of tons)
0-50	101,714
50-100	409,091
100-150	738,318
Total	1,249,123

[13] Illinois, State Geological Survey, Circular 260, Strippable Coal Reserves of Illinois, Part 2., (Urbana, 1958), p. 17.

[14] Ibid., p. 3.

These reserves, which are given in thousands of tons, apply to No. 6 coal only. The report indicates that St. Clair County had a total area underlain by strippable coal of 55,468 acres. Of this total an estimated 23,078 acres had been mined out by either underground or strip mining. Between January, 1962 and June, 1966 the number of acres affected by strip mining increased from 227 acres per year to 911 acres per year.[15] Subtracting the acres mined out in the county from the total acres of strippable coal deposit, one finds a remaining 32,390 acres of strippable coal. If an allowance is made for one thousand acres to be stripped each year, enough coal remains for more than thirty-two years of strip mining.

Calculating it another way we find that, since the first strip mine tonnage was recorded in 1926 there have been 57,510,647 tons of coal produced via this method of mining (Table 2). These records and this production cover a period of forty years. St. Clair County still has twenty times that amount in reserve which is considered to be strippable with modern improved technology. Of course, the production capacity has increased during that period from 155,939 tons in 1926 to four and one half million tons in 1965. Even so, if an annual production of five million tons per year is assumed, there are enough strippable

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[15] Annual Report, Office of Supervisor, Open Cut Land Reclamation, p. 8.

reserves for two hundred and fifty years more strip mining.

Depending upon the point of view or interest, the future of strip mining in St. Clair County is extremely good or depressingly bad. For the coal operator, assuming permissive working regulations, the strip mining future is bright. For the conservationist who takes the position that all strip mining is "bad" the future appears indeed gloomy.

CHAPTER III

STATUS OF SPOILS IN ST. CLAIR COUNTY

Historical Development

The beginning date of reclamation of stripped areas in the United States is rather indefinite but developments in Illinois appear to be among the earliest. Some historians credit coal operators in Ohio with the first attempts in 1910, others cite reclamation in Indiana in 1918 as the first attempt to reclaim mined land. It is generally agreed, however, that the first reclamation effort in the state of Illinois was made in 1920 in Vermillion County. Six acres were planted to trees, mainly Black Locust. Large scale plantings were begun in 1939, using a wide variety of species for experimental purposes. All these early efforts to reclaim strip mined land were devoted to tree planting. At that time it was assumed that trees were the only form of vegetation which could be successfully grown on these spoils. More recently, the trend has been to plant grasses and legumes wherever the spoils would support satisfactory growth. It appears that the change in concentration from trees to grasses occurred when one or two mine operators in the more favorable soil areas of Northern Illinois noticed a voluntary encroachment of sweet clover growing on their stripped lands. They rationalized

that if sweet clover grew voluntarily it would be possible to seed the areas to grass and realize a faster and more profitable return from their lands through grazing. From that beginning, state and Federally sponsored investigations determined that much of the spoils acreage of Illinois could successfully be seeded to grass.[1]

Reclamation of stripped areas in St. Clair County, Illinois, followed the state and national pattern. The first efforts at reclamation were made on a small scale on small mined areas in the vicinity of Millstadt, about six to seven miles southwest of Belleville, Illinois, some time in the late '20s. This initial effort was made by the Morgan Coal Company which was the sole operator in that area at that time. The plantings, in conformance with the vogue of that time, was entirely to trees. Unfortunately, there was no official record made in county offices of the exact location or other details relative to this embryonic project, and the coal company has long since been dissolved.[2]

When one addresses the question of why, or how, the coal operators became interested in reclaiming mined land, the response is conditioned by the interests of the

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[1]A. F. Grandt and A. L. Land, Reclaiming Illinois Strip Coal Land With Legumes and Grasses, University of Illinois Agricultural Experiment Station, Bulletin 628 (Urbana: University of Illinois Press, 1958), p. 5.

[2]Interview with L. S. Weber, Ass't. Director of Conservation, Mid-West Coal Producers Inst.,Inc.Apr. 21, 1967.

respondent. One industry spokesman says: "All the early efforts at reclamation and improvement were voluntary on the part of the strip mining industry."[3] A view that is widely held by some parties is that reclamation attempts were forced by the howl set up by disgruntled farmers who did not sell their lands at the high prices paid by the coal companies, and by some truly conservation-minded citizens who were joined by groups who were looking for a cause. An economist saw the reason for reclamation this way; "if spoil banks in general can be made productive, strip mining may well counteract the disfavor with which it is now regarded by many people".[4] Another authority on strip mining said, "In the last few years these coal companies are attempting to become decent citizens. Because of public pressure they realize that their future security depends on improving their public image."[5] A severe critic of strip mining views voluntary reclamation this way, "few operators have voluntarily experimented with the restoration of their stripped lands. The effort commands neither the money nor the men to do more than a token job."[6] A

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[3] Ibid.

[4] H. D. Graham, The Economics of Strip Coal Mining, Univ. of Ill. Bur. of Econ. and Bus. Res., Bul. 67, (Urbana: University of Illinois Press, 1948), p. 77.

[5] Interview with W. D. Klimstra, Chief of Southern Illinois University Wildlife Research Laboratory, Apr. 3, 1967.

[6] The Courier Journal, (Louisville, Ky.), Sec. 7, Jan. 5, 1964.

county conservation official suggests that all the trees are planted near the roads and the "out-of-sight" land is neglected. The coal industry's position was stated in an article printed in a trade journal.[7]

> Tired of playing public scape-goat for all the extractive industries, coal's strip mining sector is making a concerted effort to publicize its many successful reclamation-conservation projects. At the same time state legislation is striving to force the remaining negligent companies to perform the plastic surgery that transforms scarred land into acreage of beauty and value.
>
> A little over a year ago, representatives of firms in the eighteen states where mining is carried on met to form the Mined Land Conservation Conference. The purpose: to give direction and impetus to reclamation programs underway and in the planning, and to polish the industry's somewhat tarnished image. The major (mining) companies were conscientiously interested in conservation long before law or public pressure existed, when regulations were put into effect, they were enforced by responsible, trained authorities rather than political appointees. Infiltration of the latter in some areas has been as much to blame as public ignorance for some of the ultra-restrictive laws and emotional hue and cry from local citizens.

The coal strip mine industry thus contends that the responsible companies in their business have always made an effort to reclaim the disturbed lands. In any case reclamation has become a legal requirement today. The state legislatures of seven affected states have passed regulatory laws to control strip mining activities and insure some

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[7]Enid W. Stearn, "Surface Mining's Conservation Program Pays Off", Coal Mining and Processing, April, 1964.

degree of reclamation.[8]

Reclamation and Land Use Survey of Stripped Areas

The strip mines of St. Clair County are quite numerous and vary considerably in size and shape (Fig. 7). In order to simplify this analysis, these mines are grouped to form eleven areas and each area is identified alphabetically. In the following analysis, each area is individually examined and discussed in order from the northwesterly segment of mining activity near Millstadt, along the southeasterly course of the coal outcrop to the Marissa area. Land use is identified in each area and parenthetically coded in accordance with the land use code established in the Standard Land Use Coding Manual of 1965.[9] (See Appendix, Exhibit C.) The Standard Land Use Classification is followed by a subjective rating of the author, evaluating how useful he feels the area should be rated for man's purposes.

The subjective evaluation does not reflect a specific tabulation of the number of acres alloted to the various use categories. Instead, it is a rating based on the author's judgment of factors relating to land use. Consider, for example, the evaluation as to reclamation of

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[8]The Kentucky Department of Natural Resources, Strip Mining in Kentucky, a report prepared by the Strip Mining and Reclamation Commission, (Frankfort, Ky.: 1965), p. 25. (See Appendix, Exhibit B, for synopsis.)

[9]U. S. Urban Renewal Administration, Standard Land Use Coding Manual, (Wash.: U. S. Gov't. Printing Of., 1965), p. 9.

stripped grazing land. If the land is unimproved, as much of the grazing land in this study is, it may have a very low carrying capacity and thus receive a low rating. On the other hand, a similar size parcel of land coded as grazing land may receive a higher rating because in actual fact it is serving as a multi-use purpose such as recreation, waste dumping or haulage roadways and therefore is judged to be of more use to man. This rating is entirely subjective and represents the author's judgment of how effective land use is, as detailed in the explanation of Table 1. It is obviously a rating applicable only to these areas. It holds only for the point of time of this study. It represents the author's judgment as to which of these areas appear best used and which the least.

Area A - This area consists of about 1,240 acres located north, northeast of Millstadt between Illinois State Highways 163 and 158. The mined area extends from a point one-half mile northeast of Millstadt to a point three miles northeast near County Highway 22. The area varies from slightly under, to slightly over a mile wide for its entire length. The natural terrain of this area is gently rolling with wooded slopes and ravines. The soil is generally of the Bolivia-Tovey association derived from thick loess under the influence of grass. It is rated from moderate to highly productive.

This is one of the older stripped areas of the county. Time and nature with some help from man have appreciably

altered the familiar much maligned "badlands" profile. Trees have been planted in some portions, while natural voluntary trees have grown in others. Grass has been seeded and natural grasses have revegetated other acreage. Some grading has been done, but erosion and natural settling have worked to round off the peaks and fill in the ravines. Water has been impounded and some improvements have created several excellent lakes (Fig. 8).

There are some relatively small plots in this area which have been graded and are under cultivation. However, the feasibility of this type of reclamation is limited by the presence of prominent limestone boulders which were broken up and exposed by the stripping operations. One small plot (approximately ten acres) was planted to fruit trees, but because of their remoteness from the owner's base of operations and control, they were later torn down and the orchard area was converted to pasture.

The area is very convenient to several communities, notably Millstadt and Belleville. Its 100 acres of lakes make it a popular recreational attraction for thousands of people each year. Two of the best known fishing lakes in this area are Millstadt Lake and Mid-West Lake.

Millstadt Lake is owned by the St. Clair Anglers Club, a membership organization which stocks the lake with fish and maintains the grounds for its members. It is classified recreational (SLUC 7515) (Fig. 9).

Fig. 8.--This is an example of a mature strip mined area which has been reclaimed for multi-use purposes by a combination of man's efforts and nature. This area, north of Millstadt, Illinois, has several good fishing lakes and most of the area is grazed. Settling and the leveling effect of time are evident throughout the entire area. The vegetational cover is the result of some conservation efforts and some natural revegetation (Area A). This photo was made from an altitude of 1000 feet facing northwest. The lake in the right foreground is approximately 500 feet long from southeast to northwest (that portion showing in the picture).

Fig. 9.--This lovely fishing lake is a former strip mined pit. It is located about one-half mile north of Millstadt in stripped Area A. This lake, which is known as Millstadt Lake, is owned by the St. Clair Anglers Club. This is one of the better examples of recreational land use found in stripped spoils of St. Clair County. This photo was taken on the west bank facing east. The lake at this point is approximately 500 feet long.

Mid-West Lake is a fee fishing facility where the public may fish the well-stocked waters for a one dollar fee. Other sports activities are conducted there as evidenced by the following photograph (Fig. 10). It is coded "agricultural" under priority established Footnote 1t, Page 74, Chapter Four, Standard Land Use Coding Manual, which states that the major land use should take precedence. The lake owner explained that he allows the Coon Hunters Club of Millstadt to use the lake about three times each year on an annual rental basis. They are also allowed to train their dogs in the area. The Bibel Fishing Club is another organized group which leases fishing space in this stripped area. Additionally, it is recognized by the operators of the membership facilities that there is considerable "unofficial" fishing and recreational activity conducted in the area.

In this 1,240 acre area, the largest block of 800 acres is held in the name of Vernon Eckert for the Eckert brothers of local prominence in the fruit and farm produce business. Presently the entire 800 acres owned by the Eckerts is on lease. Most of the acreage is used by a tenant farmer for grazing cattle (SLUC 8160). The Mid-West Lake, a public fee fishing area, and the water area leased by the Bibel Fishing Club are also a part of the Eckert acreage.

In the interview with Mr. Eckert on May 8, 1967,

Fig. 10.--This is one of the most unusual recreational or sporting activities observed in the strip mine spoils. These people are members of the Millstadt Coon Hunters Club. They are staging a coon dog water race. The site is Mid-West Lakes in Area A. Notice the good cover in the foreground and on the hillside beyond the lake. This photo was taken facing west. The boys leading the dog on the opposite bank are about 500 feet away.

regarding plans for the 800 acres, he said, "We don't know. We have 800 acres of land near a major metropolitan area which we hope will one day be valuable property. We have real estate developers who are ready to go to work on it any time we give them the word."[10]

Mr. Eckert looked upon the land primarily as a recreational area but noted that the grazing potential has also proved satisfactory. He estimated that combined income from the area for leases and fishing fees exceeds $7,000 annually.

Regarding reclamation on the stripped acreage, Mr. Eckert indicated that Mid-West Coal Company had planted some trees before he bought the land, and that he had seeded a small plot where Peabody Coal Company had covered an industrial waste area. He has recently improved another lake area for future development as a fishing lake.

Barney D. Hirsch, a rural mail carrier from Millstadt, inherited 134 acres of the stripped area. He sold forty acres to the St. Clair Anglers Club (SLUC 7500) and leases the remaining ninety-four acres for grazing (SLUC 8160). He recently improved his land for grazing by knocking off the tops of some of the ridges and bulldozing out some of the volunteer cottonwoods which dominate the area. This improved area was then seeded. There are now fifty head of cattle grazing the ninety-four acres.

