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AN ANNOTATED BIBLIOGRAPHY OF SOURCE MATERIALS
FOR LOCATING, IDENTIFYING, AND DESCRIBING
ABANDONED COAL MINE PROBLEMS IN KANSAS

A Final Report
Submitted to

Office of Surface Mining
U.S. Department of the Interior

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by
Lawrence L. Brady
Neal D. Livingston

Kansas Geological Survey
The University of Kansas
Lawrence, Kansas 66044

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AN ANNOTATED BIBLIOGRAPHY OF SOURCE MATERIALS
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INTRODUCTION

The following bibliography of 79 references has been annotated and cross referenced to allow the reviewer a better understanding of the literature and information relative to coal, coal-mined land, and coal mine problems in Kansas. Limited work has been completed in Kansas on assessment of many of the problems resulting from past coal mining practices, and this is an area where research can be done in conjunction with the development of the Abandoned Mine Land Program in Kansas.

There has been considerable research, however, on a number of subjects directly related to coal mining. These areas included research in land reclamation with restoration to rangeland, crops, recreational areas, reforestation, and assessment of strip-mine lakes for fish and recreation potential. In addition, there are a number of papers describing the geology, mining, mine distribution, and characteristics of the mined material.

It is a total compilation of these sources of information that are included in this annotated bibliography. These references address many of the problems of coal mining to land and water and provide assessment and possible answers to those problems from previous experience.

Those references that address a specific coal mine problem or problems will be coded in the "Problem Index" listed with each reference according to the following Abandoned Mined Land topical problem listing:

- 1) mine fires; surface or underground, including burning refuse piles;
- 2) acid mine drainage; from surface or underground mines;
- 3) heavy metal and miscellaneous metal pollution;
- 4) open mine shafts/entries;
- 5) slides;
- 6) highwalls;
- 7) erosion;
- 8) watershed depletion;
- 9) refuse dumps;
- 10) surface water impoundments;
- 11) subsidence and slumping; of surface or underground mines;
- 12) revegetation due to high acid soils;
- 13) areas in need of reclamation.

Where no specific problem is addressed in the paper, a "Problem Index" of 0 is listed. In this reference list the topical items not specifically addressed by any of the authors are: mine fires (1), heavy metal pollution (3), open mine shafts (4), slide problems (5), highwall problems (6), or watershed depletion (8). Where multiple problem listings are shown, the problem best addressed in the report is listed first.

Each of the references has a cost value associated with it explaining either the cost of the publication, if it is still in print, or the cost of photocopying (P) and estimate of personnel costs to reproduce it (L). In the case of a few publications that are free or inexpensive from the publishing agency that would be costly to photocopy, the addresses of the agency are given. Because of copyright laws, a few publications cannot be reproduced and these are listed with the reference.

TOPOGRAPHIC MAPS

Kansas has nearly complete coverage of its land surface by 7.5 minute quadrangle maps prepared by the U.S. Geological Survey. All of the past

coal mining areas of the state are covered by these 7.5 minute quadrangle maps except for a very narrow strip (less than one mile wide and approximately 17 miles long) adjacent to the 7.5' Pittsburg and Kirkwood quadrangles. This area is covered by a 15' Pittsburg quadrangle map. The quadrangle maps covering the past coal mining areas of the state were reviewed for topographic expression on the map that resulted from either deep or surface mining activities.

In order to indicate the extent of surface disturbance on each map, the following classification is used for maps:

<u>Intensity</u>	<u>Extent</u>
1	any indication of coal mining up to 1/4 square mile;
2	1/4 square mile to 2 square miles;
3	2 square miles to 5 square miles;
4	at least 5 square miles of map covered.

Using the mining disturbance classification, the following topographic map quadrangles show some disturbance:

<u>County</u> *	<u>Quadrangle</u>	<u>Disturbed Land Classification</u>	
		<u>Surface Mining</u>	<u>Underground Mining</u>
Linn	Boicourt		1
	Amoret (MO)		1
	Worland (MO)	1	1
	Pleasanton	3	1
	Mound City	1	
	Prescott	3	1
	Hume (MO)	2	
Bourbon	Hammond	1	
	Fort Scott	2	
	Mantey	1	1
	Garland	1	
	Deerfield	1(?)	
Crawford	Arma	4	1
	Cato	4	1
	Girard		1
	Liberal (MO)	2	1
	Grindstone Creek	2	
	Radly	4	1

<u>County *</u>	<u>Quadrangle</u>	<u>Disturbed Land Classification</u>	
		<u>Surface Mining</u>	<u>Underground Mining</u>
Crawford (cont'd.)	Pittsburg (7.5')	4	1
	Cherokee	4	1
	Pittsburg (15') **	3	1
Cherokee	West Mineral	4	1
	McCune	1	
	Oswego	4	
	Hallowell	3	
	Columbus	2	1
	Crestline	2	
	Neutral	1	
	Kirkwood	2	1
Labette	Chetopa	1	
Osage	Burlingame		1
	Carbondale	2	1(?)
	Osage City	2	1
	Lyndon NW	1	
	Waverly	1	
	Osage City SE	1	
Coffey	Lebo NW	2	
	Lebo	2	
Franklin	Pomona	1	
	Ottawa South		1(?)
	Williamsburg		1(?)
Montgomery	Independence		1(?)

All of the U.S. Geological Survey topographic maps listed above are available from the Kansas Geological Survey, Lawrence, Kansas at a price of \$1.25 per map (plus \$0.50 charge for rolled maps in mailing tube).

* The county listed represents the county showing the most land disturbance for that quadrangle. However, the disturbed land classification shown is for the entire quadrangle.

** The evaluation of the Pittsburg 15 minute quadrangle is only for that narrow strip of land in Kansas not covered by the Pittsburg and Kirkwood 7.5 minute quadrangles.

REFERENCE LIST

1. Abernathy, G.E., 1946, Strip-mined areas in the Southeastern Kansas Coal Field: Kansas Geol. Survey Bull. no. 64, p. 125-144.

Review of the status of strip mining in Kansas in 1946. The article discusses the general stratigraphy, coal, and mines of that time. Of special interest is a detailed map of strip mines in Bourbon, Crawford, and Cherokee counties (scale 1" = 6,400 ft). The map indicates areas that have been strip mined by coal bed and shows the location of pyrite concentrating plants and coal washing plants. This is a fairly short article. The map is beneficial in defining mined out areas.

Problem Index: 13, 9

Cost: \$4.40 (P - \$2.20; L - \$2.20)

2. Abernathy, G.E., 1949, Mined areas of the Weir-Pittsburg coal bed: Kansas Geol. Survey Bull. no. 52, pt. 5, p. 213-228.

Article discusses briefly the stratigraphy and properties of the Weir-Pittsburg coal. The most important information in this article is a map of the underground mine shafts and stripped areas (scale 1" = 1 mile) of the Weir-Pittsburg coal bed in Cherokee and Crawford counties. The Weir-Pittsburg coal was the most extensively mined coal in Kansas with some 200 million tons mined by 1949. Since most of the Weir-Pittsburg coal was mined prior to 1949, this bulletin is pertinent to the location of most of the Weir-Pittsburg coal mines.

Problem Index: 13

Cost: \$4.80 (P - \$2.40; L - \$2.40)

The map would be photocopied and pieced together. Copies of the map in slightly different format, but the same scale, are available for \$1.00 each as blue line prints. The text can be photocopied for \$0.80 with \$0.40 labor.

3. Abernathy, G.E., Jewett, J.W., and Schoewe, W.H., 1947, Coal reserves in Kansas: Kansas Geol. Survey Bull. no. 70, p. 1, p. 1-20.

This is the most complete report available summarizing total coal resources in Kansas. Discussion is made in the paper of method of calculation, and resource tables are given for individual coal beds and coal beds by counties for both proven and potential coal resources.

