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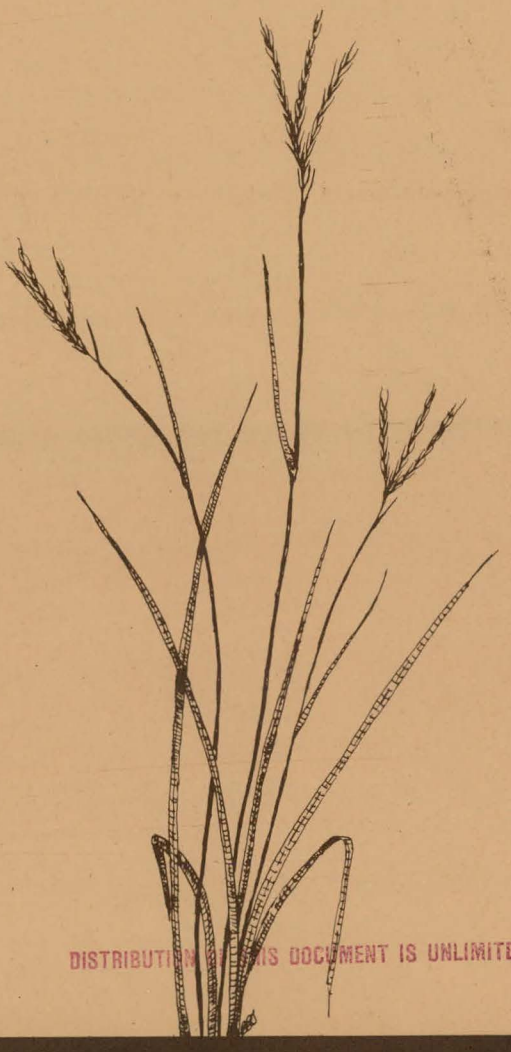
PUBLIC VIEWS OF RECLAIMING AN ABANDONED COAL MINE: THE MACOUPIN COUNTY PROJECT



LAND RECLAMATION PROGRAM

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PUBLIC VIEWS OF RECLAIMING AN ABANDONED COAL MINE: THE MACOUPIN COUNTY PROJECT

by

Jacalyn R. Bernard

Land Reclamation Program

July 1980

Prepared for the U.S. Department of Energy as part of the Argonne Land Reclamation Program, a joint effort of Argonne's Energy and Environmental Systems Division and Division of Environmental Impact Studies.

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PREFACE

This study was performed as a part of the Argonne National Laboratory Land Reclamation Program, which is sponsored by the Department of Energy, Assistant Secretary for Environment, Office of Health and Environmental Research. The program is a joint effort conducted by Argonne's Energy and Environmental Systems Division and the Division of Environmental Impact Studies.

The Land Reclamation Program, as the lead DOE activity for reclamation research, conducts basic and applied research into the physical, ecological, and economic problems of land reclamation related to surface mining of coal. This work is aimed at developing energy-efficient and cost-effective techniques for reclaiming and rehabilitating mined land to productive end uses. To achieve this goal, the Program has established integrated research and development projects focused on near- and long-term reclamation problems in all major U.S. coal resource regions. These research sites have been established to address both regional and site-specific problems. The activities of the Land Reclamation Program involve close cooperation with industry and the academic community and focus on establishing a comprehensive field and laboratory effort. At six of its research sites, the Program has developed cooperative working arrangements with the operating coal companies. Close cooperation with related research projects at academic institutions and other agencies, in order to transfer pertinent information and avoid duplication of effort, has been a primary goal of the Program.

Coordinated by Stanley D. Zellmer of Argonne's Land Reclamation Program, the work discussed in this report is part of a multidisciplinary approach to reclamation of an abandoned refuse site at a deep coal mine in the Midwest. Related investigations are concerned with groundwater and surface water quality, aquatic ecosystems, revegetation, soil characteristics, erosion and runoff, wildlife, soil microbial populations, and economic benefits of the reclamation effort. Together, these investigations are providing necessary design data for future reclamation efforts.

Ralph P. Carter, Director
Land Reclamation Program
Energy and Environmental
Systems Division

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PUBLIC VIEWS OF RECLAIMING AN ABANDONED COAL MINE: THE MACOUPIN COUNTY PROJECT

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ABSTRACT

An abandoned underground coal mine waste area in Macoupin County, Illinois, has been reclaimed for demonstration and research purposes near the city of Staunton. According to federal law, end uses of reclaimed coal mines must be determined in part by local concerns. This study examined local residents' preferences for land uses and their social and economic evaluations of reclamation at the Macoupin County site. Personal interviews with 119 residents revealed preferences for recreational use of the demonstration area; however, responses were probably influenced by prior awareness of land-use intentions. Generally, very positive evaluations of the reclamation were received. Willingness to pay for reclamation appears to be linked to fulfillment of desired recreational uses on the site and socioeconomic status of the respondent. In general, the research results provide further evidence that the value of abatement of environmental damage from mining is recognized and supported in economic terms at the public level.