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[10]Interview with Vernon Eckert, Belleville, Illinois, May 1, 1967.

One of the most fascinating uses found on this stripped land was in an area on the northeast corner of the "workings". There on a thiry-eight acre plot the city of Belleville maintains a sanitary land fill dump (SLUC 4854) that would do credit to the land use studies of Professor George Deasy, who is an advocate of this type land use for strip mined areas.[11]

During an escorted visit to the dump, E. C. Hoerner, the Belleville Sanitation Engineer, explained his dump and fill methods. He was justifiably proud of the sanitary condition of his dump and the resultant leveled acres. The city of Belleville with a population of 37,264 (1960 Census) has been using this thirty-eight acre area for nine years and has enough area remaining for another five or six years of sanitary dumping. The bonus of this type is that when the city has used all the available fill area and returned the land to the owner, Wilber Byman, he will have a leveled area suitable for almost any type of agricultural use (Fig. 11).

Two hundred acres of this 1,240 acre area are retained by Peabody Coal Company for a variety of uses related to their still active mining operations nearby, and thus is all classified as mining activity (SLUC 8552). A coal

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[11]George F. Deasy and Phyllis R. Griess, "Strip Pits and the Sanitary Landfill Process", Mineral Industries, Vol. 30, No. 2 (University Park: The Pennsylvania State University Press, 1960).

Fig. 11.-- One of the most gratifying land uses found was this sanitary land-fill dump. The area shown in this illustration is the active filling area. The operational procedure consists of dumping the waste in front of the terrace and covering it with a bulldozer. As successive layers of waste are covered, the land is leveled. This is an outstanding land use for stripped lands (Area A). This photo was taken facing south. The distance to the opposite bank of the dump is approximately 200 feet.

processing plant with its familiar tipple and associated equipment for washing, cleaning, grading and loading the coal is located on 130 acres in the northwest sector of the area. Adjacent to the processing plant is a slurry pit where the industrial waste accumulated in the cleaning and washing pit is stored. Together with three other relatively small areas, a total of seventy acres are used by Peabody Coal for dumping industrial waste. The powder company which supplies the explosives for Peabody's mining operations also uses a small plot of ground in this area.

Alten Grandt, Chief of Conservation, Peabody Coal Company, indicated that the following reclamation work had been accomplished in Area A by his company after having acquired the area from Mid-West Mining Company.[12]

TABLE 4

PEABODY RECLAMATION IN AREA A

Year	Grass (acres)	Trees (acres)
1959	75	6.0
1960	80	7.4
1961	80	8.8
1962	80	18.0
1963	162	. .
1964	81	. .
1965	80	. .
1966	130	. .
Total	768	40.2

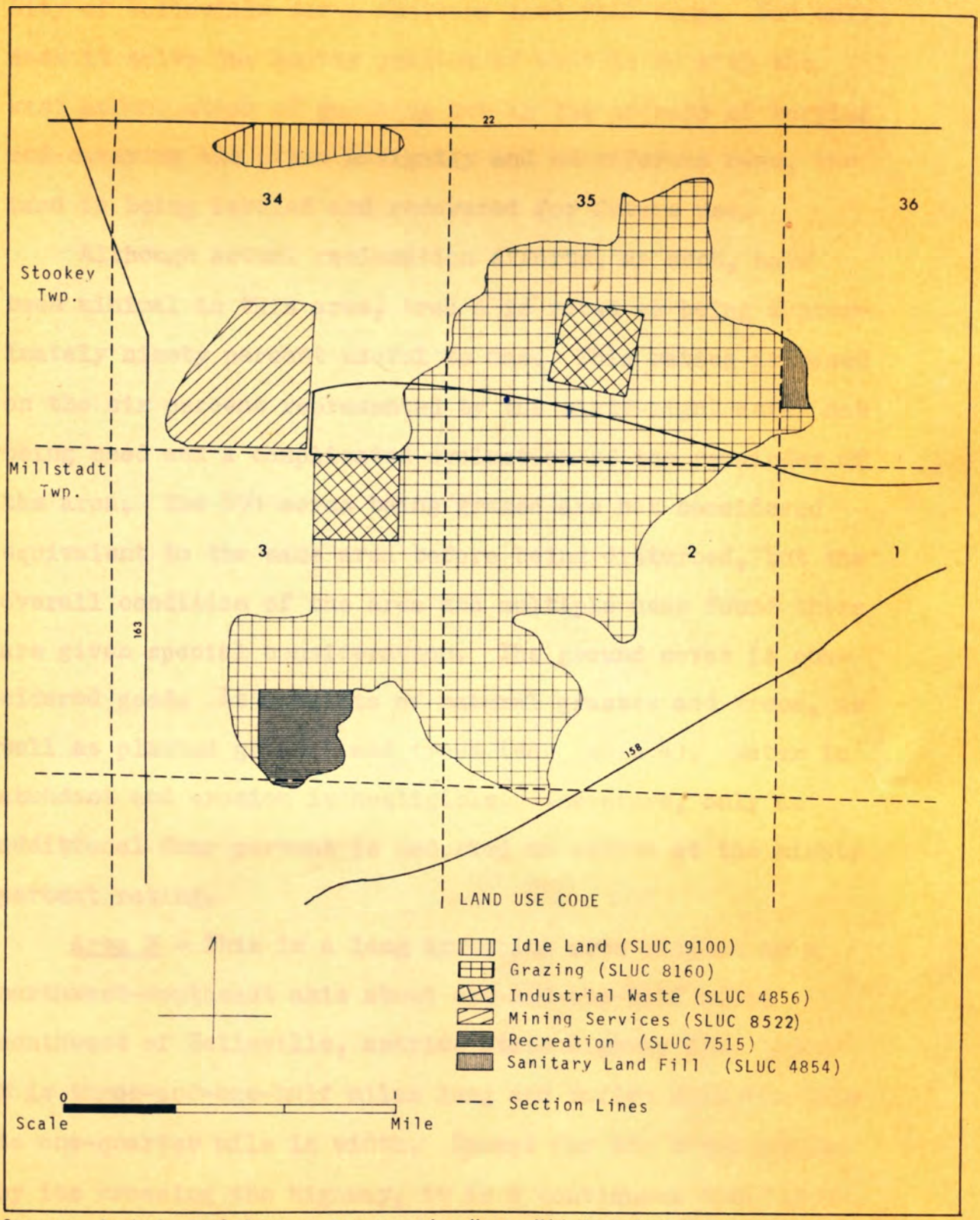
[12]Interview with Alten Grandt, Chief of Conservation, Peabody Coal Company, Belleville, Illinois, May 16, 1967.

Mr. Grandt also said that Mid-West had an active reclamation program in effect before Peabody acquired the land, but there are no records of their actual accomplishments.

The remaining land in this area is a stripped area of approximately sixty-eight acres located along County Highway 22 just northwest of the main body of Area A which will be included in this area for purposes of consolidation and convenience. This small isolated plot is oblong in shape running east to west parallel to the highway. It is covered with both trees and grass but is not being used at this time (SLUC 9100).

In summarizing the land use of this mature strip land area, one finds that the entire area, except the sixty-eight acre piece just discussed, is being used for some useful purpose to man (Fig. 12). A total of 894 acres (over seventy percent) is being grazed. There is some overlap or dual use of that public fee fishing area known as Mid-West Lake, which although being used for recreation by the public, is included in the grazing acreage. The 200 acres of land being used by Peabody Coal Company is certainly essential to their mining operation. The forty acres encompassing the St. Clair Anglers Fishing lake is being used in accordance with good planning and land use categories. Probably the most gratifying land use found in this area is the forty-eight acres being used by the

AREA 'A'



Source: Peabody Coal Company Conservation Maps; Mid-West Coal Producers Institute Maps; AMS 1:250,000 Series V501 Map; 1:24,000 Topographic Chart; Agricultural Stabilization and Conservation Service Maps, and Aerial Maps, Aerial Reconnisance, Interviews, Visitation

Figure 12

City of Belleville for a sanitary land fill dump. Not only does it solve the knotty problem of what to do with the vast accumulation of garbage, but in the process of burying and covering the often unsightly and odoriferous mess, the land is being leveled and recovered for future use.

Although actual reclamation efforts, as such, have been minimal in this area, Area A is rated as being approximately ninety percent useful to man. This rating is based on the six percent represented by the sixty-eight acres not being used and a complicated evaluation of the remainder of the area. The 894 acres being grazed are not considered equivalent to the same area before being disturbed, but the overall condition of the area and multiple uses found there are given special consideration. The ground cover is considered good. It consists of natural grasses and trees, as well as planted grasses and trees (see Table 4). Water is abundant and erosion is negligible. Therefore, only an additional four percent is deducted to arrive at the ninety percent rating.

Area B - This is a long irregular area aligned on a northwest-southeast axis about one-and-one-half miles southwest of Belleville, astride State Highway 158. Area B is three-and-one-half miles long and varies from one mile to one-quarter mile in width. Except for the break caused by its crossing the highway, it is a continuous mined area which affects some land in three townships. Approximately

150 acres of this area are located in the southeast corner of Stookey Township. There are about 450 acres in the southwest corner of St. Clair Township as the area crosses from northwest to southeast into Smithton Township. There, another 550 acres have been mined.

Without close examination one might be inclined to feel that the proximity of this area to a city the size of Belleville would suggest quick reclamation and maximum utilization. Unfortnately, this is not the case, although the area is relatively old and had an opportunity to attain reasonably good cover, it is not being used as effectively as Area A, previously examined. There are some reasons for that which are discussed in more detail in the following description of Area B.

Most of the area is owned by interests other than the mining company. Because of the shape of the area with its irregular boundaries, it is difficult to compute the average of the various categories of usage. However, with the aid of plat maps, a map measure or plainimeter, and cross checking with land owners and the county conservation office the areas were determined with reasonable accuracy.

The entire 1,150 acres has only two formally organized or recognized recreational areas. About one-half of a mile southeast of State Highway 158 just across the St. Clair Township line in Smithton Township is the fifty-seven acre East St. Louis YMCA day camp. While only twenty-seven acres have been stripped the whole area is considered in the

computation of land use (SLUC 7520). This camp, formerly owned by the Swift Packing Company of St. Louis, was purchased by the East St. Louis YMCA in 1964 for $60,000. The end cut of the mining operation created the attractive lake which is the focal point of the camp. The lake, which is stocked for fishing, is also used for boating and swimming. A foot bridge has been built across the north end of the lake to afford easy access to that part of the camp lying across the lake west from the main center of the camp (Fig. 13).

The central compound of the camp contains an office or headquarters building, a supply storage building, an open pavillon type refreshment stand and restrooms. The camping area will accommodate seventy-five to one hundred overnight campers and has served as many as 500 people on special occasions. This is an excellent camp using stripped lands to very good advantage.

Another recreational facility located about one mile southeast from the YMCA camp is the MIDCO Recreation Club (SLUC 7515). This is a twenty-six acre fee fishing lake owned and operated by an eighteen member investment club. The lake, which is stocked with bass, catfish, bluegill, and carp, is open to the public for the apparently standardized fee of one dollar. The four-year old facility has apparently been a successful investment of the club. Several fishermen were observed using the lake on numerous occasions and on Sunday, May 7, the caretaker advised that

Fig. 13.--The final cut of stripping operations in Area B created this beautiful lake. It forms the nucleus of the East St. Louis YMCA day camp. The lake is stocked for fishing, it has a boat launching ramp, and an improved swimming beach. The camp is fifty-seven acres, of which twenty-seven have been stripped. The camp will accommodate 75-100 overnight campers. This photo was taken facing east. The distance from the point the picture was made to the foot bridge crossing the lake is approximately 500 feet.

eighty-five fishermen tried their luck. Improvements on this facility consisted of the previously mentioned stocking, gravel access roads and clearing excess brush and weeds.

There are other minor water improvements in the area which show signs of unauthorized or unorganized use, but the two camps described above are the only improved fishing areas. Generally the area is too rough and unattractive for such recreational pursuits, as hiking and camping. Some shooters were observed plinking tin cans and bottles in one of the unimproved sections of this area, but it is not an area which endears itself to people bent on recreation.

Approximately half of the remaining acreage of Area B is used for grazing (SLUC 8160). The 450 acres north and west of Illinois Highway 158 has been fenced and is used by Henry Guetterman to graze his cattle. Some sectors of his grazing land, particularly those fields near his home site along County Highway 22, have been seeded. No mechanical grading has been attempted, but time and the elements along with the hooves of his cattle have had a rounding and settling effect on the ridges. One interesting and enlightening aspect of grass seeding on these slopes was that if the land had been seeded to grass early enough it discouraged the volunteer cottonwood growth which characterized other strip mine spoils in the county. The explanation,

offered by the retired Madison County Conservation agent, Anton Sajovetz, is that the grass grows before the cottonwood sheds its seed, and because of the fluffy nature and light weight of the cottonwood seed, it is held away from the ground and not allowed to germinate.[13] In any case, the grazing lands of Mr. Guetterman have very few cottonwoods growing on them, and he did plant grass seed early.