Problem Index: 0

Cost: \$1.65 (P - \$1.10; L - \$0.55)

4. Brady, L.L., 1976, Coal and coal production in southeastern Kansas in coal and oil potential of the Tri-State area - Guidebook to Tulsa Geological Society field trip, April 30 - May 1, 1976: Tulsa Geol. Soc., Tulsa, Oklahoma, p. 33-40.

This report summarizes some of the coal production in southeast Kansas and describes in detail three geological sections from mine highwalls - two in Kansas and one in Missouri.

Problem Index: 0

Cost: Article - \$1.20 (P - \$0.80; L - \$0.40)

5. Brady, L.L., Adams, D.B., Livingston, N.D., 1976, An evaluation of strippable coal reserves in Kansas: Kansas Geol. Survey, Mineral Resources Series no. 5, 40 p.

This is a summary report on the bituminous coal reserve base in Kansas that has potential for strip-mine production. Minimum coal thickness considered is 12 inches, and reserve amounts are classified on the USGS-USBM reserve system of measured, indicated, and inferred reserves. Determinations are based on information in the Kansas Geological Survey bulletins and files, and from information supplied by coal mining companies. Three general groupings are made in each of the three classes. These groupings include coals with 0-50 ft overburden, 50-100 ft overburden, and coals with a stripping ratio (ft/ft) of 30:1 or less. Reserves are determined for coal bed, different coal thicknesses, and by counties. Additional information on other coal beds and their general distribution in eastern Kansas are included.

Problem Index: 0

Cost: \$2.50 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

6. Brady, L.L. and Dutcher, L.F., 1974, Kansas coal: a future energy resource: Kansas Geol. Survey Journal, 28 p.

This is a summary article of coal mining in Kansas, summarizing the past and present mining methods, general analyses of the coals (mine run), reserves (there is a later study on strippable reserves), and past production. Data is presented by county. Reclamation discussion is based on the state law requirements in existence in 1973.

Problem Index: 0

Cost: \$4.50 (P - \$3.00; L - \$1.50)

7. Burner, C., 1956, Summary of fish growth and fishing success in managed strip pits through Spring, 1956: Kansas Forestry, Fish and Game Comm., internal report, June 9, 1956, 19 p.

Brief summaries of stocking activities are given for thirteen strip pits located in Cherokee, Crawford, and Linn counties. The size of fish and approximate rate of growth are listed for each pit. Comparisons of fish populations before and after restocking are made for several of the pits. This article is of limited use as far as pollution problems are concerned.

Problem Index: 0

Cost: \$2.85 (P - \$1.90; L - \$0.95)

8. Burner, C., 1956(?), Report on the progress of fish management studies on strip-mine lakes: Kansas Forestry, Fish and Game Comm., internal report, 10 p.

Review of the status of fish management programs in the early 1950's. Characteristics of the strip-mine lakes with regards to supporting fish populations are discussed. Some of the problems of over-population, lack of nutrients, and acidity of water are directly related to the stunted growth of fish, and the overall absence of fish in some lakes. Several techniques - removal and restocking, partial eradication of sunfish, treatment of shallow waters, and stocking immediately after mining, are discussed as solutions to unbalanced fish populations. Of limited interest are the notes on the acidity of the water and its affect on fish growth.

Problem Index: 10

Cost: \$1.50 (P - \$1.00; L - \$0.50)

9. Burner, C.C., and Leist, C., 1953, A limnological study of the college farm strip-mine lake: Kansas Acad. Sci. Trans., v. 56, no. 1, p. 78-85.

This article describes limnology and water quality in a single Kansas strip pit in southeast Crawford County. Of interest is the discussion of water quality (pH, dissolved oxygen concentration, and light penetration) and how water quality affects micro-organism growth. This article has limited applicability as it was made on the limnology of a single strip-mine lake over a one year period.

Problem Index: 10

Cost: \$0.75 (P - \$0.50; L - \$0.25)

10. Burner, C. and Schoonover, R., 1958, Report on fisheries management projects in southeastern Kansas strip-mine lakes: Kansas Forestry, Fish and Game Comm., internal report, 173 p.

This report describes the amount of water area contained in the stripped land of southeast Kansas in 1958. Summaries are made of each strip-mine lake by section. Location, water quality, depth, status of fish population, and stocking of ponds are listed for many of the lakes. This is an excellent report on the status of strip-mine lakes and for individual lakes in Crawford, Cherokee, Linn, and Bourbon counties.

Problem Index: 10

Cost: \$26.25 (P - \$17.50; L - \$8.75)

11. Camin, K.Q., 1971, Strip mine redevelopment provides new land use in southeast Kansas in Kansas mineral industry report - 1971: Kansas Geol. Survey, Spec. Distrib. Pub. no. 61, p. 41-46.

Review of the mine land reclamation project undertaken for the Ozarks Regional Commission by the Kansas Geological Survey. Article indicates some of the monetary benefits of reclaiming the land and contains summarized information found in her reports to the Ozarks Regional Commission. Of interest are the tables of acres strip mined for coal prior to January 1, 1969, and acres covered by lead and zinc tailings listed by county.

Problem Index: 13, 12

Cost: \$1.05 (P - \$0.70; L - \$0.35)

12. Camin, K.Q., 1975, Mined-land redevelopment: Cropland - Kansas portion of the Ozarks region - Final report to the Ozark Regional Commission for Agreement No. 74-4 (Neg) K-1: Department of Economics, Wichita State University, Wichita, Kansas, 11 p.

Final report for a 3-year program of the mined-land redevelopment project in southeast Kansas. Eleven demonstration sites totaling 245 acres were reclaimed and planted with one of five cash crops in Cherokee and Crawford counties. Of interest is the requirements of leveling, liming, and seeding of spoils necessary for reclamation, and the economic profit gained by the farmer in reclaiming the land.

Problem Index: 12

Cost: \$1.95 (P - \$1.30; L - \$0.65)

13. Camin, K.Q., 1975, Mined-land redevelopment: Kansas, Missouri, Oklahoma - Volume I, Overview - Final report to the Ozark Regional Commission for Contract No. DEM-73-6 (Neg): Department of Economics, Wichita State University, Wichita, Kansas, 39 p.

Final report of mined-land redevelopment project in Kansas, Missouri, and Oklahoma. This is Volume I of a three part report and contains an overview of the project. In Kansas ninety-two sites totaling 1848 acres were reclaimed. The reclamation process is discussed in detail from tree removal to grading, dragging, offset disking, liming, and seeding. A cost benefit analysis is done to indicate the profit obtainable through reclamation. Soil tests of areas after grading indicate the soil quality of mined-land.

Problem Index: 12

Cost: \$5.35 (P - \$3.90; L - \$1.45)

14. Camin, K.Q., 1975, Mined-land redevelopment: Kansas, Missouri, Oklahoma - Volume III, Individual demonstration site data - Final report to the Ozark Regional Commission for Contract No. DEM-73-6 (Neg): Department of Economics, Wichita State University, Wichita, Kansas, 111 p.

This is volume three of the final report of mined-land redevelopment project in Kansas, Missouri, Oklahoma. This report describes the reclamation, history of mining, spoil bank characteristics, and soil test information for each specific site. The information can be used to characterize the type of spoil piles and quality of the spoil areas with regards to revegetation potential. In Kansas, test plots are in Cherokee and Crawford counties. Note: Volume II does not include Kansas land.

Problem Index: 12

Cost: \$18.75 (P - \$12.50; L - \$6.25)

15. Camin, K.Q. and Hardy, R.G., 1972, Mined-land redevelopment: Southeast Kansas portion of the Ozarks Region - Final report to the Ozark Regional Commission on Contract No. TA70-19 (Neg), October 15, 1971 - October 15, 1972: Kansas Geol. Survey, Lawrence, Kansas, 173 p.