1 INTRODUCTION

As of 1977, there were approximately 445,000 ha of land abandoned after coal mining in the United States out of 2.3 million ha disturbed by all types of mining (USDA, 1979). As used here, the term "abandoned mines" refers to land taken out of production due to surface and underground coal mining. The recently enacted federal Surface Mining Control and Reclamation Act (P.L. 95-87)* includes the Abandoned Mine Reclamation Program, through which abandoned coal-mine lands across the nation will be reclaimed. Before enactment of this law, state legislation was not uniform in requiring mining companies to reclaim abandoned sites.

In Illinois, there are about 40,400 ha of abandoned mine land. No additional mine lands are expected to be classified as abandoned because a state law, effective in 1962 for surface mines and 1972 for deep mines, requires mining companies to reclaim lands disturbed after those dates. Because most of the abandoned lands are not characterized by acid-forming spoils, they are naturally revegetated and pose no major health or environmental problems due to exposure and erosion of acid materials.

*Public Law 95-87, 91 Stat., Aug. 3, 1977, Title IV.

About half of the abandoned acreage in Illinois is used for pasture or other agricultural activities. Because abandoned mined lands provide a type of upland topography not encountered in most of Illinois, about 30% of the abandoned acreage is used for homes, sports clubs, state parks, wildlife areas, or private and municipal recreational facilities. However, about 9,300 ha of the abandoned lands, scattered throughout the state, are considered problem areas because acid conditions affect the site and surrounding land. At these 800 problem sites ranging in size from less than 1 to 177 ha, the value of surrounding property is often depressed, there are usually aesthetic impacts, and the land is simply not useful (Abandoned Mined Land Reclamation Council, 1978; Haynes and Klimstra, 1975; Nawrot et al., 1977).

The federal law requires mining companies to pay a reclamation fee of $0.39/t of surface-mined coal and $0.17/t of coal from underground mines; these fees go to the Abandoned Mine Reclamation Fund. Through this fund, at least one-half of the revenues contributed from each state will be returned to the state for reclamation of abandoned mines. The total value of the revenue available to Illinois should be about $7.5 million per year, assuming average annual coal production in Illinois of 67 million tons divided evenly between surface and underground mining (Carter et al., 1974). Disbursement of the funds will begin after the state develops an approved reclamation program that provides for determination of land uses on the sites in compliance with federal regulations. Illinois will be ready to administer such a program in 1980.

The priorities established by P.L. 95-87 are intended to protect the public from adverse effects of mining, and, through the Abandoned Mine Reclamation Program, to restore land for public needs. As yet, there is no established process in Illinois for determining land uses on parcels having a high priority for reclamation. In the past, reclamation efforts were undertaken by mining companies that determined desirable land uses by in-house criteria; there was very little consultation with nearby communities. According to P.L. 95-87, state decisions about land uses for these parcels must take into consideration the desires of local government, as well as regional and state development goals. At the same time, ecological and engineering data on the capability of each site to support desired public uses must be incorporated in each decision. There are few examples to follow in determining community desires for uses of reclaimed land and few cases of integrating these desires with specific limitations on uses imposed by reclamation of areas containing environmentally hazardous materials.

The implicit assumption is that the costs of reclamation, passed on to society through increased energy prices, are at least equal to the benefits to be derived. As in all projects, however, it is desirable to have the maximum benefit for the minimum cost. Since most reclamation to date has been done by mining companies, the states may not yet be equipped to use cost-effective and efficient methods of reclamation on problem abandoned mines. Because cost-effectiveness of abandoned mine reclamation must now be assessed in the public domain, it is important to consider and quantify in some way the value of reclamation to society.

Two abandoned-mine reclamation projects in Illinois are being conducted by Argonne National Laboratory with the cooperation of the State of Illinois and the United States Department of Energy (DOE). One of these projects is an abandoned surface coal mine that now lies within a state park in northeastern Illinois. The research described in this report is associated with the second project, which is near the small city of Staunton in Macoupin County, Illinois. Preliminary analysis led to a decision to reclaim the site for recreational use, although community desires for uses had not been formally assessed. This investigation explores the use of a sample survey as one method of achieving the following objectives:

1. Determine preferences of nearby residents for use of a reclaimed site, assuming *a priori* that recreation is one of the preferred uses; and

2. Determine how these residents value reclamation both in attitudinal and economic terms.

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2 DESCRIPTION OF THE STUDY AREA

2.1 THE RECLAIMED SITE

The Macoupin County reclamation site is located about 80 km northeast of St. Louis, Missouri, and approximately 1 km northwest of Staunton, Illinois (see Figure 2.1). The 13-ha site consists of three parcels of land affected by activities associated with underground coal mining from 1904 to 1923 (see Figures 2.2 and 2.3). It was the site of the Consolidation Coal Company Mine No. 14, which employed an average of 500 men in the mine, coal-cleaning plant, and rail yard.

Wastes ("gob") from coal cleaning were piled in an area of about 2 ha and ultimately reached a height of about 25 m. To provide a sump for the slurry during operation of the coal-cleaning plant, the mining company created an impoundment which, when the mine was finally abandoned, filled with acid drainage from the gob pile. This 4.5-ha slurry pond eventually breached its dam and contributed to the pollution of Cahokia Creek, a tributary of the Mississippi River. Because of the acidic nature of the gob pile and associated runoff, more than two-thirds of the entire site was barren, despite the passage of 50 years.