Across the highway about 250 of the remaining 550 acres in Area B are used for grazing (SLUC 8160). The grazing acreage, except for fencing and limited seeding, is unimproved. The terrain is rough, there are numerous large limestone boulders exposed, and the natural vegetation growth covering most of the spoils did not appear top quality for cattle grazing. In one "pasture", of 165 acres, located in section thirty-two of St. Clair Township, a condition exists which appears hazardous to the cattle grazing in this field (Fig. 14). The exposed highwall, left by the final cut, is standing almost vertically for the length of the field. The final cut has some water impounded, but the most prominent feature is the absolutely sterile ridges of rock piled up with no soil or earth cover whatever. Obviously this area is lost to any productive use for an indefinite period of time unless reclaimed at great expense

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[13]Interview with Anton Sajovetz, Belleville, Illinois, April 12, 1967.

Fig. 14.--This is an illustration of what can happen on a final cut when the overburden contains stone. Unfortunately when mining ceased at this point there was nothing left to cover these stones. This type spoils will remain unproductive for many years and will undoubtedly not contribute favorably to the strip mining image. Some observers feel that the highwall (on the right) should be graded to a reasonable slope before the mining equipment is pulled out (Area B). This photo was made facing west. The highwall is about forty feet high and the final cut east to west is about 1000 feet long.

and effort. It would appear prudent for this farmer to fence out this dangerous waste land for the protection of his cattle. This has not been done, however, and the cattle are allowed to graze and/or traverse the narrow strip between the edge of the highwall and the fence.

Two farmers use a combined total of approximately 150 acres in sections four and five of Smithton Township for grazing (SLUC 8160). Here too, the surface is very rough and the natural vegetation covering the spoils is neither good nor heavy, but it is usable and it is grazed.

A land fill dump of ten acres (SLUC 4854) is located in a rough section of the spoils west of Illinois Highway 158. It is used by a commercial garbage hauling company and does not match the sanitation standards found in the Belleville City dump. The dumping area is a deep ravine and is serving the purpose of filling and eventually leveling an almost inaccessible area. In that respect it is being used to good purpose.

The remaining 207 acres of Area B is standing idle (SLUC 9100) and, in so far as possible to determine, is not being used except as an unauthorized and illegal dumping area by irresponsible citizens (Fig. 15). The idle spoils are not fenced, are characterized by very rough surfaces, some slick spots and many large boulders. It does not appear to have any immediate practical future without considerable expenditure of time and money.

Fig. 15.--Apparently many residents of the area look upon strip mine spoils as an ideal place to unload unwanted refuse. Several examples of this type unauthorized dumping were found during field research. While a controlled dumping facility is excellent land use for these acres, this type of activity only contributes to the generally unfavorable strip mine image (Area B). The wooden crate in the foreground of this rubbish heap is approximately four feet by eight feet in size.

The land use of Area B is thus rather similar to that of Area A. Some 850 acres, over seventy percent, is in grazing, and the balance is distributed between municipal, recreational and idle categories. There is relatively more idle land and no active mining use as in Area A, however.

Considering the quality of grazing land and the idle, rough acreage in Area B, the author estimates that it is fifty percent useful to man. The recreational facilities are excellent usage of stripped land and perhaps no more ideal use could be conceived for these lands than a sanitary land fill garbage dump. However, in spite of the high quality usage factor, the dump is not properly maintained and can not receive full credit. While more than fifty percent of the area is grazed, the quality of grazing is so inferior that full credit for usefulness is not given to this land. The grass cover is sparse and weedy. While erosion as such is not a significant factor, some of the slopes are steep and many boulders are exposed. Water is adequate but supplies are not exceptional. Thus, giving full credit for the recreational and land fill dump land uses and allowing two-thirds effectiveness for the grazing land, the over-all fifty percent usefulness rating is awarded.

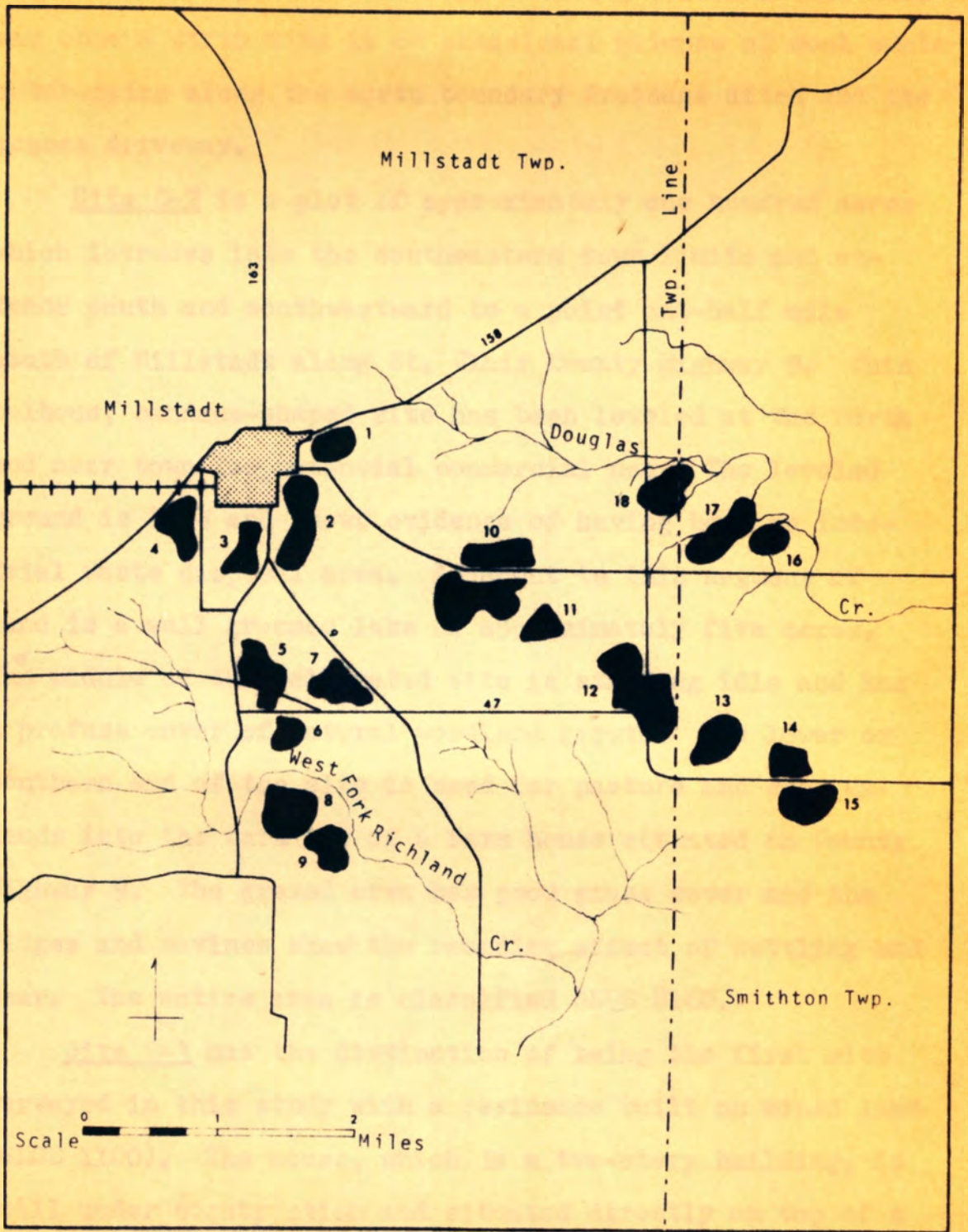
Area C- This is a most complex, most interesting and yet most difficult area to study. It is generally an old mined area, and yet has one active mining site. It is the largest area in the county, yet no mined site is larger than

two hundred acres. It is located chiefly in Millstadt Township yet has five small mined plots in Smithon Township. Assuming the town of Millstadt as the center of a compass rose, this area consists of eighteen relatively small mined plots located in the Southeast quadrant, at distances varying up to five miles from the town limits and including some sites within them. The aggregate affected is some 1,300 acres, yet individual plots are so small and dispersed that they do not create the same unfavorable impression that one mined area of the same size might create. Furthermore, some of these plots have been so effectively reclaimed, that they are hardly recognizable any longer as mined sites. In fact, if this examiner had not drawn a current map showing all mined sites in St. Clair County, it is conceivable that some of these plots would have been overlooked.

While the entire area has been designated as Area C, each of the small mined plots is identified by number (Fig. 16), and each is commented on separately in the following analysis.

Site C-1 is located at the eastern edge of the town limits of Millstadt on the southside of Illinois Highway 158. This site of approximately fifty acres, owned by the town of Millstadt, has been completely reclaimed as a recreational area (SLUC 7420). It contains four Little league baseball diamonds and a small pond. The entire area, except for the pond, has been leveled, and except

AREA 'C'



Source: Peabody Coal Company Conservation Maps; Mid-West Coal Producers Institute Maps; AMS 1:250,000 Series V501 Map; 1:24,000 Topographic Chart; Agricultural Stabilization and Conservation Service Maps, and Aerial Maps, Aerial Reconnisance, Interviews, Visitation

Figure 16

for the infield section of the ball diamonds, is well covered with seeded grass. The only existing evidence that this was once a strip mine is an occasional glimpse of coal waste outcropping along the north boundary drainage ditch and the access driveway.

Site C-2 is a plot of approximately one hundred acres which intrudes into the southeastern town limits and extends south and southwestward to a point one-half mile south of Millstadt along St. Clair County Highway 9. This bulbous, bannana-shaped site has been leveled at the north and near town for potential commercial use. The leveled ground is bare and shows evidence of having been an industrial waste disposal area. Adjacent to this segment of land is a well groomed lake of approximately five acres. The middle of this elongated site is standing idle and has a profuse cover of natural woodland growth. The lower or southern end of the site is used for pasture and even extends into the barn lot of a farm house situated on County Highway 9. The grazed area has good grass cover and the ridges and ravines show the rounding effect of settling and wear. The entire area is classified SLUC 8160.

Site C-3 has the distinction of being the first site surveyed in this study with a residence built on mined land (SLUC 1100). The house, which is a two-story building, is still under construction and situated directly on top of a rounded spoil ridge. The land surrounding the house

contains a small mine-created lake and profuse cottonwood growth. The remainder of this site, of approximately sixty acres in all, is well covered with grass and cottonwoods, except that some bare banks are exposed (SLUC 9100). Approximately forty acres of the site are fenced and grazed (SLUC 8160).

Site C-4 is an entirely fenced area of eighty acres so completely reclaimed for grazing (SLUC 8160) that it is difficult to identify as a mined site. The spoils are well settled and rounded off to a pleasant rolling surface. Very few stones are exposed, the grass cover is excellent, and the pasture has only a few small cottonwood trees. The site has four small ponds.

Site C-5 is divided into three major types of land use. Sixty acres are farm owned and used for grazing (SLUC 8160). The slopes are well rounded and covered. Cottonwoods have attained good growth, but they are not too thick to allow for good grass cover. There are three small stock ponds on the property and some limestone boulders are exposed. The farm house on the site is situated one and one-half miles south of Millstadt on County Highway 71. The barn lot is mined land.

Across the new County Highway 47, twenty acres of this site are being used as a membership fishing club and recreation site (SLUC 7515). This commercial facility has nine separate bodies of water for fishing. Members of this

club, known as Bass Lake, pay one dollar for a membership card, ten dollars fishing fee and twenty-five cents for insurance annually. Improvements consist of a gravel road through the fish ponds and few picnic tables. Bass Lake opened in 1955.

Across the highway, north of Bass Lake, is a relatively new residence built on a low, leveled spoil ridge, estimated to occupy two acres (SLUC 1100).

Site C-6, thirty acres in size, has been completely recovered for agriculture. It is located just south of Bass Lake. The land has been leveled and except for a five-acre lake is in wheat (SLUC 8120).

Site C-7 comprises sixty acres located south of Millstadt at the intersection of County Highways 9 and 47. It has a relatively rough surface with stone and exposed banks showing on the spoil ridges. There are three good lakes and a substantial growth of cottonwoods on the site (SLUC 9100). There is no evidence of improvements except that two houses have been built on the spoils. One of the houses is still under construction, the other appears to be about eight years old (SLUC 1100).

Sites C-8 and C-9 are located two miles south of Millstadt on the West Fork of Richland Creek. This is a stream dissected, hill and ravine, heavily wooded area. No attempt has been made to reclaim the stripped lands in this site and they have remained undeveloped (SLUC 9100). The combined area of the two sites is approximately 170 acres.

The mine lands are situated in a loop formed by the creek so that they are not readily apparent.

Site C-10 is the largest of those in Area C. Comprising some 200 acres, it is located about one and one-half miles southeast of Millstadt. The land is fenced and portions of it (estimated at 40 acres) are used for grazing (SLUC 8160) even though for the most part it has a rough terrain which has grown up in trees and brush and is classified unused (SLUC 9100). In some spots, industrial waste is still exposed and boulders are scattered at random. With few exceptions, however, the site blends well with the surrounding area.

Site C-11, of about forty acres, is located adjacent to C-10. Its surface features and use are essentially the same as those of C-10 (SLUC 9100), but it is less accessible. There is an all-weather road running through C-10, but site C-11 is about one-quarter mile from the nearest road, which heightens its inconspicuousness.

Site C-12 is a rough, wild, unimproved, unused 180 acres of strip mined land (SLUC 9100). It is located about three miles southeast of Millstadt along County Highway 47. In spite of its abandoned state, it does not constitute an unslightly or offensive site. In fact, it is not unlike numerous other woodland in this area. It is heavily wooded, has some small water impoundments, and some small spots of industrial waste.

Site C-13 is another small area (fifty acres) with

essentially the same features and characteristics as C-12 (SLUC 9100). The chief difference is that it is less accessible, being about one-quarter of a mile from the nearest road. A heavy tree cover makes it difficult to identify as a mined area.