This third year report is an evaluation of the mined-land reclamation project in Kansas. Earlier reports are by Hardy and Camin (1970) and Camin, Hardy, and Hambleton (1971). The report is mainly devoted to land that has been reclaimed under the project, productivity of the land, and methods of improving reclamation. A number of test sites were used to represent the range in land quality associated with reclamation of Kansas spoils. For each site soil pH, liming requirements, and fertilizing needs are presented indicating the character of the spoil land. Maps and tables

15. (Continued)

are presented for each site. The report is good for use as a guideline for further reclamation projects. Of special interest is a map showing the general distribution of surface spoils of coal and lead-zinc spoil piles in Cherokee and Crawford counties. (Scale 1" = 15,000 ft) map prepared from 1:24,000 scale air photos.

Problem Index: 12, 13

Cost: Free from Kansas Geological Survey in a limited number.

16. Camin, K.Q., Hardy, R.G., and Hambleton, W.W., 1971, Mined-land redevelopment: Southeast Kansas portion of the Ozarks Region - Final report to the Ozarks Regional Commission on Contract No. ORC TA70-19 (Neg), October 15, 1970 - October 15, 1971: Kansas Geol. Survey, Lawrence, Kansas, 36 p.

This second annual report describes ongoing research in southeastern Kansas that is concerned with the redevelopment of land disturbed by mining. Numerous test plots were created during this study year in order to determine the most efficacious land treatment for grazing. Comparisons are made between test plots to determine the best methods of reclamation. Data and tables of results are presented for each test plot. This report contains maps of Labette and Bourbon counties showing land strip mined for coal. (Scale 1" = 1/2 mile) map prepared from air photos (1:24,000 scale).

Problem Index: 12, 13

Cost: Free from the Kansas Geological Survey in a limited number.

17. Coal Age, 1966, P & M surface mining....equipment, methods, results: Coal Age v. 71, no. 10, p. 88-100.

Description is made in this article of the Pittsburg and Midway Coal Mining Company Mine #19 in which overburden was removed by the largest shovel ever employed in Kansas and the deepest strip mines were dug. Of interest is the size of the pits and the height of the spoil piles indicating the size of reclamation which must be undertaken. The location of the mining area is in the western part of Cherokee County.

Problem Index: 0

Cost: Because of copyright laws, this article cannot be reproduced and sold.

18. Eshbaugh, F.P., 1949, The place of research in relation to certain phases of strip land reclamation in Kansas: Kansas Acad. Sci. Trans., v. 52, no. 2, p. 149-159.

This is a good short article describing the potential for various types of reclamation practices. Some of the suggestions by the author for reclamation research and funding are presently being implemented. The article gives a brief characterization of soils found on orphan soils and describes several crops that can successfully be grown on reclaimed land. The article is thirty years old and the areas of interest covered by this project can be found in more recent reports such as the Camin and Hardy (1972) report to the Ozark Regional Commission.

Problem Index: 13, 12

Cost: \$0.90 (P - \$0.60; L - \$0.30)

19. Fuller, C.C., 1952, Fish production in strip-mine lakes of southeastern Kansas: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 42 p.

Rate of growth of fish were determined for sunfish and black bass using fish scales for a single Kansas strip-mine lake. Results indicated that both varieties of fish were stunted in growth. Article may be of value in that the water quality was the primary factor in determining fish growth rates.

Problem Index: 10

Cost: \$7.50 (P - \$5.00; L - \$2.50)

20. Gash, S.L., 1968, Limnology and fisheries productivity of acid and alkaline strip-mine lakes: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 164 p.

This work is a continuation of monthly monitoring of selected parameters set forth by Waller and Bass (1967) on determination of fisheries production in six strip-mine lakes in Cherokee and Crawford counties. New data involves the analysis of fish production in a moderately acid strip-mine lake. The alkaline lake was restocked and the moderately acid lake was neutralized with lime and restocked. Growth rates in these lakes initially appeared the same. Of interest in the report are the water quality parameters. This is the second part of a six part project.

Problem Index: 10

Cost: \$25.50 (P - \$17.00; L - \$8.50)

21. Gash, S.L. and Bass, C.J., 1973, Limnology of acid and alkaline strip-mine lakes in southeast Kansas: Kansas Acad. Sci. Trans., v. 76, no. 3, p. 208-221.

This article is a review of the limnology of six strip pits in Cherokee and Crawford counties. The article describes the water conditions found in strip pits and affects of water conditions on fish, with the study conducted over a six year interval. Much of the study data comes from the Waller and Bass (1967), Tobaben (1969), Gash (1970), Scheve (1971), and Lillie (1971) reports.

Problem Index: 10

Cost: \$1.20 (P - \$0.80; L - \$0.40)

22. Geyer, W.A., 1969, Tree species performance on Kansas coal spoils in Ecology and reclamation of devastated land - v. 2: Gordon and Breach Publishing Co., New York, p. 81-91.

This report is part of the published proceedings of a N.A.T.O. meeting on ecology and revegetation of drastically disturbed lands that was held at Pennsylvania State University in August, 1969. Results of afforestation experiments on mine spoils after twenty-two years of tree growth indicate that tree survival is less than 32 percent for all species. Results also show a very small investment return per acre on the amount of wood that can be harvested from forested areas. This report has limited use as an indicator of the type of spoils found in Kansas and potential for revegetation. Research in the report represents six experimental plots in southeast Kansas.

Problem Index: 12

Cost: Because of copyright laws, this article cannot be reproduced and sold.

23. Geyer, W.A., 1971, Reforesting Kansas coal spoils: Kansas State Univ. Agricultural Experiment Station Circ. 399, 9 p.

Discusses reforested strip mine land; rate of tree growth and survival rate. Several recommendations are made for further study. The paper discusses Kansas spoils and the potential for plant growth on spoils. No specific research areas are described; however, emphasis is on the southeast Kansas area.

Problem Index: 0

Cost: \$0.90 (P - \$0.60; L - \$0.30)

Publication is free in limited amounts from:

Cooperative Extension Service
Distribution Center
Umberger Hall
Kansas State University
Manhattan, Kansas 66506

24. Geyer, W.A., 1971, Timber growth on graded and ungraded strip-mine spoil banks in southeast Kansas: Kansas Acad. Sci. Trans., v. 74, no. 3-4, p. 318-323.

The grading of spoils composed of silt loams and silty shales adversely affected the performance of tree growth for 22 years. Tree mortality was higher on the graded than on the ungraded spoils during the first growing season and increased as the plantations aged. Performance of most species was poor and except for a few species, planting is not recommended. This article is of interest as a guideline for revegetation of mine spoils with trees. Emphasis of the study is in Crawford County.

Problem Index: 0

Cost: \$0.90 (P - \$0.60; L - \$0.30)

25. Geyer, W.A., 1978, Early tree growth on "strike-off" graded coal-mined spoils in southeastern Kansas: Kansas Acad. Sci. Trans., v. 81, no. 3, p. 251-261.

Leveling tops of strip-mine ridges with a crawler tractor is called "strike-off" grading. Tree seedling survival and growth on "strike-off" graded strip-mine spoils varied by species, spoil material, and topographic position. Cottonwood, hedge, and autumn olive grew well. Survival was generally 20 percent less on the flat tops of graded banks, and even less on black-shale spoil material when compared to survival rate on slopes of ridges. Shallow or deep planting had little effect on survival or growth. This article is of interest in characteristics of spoil piles and reclamation techniques used to enhance tree growth. Area of study is around Pittsburg and Midway Coal Mining Company's Mine #19 in Cherokee County.

Problem Index: 0

Cost: \$0.90 (P - \$0.60; L - \$0.30)

26. Geyer, W.A. and Naughton, G.G., 1970, Growth and management of Black Walnut (*Juglans Nigra* L.) on strip-mined lands in southeastern Kansas: Kansas Acad. Sci. Trans., v. 73, no. 4, p. 491-501.

Black walnut plantations on partially strip-mined lands have been successfully established from seed. Dominant and co-dominant trees, after 32 years, are 6.1 inches in diameter at breast height and 33 feet tall. It was found that management of poor site walnut stands should include early selection of individual high quality trees for release and pruning. This article is of potential use as a guideline for revegetation of mine spoils. Area of study is in Cherokee and Crawford counties.