Much of the area had been used as a general dump for years. Small game inhabited about 4.5 ha of the site; hunters had used the area for target practice, and there was evidence of off-road vehicle use on the site. A 55-m high concrete smokestack and the foundations of several buildings on the site were remnants of mining days.

Several agencies were involved in choosing this site for reclamation from 29 coal-mine refuse sites in the area of Cahokia Creek. The U.S. Department of Energy (DOE), the Illinois Abandoned Mined Land Reclamation Council, and the Illinois Institute for Natural Resources jointly supported the site selection criteria and reclamation project developed by Argonne National Laboratory. The goals of the project were to: (1) reduce the quantity of pollutants entering the environment; (2) increase the economic potential of the area; (3) improve the aesthetics of the locale; and (4) develop and demonstrate cost-effective reclamation techniques.

The Macoupin County site was chosen for reclamation because it obviously contributed to poor water quality in Cahokia Creek. It is also adjacent to the town of Staunton (1978 population: 4336), and the small Parksville subdivision. Land values around the site were depressed, and expansion plans for the town of Staunton were limited because of the site's unreclaimed condition. About 9.3 ha needed reclamation in order to mitigate the adverse impacts. Because the city owned an additional 4 ha adjacent to the gob pile on the east, there would be greater possibilities for use of the entire area if the mine area were reclaimed.

A number of small farms are adjacent to the reclaimed site, most of them owned by Parksville residents. To the southwest of the site is a city-owned sewage pond which is screened from the site by trees and apparently is not a major nuisance in the area. On the southeast, close to the Staunton city limits, is a firm that stores and distributes steel conduit.

Before reclamation work began, consultation with officials of Staunton, the Macoupin County Board of Supervisors, and the West-Central Illinois Regional Planning Commission revealed that the preferred end-use after reclamation was industrial, commercial, or residential. However, those uses were not feasible because stability problems would be encountered when building on the refuse. Another alternative, recreational use, was therefore seen as having the least potential impact on the reclaimed site, while still fulfilling community needs.

The inadequacy in recreational facilities for Staunton has been recognized since 1961, when a Comprehensive City Plan was developed with recommendations for increased recreational opportunities. Recommended goals had still not been met by 1976, when the West-Central Illinois Regional Planning Commission proposed a recreation plan for the refuse area studied here. Staunton contains one 7.3-ha park for baseball and group picnics on the north side of the city and one vest-pocket park downtown. The school is set on 13 ha on the northwest edge of Staunton and contains playground and team sports facilities. There are also two tennis courts and a bowling alley in Staunton, and bicycling appears to be a popular activity among children and adults. Several recreation clubs are near Staunton, including the Gun Club, the Sportsman's Club, and the Staunton Country Club. Other organizations based in Staunton include the Veterans of Foreign Wars and active church groups.

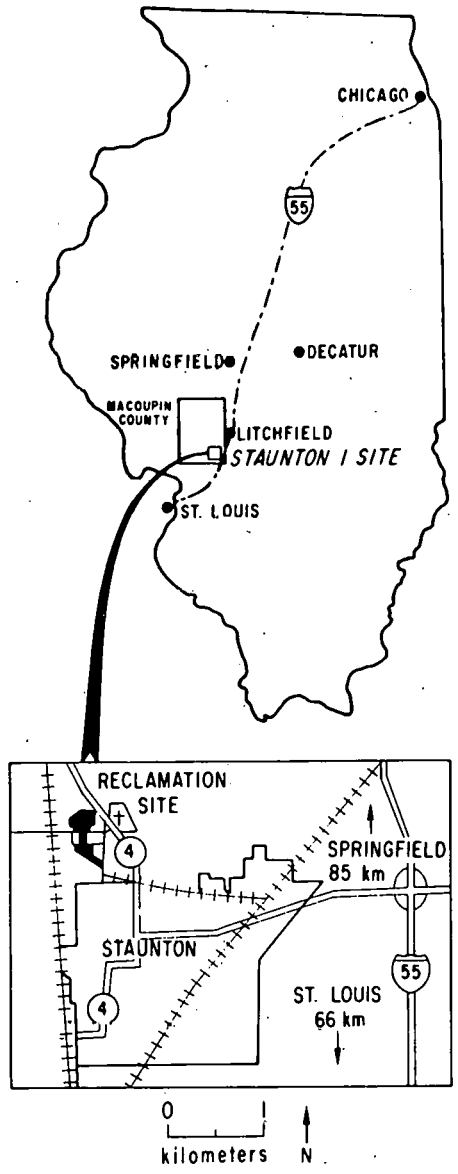

Fig. 2.1. Location of the Macoupin County Reclamation Site

There are at least 14 state-owned recreational areas within an 80-km radius of Staunton; several are located on the Illinois and Mississippi rivers and others are near large reservoirs such as Rend Lake, Carlinville Lake, and Carlyle Lake. The city council of Staunton suggested that the reclaimed refuse site be used as a combined recreational, wildlife, and environmental education area for the residents of Staunton.