Site C-14, the only active mining site in this area (SLUC 8522), includes about fifty acres. It is located four and one-half miles southeast of Millstadt on County Highway 47. It is two miles due west of Douglas and is one of the sites located in Smithton Township. Since the area presently is being mined, it will probably be three years before the state required reclamation is completed. However, already the impact of the law is obvious in the effect it has had on the mining company's treatment of the spoils. In contrast to pre-law stripping, where the familiar saw tooth profile dominated every mining scene, this area has already been graded to a smooth rolling surface, particularly near the highway. The earliest mined section of this site already has a slight cover of grasses. There are some limestone boulders exposed, but it is obvious that a usuable surface will be left when this site is abandoned.

Site C-15 is a sixty acre plot located across the highway from C-14. It was mined just prior to site C-14. Since it has been mined after the effective date of the state reclamation law, it shows the effects of the law. The site is well graded, and the entire surface is accessible to tractors or other farm equipment. Since no cover

crop has been sown as yet, except for a small strip of sweet clover along the highway, it is classified as SLUC 9100.

Sites C-16 and 17 are located in a heavily wooded region along Douglas Creek about three miles directly east of Millstadt. Their combined area is approximately 110 acres. They lie in an area of heavily wooded dissected terrain and are so well masked by the surrounding tree growth that they are not recognizable as mined sites until approached very closely. Site C-16, approximately thirty acres in size, contains an eight acre lake which is the property and home site of the Millstadt Sportman's Club, a membership fishing club (SLUC 7515). Site C-17, with eighty acres, contains a twelve acre lake which is open to the public for the familiar one dollar fishing fee (SLUC 7515). The remaining ninety acres in the two sites are idle (SLUC 9100). The natural wood cover must be penetrated to find this secluded fishing site.

Site C-18, the final site in Area C, is a 100 acre plot located astride the channel of Douglas Creek, two and three-quarters miles east of Millstadt. This land, which is on the boundary line between Millstadt and Smithton Township, has a landscape comparable to that around Sites C-16 and 17. The adjoining terrain is rough with heavy woodland cover. This site is not being used for any apparent purpose and has reverted to volunteer vegetation growth, thus being classified idle land (SLUC 9100). It blends well with the

surrounding land and is not conspicious as a mined site.

In summary, over sixty percent of the land in these eighteen sites is classified as undeveloped, while only some twenty percent is in agricultural use. A very small share, less than 100 acres, has been developed for recreational purposes. For the first time, some residential use is made of a strip mine area.

One of the complaints often heard about strip mining is that the spoil heaps left by the mining operation are unattractive and offensive to the eye. In Area C this charge is not entirely true. There are limited sections of the area which show obvious scars of the surface mining technique, but generally, the sites, which are individually relatively small, have either been reclaimed and pressed into agricultural use or have revegetated and now blend with the surrounding area.

There are some logical explanations for this phenomenon of almost natural, and certainly minimum effort reclamation. The first factor of significance is the relatively small, more easily manageable size of the sites. Psychologically, it is easier for man to confront fifty acres of spoils than it is to take on the task of reclaiming a thousand acres. The size contributes to their reclamation in another way. As a farmer cultivates the fields surrounding spoil areas he has a natural inclination to encroach on the spoil acres as far as physically possible.

After several years an area that was originally fifty acres may in this manner be reduced to thirty. Another factor is the adaptability of the overburden in this county to revegetation. Grandt and Lang in their research for the report on reclaiming Illinois strip coal land made 185 soil tests in St. Clair County and found the average ph to be 7.1, a condition most adaptable to revegetation.[14] A third factor is that all of these small sites, except those currently in operation, were mined by small companies, on shallow deposits with limited capacity equipment. Therefore, the diggings are not as deep and consequently not as disturbing to the land as today's mining. So time and nature with their settling, leveling, and revegetating either accomplish the task of reclamation or make it easier for man to do the job.

In spite of the fact that very limited actual applied reclamation effort has been made in this area, Area C is rated as approximately seventy-five percent recovered. Except for recently mined sites (C-14, 15) the ground cover in this area is generally good. All types of vegetation considered in Table 1 are found in Area C and all combinations are also present. Erosion is minimal and slopes are generally rounded and well covered. In terms of total acreage actually recovered by man-inspired efforts this rating may appear to be unjustified. However, the position

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[14]Grandt and Lang, p. 13.

is taken here that land is reclaimed whether that state results from natural evolution or from man-made efforts.

Area D - This area has 400 acres mostly devoted to active mining (SLUC 8522). It is located in Smithton Township, four and one-half miles south of Belleville and three and one-half miles northwest of Freeburg. The area cuts across the Sugar Creek watershed about three-quarters of a mile west of County Highway 4 (known locally as "Old Freeburg Road"). The area is known as "Freeburg West" to Peabody Coal Company.

At present there are two draglines working this area, one located toward the northern limits and the other, at the opposite end. Each is working in tandem with a smaller shovel loading the coal into haulage trucks.

Since this is an active mining area and since mining activity in this area is relatively recent, very little actual reclamation has been done. There is one area near a paved country road, connecting County Highway 4 and Illinois Highway 159, which has been dressed up. The tops of the ridges near the road have been graded, grass has been seeded and about ten acres have been fenced for grazing thus being classified as agricultural land use (SLUC 8160). Six Guernesey cows were observed grazing in the area. Beyond this facade, the spoils are very rough. The typical mixed-up effect of the dragline operation is apparent. There is no pattern to the spoils. There are ridges, short and long, and there are conical peaks, some

high, some low. There is also evidence of considerable shale-like materials exposed on the spoil banks. Mr. Grandt, the Peabody conservationist, says these materials are non-toxic.

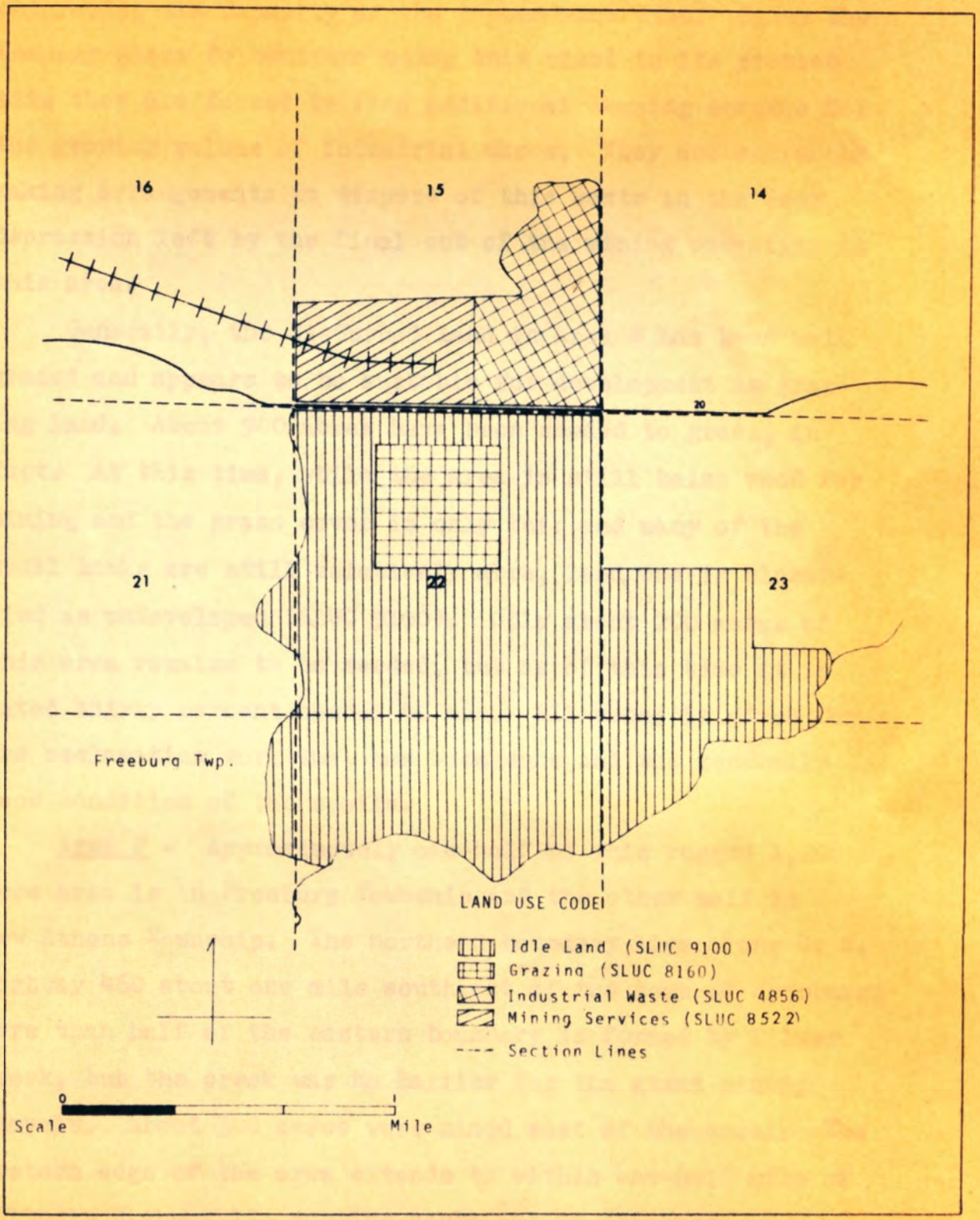
In any case, the area has not been recovered and Mr. Grandt agrees that because of the chopped up nature of the spoils it will be a challenge to reclaim them. He feels certain, however, that it will be done in compliance with the existing Illinois law. On the basis of present conditions, this area is assigned a usefulness factor of only five percent. The justification for this low rating is found in the characteristics of the spoils. Ground cover is poor. The slopes are rocky and very irregular and no water has been impounded as yet.

Area E - This 1,260 acre block of stripped land is located in Freeburg Township approximately two and one-half miles due east of the town of Freeburg. It has had relatively recent mining activity. In fact, Peabody Coal Company still maintains one of its largest tipples and coal processing plants on the northern end of this area, using 160 acres of land (SLUC 8552). Peabody classifies the area as a multiple-use area. Since, in addition to the use noted above, some 120 acres are being grazed (SLUC 8160) and 112 acres of impounded water are being developed as a recreational area for Peabody employees (Figs. 17 and 18).

One of the problems being encountered in this area is that the coal processing plant has been in use for so long and so intensively, that the volume of industrial waste is

Fig. 17.--The dark area with the buildings in the foreground is a coal processing and loading area with adjacent industrial waste disposal area. The mined area in the background has been graded and seeded to grass. The grading consisted of striking off the tops of the ridges. One hundred twenty acres (right, center) of this area is grazing land (Area E). This photo was taken from 1000 feet altitude facing southeast. The scale could be determined by the trucks on the road and in the plant yard, and the rail cars on the tracks. The building in the right foreground is approximately 200 feet long.

AREA 'E'



Source: Peabody Coal Company Conservation Maps; Mid-West Coal Producers Institute Maps, AMS 1:250,000 Series V501 Map; 1:24,000 Topographic Chart; Agricultural Stabilization and Conservation Service Maps, and Aerial Maps, Aerial Reconnisance, Interviews, Visitation

Figure 18

outgrowing the capacity of the impoundment dike. Since the company plans to continue using this plant in its present site they are forced to find additional dumping acreage for the growing volume of industrial waste. They are currently making arrangements to dispose of this waste in the deep depression left by the final cut of the mining operation in this area.

Generally, the disturbed land in Area E has been well graded and appears to be suitable for development as grazing land. About 900 acres have been seeded to grass, in fact. At this time, while the area is still being used for mining and the grass cover is only fair and many of the spoil banks are still relatively abre, land use is classified as undeveloped (SLUC 9100). Only about 200 acres of this area remains to be seeded, but as of this time it is rated thirty percent useful to man. Allowance is given for the reclamation work that has been done and the generally good condition of the spoils.

Area F - Approximately one-half of this rugged 1,200 acre area is in Freeburg Township and the other half in New Athens Township. The northern boundary lies along U. S. Highway 460 about one mile southeast of the town of Freeburg. More than half of the eastern boundary is formed by Silver Creek, but the creek was no barrier for the giant mining shovels. About 300 acres were mined east of the creek. The western edge of the area extends to within one-half mile of Illinois Highway 13, running south out of Freeburg.

This area, particularly in the southern half, is one of

the wildest, most heavily timbered areas of those studied and is largely undeveloped land (SLUC 9100). It has a mining history which dates back to the early 1930's. The southern part of this area was originally mined by the United Electric Mining Company. At that time it was known as the Red Ray Mine. United Electric abandoned the site in the late 30's and it lay idle until Peabody bought the property and renewed mining where the former operations had ceased. Peabody mined the northern part from 1958 to 1964. The spoil ridges in the northern part have been graded and the entire area seeded, but the company officials privately concede that the future land use pattern has probably been established by the wild growth of natural vegetation in the southern part of the area (Fig. 19).

Unofficially, Peabody Coal Company, the present owner of the land, hopes to develop this area into a public recreation site. In fact, within the past few months the company has removed the posted signs, and it eventually plans to encourage camping, hunting and fishing there. Wolves have been reported in the wilderness of this area.