Problem Index: 0

Cost: \$0.90 (P - \$0.60; L - \$0.30)

27. Hager, R.O., 1971, Management plan of the strip pits game management area: Kansas Forestry, Fish and Game Comm, internal report, 123 p.

Descriptions are made in this report of the limnology and fish content of strip-mine lakes and the wildlife and vegetation associated with 24 strip-mine land tracts. These tracts are owned by the State of Kansas in Cherokee and Crawford counties on a total of 6064 acres. This report assesses the potential of developing these tracts to be better utilized by the State. Development problems associated with the acidity of many of the lakes and the expenses involved in leveling strip-mine spoils are discussed. The report by Hartman (1964) "Biological Reconnaissance of the Strip Pits Fisheries Management Area" is included in this report in its full content.

Problem Index: 10, 2, 13

Cost: \$18.60 (P - \$12.40; L - \$6.20)

28. Hambleton, W.W., 1953, Petrographic study of southeast Kansas coals: Kansas Geol. Survey Bull., no. 102, pt. 1, p. 1-76.

This report describes the lithology, chemical composition, and petrography of the Mineral, Croweburg, and Bevier coals. Of particular interest is the mineral matter in the coals (especially pyrite) and a discussion of their presence and occurrence in the coals.

Problem Index: 0

Cost: \$1.00 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

29. Hardy, R.G. and Camin, K.Q., 1970, Mined-land redevelopment: Southeast Kansas portion of the Ozarks Region - Final report to the Ozarks Regional Commission on Contract No. TA69-5 (Neg), September 15, 1969 - September 15, 1970: Kansas Geol. Survey, Lawrence, Kansas, 30 p.

A report of the first year's work to provide a program for redevelopment of mined-land areas of the Ozarks portion of Kansas. The objectives of the year's work were aimed at: (1) determining the availability, characteristics, and development potential of about 50,000 acres of mined-land and water areas; (2) to prepare and initiate project plans and proposals for appropriate multiple land use; and (3) to establish and operate a system for evaluating and measuring the economic and social impacts of mined-area redevelopment. Some 700 acres of land were restored this year under this program. This is the first of three annual reports. This report contains a map of Cherokee and Crawford counties showing land strip mined for coal. (Scale 1" = 14,500 ft) maps were developed from air photos with a scale of 1:24,000.

Problem Index: 12, 13

Cost: Free from Kansas Geological Survey in a limited number.

30. Hartman, R.F., 1964, Biological reconnaissance of the strip pits fisheries management area: Kansas Forestry, Fish and Game Comm., internal report, 16 p.

This is a short article which gives a generalized view of the strip-mined areas in southeast Kansas and the aquatic life found therein. An overall view of the land characteristics before and after mining is presented. Of interest is a list of eleven areas in Cherokee and Crawford counties which strip pit lakes and land could be improved.

Problem Index: 10, 12

Cost: \$2.40 (P - \$1.60; L - \$0.80)

31. Hartstock, D.L., 1970, Coal mining in Osage County, Kansas: Resource development in an economically marginal area: M.A. Thesis, Dept. of Geography, University of Kansas, Lawrence, Kansas, 163 p.

This is a history of coal production in Osage County from the earliest mining days (1870 to 1968). The thesis is mainly a review of the numerous rises and falls in coal production and the final collapse of coal mining in Osage County. Of interest are descriptions of the mining methods used (p. 31-35) and a section describing the effects of coal mining upon the county landscape (p. 138-147). The location of mine dumps and strip mines are listed for several of the most prominent or recent mines. Mining in Osage County was by both deep and stripping methods, and production of coal totaled nearly 12 million tons.

Problem Index: 13

Cost: \$25.35 (P - \$16.90; L - \$8.45)

32. Haworth, E. and Crane, W.R., 1898, Special report on coal: Kansas University Geol. Survey, v. 3, 347 p.

Discussion is made in this large report of the stratigraphy and history of coal mining in Kansas. Some of the earliest mines and mining methods in the state are described. Many stratigraphic descriptions are included in the report, most of which came from drill holes that penetrated the Weir-Pittsburg coal. Locations of mines, description of mines, and location of tipple areas are presented throughout the report. This is an old report, but it is very comprehensive and possibly useful in determining the location of many old mines, the character of the mines including overburden and size of the mine, and locating old tipple sites.

Problem Index: 0

Cost: \$56.10 (P - \$37.40; L - \$18.70)

33. Hinds, H. and Greene, F.C., 1917, Description of the Leavenworth-Smithville quadrangles [Kansas-Missouri]: U.S. Geol. Survey Geol. Atlas, Folio 206.

This folio covers a wide range of geological and geographical features for the area including topography, drainage, stratigraphy, structure, and climate. Of interest to the coal geology are stratigraphic descriptions of coal mines in the Leavenworth area of Kansas. Logs of the Penitentiary Mine at Lansing, Kansas, and the North Mine in Leavenworth are presented. These mines accounted for most of the coal production in Leavenworth County.

Problem Index: 0

Cost: Because of the size of the folio, this publication would be awkward to reproduce.

34. Jewett, J.W. and Bowsher, A.L., 1943, Coal resources of the Douglas Group in east-central Kansas: Kansas Geol. Survey Bull. no. 46, 94 p.

This is a detailed history of mining of the Douglas Group of coals. Type of mining, areas of mining, geology, and tonnages produced are all discussed in this report. Locations of a large number of small mines are given and the tonnages each mine produced are listed for Franklin, Osage, Anderson, Coffey, Woodson, Greenwood, Leavenworth, and Douglas counties. Most of the mines are quite small. Production of coal from this geologic group is probably less than 200,000 tons.

Problem Index: 0

Cost: \$7.20 (P - \$4.80; L - \$2.40)

35. Kansas Department of Health and Environment, 1978, Kansas water quality management plan - Mineral resource activities in Kansas - Technical Report: Kansas Dept. Health and Environment, Topeka, Kansas, 179 p.

This report was prepared as technical background material for the development of water quality management plans for Section 208 of P.O. 92-500. Section I of this report covers coal mine drainage and represents the bulk of the report (p. 1-115). The remainder of the report covers problems associated with minerals other than coal. Water quality is evaluated from four stream basins (Cherry Creek, Lightning Creek, Cow Creek, Deer Creek) that flow through the majority of the land which has been strip mined in southeast Kansas. Five Kansas counties, including Cherokee, Crawford, Bourbon, Labette, and Linn are covered in the report. Water analysis data are presented for specific sites in problem areas. Recommendations and costs for abatement alternatives are reviewed for the area in general. This is a good report for citing specific areas of acid mine drainage.

Problem Index: 2

35. (continued)

Cost: \$27.75 (P - \$18.50; L - \$9.25)

Probably available free to O.S.M. from:
 Kansas Department of Health and Environment
 Building 740, Forbes Field
 Topeka, Kansas 66620

36. Kansas Department of Health and Environment, 1978, Kansas water quality management plan - Mineral resource activities in Kansas - 208 management report: Kansas Dept. of Health and Environment, Topeka, Kansas, 90 p.

This report discusses the effect the Kansas mining industry has on water quality with most of the study devoted to water pollution problems associated with coal mining. Much of this report is a summary of the technical assessment of the water quality impacts of mineral extraction that was included in the Kansas Health and Environment 208 technical report. In addition, a review of the existing institutional policies providing for management options for control of these impacts are proposed; and policies, personnel needs, costs, and water quality benefits relative to each proposed option are summarized. Emphasis of coal mining is on the problem areas of the watersheds of Deer, Cow, Cherry, and Lightning Creeks in Cherokee and Crawford counties.

Problem Index: 2

Cost: \$14.40 (P - \$9.60; L - \$4.80)

37. Kansas Forestry, Fish and Game Commission, 1953, Proposed plan for fisheries development in southeast Kansas: Kansas Forestry, Fish and Game Comm., internal report, 8 p.

This report is a short review of plans to develop more strip-mine lakes into fishable lakes in southeast Kansas. Of interest in the report is the section on investigation of methods of general habitat improvement, including construction of access roads, blocking off acid drainage, and building of terraces to direct surface drainage into lakes to increase lake fertility. This is a short article giving a general overview of the intent of the Kansas Forestry and Game Commission to increase fishable waters. No specific problem areas are discussed.