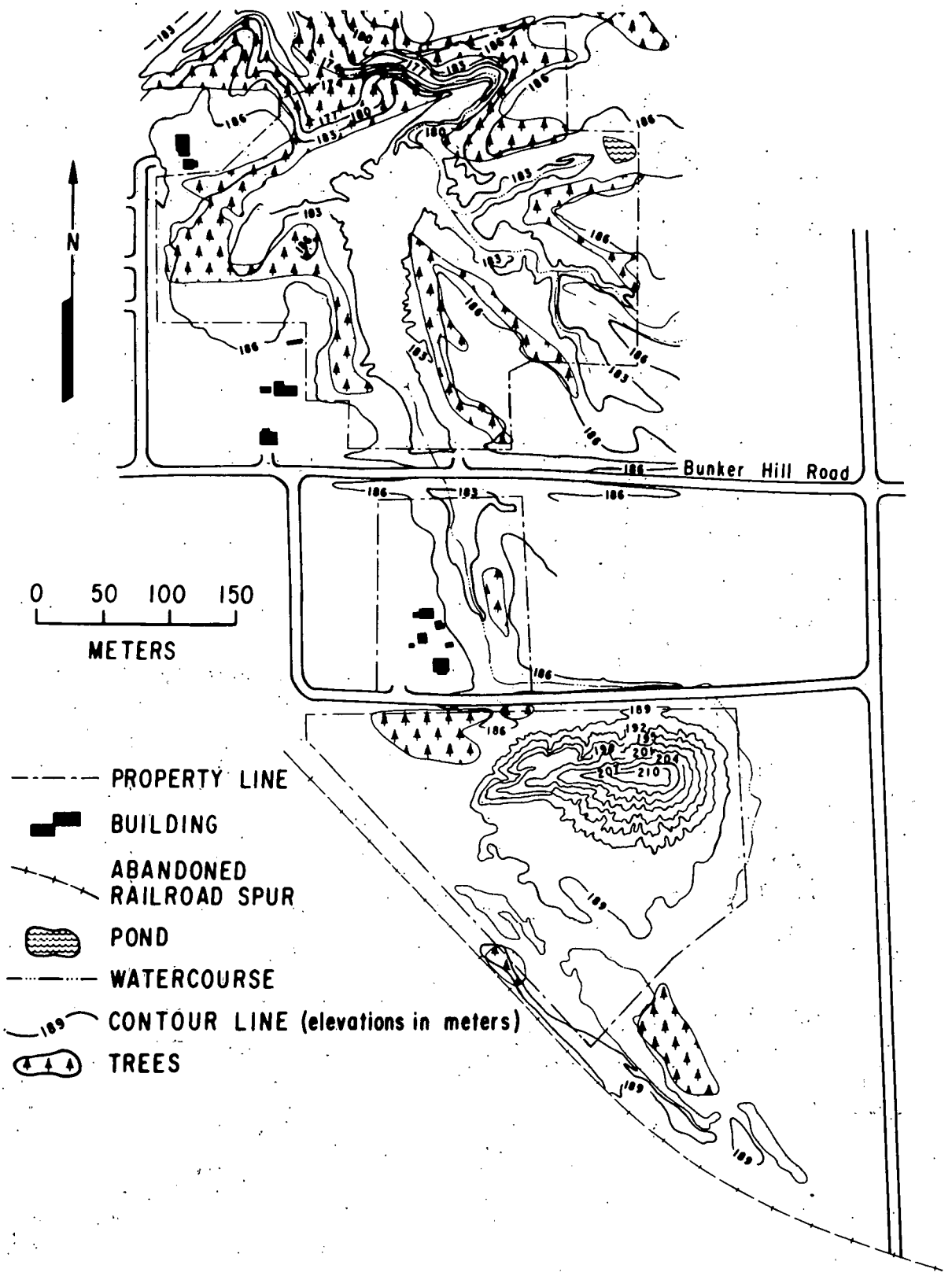

Fig. 2.2. Map of the Area before Reclamation

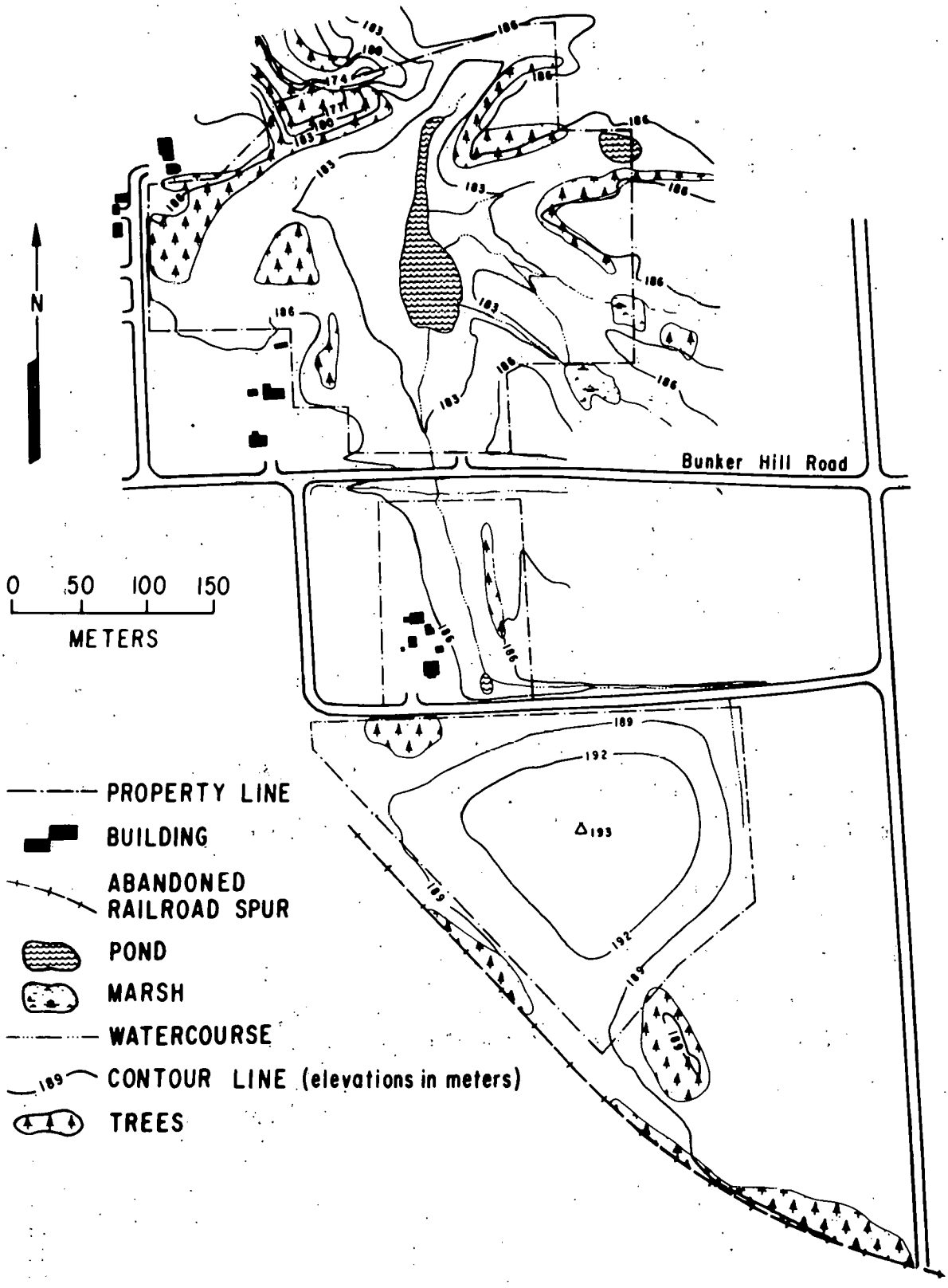

Fig. 2.3. Map of the Area after Reclamation

2.2 THE STAUNTON POPULATION

There are approximately 1800 households in the city of Staunton. The average household size, based on 1978 population figures, is 2.4 persons. According to the 1970 census, 27.9% of Staunton households were on Social Security. Of those in the total population over the age of 25, 10.7% were educated beyond high school, and about 44% had completed high school. The entire population is Caucasian.

Staunton's historical roots are in the coal-mining industry. Many of its people worked in nearby underground mines or had relatives who worked in the mines. Having no major industries of its own now, the Staunton labor force gains much of its employment in the nearby cities of Alton, East St. Louis, and others where petroleum refining and other manufacturing industries are situated on or near the Mississippi River. Employment in transportation is also common because of the proximity to major transportation routes. Mean income for all Illinois workers in 1977 was $12,900 annually; estimates of mean income for the study area in 1977 range from $10,600 for Macoupin County to $16,000 (in 1978) for production workers in central Illinois standard metropolitan statistical areas.* The city is a convenience center and residential area for people who work or farm nearby, similar to a number of other small towns in the region (Richard E. Nichols Associates,1978).

About 15 households are located in Parksville; residents here gain their livelihood partly from farming. Cash crops such as corn and soybeans are common, and some livestock is sustained on these farms as well. Census data on these households were not available for this study.

By June 1978, Staunton residents were well aware of the Macoupin reclamation project through word-of-mouth, minutes of town council meetings published in the weekly Staunton Star Times, one or two small articles on the topic in that paper, and articles in other local papers such as the Edwardsville Intelligencer and Alton Telegraph.