Although it is generally agreed that most of Area F is wild and inaccessible, it is not a total loss to man. A farmer on the southern edge of the land has fenced about eighty acres for grazing (SLUC 8160). The state police have set a pistol and rifle range along the western fringe (SLUC 6720) which is so small that it will not be included in the tabulation. The town of Freeburg uses a few acres for sanitary land fill dump (SLUC 4854). The dumping and filling procedure is not well organized, but the volume of waste is not great and the system works effectively. One

Fig. 19.--This is a wild rugged area which is generally unreclaimed. Some of the ridges in the more recently mined portions have been topped and seeded to grass, but the general character of this area is wilderness. About eighty acres in the background of this illustration are fenced and grazed. This is the area in which the powder facility was found (Area F). This photo was taken at an altitude of 1000 feet facing southeast. The prominent lake in the center of the picture is approximately 1000 feet long.

of the most practical land uses found in this area was that of the Hercules Powder Company. It has established a powder packing and loading plant back among the natural "bunkers" formed by the spoil ridges (SLUC 2892). From the standpoint of safety to society, no more isolated and secure site could be found in the entire county. The company employs from twelve to fourteen people. The Tri-State Trucking Company, the prime hauler of Hercules powder, also uses this area to park loaded trucks, which is included here as industrial land use (SLUC 2892).

Thus, in recapitulation, this "wild" area has over 1,000 acres (over eighty percent) of its land undeveloped, with the remaining twenty percent about equally divided between industrial and agricultural land use. A small area is used as land fill.

Many of the residents of the countryside use this area for hunting and fishing. It abounds with game. In addition to the wolves previously mentioned, it is claimed that bobcats have been shot in the area. Other species of game include fox, opossum, raccoon, squirrel, rabbit and quail. There are several lakes which yield good and plentiful fish hauls for anglers. Giving full credit for the industrial and agricultural land uses in this area, and additional credit for the unofficial recreational land uses, this area is rated as about thirty percent useful to man. As indicated the ground cover in this area is generally good.

While most land would not qualify as grazing land, the profuse growth does an excellent job of retarding erosion and masking unsightly spoils. The ground cover is generally a mixed hardwood forest with cottonwoods dominating. There is abundant water in the area and the entire character of the spoils makes an excellent habitat for wildlife.

Area G - This area of some 700 acres has been mined extensively except its eastern section. It is located immediately east of the town of New Athens with the northern boundary formed by the Kaskaskia river and the southern extending to the Illinois Central railroad tracks. The area is located in the center of New Athens Township (Fig. 20).

The area is presently active in mining activity (SLUC 8522). As is customary in the Peabody mining operations, larger excavating equipment has recently been brought in to continue stripping where former operations were discontinued as the in-place equipment reached its overburden capacity limits.

The entire area, except for those acres currently being mined, has been "graded" and seeded to grass ("graded" in this context means that the tops of the ridges have been knocked off). The cover, however, is very light and exposed materials show considerable rock and waste. A small segment of 120 acres has been fenced, and an employee of Peabody is leasing it from the company and using it for grazing (SLUC 8160). By this system the company obtains additional revenue from mined land.

Fig. 20.--This is an active mining area which has been graded and partially seeded. The active mining is outside the picture on the left. The Kaskaskia River which forms the northern boundary of this area is in the left foreground. One hundred twenty acres in the right background are grazed (Area G). This photo taken from an altitude of 1000 feet facing southeast. That portion of the road running across the center of the picture is about one quarter of a mile long from one side of the photo to the other side.

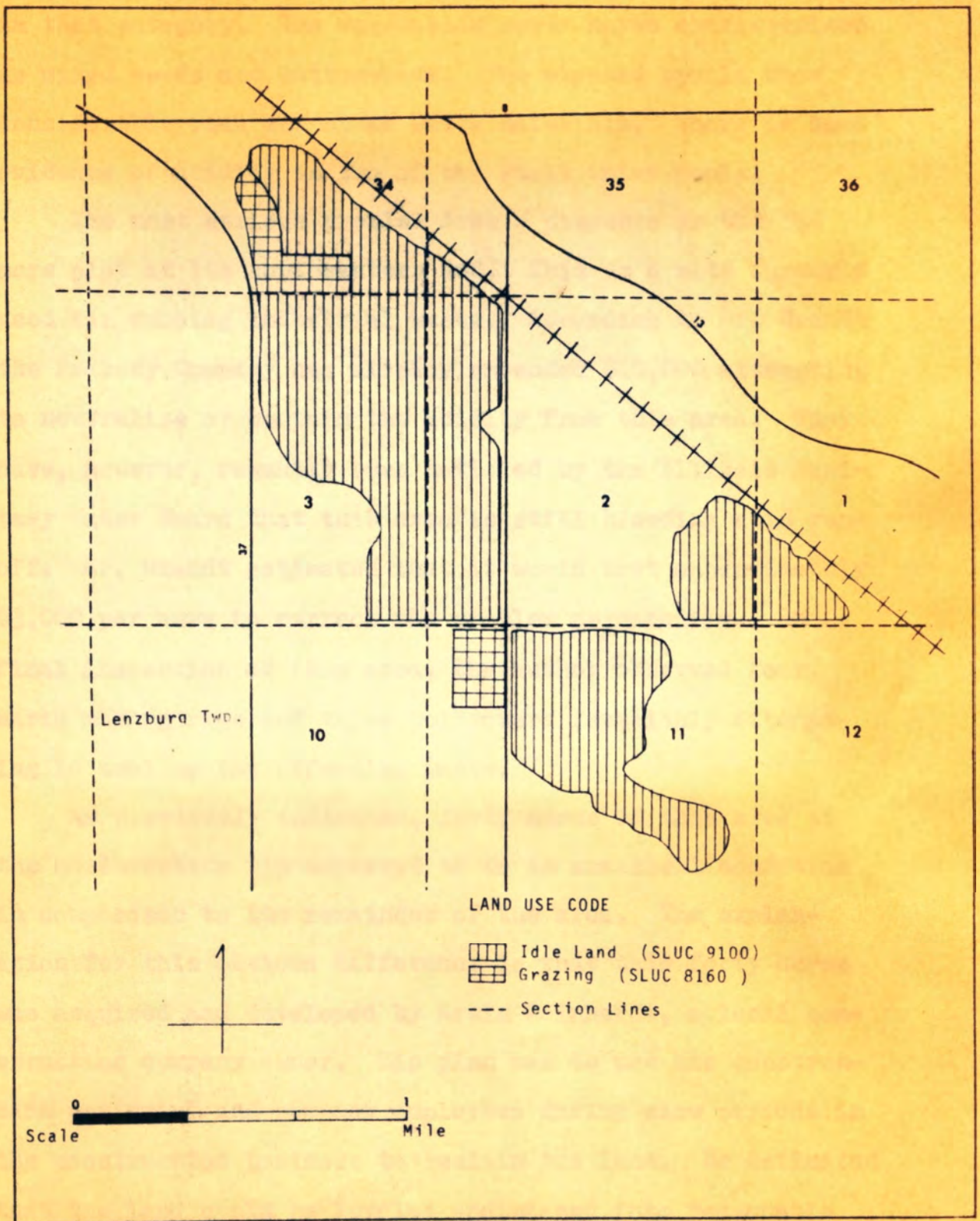
Although this area has been graded and seeded and a portion of the area is being grazed, it is rated as only ten percent in usefulness to man. The low rating for this area is assigned on the basis of poor grass cover, limited water impoundments, and the exposed nature of the slopes. The mining activity is not particularly productive, and grazing is definitely inferior.

Area H - This irregular shaped area lies one-half mile southeast of New Athens along the Illinois Central railroad. It extends to a point two and one-half miles southeast of New Athens to within three-quarters of a mile east and northeast of Lenzburg. This area encompasses three different plots of land. The largest of these, nearest New Athens, consists of approximately 500 acres. A sixty acre plot lies directly east of this larger area and adjacent to the Illinois Central railroad. The remaining 130 acres is situated at the southeast tip of the 500 acre plot. The total acreage is approximately 700 acres (Figs. 21 and 22).

With the exception of forty acres at the northwest tip, Area H is in poor condition and is all classified as essentially undeveloped land (SLUC 9100). The entire area has been seeded to grass but Mr. Grandt says that the seeding was improperly done. He explained that Peabody contracts for aerial seeding from private companies and that on occasion, unless the work is supervised, it may not be satisfactorily accomplished. He suggests that this area falls

Fig. 21.--This is an example of an area which has not been effectively reclaimed by either man or nature. The entire area has been seeded to grass but the technique is alleged to have been faulty. The spoils in the foreground have very limited cover. Forty acres in the upper left of this illustration have been reclaimed for agriculture. This area includes one hundred thirty acres of former waste disposal land. It is located off this picture at the bottom right corner (Area H). This photo was taken from an altitude of about 800 feet facing northwest. The lake running across the center of the picture is approximately 1000 feet long.

AREA 'H'



Source: Peabody Coal Company Conservation Maps; Mid-West Coal Producers Institute Maps; AMS 1:250,000 Series V501 Map; 1:24,000 Topographic Chart; Agricultural Stabilization and Conservation Service Maps, and Aerial Maps, Aerial Reconnisance, Interviews, Visitation

Figure 22

in that category. The vegetation cover maybe characterized as mixed weeds and cottonwoods. The exposed spoils show considerable rock and other waste materials. There is some evidence of acidity in two of the small water pools.

The most serious problem Area H presents is the 130 acre plot at its southeastern end. This is a site formerly used for dumping industrial waste. According to Mr. Grandt the Peabody Company has already expended $10,000 attempting to neutralize or contain the acidity from this area. They have, however, recently been notified by the Illinois Sanitary Water Board that this area is still bleeding acid run-off. Mr. Grandt estimated that it would cost approximately $3,000 per acre to correct the problem permanently. On final inspection of this area, the author observed four earth moving rigs and three bulldozers feverishly attempting to seal up the offending waste.

As previously indicated, forty acres of this area at the northwestern tip appeared to be in excellent condition in comparison to the remainder of the area. The explanation for this obvious difference is that this forty acres was acquired and developed by Arwin Reinhardt, a local construction company owner. His plan was to use his construction equipment and company employees during slow periods in the construction business to reclaim the land. He estimated that the land could be leveled and placed into reasonable condition for agriculture for approximately eighty dollars

per acre. He soon discovered that his estimate was much too low and that it would not be economically feasible to reclaim strip mined land in this manner, even with his equipment and labor advantage. Nevertheless, he does have forty acres of well-reclaimed land, about twenty of which is in wheat (SLUC 8120) and the remainder grazed (SLUC 8160).

About the only use man is making of this land is the agricultural use on the forty acres just discussed and some recreational use by local fishermen on the lakes. On this basis the land is rated about twenty percent on the usefulness to man scale with five percent being awarded for the well reclaimed forty acres and an additional fifteen percent awarded for the recreational value of the area and the reclamation work carried out by the mine company and private individuals. Ground cover is poor, water impoundment is adequate, the slopes are not eroding but there are abundant rocks and some toxic materials exposed. Considerable hunting and fishing in the area increases the use rating as indicated above.

Area I - This 525 acre area surrounds the west and south limits of the small town of Lenzburg. This one by one and three-quarters mile area was purchased by three doctors for development as a recreational area. "Recre-Acres", the official name of this recreational site, is located in Lenzburg Township (Fig. 23).

Dr. Fred Rose of Belleville, one of the three owners of this area, described to the author the improvements made

Fig. 23.--This is "Recre-Acres", a strip mined area which is being developed for recreation. The lakes are stocked for fishing and the grounds are stocked with game for hunting. Some swimming areas have been improved and plans call for further development of the over-night camping facilities. It is relatively undeveloped now, but with planning and promotion it could have potential (Area I). This photo was taken from 1000 feet altitude facing northeast. The road through the area from west to east is approximately one half mile long.

and explained how the area is used. Some of the lakes have been improved with boat launching and landing facilities. The lakes are stocked with fish and some of the lake banks have been cut down to facilitate accessibility. An old home site there has been improved and modernized for use by the fee paying hunters and fishermen and constitutes the main camping area. "Recre-Acres" is listed in campers maps and guides printed and distributed nationally. The entire 525 acres is classified as recreational (SLUC 7610), the only entire area thus classified of those in the study region.

The spoil ridges of Area I have not been graded and no seeding has been attempted except that some pine trees, which are apparently not doing well, have been planted. The area is a licensed shooting preserve and the stocked game is hunted five months of the year. Game available for hunters includes quail, rabbit, and duck. One of the lakes has been improved for swimming. Sand has been hauled in to create a sand beach and a fresh water circulation system has been devised. The promoters presently have three saddle horses on the grounds as an experiment in handling and renting horses to campers and vacationists.

The three-doctor combine which owns and promotes "Recre-Acres" realize that more effort and expenditure of funds will be necessary to properly develop this area, but they feel that it has a potential not yet realized. In

fact, it has not yet proved to be a profitable venture for them; perhaps, however, a 2,000 acre lake now being developed by Illinois Power Company two miles southwest of their site will attract additional recreation seekers into their grounds.

In its present status this area is rated as of thirty percent quality in use to man. This rating is based on the present status of the area and the reported use made of it and does not consider its potential.

Area J - This area, of approximately 400 acres is located in Marissa Township about one-quarter mile southeast of Lenzburg and one and one half miles northwest of Marissa. It is an oblong-shaped area aligned northwest to southeast parallel and adjacent to the Illinois Central Railroad Company tracks. It is one-and-one-quarter miles long and approximately three-quarters of a mile wide. It is separated from the active mining area west of Marissa only by a paved country road (Fig. 24).