Problem Index: 10, 2

Cost: \$1.20 (P - \$0.80; L - \$0.40)

38. Kansas Geological Survey, 1971, Mined-land redevelopment workshop, Pittsburg, Kansas: Kansas Geol. Survey, Spec. Distrib. Pub., no. 58, 48 p.

This publication includes seven short papers dealing with reclamation, and four of those relate to preliminary project descriptions associated with the Ozark Regional Commission study. These articles include: (1) overall project outline and description, (2) use of fly ash on strip mine soil, and (3) summary of crop experiment on test plot areas.

Problem Index: 12

Cost: \$7.20 (P - \$4.80; L - \$2.40)

A few copies of original publication would be available from Kansas Geological Survey, Lawrence, Kansas 66044, to O.S.M.

39. Kansas Geological Survey, 1972, Mined-land workshop proceedings - Mined-land redevelopment workshop - Pittsburg, Kansas, May 23-24, 1972: Kansas Geol. Survey, Spec. Pub. 65, 29 p.

The following short articles in this "Proceedings" volume are of interest to this bibliography:

Jurgens, L., 1972, Suitable plant materials for various uses on reclaimed mined land in southeast Kansas (p. 7-9).

This article is a brief description of the coal-mining spoils and their characteristics such as pH and decomposition of the spoils into soils. Also emphasized in the article are the plant materials best adapted to growing on spoils. Emphasis is on western Cherokee County.

Geyer, W.A., 1972, Mined-land potential for raising timber crops (p. 18-21).

A review is made of various timber crops that can be grown on spoil banks, estimates of their costs, and the expected return of those crops. Good short summary article. A useful discussion is given of revegetation potential for Kansas spoil piles.

Camin, K.Q., 1972, Data collected from the demonstration sites (p. 21-23).

This article is an overview of the results of tests on reclaiming coal mine spoils. Evaluations are given of soil testing, soil preparation, lime application, and fertilizer applications to develop reclamation programs in southeast Kansas (Cherokee and Crawford counties). This is a short review primarily on converting orphan spoils to grassland. More complete articles of the study can be found in the Camin and Hardy reports to the Ozarks Regional Commission.

39. (continued)

McClain, T.J., 1972, Preliminary results of hydrologic studies in southeastern Kansas coal fields (p. 24-26).

This report is a review of seven test holes drilled into coal spoil banks in an attempt to correlate water quality and quantity information with the surface water in old strip pit areas. Characteristics of the spoil as an aquifer were determined. New data is presented, but it is of limited areal extent in northwest Cherokee County.

Kovacic, W.J., 1972, The use of fly ash on the acid spoil of reclaimed mined land (p. 26-27).

Test plots in Crawford County where fly ash was used as a soil amendment were evaluated in this article. Fly ash was found to be useful for land with a high acid pH and was especially beneficial in areas where grasses are to be planted. Economic evaluations must be made in the areas where fly ash can be effectively used because of transportation costs of the fly ash and the higher effective lime content of agriculture limestone that might be available closer to the application site.

Problem Index: 12, 2, 13

Cost: \$1.00 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

40. Kansas Labor Department (1887-1956), Report of the inspector of coal mines, State of Kansas (56 annual and biannual reports): Kansas Labor Dept., Topeka, Kansas. Length of reports vary.

A nearly complete series of coal mine inspectors' reports are available at the Kansas Geological Survey. A few of the earlier years are missing from the complete series. Each report covers the coal mining activity for the year or years of the report. All commercial coal mines are listed including tonnages, locations, type of mine, depth of main shaft, number of employees, name of mine superintendent, and other information relative to the mine. Serious accidents are described as well as frequent discussions of individual mine conditions. Mine locations given are rather poor in the earlier reports and it is difficult to locate accurately a specific mine.

Problem Index: 0

Cost: It is suggested that the O.S.M. person who would probably be using the data evaluate this set of books. In total, there are approximately 7 to 8 thousand pages in the set.

41. Kansas State University Cooperative Extension Service, 1972, Mined-land research - Demonstration program for southeast Kansas - A final report to Ozark Regional Commission: Kansas State University Cooperative Extension Service, Manhattan, Kansas, 35 p.

Four forty-acre sites (two in Crawford County and two in Cherokee County) were chosen to demonstrate the economic feasibility of redeveloping mined-land into grassland. It was found that: (1) the weathering during the period from leveling to seeding resulted in a very significant breakdown of shale resulting in a relatively fine seed bed, (2) it is not possible to establish suitable stands of grass on those areas which are quite acid (3.0 - 4.0 pH) without amending those soils with liberal applications of agricultural lime, (3) phosphorus and potassium levels varied greatly from high to very low, and (4) the best time to plant cool season grasses is in the fall.

Problem Index: 12

Cost: \$5.55 (P - \$3.70; L - \$1.85)

42. Kelly, D.S., 1887, Coal measures of Lyon County: Kansas Acad. Sci. Trans., v. 10, p. 45.

1886 report on the location and operation of coal mines in Lyon County, Kansas. This is just a one-page summary. Since little coal has been mined in the county since the time of the report, the approximate location of mines at that time is of potential interest.

Problem Index: 0

Cost: \$0.35 (P - \$0.10; L - \$0.25)

43. Knerr, E.B., 1905, Coal mining in Atchison County: Kansas Acad. Sci. Trans., v. 19, p. 105-106.

Description of coal-mining activities in Atchison County from 1893 to 1904. One mine is discussed in which approximately 50,000 tons of coal was mined by the longwall method. The exact location of the mine is not given. A shaft was sunk during this time period some 900 feet. Due to large volumes of groundwater entering the shaft, the coal bed of interest was not reached. Several small mining operations within the county were also noted in the article.

Problem Index: 0

Cost: \$0.30 (P - \$0.20; L - \$0.10)

44. Lillie, J.D., 1971, Limnology and fisheries investigation of twelve strip-mine lakes in southeast Kansas: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 150 p.

This paper reports progress of a continuing research project concerned with strip-mine lakes in southeast Kansas. The productivity of fish is evaluated after liming of several acid pits, restocking of poisoned lakes, and the stocking of new ponds. This is a fairly long thesis and much of the information contained in it can be found in Waller and Bass (1967), Gash (1968), and Tobaben (1969) whose research dealt with many of the same strip-mined lakes. Water quality data and its effects on pond limnology is of potential interest. All of the lakes are in Cherokee and Crawford counties.

Problem Index: 10

Cost: \$24.00 (P - \$16.00; L - \$8.00)

45. Limstrom, G.S., 1948, Extent, character, and forestation possibilities of land stripped for coal in the central United States: U.S. Forest Service, Central State Forest Experiment Station, Tech. Paper no. 109, 79 p.

Overall view of the characteristics of spoil piles and forestation possibilities for those spoil piles in the midwest. Of interest is a section of report concerned with Kansas (table 19 to 21 on p. 60-63). Soils are classified by acidity and texture, and the percentage of each class found in a county is presented in tabular form. These tables give a good overview of the suitability of Kansas spoils to revegetation.

Problem Index: 12

Cost: \$12.45 (P - \$8.30; L - \$4.15)

46. Limstrom, G.S., 1960, Forestation of strip-mined land in the central states: U.S. Dept. of Agriculture, Agric. Handbook, no. 166, 74 p.

This article is a summary of reforestation experiments conducted in Ohio, Illinois, Kentucky, Iowa, Missouri, Kansas, and Oklahoma on strip-mined land. Effects of the amount of soil, chemical conditions, nutrients availability, parental material, method of grading, and erosion conditions on plant growth in reclaimed areas are described for many sites. Several Kansas sites in Crawford County were used to measure the effects of moisture loss in spoil banks, and to test the feasibility of using black walnut trees for reforestation of strip-mined land. Black walnut trees were found to have a low mortality rate in Kansas. There is limited information in the report on Kansas.