*From Illinois Bureau of Employment Security, average weekly earnings estimates for 1977 for Illinois and Macoupin County. Earnings for production workers in central Illinois are based on July-August 1978 estimates.

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3 APPROACH TO ANALYZING PUBLIC VIEWS OF RECLAMATION

Because this reclamation project was intended as a demonstration of the appropriate methods for approaching a statewide reclamation program, it was important to obtain evaluations of the reclamation from those individuals most affected by it. Since the town council had approved recreational use of the site, public satisfaction of such a use was assumed to exist. However, this assumption needed to be tested in order to understand evaluations of the site. A survey of Staunton residents was undertaken to investigate perceptions of the reclamation and its value to themselves and others. The personal-interview approach seemed best for obtaining a cross-section of responses to many questions aimed at determining the social value of reclamation.

The consensus among professionals familiar with the Macoupin project was that the residents of Staunton generally viewed the project favorably. Measurement of attitudes toward this reclamation project might indicate how other communities would view reclamation and abatements of environmental damages, assuming the Illinois population holds similar attitudes about the need for environmental protection. It might be expected that people view a project favorably when it is close to their homes, but that interest declines in similar benefits elsewhere. A change in perception toward living near the reclaimed site might also indicate favorability toward the project. In addition, it was supposed that most respondents would be familiar with some of the detrimental characteristics of mine refuse and would reveal that awareness through survey questions about limitations on uses of the site.