This is a mature area with a well rounded profile and heavy cover of vegetation. Some rocks are exposed and an occasional bare bank is showing, but generally the spoils are well covered. Clover appears to be the dominant growth. There are two relatively small lakes in the area. It appears to be an area ideally suited for grazing, but it is not being so used and thus is classified as idle land (SLUC 9100).

Area J is not a problem area in the sense that it is well covered, is not unsightly and is far enough removed from the passing public to not offend aesthetic sensitivities. But it is not being used even though it apparently

Fig. 24.--This is an unused area of approximately four hundred acres. It is relatively unreclaimed, but it now has reasonably good grass cover and appears to be a potentially good prospective grazing area. The different shaded outlines are created by different mining periods. Two or three small pools of copperas water are shown in the foreground (Area J). This photo was taken from an altitude of 800 feet facing northwest. The lake running across the upper center of the picture is approximately 1500 feet long (that portion shown).

would support grazing activity. On the basis of its idleness, the author's "use to man" rating applied to Area J is ten percent, allowing for some recreational value.

Area K - When this study began this area measured approximately 400 acres. As of this writing, it has reached a size of 1,225 acres, and with the world's second largest shovel and two giant drag lines all working simultaneously it will continue to grow at a rapid rate until the entire 2,800 acre holdings in this area have been stripped. Before that happens, operations will have moved south in one continuous strip into Randolph County.

At present the area is located directly west of the town of Marissa in Marissa Township. It is bounded on the northeast by the Illinois Central railroad, and extends to the previously mined Area J on the north and northwest. It has not reached its western limits, but they will be approximately on the western boundary of Marissa Township. As previously indicated the southern limits will extend into Randolph County (Fig. 25).

Obviously, the chief land uses of this area now are the extensive and intensive mining operations and thus the entire area is classified in this land use category (SLUC 8522). However, in spite of the concentration on extraction of coal from the ground, some 575 acres of the area have been seeded. Some of the ridges have also been topped as mining and earth moving equipment became available for that purpose.

Fig. 25.--This is the largest and most active mining area in St. Clair County. The world's second largest shovel is seen in right center of this illustration. In addition to this shovel there are two giant drag-lines at work in this area. Parts of this area have been graded and some seeding to grass has been accomplished, but reclamation by law will not be required until after mining is completed in the area (Area K). This photo was taken from an altitude of 800 feet facing northwest. The section of road visible in the foreground of the picture is about one quarter of a mile long.

When mining has been completed in this area, some 330 acres will revert to former owners. The remaining acreage will be owned by Peabody Coal Company. Currently, the company plans to establish two, or possibly three, farm units on the land.

On the basis of the unused land which has practically no cover, and as yet no water impoundments only the very limited portion of the area being mined at present is considered useful to man. Therefore, an estimated rating of ten percent is assigned by the author.

Changing Landscape

When this study began, the total acreage reported to have been stripped in St. Clair County exceeded 8,000 acres. In a subsequent informational item relative to total stripped acreage a figure of better than 9,000 acres was used. At this writing the figure has reached over 10,000 acres. Obviously as long as active stripping continues in the county, the total acreage will grow. At present there are four active mining areas in the county. Those areas are: Site 14, Area C; Area D; Area G; and Area K. With this concentration, the total land mined this year will undoubtedly exceed the former record high of 910 acres recorded during the last reporting year (July, 1965 to July, 1966).

Subjective Rating of Land Use

As each area has been surveyed and the land use investigated, a subjective rating reflecting "usefulness to

man" has been applied to each area. The results of that rating are given in the following table:

TABLE 5

SUBJECTIVE LAND USE TABLE

Area	Acres	Usefulness to Man (Percent)
A	1,240	90
B	1,150	50
C	1,420	75
D	400	5
E	1,260	30
F	1,200	30
G	700	10
H	700	20
I	525	30
J	400	10
K	1,225	10
	10,220	40[a]

[a]Total usefulness, if percentage figures are converted to acreage. Such figures are not really convertible, however, so this is a very crude estimate.

On this rating scheme the percent of "usefulness to man" for all areas combined is estimated as forty percent. This figure represents the author's evaluation of the area and is not based on any precise criteria or weighting of values. The overall rating is arrived at by converting the percentage figure for each area to an acreage figure and then totaling the acres and computing these as a percentage of all areas. Obviously, the rating applies only to conditions observed at the time of the survey and is highly

subjective. Its chief value is perhaps in indicating that there is a wide range in the condition of strip mined land usefulness and that evaluation of their worth is extremely complex. The land use now will be summarized in terms of the Standard Land Use classification applied by the author. Then, some appraisals of reclamation by others will be noted.

Land Use Based on Objective Classification

The land use rating in Table 6 represents the independent evaluation by the author using the Standard Land Use coding system.

The largest single category in this rating is the idle category (forty-one percent). Some geographers might have classified some of this land in other categories, such as recreational. However, such a classification was not used unless the land had been developed for such a purpose.

The second largest category of use is mining (twenty-five percent). This land use includes all the stripped acres in the currently active mining areas plus the acreage occupied by the processing and loading facilities. The actual number of acres undergoing stripping may be relatively limited, but the entire area is counted as a mining area if all or any part of it is subject to use for dumping waste, haulage and access roads and other activities related to the mining operation.

The agricultural use (twenty-four percent) is devoted

TABLE 6

LAND USE IN ST. CLAIR COUNTY STRIPPED AREAS

Standard Land Use Classification[a]

Area Name	Size	Household Units SLUC[b] 1100	Explosives Manu. 2892	Sanitary Land Fill 4854	Recreation 7420-7515[c]	Agriculture 8120-8160[c]	Mining & Services 8522-8552	Unused Land 9100
				Acres				
A	1,240	..	..	38	40	894	200	68
B	1,150	..	..	10	83	850	. .	207
C	1,420	22	..	..	88	350	50	910
D	400	..	..	..	..	10	390	. .
E	1,260	..	..	..	..	120	160	980
F	1,200	..	100	10	..	80	. .	1,010
G	700	..	..	..	..	120	580	. .
H	700	..	..	..	..	40	. .	660
I	525	..	..	..	525	..	. .	. .
J	400	..	..	..	..	..	. .	400
K	1,225	..	..	..	..	..	1,225	. .
Total	10,220	22	100	58	736	2,464	2,605	4,235
Percent	100	1[d]	1[d]	1[d]	7	24	25	41

a Source: Urban Renewal Administration, Housing and Home Finance Agency and Bureau of Roads Department of Commerce, Standard Land Use Coding Manual, (Wash., D.C., 1965)

b Standard Land Use Codes

c For more detail land use see Appendix, Exhibit C

d Less than one percent

almost entirely to grazing. As related earlier some of the grazing land has been improved but most of it is unimproved. No attempt is made to evaluate the degree of effectiveness or quality of the grazing land.

The seven percent credited to recreational use does not include those areas which are also grazed or used for dual purposes. Occasional and incidental recreational uses are not credited either. This figure represents only those areas developed as recreational areas.

The one percent industrial use derives from the powder works and trucking operation in Area F. The six-tenths of one percent for municipal use results from the land fill dumps. The four houses built in Area C occupy only two tenths of one percent of the ten thousand stripped acres in the county.

Other Views on Reclamation

When one examines reclamation of strip mine spoil areas, it very soon becomes evident that the concept of reclamation has a wide range of interpretation. It appears that the meaning of the word is fitted to the purpose of the person using it.

The agriculturally oriented conservationist may infer that reclamation means to reclaim the disturbed land to its approximate original conformation and state of agricultural productiveness. The sportsman may think of reclamation acts largely as those which provide good cover for wildlife or

impound water for fishing lakes. Some of the mining industry representations may consider reclamation as that restoration of land sufficient to satisfy public reaction, or to conform with existing statutes.

The objective of the Illinois Open Cut Land Reclamation Act of 1961 (HB-306) as amended in 1963 (HB-582) and as amended in 1966 is stated in this manner:

> Section 2. It is hereby declared to be the policy of this state to provide, after surface mining operations are completed, for reclamation to encourage productive use to include but not be limited to: the planting of forests; the seeding of grasses and legumes for grazing purposes; and planting crops for harvest; enhancement of wildlife and aquatic resources; home and industrial sites; and for the conservation, development, management and wise use for compatible multiple purposes, of all natural resources of such areas, to aid in maintaining or improving the tax base and protecting the health, safety and general welfare of the people as well as the natural beauty and aesthetic values, in the affected areas of this state.
>
> Section 3. (a) "Reclamation for productive use" means conditioning areas affected by surface mining to make them usable for any purposes consistent with those enumerated in the statement of policy.

The Act presents a broad and, it is believed most would agree, reasonable policy. There is no attempt to legislate or direct the type of reclamation or land use. The term "productive use" as used in the Act is very compatible in meaning to that part of the purpose for this study stated as "usefulness to man". No attempt is made by the Act to direct the type of reclamation as long as it is for some useful purpose.

In the course of various interviews, the author has found that well informed persons who have an interest in strip mining have agreed that the policy must be phrased in this broad manner. They hold that it is not practical nor reasonable for the law or the enforcing agency to dictate the specific type of land use to be made of mined land. They contend that, in the first place, ownership rights should be allowed to use it for whatever purpose the company determines is most practical and/or profitable for the company, as long as this use complies with state law. Secondly, they point out that each piece of mined property differs from others in numerous ways.

The potentials of strip mine land are certainly different from place to place. Physical characteristics such as rock content and toxicity vary. Also, potentials vary in accordance with the needs of the surrounding region. Population pressure may demand or suggest that recreational facilities are direly needed. Perhaps, circumstances favor industrial building sites, or residential building development. Other possibilities are numerous.

The problem of determining what the best land use would be after mining is obviously extremely complex. After certain standards of reclamation are established by the Act and certain guarantees are deposited by the mining companies to demonstrate good faith, the office of Supervisor of Open Cut Land Reclamation exercises regulatory supervision to

insure that required reclamation is accomplished, but does not attempt to dictate specific practices.

Since the law only became effective on January 1, 1962, and sine the law allows three years on "non-problem" land before reclamation is required and since this study is concerned only with stripped land in St. Clair County, the records of the Supervisor of Open Cut Land Reclamation are not too meaningful to this study. The records of that office show that only 227 acres requiring reclamation were mined in St. Clair County during the current period and that considerably more acres than that were reclaimed in accordance with the law.[15]

A better source of information for the purposes of this study is the office of Louis S. Weber, Assistant Director of Conservation for Mid-West Coal Producers Institute, which is located in Springfield. His report on the status of reclamation in St, Clair County shows that strip mining had, as of June 30, 1965 affected 8,474 acres of which only about one percent was not reclaimed. The report is presented in Table 7.

When Mr. Weber was asked about his personal interpretation of adequate reclamation be replied, "When I speak of reclamation I'm talking about providing the land with enough vegetational cover to stop erosion and run-off. If

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[15] Annual Report, Supervisor Open Cut Land Reclamation, p. 2-8.

there is vegetation enough to hold the ground it's reclaimed." The breakdown used in Mr. Weber's report reflects this philosophy, which is a representative coal mining industry viewpoint.

TABLE 7

STATUS OF RECLAMATION ON STRIPPED LAND IN ST. CLAIR COUNTY

Acres	Status
537	Graded so as to be traversible by farm equipment
1,862	Graded to the extent that the peaks and ridges were struck off to a width of ten or more feet and which have been seeded for pasture use.
693	Seeded with pasture mixture, having no grading other than access roads.
310	Successfully reforested
635	Natural forest cover
1,308	Adequately covered with natural vegetation other than trees
421	Lakes suitable for aquatic life
369	Industrial waste
1,068	Not reclaimed
1,271	Not reclaimed, but under approved plan for reclamation under the state law requiring such reclamation, as of June 30, 1965.[16]

Another source consulted was United States Department of Agriculture Conservation agents for St. Clair County, R. R. Erwin and his assistant (conservation technician) Grover Carr. While both of these men are familiar with the field of conservation as it applies to the farmer and his land, they have only a cursory knowledge of the stripped land in their county because very little of it has been

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[16]Letter from L. S. Weber, Ass't Director of Conservation Mid-West Coal Producers Institute, Inc. Jan. 16, 1967.

improved sufficiently for them to be called upon for advice and assistance regarding its use. They listen to the farmers, however, and they do have personal knowledge of some of the use being made of stripped lands. They also have definite opinions about the agricultural value of the land after it has been stripped. When Mr. Erwin, who holds a degree in agronomy from the University of Illinois, was asked what percent of the stripped land in his county had been reclaimed, he replied, "I think an estimate of twenty-five percent would be a generous estimate. You don't just throw a fence around this land, turn some cattle loose in it and call it a pasture." Mr. Carr said he knows of a farmer who had fenced some grown-up mined land, turned his cows out in it and hadn't been able to find them since. They both stressed the importance of access roads and pointed out the dangers of steep ridges and highwalls to cattle.[17]

The above views are those of agriculturally oriented people who naturally think in terms of past quality of the land versus post-mined quality. In their opinion post-mined quality just does not measure up without extensive and excessive expenditures of time and money.