Problem Index: 12

Cost: \$12.00 (P - \$8.00; L - \$4.00)

47. Maupin, J.K., Wells, J.R., and Leist, C., 1954, A preliminary survey of food habits of the fish and physico-chemical conditions of the water of three strip-mine lakes: Kansas Acad. Sci. Trans. v. 57, no. 2, p. 164-171.

This is a short article dealing with benthic organisms found in strip pits. Of interest is the water quality determinations, including pH, dissolved oxygen, light penetration, and carbonate content. This article is limited in scope as only three strip pits in Crawford County were studied over a two-year period, and fish were caught by hand lines.

Problem Index: 10

Cost: \$0.75 (P - \$0.50; L - \$0.25)

48. Metzler, D.F., 1958, Cherry Creek stream survey report: Kansas Board of Health, Topeka, Kansas, 26 p.

This report covers the acid mine drainage in the Cherry Creek stream basin of Cherokee County, Kansas. Discussion is made of the mine pollution problem areas with tables showing acidity values for different sampling sites. A number of possible solutions to the pollution problems are proposed. This is a relatively short report, but it describes an area in which there is immediate need for pollution control.

Problem Index: 2

Cost: \$4.75 (P - \$3.10; L - \$1.65)

49. Moore, R.C., Herbert, C.A., Owings, C.W., Tryon, F.G., Snyder, N.H., J.N., and Osgood, F.D., 1929, Analyses of Kansas coals: U.S. Bureau of Mines, Tech. Paper no. 455, 52 p.

Reserve estimates, mining methods, coal analysis, and mine conditions are described in the report for Bourbon, Cherokee, Crawford, Franklin, Leavenworth, Linn, and Osage counties.

Problem Index: 0

Cost: \$7.95 (P - \$5.30; L - \$2.65)

50. Pierce, W.G., and Courtier, W.H., 1937, Geology and coal resources of the southeastern Kansas Coal Field in Crawford, Cherokee, and Labette counties: Kansas Geol. Survey Bull., no. 24, 91 p.

This bulletin has a good description of the stratigraphy and coals of the three southeastern-most Kansas counties. Emphasis of the report is on the coals of the Cherokee Group. This report covers the time period of 1885-1934 and is somewhat dated in showing the mined areas. A number of

50. (continued)

good stratigraphic sections are described that are useful for overburden determination. This report contains a geologic map showing strip-mined areas and some deep-mined areas of Cherokee County and parts of Crawford and Labette counties with a scale of 1" = 0.75 miles. A structure map is included with the report that uses the Weir-Pittsburg coal as the datum plane and is shown at a scale of 1" = 0.5 miles. The area covered by the structure map is a portion of the three counties.

Problem Index: 13

Cost: \$17.60 (P - \$8.80; L - \$8.80)

51. Powell, W.E., 1970, The historical geography of the impact of coal mining upon the Cherokee-Crawford Coal Field of southeastern Kansas: Ph.D. Dissertation, Dept. of Geography, University of Nebraska, Lincoln, Nebraska, 334 p.

This report is a good review of the history of coal mining in Cherokee and Crawford counties, and the effect mining had on the geography of the land and its people. Of particular interest is a section on the disruptive impact of coal mining upon the physical environment (p. 138-185). Problems associated with mining are mainly general discussions, with a few specific examples, and include - effects on soils, strata, terrain (including erosion and subsidence), natural vegetation, drainage, and reclamation of mined lands.

Problem Index: 13, 2, 7, 10, 11, 12

Cost: \$52.20 (P - \$34.80; L - \$17.40)

52. Powell, W.E., 1973, Mechanized strip-mining and land reclamation in the Cherokee-Crawford Coal Field of Southeastern Kansas: Kansas Acad. Sci. Trans., v. 76, no. 2, p. 167-181.

This paper reviews the strip-mining history and reclamation practices in Kansas. Of interest is the section on landscape damages and the associated percentage of mine spoils with pH values less than 4.0, and strip pit lakes having acidic conditions. This is a short article that discusses the effect the Mined-Land Conservation and Reclamation Act of Kansas has on the coal mining in Cherokee and Crawford counties.

Problem Index: 13, 12, 10

Cost: \$1.35 (P - \$0.90; L - \$0.45)

53. Reavis, J.L., Jr., 1974, Shallow-cover coal: New mining methods and the environment - A final report to Ozark Regional Commission on Contract No. TA73-9, September 1, 1973 - September 1, 1974: Institute of Mineral Resource Research, University of Kansas, Lawrence, Kansas, 87 p.

Auger strip mining and Longwall strip mining are suggested as economically feasible ways of mining in which the environment can be better preserved. Of interest are the estimated percentage of land disturbed by different mining techniques and the economics of reclaiming land. No specific areas are included, but study is relative to thin coal beds, with overburden material similar to that present over coals in southeast Kansas.

Problem Index: 0

Cost: Free in limited quantities from Kansas Geological Survey.

54. Robertson, D.R., 1975, Surface-mined land reclamation in southeast Kansas in Proceedings of the third symposium on surface mining and reclamation: Louisville, Kentucky, October 21-23, 1975, Volume II: National Coal Association, Washington, D.C., p. 229-238.

Review of the history of reclamation in southeast Kansas. Most of the data is from the Ozarks Regional Commission study of reclamation in southeast Kansas. [See Camin and Hardy (1972) for a lot of the data used in this study.]

Problem Index: 13

Cost: Because of copyright laws, this article cannot be reproduced and sold.

55. Rott, D.E., Swanson, D.W., and Jorgensen, G.N., 1973, Soil survey of Crawford County: U.S. Soil Conserv. Serv., 50 p. plus soil maps of county.

This report covers in detail the soil series, locations, and characteristics of Crawford County, Kansas. Soil surveys were undertaken using field work from 1957-1967. After a guide for classifying and naming soils had been worked out from the field work, boundaries of the individual soils were drawn on aerial photographs. The aerial photos were taken at low altitudes in 1970. Maps showing specific soils are plotted for Crawford County at a scale of 1:20,000 on the aerial photos. Of special interest is the soil class (Md) that represents mine pits and dumps. These soils maps present the most accurately defined areas of unreclaimed land in Crawford County.

Problem Index: 13

Cost: Publication is available free in limited quantities from the U.S. Conservation Service, Crawford County Courthouse, Girard, Kansas 66743.

56. Scheve, J.W., 1971, Limnological and fisheries investigations of strip-mine lakes in southeast Kansas: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 171 p.

This report is a continuation of the investigations of Waller and Bass (1967), Gash (1968), Tobaben (1969), and Lillie (1971). Data was collected on twelve strip-mine lakes in Cherokee and Crawford counties. This report deals mainly with the affects acid drainage had on the water quality and the biota of strip-mine lakes. The report also characterized the changes in water quality and community structure of strip-mine lakes in accordance with the decline in acid pollution as the result of neutralization with agricultural lime. This is a good recent investigation.

Problem Index: 10, 2

Cost: \$26.75 (P - \$17.50; L - \$8.75)

57. Stockinger, N.F. and Hays, H.A., 1960, Plankton, benthos, and fish in three strip-mine lakes with varying pH values: Kansas Acad. Sci. Trans., v. 63, no. 1, p. 1-11.

This study discusses the influence the water pH has on fish, plankton, and benthos populations of strip pits. The article indicates the limited seasonal variations in water quality due to the acid nature of the lakes. Stunting of fish growth due to the acid nature of the water is rated. This report is restricted to the study of three lakes in Crawford County.

Problem Index: 10

Cost: \$0.90 (P - \$0.60; L - \$0.30)

58. Schoewe, W.H., 1944, Coal resources of the Kansas City Group, Thayer bed, in eastern Kansas: Kansas Geol. Survey Bull. no. 52, pt. 3, p. 81-136.

This report discusses the stratigraphy and distribution of the Thayer coal in Kansas. Drift, strip, and shaft mine locations and tons produced are listed for Linn, Neosho, Wilson, and Montgomery counties. The Thayer coal is thin and variable in quality. Consequently, the mines were small and total production of this coal was approximately 800,000 tons.