Informal interviews with city officials and Staunton residents had previously revealed that there were few recreational facilities in the town, a problem that was especially acute for teenagers. Therefore, it was expected that respondents, especially those with children or who had raised children, would support recreational use of the site. Appendix A provides further background on reclamation for recreation.

The value of a cleaner environment has in recent years been approached through surveys carefully designed to elicit willingness-to-pay values for environmental improvements (Smith, Conrad, and Storey, 1978; Randall, Ives and Eastman, 1974; Brookshire, Ives and Schultz, 1976; Davis, 1963). Appendix A also contains a brief discussion of this concept, its evaluation, and its relative merits. A recent study obtained Appalachian residents' valuations, or willingness to pay, for reclamation of strip-mining areas in Appalachia (Randall et al., 1978). Questions constructed for interviews with Staunton residents were oriented toward obtaining attitudinal as well as willingness-to-pay valuations of the reclamation, for comparative purposes. A secondary aim of the questions was to determine if the preferred land use on the site is primarily that of recreation.

The relationship between income and willingness to pay is expected to hold. Education and occupation as indicators of income or status may also be related to willingness to pay. Years of residence in the town may also be indicative of a commitment to pay for the local improvements. The value of improvements for the community will probably be recognized by those who

are more involved in community organizations, that is, willingness to pay could be positively related to memberships in organizations. Prior knowledge of the intended recreational use of the reclaimed area may influence respondents statements about preferred uses of the land; thus, some caution must be used in drawing relationships between the respondents' preferred use of the site for recreation and willingness to pay.

3.1 SURVEY ADMINISTRATION

A sample of households in Staunton was obtained by systematically drawing addresses from a list of water customers in the city.* In addition, as many Parksville residents as possible were interviewed; because these individuals were probably affected most by reclamation in terms of land value, aesthetics, and potential uses of the site, their responses are counted with those of the Staunton residents.

Letters describing the survey and asking for participation were printed on Argonne National Laboratory letterhead, signed by the project coordinator, and sent to the selected addresses in Staunton. An article describing the survey was published in the local newspaper, and officials of Staunton provided a letter of introduction to show to potential respondents. In anticipation of interviewing some people who were unaware of the reclamation project, care had been taken not to reveal the specific subject of the interview in the letters and newspaper articles.

A small number of interviews (N = 10) were conducted on July 6 and 7 as a pretest; after several minor changes, interviewing was carried out during two time periods separated by one month. Tests of differences in response between the two time periods showed no significant variation. Appendix B contains a copy of the questionnaire, the information presented to respondents on cards, and the before-and-after reclamation photographs of the site that were shown to each respondent.

3.2 DATA ANALYSIS TECHNIQUES

The information obtained in the survey was coded for statistical manipulations using the Statistical Package for Social Sciences (SPSS) on an IBM-370 Model 195 computer at Argonne National Laboratory. Recoding of variables was done for certain analyses, and some hand tabulations were carried out.

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*The list consisted of addresses of all homes, businesses, and organizations that used the city water system. Members of the Staunton city clerk's office helped identify businesses and some vacant houses to be excluded from counting and apartment units to be included in the count. Every eighth residence on the list, ordered by streets, was selected. Subsequent reconnaisance of the addresses chosen showed no obvious systematic bias introduced by the method of drawing the sample. The number eight was chosen because it provided more than 200 addresses, the maximum number expected to be completed within the time and cost constraints of the project.

4 EMPIRICAL RESULTS OF THE SURVEY

4.1 RESPONSE DATA

Of the 136 residents in Staunton who were actually contacted, 110 questionnaires were completed (Table 4.1). Plotting of interviewees' locations showed a lower concentration of completed questionnaires in portions of the far south and west extensions of Staunton. A slight bias toward higher-income households may exist because subjective evidence indicates that these far south and west portions may contain more retired citizens and lower-income households. However, it is uncertain whether a bias actually exists because Staunton exhibits a relative homogeneity in most of its districts, mainly due to its aging-in-place population.

In Parksville, nine households adjacent to the mine area were interviewed (zero refusals). Those responses were added to the Staunton responses for tabulations (except for willingness-to-pay amounts) bringing the number of completed questionnaires to 119.

4.2 THE SAMPLE POPULATION

The average age of the sample population of 119 is 45 years, ranging from 17 to 96 years, with 39.5% rearing children below 18 at home, and 43.6% having grown children who have left home. Friends and family of most respondents live in the Staunton area. Sixty-five percent of the sampled residents had completed some high school, compared to 44% in the 1970 census; 22.6% had some college education, compared to 10.7% in 1970.

Table 4.1. Response Rate for Staunton Sample Population

Sample drawn[a]	267
Vacant	42
No answer[b]	47
Not located	42
Refusals	26
Completed questionnaires	110
Total number contacted	136
Response rate = $\frac{110}{136}$ = 80.9%	

[a]Excludes Parksville residents. Replacement samples were drawn upon receiving returned mail by choosing either an odd or even numbered house (based on a coin toss) nearest to the house being replaced.

[b]Up to three callbacks per house.