A quite different view of land reclamation quality is presented by Alten F. Grandt, Peabody Coal Company's Chief Conservationist. Mr. Grandt was recommended to the author

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[17]Interview with R. R. Irwin and Grover Carr, April 20, 1967.

by many of the other persons interviewed as one of the most respected authorities working in strip mine reclamation in the state of Illinois. He was at the dissertation stage for a Ph. D. in agronomy before leaving the University of Illinois to work on strip mine reclamation. In conjunction with Mr. A. L. Lang he did a study and published a pamphlet called Reclaiming Illinois Strip Coal Land with Legumes and Grasses. He found that properly prepared and seeded strip mine lands compare favorably as pasture with unmined lands, as indicated by the following table.[18]

TABLE 8

BEEF CATTLE GAINS FROM GRAZING STRIP-MINED PASTURE (W. ILL.)[a]

	Avg. Daily Gain, lb. 1948	1949	1950	3-yr. Avg. Daily Gain, lb.
Lot 1 (Strip Mine Pasture)	1.19	.98	1.56	1.24
Lot 2 (Control Pasture)	1.29	1.10	1.17	1.19

[a]The same experiment over a two year period in southern Illinois showed .95 average daily gain on strip mine land compared to 1.17 on unstripped mine land.

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[18]A. F. Grandt and A. L. Lang, Reclaiming Illinois Strip Coal Land with Legumes and Grasses, University of Illinois, Agriculture Exp. Sta. Bul. 628, (Urbana: University of Illinois Press, 1958), pp. 51-52.

Yet in speaking of the work he does, Mr. Grandt avoids using "reclaimed" in favor of "revegetated". He also prefers the term "disturbed land" and resents the use of "waste land". Concerning his work in St. Clair County, he says that soil tests have satisfied him that this county is second only to Fulton in the amenability of spoils to revegetation. He does not feel that St. Clair County has any problem land except a couple of pieces formerly used to dump industrial waste.

A recently retired conservation agent, Mr. Anton Sajovetz, who served in both St. Clair and Madison Counties, compared the value of unmined land and unimproved mined land as pasture. He estimated that it would take ten to fifteen acres of unimproved mined land to support one animal unit while one acre of undisturbed land could ordinarily support one or two animal units. He declined to estimate the value of seeded mined land because of the differences in the methods and application. He felt that most of the efforts were ineffectually accomplished.[19]

Dr. W. D. Klimstra, head of Southern Illinois University Wildlife Research Laboratory and a member of the Governors Strip Mine Study Commission, was also consulted regarding the status of strip mined lands in Illinois. In reply to a question about the adequacy of the Illinois law, he emphatically proclaimed that as amended he felt that it was

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[19]Interview with Anton Sajovetz, May 3, 1967.

the most workable of any state law in dealing with the strip mine problem. He suggested two further amendments to the law: (1) that coal companies be required to eliminate the highwall for considerations of safety and the potential acid bleeding of exposed toxic materials; (2) that contour stripping in Illinois be outlawed. He feels that the latter practice sets up acid run-off and erosional problems out of proportion to the gains of this type stripping in Illinois. With regard to the status of stripped lands in St. Clair County, he stated that the only problem was dealing with sandstone and limestone boulders left by the stripping operations. He feels that this problem can be eliminated with proper mining techniques. Relative to the comparability of stripped and unstripped pasture land, he cited an instance in which cattle had been turned loose with a choice of grazing either type land and had voluntarily selected the mined pasture. His assumption was that the mining disturbance had turned up nutrients and chemicals that made the grasses more palatible to the cattle.[20]

Another agency consulted was the office of the Supervisor of Open Cut Land Reclamation which is in the Illinois State Department of Conservation and is responsible for administration of the reclamation law. A forester, J. Donovan Larson, and an agronomist, Phillip Christy, were interviewed. Mr. Larson administers the southern part of

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[20]Interview with W. D. Klimstra, April 3, 1967.

the state and Mr. Christy has the northern part.

Mr. Larson said that cooperation and compliance with the law which requires that a reclamation plan be submitted by mining companies granted mining permits, had been excellent. He said that while six or seven companies had been taken to court to force compliance with certain aspects of the law, most of the responsible mining companies had been practicing some form of reclamation before the law became effective. Consequently, they have no problem in complying with the law. When asked how he determines whether the requirements of the law to comply with the reclamation plan have been met, he said, "I watch them. I know every acre of mined land in my district and how it is supposed to be reclaimed. If these fellows don't do the job right we don't release their bond."

When queried about the quality or success of plantings on reclaimed land he pointed out that grass seeding was not usually a problem. Through tests, he knows whether the soils will support grass or not, and he checks the grass growth before releasing the bond. However, he did recognize a deficiency in the law, in that it does not specify a percent of successful survival on tree plantings. After the trees have been planted by the company, he releases the bond. If the trees all die soon thereafter, he has no recourse under the law for further action. He feels that the law should be revised to provide for a guaranteed survival percentage and thinks that this revision will be made

in the near future.[21]

Many varied expressions on the state and degree of reclamation have been noted. It has been found that the evaluations of reclamation vary according to the objectives of the analyst. Thus, the analysis by L. S. Weber, conservationist for Mid-West Coal Producers Institute, indicates that about seventy percent of the mined land of the county has been reclaimed. By contrast, R. R. Irwin, the County Conservation Agent, estimated, on the basis of general knowledge, that twenty-five percent reclamation would be a most generous allowance. These two appraisals are from such opposing viewpoints that their reclamation estimates are almost precisely the reverse of each other.

The inconsistency of reclamation appraisal is not restricted to differences between industrial and agricultural viewpoints. Two agencies, presumably working toward the same end, a realistic evaluation of reclamation in the state of Illinois, differed surprisingly in their estimates. The Strip Mine Study Group of the Appalachia Regional Development Act estimated that eighty-two percent of the affected coal lands of Illinois had been reclaimed as of June 30, 1965. The office of the Supervisor of Open Cut Land Reclamation in Illinois estimated that only fifty-six percent of the mined lands of the state had been reclaimed as of

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[21] Interview with J. D. Larson, April 21, 1967.

that date.[22] The estimates cover the same area.

It is apparent that different standards, interests and emphasis preclude any reasonable degree of concurrence between various agencies on the state of reclamation in any given area.

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[22] 1966 Annual Report, Supervisor Open Cut Land Reclamation, p. 2.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Strip mining has been conducted continuously in St. Clair County for the past forty years. Because of the geologic structure of the underlying bedrock (Figs. 4 and 5) only eight of the twenty townships of the county have been affected by surface coal mining. A large volume of strippable reserves in these townships is available for continued strip mining at the present rate for many decades.

Reclamation of the mined lands in St. Clair County has been practiced to a limited extent almost from the beginning of strip mining in this county. While conservation efforts, have not been well planned, the strip mine spoils of this county, are being reclaimed in one way or another. Much of the mined land which has not had the benefit of applied reclamation has been "reclaimed" by nature and reverted to the pre-mined state. These "reclaimed-by-nature" tracts have a limited agricultural value. Generally, the surface is so rough and strewn with sandstone or limestone boulders as to preclude the use of farm machinery.

The usefulness of strip mine land to man was found to vary greatly from one area to another. Under one scheme of classification, devised by the author, the land was rated as

forty percent quality in usefulness in a scale which would consider above eighty percent as good, fifty to eighty percent as fair, and below that as relatively poor. This compared to views of others that from over eighty to only about twenty-five percent of the land had been reclaimed. In terms of Standard Land Use Classification about sixty percent of the land was being put to use with the remainder in essentially idle land.

The Standard Land Use Classification showed that the land uses in the stripped areas of St. Clair County had a limited number of uses. Of course, the most obvious and greatest user of stripped lands is the benefactor of the system, the mining industry. Twenty-five percent of the stripped lands of the county were being used in some manner by the mining operations. While the actual area under the shovel is relatively limited, the other needs of the industry are great and no other activity can normally be introduced in an active mining area until mining is discontinued. Consequently, the area credited to mining is substantially inflated.

Agriculture used the next greatest percent of mined land. In one sense this figure is also misleading. While the general category is agriculture, the major portion of that category using stripped lands is stock grazing, and in many cases the area of land grazed is out of proportion to the number of animal units being supported. Agriculture

is credited with using twenty-four percent of the stripped lands in St. Clair County.

A great deal of oratory and journalistic effort has been expended across the country about the merits of strip mine land and its potential for recreational development. No doubt there is some justification for these views, but generally, without expenditure of funds for improvement the recreational potential remains rather limited. In St. Clair County only seven percent of the mined land was classified as being used for organized recreational activities. There is no doubt a considerable incidental use of the lands for recreational pursuits but this was not considered sufficient to justify a recreational classification. Eventually, a considerable acreage of these stripped lands may be developed into satisfactory recreational facilities.

Industrial activities occupied only one percent of the stripped areas in St. Clair County. Municipal activities, (primarily land fill dumps) used less than one percent, as did residential use. About forty percent of the stripped area was not being used as of the time of the study.

Land use maps of three areas (Figs. 12, 18 and 22) illustrate how the patterns of use vary from place to place even within a relatively limited area. In one case over ninety percent of the total land area was in use (Area A), but in another only about twenty percent (Area E), and in the third, only about five percent was being used (Area H).

Although over 4,000 acres (about forty percent) of mined land are idle, there is no particular pressure, at this time, to reclaim these acres for agricultural production. In fact, the Agricultural Stablization and Conservation Service has authorized withdrawal of 6,600 acres of regular crop land in St. Clair County from production this year and would probably have authorized withdrawal of acreage equivalent to the total stripped acreage of some 10,000 acres except that the nation's supply of surplus wheat has been expended so that no wheat land was idled this year.[1]

Erosion in area stripping generally, and in St. Clair County specifically, does not appear to be a problem. Erosion in area stripping appears to have a leveling effect. Those soil particles eroded from the ridges usually settle in the valleys. This wearing and filling action helps to level the entire area profile. Normally the stripped area acts as a basin to contain any eroded materials in that basin.

Soil acidity and acid run-off are not considered a serious problem in the area stripping of St. Clair County. Generally, the disturbed spoils are neutral in character and in very limited instances are acid forming materials exposed. Unless those materials are covered (which is re-

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[1]Interview with Doleres Grimmer, St. Clair County Agricultural Stablization and Conservation Service, Belleville, Illinois, May 24, 1967.

quired by the Illinois reclamation law) there may be isolated pools of acidic water or toxic spoil banks found in the mined lands. Even these isolated instances are normally contained within the stripped basin.

There are controversial views on the effect of grading stripped lands. Grandt and Lang, examining the pros and cons of grading, report relatively beneficial effects. To study the effect of grading on pH and on the availability of phosphorus and potassium they took 238 soil samples from fifteen graded sites and 261 samples from fourteen ungraded sites. The effect on pH was variable, with the pH being appreciably raised in some areas and appreciably lowered in others. With but one exception, grading raised the amount of available phosphorus. Available potassium was on the average increased.

In testing permeability they discovered that there was very little difference in infiltration rate between leveled, land and areas with strike-off tops, but the undisturbed ridges had a significantly higher rate. Grandt and Lang suggest that the ultimate test must be the growth made by forage plants. The results of their tests indicated that grading had several beneficial effects. A better seedbed can be prepared, less seed is required per acre, thicker stands have been obtained, weeds can be controlled more easily, and the excess forage material can be harvested as hay as well as pasture. Striking off the ridges to a width of twelve to sixteen feet will do much to improve the forage,

both by flattening the tops and by shortening the length of slope.[2]

At this time it would appear that the most practical uses for strip mined land in St. Clair County are grazing and recreation. In most instances stripped land can be adapted to these uses soon after stripping. The author believes that this could be done in most instances without excessive costs relative to benefits.

When one considers the reclamation of strip mined land, he must be aware that the processes of nature move slowly. Too many people are inclined to expect immediate visual results from reclamation. Given time and aided by sound reclamation practices, the author believes that practically all of the stripped lands of St. Clair County can be restored to useful productive condition. On the basis of the author's assignment of the Standard Land Use Code, about sixty percent of these lands are already in productive use. But, his subjective rating of value to man suggests that their present quality of use is low.

Further Studies

The scope of research for this study is limited to those factors relating to the status of reclamation in the strip mine lands of St. Clair County. During research activities for this study other follow-up studies became apparent. One such study which should prove to be interesting and informative is a comparative study of the lands

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[2]Grandt and Lang, Reclaiming Illinois Strip Coal Land with Legumes and Grasses, pp. 19-28.

stripped before the state reclamation law became effective and post-law stripped lands. A possible related study, would be to investigate the effect reclamation has on ultimate land use.

With the excellent land use example set by the city of Belleville, another study with worthy potential is a feasibility study of using stripped lands as sanitary land fill dumps for other St. Louis metropolitan municipalities. As population pressure increases and as stream and air pollution laws become more restrictive, these stripped areas become more obvious as the answer to a knotty waste disposal problem.

Other areas of study might be to investigate the potential of these areas as industrial development sites, or as estate-type residential developments. And, of course, as the urban areas expand these stripped areas with lakes, hills, woods, and open space become prime sites to study for recreational development.

The trend in strip mine legislation appears to be toward more stringent controls over strip mine operators. At the same time, rising costs create pressure for more productivity. Three strip mining states have recently revised their laws to insure more positive control over the mine operators. One writer suggests that the Pennsylvania law requires the operator "to put everything back in the

hole except the coal."[3] The student who can resolve the problem of allowing the miner to strip mine this inexpensive fuel and return the terrain to a satisfactory condition without sacrificing the advantage of the mining method will indeed make a significant contribution to society. In conclusion, students of Southern, the challenge is here - the problem is vital, and the action is near!

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[3] Time, "Conservation", March 31, 1967, p. 90.

APPENDIX

Exhibit A

Glossary of Strip Mining Terms[a]

Acid producing - (a) a substance which causes a sour reaction, usually sulphurous in nature.