Problem Index: 0

Cost: \$4.80 (P - \$3.20; L - \$1.60)

59. Schoewe, W.H., 1946, Coal resources of the Wabaunsee Group in eastern Kansas: Kansas Geol. Survey Bull. 63, 144 p.

This report deals with the stratigraphy and mining history of the coals of the Wabaunsee Group of Pennsylvanian age in Kansas. A discussion is made of the strip, shaft, and drift mining of coals. The locations are given of mines in Atchison, Brown, Chautauqua, Coffey, Cowley, Doniphan, Elk, Greenwood, Jackson, Jefferson, Lyon, Nemaha, Osage, Pottawatomie, Shawnee, and Wabaunsee counties. Most of the mines were small. A map of Osage County shows many of the abandoned shaft and strip mine areas for that county (approx. scale 1" = 0.75 miles). Total production on the Wabaunsee coals is nearly 12 million tons, with most of that production from the Nodaway coal in Osage County.

Problem Index: 13

Cost: \$11.70 (P - \$7.80; L - \$3.90)

60. Schoewe, W.H., 1951, Coal resources of the Permian System in Kansas: Kansas Geol. Survey Bull. no. 90, pt. 3, p. 53-68.

This report discusses the stratigraphy and history of mining of coals present in the Permian System. The mining districts and associated mines in Wabaunsee and Geary counties are located on maps (scale approx. 1" = 1 mile). Relatively little coal has been mined from Permian rocks in Kansas, so usefulness of the article is limited.

Problem Index: 0

Cost: \$1.00 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

61. Schoewe, W.H., 1952, Coal resources of the Cretaceous System (Dakota Formation) in central Kansas: Kansas Geol. Survey Bull. no. 96, pt. 2, p. 69-156.

A review of the stratigraphy and mining history of the Cretaceous lignites of Kansas. Mine locations and approximate tonnages produced are given for Clay, Cloud, Dickinson, Ellsworth, Hodgeman, Ford, Jewell, Lincoln, Mitchell, Republic, Russell, Washington, and Ottawa counties. There was a limited amount of mining of lignite in the past in Kansas totaling approximately 300,000 tons. About 25 pages of this article would be of interest - showing areas mined and tonnages of coal produced.

Problem Index: 0

Cost: \$1.00 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

62. Schoewe, W.H., 1955, Coal resources of the Marmaton Group in eastern Kansas: Kansas Geol. Survey Bull. no. 114, pt. 2, p. 49-112.

Description is made in this report of the geology of the Marmaton Group with emphasis on the coals, especially the Mulberry coal. Locations of deep and strip mines and tonnages of coals produced are given for Linn and Bourbon counties. At the writing of the report, mining was still active in Linn County, and approximately 9.4 million tons of coal had been mined from the Mulberry coal. This coal will become important again in Kansas when the Midway Mine of the Pittsburg and Midway Coal Mining Company is scheduled to move back into Linn County, Kansas in 1979 or 1980. A large map of reserves and coal mines of Mulberry coal in Linn and Bourbon counties is shown at a scale of 1" = 0.6 miles.

Problem Index: 13

Cost: \$1.00 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

63. Schoewe, W.H., 1958, The Geography of Kansas: Pt. IV, economic geography: mineral resources: Kansas Acad. Sci, Trans., v. 61, no. 4, p. 359-468.

A summary review of coal mining and coal mining history of Kansas. The article deals with all Kansas minerals, but a large part of the article is restricted to coal (p. 367-391). Of special interest is a summary by county of the coals mined, period of mining, depth to coal, tons produced, and the number of mines. This article provides a general review of Kansas coal mining.

Problem Index: 0

Cost: Entire article: \$8.70 (P - \$5.80; L - \$2.90)
Coal portion: \$2.10 (P - \$1.40; L - \$0.70)

64. Schoewe, W.H., 1959, Coal resources of the Cherokee Group in eastern Kansas - 1. Mulky coal: Kansas Geol. Survey Bull. 134, pt. 5, p. 181-222.

This report discusses the Mulky coal, its stratigraphic setting, mine history, and quality. Map of the area of Mulky coal mining, reserve coal areas, and trace of the basal Fort Scott limestone is of particular interest (map scale: 1" - 2 miles).

Problem Index: 13

Cost: \$1.00 - Publication is available from the Kansas Geological Survey, Lawrence, Kansas 66044

65. See-Kan Resource Conservation and Development Project, Inc., Board of Trustees, 1972, Land and water redevelopment on mined-land: Final report to Ozark Regional Commission on Contract No. DEM-K-71-2, June 28, 1971 - June 30, 1972: See-Kan RC&D Project, Inc., Coffeyville, Kansas, 42 p.

Description of sixty-two small reclamation projects covering a three county area and totaling 1,000 acres. Based on the results of these reclamation plots, recommendations are made for further reclamation efforts. Specifications are made for land shaping, planting, soil treatment, and soil sample testing. This article is not as complete on site descriptions as the Camin and Hardy (1972) report to the Ozark Regional Commission.

Problem Index: 12

Cost: \$7.20 (P - \$4.80; L - \$2.40)

66. Simpson, G.M., 1961, Chemical composition of strip-mine lake waters: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 98 p.

Three strip-mine lakes, two in Cherokee County and one in Crawford County, with pH values ranging from 3.8 to 7.8, were chosen for chemical analysis. Collections from these lakes were taken once each month for twelve months beginning in October, 1959, and ending in September, 1960. Concentrations of sodium, potassium, calcium, magnesium, manganese, iron, aluminum, phosphate, chloride, sulfate, bicarbonates, carbon dioxide, and dissolved oxygen were measured. Sampling operations of each station included the recording of the water temperature both at the surface and at the bottom, the air temperature, wind direction and velocity, and the color and transparency of the water.

Problem Index: 10

Cost: \$15.90 (P - \$10.60; L - \$5.30)

67. Skubitz, J., Jr., 1934, A history of the development of deep mine production in Crawford County and the factors that have influenced it: M.S. Thesis, Kansas State Teachers College, Pittsburg, Kansas, 60 p.

This thesis is mainly a history of deep mining in Crawford County. Some of the earliest mines are described as to when they opened and the number of men employed. The thesis deals mainly with the social aspects of mining including strikes, major mine disasters, and the overall decline of shaft mining due to the production of oil and gas. Of interest would be the location of early mines.

Problem Index: 0

Cost: \$9.90 (P - \$6.60; L - \$3.30)

68. Soule, M.A., 1974, Evaluation of reclamation of land strip-mined for coal in Crawford County, Kansas, using remote sensing techniques: M.S. Thesis, Dept. of Geology, University of Kansas, Lawrence, Kansas, 43 p.

This research evaluates use of aerial photography to monitor reclamation efforts. Multiband low altitude photography was used to estimate the condition of the land while being reclaimed. The benefits shown by the techniques include: false-color infrared imagery to distinguish between voluntary and mandatory reclamation, and color and false-color infrared film used together to maximize the detection of depressions in which standing water kills vegetation after rainfalls. It is concluded that professional vertical aerial photography and company-acquired oblique photography can be used to evaluate reclamation success and to focus on problem areas that would otherwise require many hours of field work. This thesis is limited to several specific sites in Cherokee and Crawford counties. No particular pollution problem is isolated, although many general problems associated with reclamation are discussed.

Problem Index: 12, 7, 13

Cost: \$7.50 (P - \$5.00; L - \$2.50)

69. Stroup, R.K. and Falvey, A.E., 1969, Coal reserves for steam-electric generation in Kansas and Missouri areas of Missouri River Basin: U.S. Bureau Mines Preliminary Report no. 174, 37 p.

Summary of coal use by power plants in Kansas and Missouri. Of interest are tables of estimates of coal reserves and potential production in Kansas by county.