The mean annual income level of the sample is about $15,000. This is considerably higher than the mean 1977 income for Macoupin County residents, but is consistent with statewide 1977 average incomes and 1978 production workers' earnings for central Illinois (see Section 2). Production workers comprise only 5% of the respondents, although when employment of spouses of housewife respondents (N = 29, or 24%) was considered, production workers totaled 21% of the sample households. About 28% of the sample were retired citizens, which is comparable to the 1970 census levels (27%) for this population. An additional 23% of the sample were service workers, 13% were professionals or tradespeople, and 7% were in wholesale or retail trade. Census data for 1970 are not directly comparable to these employment figures, and although the relative proportion of retired persons in the sample is the same as the census proportion, information about net migration flows of the Staunton population since 1970 is unavailable to substantiate this cross-section.

4.3 PREFERENCES FOR SITE USE

Respondents were asked about the types of land use they would like to see on the reclaimed site if it were (1) owned by the respondent, or (2) owned by the public. Responses to choices of land use are shown in Tables 4.2 and 4.3. Favored land uses in private ownership are private (fee) recreation, city housing, and return of the land to premine use. The large response to recreation seems unusual when a respondent, as the hypothetical landowner, could consider more traditionally profitable uses of private land. The influence of publicity about proposed uses of the site is assumed to be operating in this response category, and possibly the influence of the restricted categories offered in the questionnaire. Under public ownership, the overwhelming first choice is recreation, with educational use and a nature preserve being close second choices.

Respondents with children at home or who had raised children mostly preferred recreational use over other uses of the site, but not in any greater proportion than those without children. There was, in general, recognition of the desirability of having more recreation facilities for children near the town, as expressed in respondents' frequent statements that the type of recreation needed was "something for the kids."

Questions 22 and 24 of the questionnaire asked what kinds of recreation would be desirable on the reclaimed site and in Staunton. This was done in an open-ended format before any specific recreation facilities were discussed. Respondents were also asked what they do for a recreational outing lasting a few hours. There is a difference between what respondents want for recreational activity both on the reclaimed area and in Staunton, and what they actually do for recreation, as shown in Table 4.4. Obviously, this may be due to lack of opportunity to participate in the desired activities. Alternatively, it may be that respondents are simply naming conventional types of recreation for the site; within the time frame of an interview, unusual recreational activities may not come to mind. Also, respondents' recreational desires may differ from what the respondents want for others and for children. There may be an influence of prior knowledge of recreational facilities proposed on the site, although water-based activities were not proposed and yet received the highest frequency of response.

Table 4.2. Respondents' Preferred Use of Reclaimed Land if Owned by Respondents[a]

Land Use	First Choice	Second Choice
What it was before mining (timber and pasture)	16.8	11.8
Agriculture (rowcrops, pasture)	9.2	14.3
City housing	21.8	10.1
Acreages	5.0	3.4
Leave as is now	6.7	10.9
Private recreation	23.5	18.5
Private commercial development	8.4	8.4
Other	8.4	9.2
Missing	0.0	13.4

[a]In percent of responses; totals may not add to 100.0 due to rounding.

Table 4.3. Respondents' Preferred Use of Reclaimed Land in Public Ownership[a]

Land Use	First Choice	Second Choice
What it was before mining (timber and pasture)	3.4	3.4
Community facility (church, hall)	5.9	16.0
Nature preserve	13.4	19.3
Park or recreation area	64.7	10.1
Fairgrounds	0.8	3.4
Leave as is now	5.0	8.4
Educational use	5.0	21.0
Other	1.7	6.7
Missing	0.0	11.8

[a]In percent of responses; totals may not add to 100.0 due to rounding.

Table 4.4. Types of Recreation That Respondents Participate in, Would Like in Staunton, and Would Like on the Reclaimed Area[a]

	Mentioned Participating in Activity	Would Like in Staunton	Would Like on Reclaimed Area
Park, picnic area, playground	21.0	16.0	45.3
Passive outdoor (e.g., camp, relax outdoors, mushroom hunt, nature study, being outdoors, sunbathing)	14.3	15.1	5.9
Water-based (swim, fish, boat, sail, being at a lake)	40.3	43.6	38.7
Indoor active (dance, bowl, rollerskate)	0.8	7.6	13.4
Outdoor games and sports (tennis, all types of ball games, archery, mini-golf, horseshoes)	14.3	19.3	45.4
Indoor passive (shop, eat out, visit friends, cards, community center, read)	35.3	10.9	3.4
Scheduled events (shows, carnivals, auctions, church)	19.3	13.4	8.4
Trails (horse, bicycle, nature)	0.8	5.0	13.4
Hunt	2.5	2.5	___

[a]In percent; totals do not add to 100.0 because many respondents mentioned more than one activity.

According to the table, respondents do not mention participation in each category as frequently as they mention wanting that type of recreation. Passive indoor recreation and attending scheduled events are exceptions, both activities are in keeping with the present opportunities available in and near Staunton. Water-based activities are also available within a reasonable distance from Staunton, but are still desired closer to the city. Although a small percentage said that they would like trails, few

said that they actually go hiking, walking, or bicycling for recreation. Bicycling by both adults and children was frequently observed in Staunton, but may not be viewed as a major form of recreation.