(b) a mineral compound generally associated with coal mining which will, when acted upon by water and air, cause acids to form.

Area stripping - open cut, surface or strip mining that is carried on in level to gentle rolling topography on relatively large tracts. This type of mining is done primarily on the Western Kentucky field.

Auger mining - mining of coal from an exposed vertical coal face by means of a mechanically driven boring machine which employs an auger to cut and bring the coal out the bore hole. These machines, with bits ranging from two to three to seven feet in diameter, forces out the coal as a brace-and-bit forces out wood curls as it bores into wood.

Back-fill - to literally place material back into an area that has been excavated to a pre-determined slope.

Back-blade - to drag the blade of a bulldozer or grader as the machine moves backward, as opposed to pushing the blade forward; this is used for final smoothing.

Bench - (a) the surface of an excavated area at some point in the overburden between the coal or material being mined and the original surface of the ground on which machines can sit, move and operate.

(b) a working road or base below a highwall as in contour stripping for coal.

Berm - (a) a strip of coal left in place temporarily for use in hauling or stripping.

(b) a layer of large rock or other relatively heavy stable material placed at the outside bottom of the spoil pile to help hold the pile in position (a toe wall). Also used similarly, higher in the spoils for the same purpose.

Coal Seam - a layer, vein or deposit of coal; a stratigraphic part of earth surface containing coal.

Copperas water - water containing by suspension or in solution ferrous sulfate formed by oxidation of sulfur and sulfide of iron, usually green in color later turning reddish-brown.

Compaction - the closing of the pore spaces among the particles of soil and rock, generally caused by running heavy equipment over the area, as in the process of leveling the overburden material of strip mine banks.

Continuous-miner - a single piece of mining equipment that can cut, load and convey coal from the face of a coal seam in a sustained operation.

Contour stripping - the removal of overburden and mining from a coal seam that approaches the surface at approximately the same elevation, in steep or mountainous areas - resembling a contoured terrace.

Cut - longitudinal excavation made by a strip-mining machine to remove overburden in a single progressive line from one side or end of the property being mined to the other side or end.

Deep mining - as opposed to strip or surface mining - removal of a product being mined without the disturbance of the surface or entire overburden (underground mining).

Disturbed land - land from which overburden has been removed, or upon which overburden has been deposited, or both.

Diversion ditch - a machine-made waterway used for collecting ground water on the uphill side of a mine in order to keep it out of the workings; a ditch designed to change normal or actual course of water in order to help in the mining operation.

Dragline - an excavation machine that utilizes a bucket operated and suspended by means of lines or cables, one of which hoists or lowers the bucket from a boom; the other, from which the name is derived, allows the bucket to swing out from the machine or to be dragged toward the machine for loading. Mobility of draglines is by crawler mounting or by a walking device for propelling, featuring pontoon-like feet and circular base or tub. The swing of the machine is based on rollers and rail. The machine usually operates from the highwall.

Dozer or Bulldozer - tractor with a steel plate or blade mounted on the front end in such a manner that it can be used to cut into earth, or other material and move said material primarily forward by pushing.

Erosion - the movement of any substance or material by a natural element. May also be applied to describe a no-coal area in a coal seam, as well as soil or soil material on an inclined surface worn away by water or wind.

Euclid (uke) - trade name for various pieces of earth-moving equipment; usually applied to a large truck used to haul coal from pit to preparation plant. Also known as haulage units.

Fault - a break in the continuity of a strata or vein in a geological formation with the dislocation along the plane of fracture. Any displacement from a stratigraphic plane.

Final cut - last cut or line of excavation made on a specific property or area.

Gob - waste coal, rock, pyrites, slate or other unmerchantable material of relatively large size which is readily separated from the coal in the coal cleaning process; solid refuse material not readily water-borne or pumpable without crushing.

Haul road - road from pit to loading dock, tipple, ramp or preparation plant used for transporting coal by truck.

High road - service or access road, either on the spoils or on the highwall; main haulage road.

Highwall - the vertical wall, consisting of the coal face and the overlying rock and soil strata of the mining site. The final cut of stripping operation.

Hot - refers to material in the overburden or gob piles, either capable of spontaneous ignition or containing highly acid producing material.

Hydrology - the study of water and its behavior from both a physical and chemical standpoint.

Leach - a natural change from an acid state to a neutral state; waste coal and overburden sometimes contain compounds which cause acids and acid salts to form. When formed, the action of the rains will carry them away in solution of suspension. This process is called leaching.

Open pit mining - strip mining, a type of mining in which the overburden is removed from the product being mined and is dumped back after mining; or may specifically refer to an area from which the overburden has been removed and has not been filled.

Orphan banks - disturbed surfaces resulting from strip mining which were abandoned by the owners and not planted to vegetation or otherwise reclaimed. Usually refers to pre-law mined spoil banks.

Overburden - the earth, rock and other materials which lie above a natural coal deposit.

Peak - (a) a small hill or mound left in the process of strip or surface mining.

(b) the tops of strip mine banks before grading.

Percolation - the act of a liquid passing through a porous material by gravity. As in grading strip mines, the greater the degree of leveling with resultant compaction, the less the percolation and the greater the surface run off and erosion.

pH - the symbol or term refers to a scale commonly used to express the degrees of acidity or alkalinity. On this scale ph of 1 is the strongest acid, pH of 14 is the strongest alkali, ph of 7 is the point of neutrality at which there is neither acidity or alkalinity. ph is not a measure of the weight of acid or alkali contained in or available in a given volume.

Pit - used in reference to a specifically describable area of open cut mining. May be used to refer to only that part of the open cut mining area from which coal is being actively removed or may refer to the entire contiguous mined area.

Pyrite - a yellowish mineral, iron disulfide, FeS_2, generally metallic appearing; also known as "fool's gold".

Reclamation - (in this report) the process of reconverting mined land to other forms of productive uses.

Red dog - a gob pile after it has burned. The material is generally used as a road surfacing material; it has no harmful acid or alkaline reaction.

Rider coal seam - a "stray" coal seam usually above and divided from the main coal bed by rock, shale or other strata material. The rider seam is generally thin and

seldom merchantable.

Shale - sedimentary or stratified rock structure generally formed by the consolidation of clay or clay-like material.

Shovel - excavating or coal-loading machine that utilizes a bucket mounted on and operated by means of a handle or dipper stick that moves longitudinally on gears and which is lifted or lowered by cable. The entire machine is mounted on crawlers for mobility and the upper structure is mounted on rollers and rail for swing or turn.

Siltation - small sized sedimentary particles of soil or overburden materials carried by rain, into lower levels. Also known as sedimentation.

Slate - a fine grained rock formed by the compression of clay or shale that tends to split along parallel cleavage planes. Usually found above and next to some coal seams.

Slip or slide - a mass of soil and rock that moves downward and outward to a lower elevation due to the force of gravity, generally caused when loosened by freeze and thaw or a large amount of rainfall.

Slope - the degree of repose from the horizontal plane of the ridges or mounds of earth and rock in the overburden material made in the process of surface mining. The angle of a hill or mountain.

Slurry - refuse separated from the coal in the coal cleaning process of relatively small size which is readily pumpable in the washing plant effluent. A pulverized coal-liquid mixture transported by pipeline.

Spoil - all overburden material removed from over the coal after it is either deposited back into the area from which the coal has been removed or on undisturbed land.

Spoil bank - ridged area created by the deposited spoil or overburden material.

Stablize - settle, fix in place, non-moving; usually accomplished on overburden by planting trees, shrubs, or grasses or by mechanical compaction or aging.

Strike-off - mechanically removing the apex of the spoil bank or ridged spoil area to provide a truncated condition.

Strip mine - refers to a procedure of mining which entails the complete removal of all material from over the product to be mined in a series of rows or strips; also referred to as "open cut", "open pit", "surface mine".

Sulfuric materials - mineral material or compounds containing sulfur that can be oxidized in the presence of moisture to form acid, such as pyrite or marcacite.

Surface mining - interchangeable with strip mining or open cut mining; the mining of a product after complete removal of the surface or overburden above the deposit.

Sweet - refers to the lime content or calcareous condition of the overburden which indicates a neutral or slightly alkaline material capable of supporting certain calcium-demanding plants; indicates a pH of 7 or above.

Toe - refers to the lower outside portion of the highwall or spoil where the sloped surface meets the horizontal.

[a]Kentucky, Department of Natural Resources, Strip Mining in Kentucky, The Strip Mine and Rec. Comm., (Frankfort, Ky.: 1965), pp. 4-5.

Exhibit B

State Surface Mining Licensure, Bond and Reclamation Requirements[b]

Kentucky

License or Permit - Required. $50 per year, plus $25 per acre. Approved Reclamation Plan before issuance of permit. Local Soil Conservation District must be consulted.

Bonding Requirement - $100 to $500 per acre, with a minimum of $2,000.

Reclamation Required - Spoil grading concurrent with operation and reclamation completed within 12 months of permit expiration. Stand percentage complete prior to bond release. Coverage of acid-producing material.

Refuse - Remove all metal, lumber, and other refuse resulting from operation. Prohibition against depositing refuse or spoil material into public roads, streams, lakes, sub-terranean waters, or any other public property.

Substitution of Sites - Allowed with respect to planting only, subject to approval of Division if investigation shows that re-vegetation of original site may not be successful.

Minerals Covered - Coal, clay, (except ball clay).

Pennsylvania

License or Permit - License or permit $300 per year flat fee. Mining and backfilling plans required before permit issued.

Bonding Requirement - In any case not less than $500 per acre, but regulating agency may bond to $1,000 per acre if conditions warrant. Minimum bond $5,000.

Reclamation Required - Filling cuts near highways and coverage of exposed coal. Drainage if practicable. Leveling of peaks and ridges necessary for planting. For anthracite, planting within 1 year of termination, or $60 per acre deposit. For bituminous, three

years of $60 per acre. Plantage is landowner's.

Refuse - No specific provisions.

Substitution of Sites - No statutory provisions; however the operator may option not to plant and to pay $100 per acre to state instead.

Minerals Covered - Anthracite and Bituminous Coal.

Illinois

License or Permit - Required. $50 for first acre, plus $5.50 to $11.50 per additional acre depending upon quantity.

Bonding Requirement - $200 per acre, with a minimum of $1,000.

Reclamation Required - Grading adjacent to highways by striking off ridges to 10 feet width. Dams required in final cuts if not interfering with adjoining property. Acid forming material to be covered 2 feet in depth by spoil or water.

Refuse - No specific provisions.

Substitution of Sites - Subject to approval of Department of Conservation.

Minerals Covered - All minerals.

Indiana

License or Permit - $100 to $500 annually, depending upon the number of acres stripped.

Bonding Requirement - $1,000 plus $200 per acre or fraction thereof stripped in excess of 5 acres. Cash deposit is acceptable.

Reclamation Required - Leveling of ridges grading to rolling topography. Damming of open last cuts. Fire lanes and access roads. Planting of affected or substitute area.

Refuse - No specific provisions.

Substitution of Sites - Subject to approval of regulating agency. Substitute site must be an equal area

previously mined by the operator requesting such substitution.

Minerals Covered - Coal, Clay or Shale.

Maryland

License or Permit - Required to register with Bureau of Mines, and $50 per year.

Bonding Requirement - $500 per acre with a minimum of $2,000. Cash deposit is acceptable.

Reclamation Required - Coverage of exposed unmined coal. Leveling of peaks and ridges to permit planting.

Refuse - No provisions.

Substitution of Sites - No provisions.

Minerals Covered - Coal.

Ohio

License or Permit - Required. $50 per year, plus $10 per acre.

Bonding Requirement - $220 per acre, with a minimum of $1,000. Cash deposit is acceptable.

Reclamation Required - Grading to rolling topography to reduce erosion and permit logging or grazing. Grading of isolated peaks. Access roads and fire lanes. Construction of earth dams in final cut. Reclamation complete 2 years from completion of stripping. Substitution.

Refuse - Loose coal, mine refuse and other debris to be graded so as to reduce the piles of such material and make possible its submergence in water, or to create a more uniform topography.

Substitution of Sites - Subject to approval of Division of Reclamation. Affected area to be substituted must be equal acreage to the original area affected.

Minerals Covered - Coal.

West Virginia

License or Permit - $100 for first year, and $50 for each annual renewal.

Bonding Requirement - Minimum of $1,000, plus $150 per acre of disturbed area.

Reclamation Required - Drainage. Coverage of exposed coal. Removal of refuse. Seal-off of breakthroughs in cuts. Planting of cover within 1 year of mining completion. Reclamation deposit statisfies requirement, amount set by conservation district.

Refuse - Metal, lumber, and other debris must be removed.

Substitution of Sites - No provisions.

Minerals Covered - Coal, sand, clay, quarries, cement work.

[b]Ibid., p. 25.

Exhibit C

Standard Land Use Codes[c]
(used in this study)

Code	Category
1100	Household units
2892	Explosives - Manufacturing
4854	Sanitary land fills
6720	Protective functions and their related activities
7420	Playgrounds and athletic areas
7500	Resorts and group camps
7515	Hunting and fishing clubs
8120	Farms (Predominate crop, cash grains)
8160	Farms and ranches (livestock other than dairy)
8522	Bituminous coal mining
8552	Coal mining - services
9100	Undeveloped and unused land area (excluding non-commercial forest development)

[c]U. S., Urban Renewal Administration, Housing and Home Finances Agency and Bureau of Public Roads, Department of Commerce, Standard Land Use Coding Manual, (Washington, D. C., 1965).

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