Problem Index: 0

Cost: \$6.00 (P - \$4.00; L - \$2.00)

70. Tippie, J.W., 1974, Surface mine spoil reclamation in southeast Kansas: Master of Resource Administration Thesis, University of Montana, Missoula, Montana, 131 p.

This thesis represents a complete history of reclamation activities in Kansas - the nature of spoil piles, maps of the distribution of mined-land, and tables indicating acres of unreclaimed land. Efforts of reclamation conducted by early investigators that planted fruit orchards, timber crops, and stocked strip-mine lakes are described. Later reclamation interests and practices of the State Conservation Commission; Ozark Regional Commission; Mineral Resources Task Group; See-Kan RC&R; Kansas State University; Kansas Forestry, Fish and Game Commission; Agricultural Stabilization and Conservation Service; Forest Service; and Soil Conservation Service, are detailed. Emphasis is on Cherokee and Crawford counties as well as portions of Labette and Bourbon counties.

Problem Index: 12, 10, 13

Costs: \$21.15 (P - \$14.10; L - \$7.05)

71. Tobaben, D.J., 1969, Limnology of strip-mine lakes and chemical analyses of spoil materials: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 84 p.

This report is a continuation of monthly monitoring of six strip-mine lakes from Waller and Bass (1967), and Gash (1968) reports. In addition, soil analyses were conducted of immediate spoil banks to determine if their soils were of importance as a source of acid drainage into lakes. It was found that drainage from pyrite concentration sources, such as old tipples, was far more damaging to a lake than runoff from soils of the spoil bank.

Problem Index: 10, 2, 9

Cost: \$15.00 (P - \$10.00; L - \$5.00)

72. U.S. Bureau of Mines, 1973, Methods and costs of coal refuse disposal and reclamation: U.S. Bur. Mines Inf. Circ. 8576, 36 p.

A very brief discussion (p. 19-21) is given of the Pittsburg and Midway Coal Mining Co. refuse disposal from their old tipple at Mine #19 near Hallowell, Kansas (Cherokee County). Total annual cost of refuse disposal from the Mine #19 tipple was estimated at \$115,200 at the time of publication. Disposal was on strip-mine land and covered with four feet of soil.

Problem Index: 9

Cost: Entire publication: \$6.00 (P - \$4.00; L - \$2.00)
Kansas portion: \$0.60 (P - \$0.40; L - \$0.20)

73. U.S. Geological Survey, 1979, Water resources data for Kansas, water year 1978: U.S. Geol. Survey Water-Data Report KS-78-1, Lawrence, Kansas, 656 p.

Water resources data presented in this report consists of records of stage, discharge, and water quality of Kansas streams; stage, contents, and water quality of Kansas lakes and reservoirs; and water levels and water quality of groundwater. Of interest to this bibliographic summary are the records of water quality on Cherry, Deer, Lightning, Brush, and Cow Creeks which flow through former coal mine areas (p. 317-359). Very low pH values are noted for several of the streams. The water quality data for these creeks are part of an ongoing project conducted by the U.S.G.S. and titled "Chemical quality of water and fluvial sediment in streams draining coal mine areas in southeastern Kansas."

Problem Index: 2

Cost: For entire report: \$100.00 (P - \$66.70; L - \$33.30)
For section of p. 317-359: \$6.60 (P - \$4.40; L - \$2.20)
This report is probably available free to O.S.M. from:
U.S. Geological Survey
1950 Avenue "A", Campus West
Lawrence, Kansas 66044

74. Voth, R.D., 1973, Plant extraction of phosphorus and potassium from reclaimed strip-mined soils in Kansas: M.S. Thesis, Department of Agronomy, Kansas State University, Manhattan, Kansas, 79 p.

Four strip-mine and two virgin soils from the coal-mining region in Cherokee and Crawford counties were used to study the plant extractable phosphorus and potassium in strip-mine soils and to determine if the available phosphorus and potassium are accurately measured by soil testing. The plant extractable phosphorus and potassium content of three of the four strip-mine soils was found to be higher than virgin soils. Of interest is the section on Reclamation Research (p. 6-19) in which the problems and characteristics of mined spoils and the physical and chemical change of mine spoils over time are discussed.

Problem Index: 12

Cost: \$13.05 (P - \$8.70; L - \$4.35)

75. Waller, W.T. and Bass, J.C., 1967, Pre- and post-improvement limnological analyses of certain strip-mine lakes in southeast Kansas. A completion report submitted to the Kansas Forestry, Fish and Game Commission for D-J Project F-12-R-3, Job 4-3: Kansas State College of Pittsburg, Pittsburg, Kansas, 94 p.

Waller initiated, under the guidance of Bass, an extensive study of six southeast Kansas strip-mine lakes. He constructed hydrographic maps of the lakes and renovated two acid lakes by increasing the pH with the addition of agricultural lime. The physico-chemical and biological data for these lakes were also monitored during this time. Some of the data monitored were: boiling point acidity, pH values, water temperature, total alkalinity, carbon dioxide, dissolved oxygen, phosphate, benthic organisms, net plankton, and fish. This is the first report in a six part series.

Problem Index: 10

Cost: \$15.90 (P - \$10.60; L - \$5.30)

76. Wells, J.R., 1953, The reclamation of strip-mined acres in southeastern Kansas: Kansas Acad. Sci. Trans., v. 56, no. 3, p. 269-292.

This is an early report summarizing some reclamation efforts in southeast Kansas (including Cherokee, Crawford, Bourbon, and Linn counties). Forestation, orchards, pasture development, and fish, wildlife and recreation use, are discussed in the article. Discussion of the early attempts and failures of fruit and vineyard growing on the spoils is an important part of this article. The author indicates, with proper care and management, there appears to be potential in fruit orchards since good fruit growth has been demonstrated.

Problem Index: 13, 10, 12

Cost: \$1.80 (P - \$1.20; L - \$0.60)

77. Whitla, R.E., 1940, Coal resources of Kansas: Post-Cherokee deposits: Kansas Geol. Survey Bull. no. 32, 64 p.

This report is a discussion of the coals that occur in stratigraphic position higher than the Cherokee Group. The main mining areas are summarized for these coals. Small county maps (1" = 9 miles) indicate the location of the mines in each coal district. A more complete review can be found in the Kansas Geological Survey bulletins that deal with the specific geological groups. Report covers the history of mining for Anderson, Atchison, Bourbon, Brown, Chautauqua, Cloud, Coffey, Douglas, Elk, Ellsworth, Franklin, Jackson, Jefferson, Jewell, Leavenworth, Lincoln, Linn, Lyon, Mitchell, Montgomery, Neosho, Osage, Republic, Russell, Shawnee, Wabaunsee, Wilson, and Woodson counties.

Problem Index: 13

Cost: \$4.95 (P - \$3.30; L - \$1.65)

78. Wilbert, D.L., 1974, Limnological and fisheries investigations of twelve strip-mine lakes in southeast Kansas: M.S. Thesis, Kansas State College of Pittsburg, Pittsburg, Kansas, 130 p.

This is a concluding report of an eight year study of the limnology of twelve strip-mine lakes in Crawford and Cherokee counties. Comparison is made in the study of fish populations in acid lakes with those found in neutral lakes. Fish communities of acid lakes were characterized by lower species diversity and standing crop values. The adjustment of pH by the application of agricultural lime to a moderately acid lake, and restocking with a balanced fish community resulted in a marked increase in the standing crop of fishes.

Problem Index: 10

Cost: \$21.90 (P - \$14.60; L - \$7.30)

79. Young, C.M., and Allen, H.C., 1925, Kansas coal: Kansas Univ. Bull. v. 26, no. 5 (also Engr. Experiment Sta. Bull. no. 13, and Chem. Research Div. Bull, no. 4), 202 p.

This report primarily describes Kansas coal districts, coal mining techniques, and the chemistry of Kansas coal. Of interest are brief discussions of the size of stripping operations and the lack of reclamation. There is a limited number of mine locations listed for Cherokee and Crawford counties.

Problem Index: 0

Cost: \$15.45 (P - \$10.30; L - \$5.15)

Coal Mine Problem Index

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