Table 4.5 presents respondents' positions on some of the recreational needs of the town. A city park, fishing area, playing fields, bicycle or hiking trails, and a picnic area, respectively, score highest, while a motorcycle track scores lowest, significantly among older respondents (τ = 0.2546).* The importance placed on bicycling and hiking trails is again contrasted with the few who said they actually bicycle and hike.

Only 3.4% of the sample opposed tourists coming into Staunton should there be some attraction such as a recreational development on the reclaimed site. About 80% of the sample said they would visit the site if it had a recreational use that they liked; there was, however, a negative correlation coefficient (τ = -0.2597) in a cross-tabulation by years of residence, which logically suggested that elderly residents were less likely to visit the mine area for recreation. Stage-in-life cycle affected responses to visiting the area; the more involved in child rearing, the more likely the respondent was to visit the area.

Table 4.5. Reported Importance of Having Selected Types of Recreation in or near Staunton[a]

Recreation Type	Important	Neutral	Unimportant	Missing
Nature center	63.8	23.5	12.6	—
Wildlife preserve	63.8	21.8	14.2	—
City park	82.3	8.4	9.2	—
Museums	43.6	28.6	27.7	—
Campground	58.8	8.4	32.0	0.8
Fishing	75.7	13.4	10.8	—
Motorcycle track	16.8	10.1	73.2	—
Playing fields	70.6	13.4	16.0	—
Bicycling or hiking trails	81.5	7.6	10.9	—
Shooting range	32.8	21.8	45.4	—
Off-road vehicle park	25.2	21.0	53.8	—
Picnic area	81.4	5.9	4.2	8.4

[a]In percent of responses.

*Kendall's tau$_b$ (τ_b) correlation coefficient ranges from +1 to -1, where a $\tau > 0$ indicates a direct relationship and $\tau < 0$ indicates an inverse relationship between two variables.

Table 4.6. Favorability toward Reclamation[a]

Statement	Very Important	Important	Of Little Importance	Neutral	Somewhat Unimportant	Unimportant	Very Unimportant	Total[b]
Personally important that reclamation was done	35.2	17.6	11.8	24.4	2.5	1.7	6.7	99.9
	Very Good	Good	Somewhat Good	Neutral	Somewhat Bad	Bad	Very Bad	Total
Generally good that reclamation was done	63.0	20.2	10.1	5.9	0.8	---	---	100.0
	Agree Strongly	Agree	Agree Somewhat	Neutral	Disagree Somewhat	Disagree	Disagree Strongly	Total
Other piles near Staunton should also be reclaimed	68.1	10.9	7.6	8.4	1.7	---	3.4	100.1
Other piles in Illinois should be reclaimed	58.0	19.3	10.1	8.4	2.5	---	1.7	100.0
Reclamation should not have been done	0.8	1.7	---	6.7	10.9	6.7	73.1	99.9

[a]In percent of responses; totals may not add to 100% due to rounding.

Recreational use of the reclaimed site is most preferred by respondents. Facilities for outdoor games and sports, a park with a picnic area, and playground are mentioned most frequently as desirable, although water-based recreation, bicycling or hiking trails, and indoor active sport areas are also deemed important.

4.4 VIEWS OF RECLAMATION

The majority of respondents had come to know about the reclamation through the newspapers (45.4%), word-of-mouth (33.6%) or driving by (10.1%). A small percentage (6.0%) of respondents said they had not heard about the project until the interview or within a month of the interview, while 73.1% had heard about it two or more years before the interview.

After showing respondents the before-and-after photographs of the site (Figures B-1/B-8), evaluations were sought using a summated rating scale of the Likert type. These evaluations were based on: how important the reclamation was to the respondent, the worth of the completed project, or whether other such sites near Staunton should be reclaimed, and if other abandoned mine spoils in Illinois should be reclaimed. State and town involvements were also evaluated, as was the question of whether the reclamation should have been done.

Table 4.6 shows the results for each of these questions. Individual evaluations of the personal importance of the reclamation were lower than individual evaluations of the general good engendered by the reclamation, although only 10.9% of the respondents, i.e., those who chose "unimportant" categories, said that the reclamation was of no personal importance. This suggests that the reclamation is indeed viewed favorably, as does the large negative response to the proposition that the reclamation should not have been done. As expected, the proposal for reclamation of other mine sites near Staunton was more positively evaluated than reclamation of other sites throughout Illinois. When asked if the reclamation had changed their opinion about living near the reclaimed site, 59.7% said yes, 34.5% said no, and the remainder were not certain.

An index of favorability was created by recoding the variables in Table 4.6 (Appendix C). Favorability levels were grouped as low, medium, or high, with the distribution of respondents among these categories shown in Table 4.7. Seven respondents were generally unfavorable toward the reclamation, while the majority viewed the reclamation most favorably.

Cross-tabulation of the favorability index with preferences for private land uses (i.e., if the respondent owned it) on the reclaimed area show that preferences of those respondents who were generally unfavorable or neutral toward the reclamation area were for premine use and "other" land uses on the reclaimed area (Table 4.8). The next category of moderately favorable respondents preferred housing (26.5%), private recreation (23.5%), premining use (14.7%), and agriculture (11.8%). Those having the highest favorability preferred private recreation (24.4%), housing (20.5%), and premine land use (16.7%) if the land were privately owned.

Table 4.7. Favorability Index of Attitudes toward Reclamation

Response	Percent	Number
Low (very negative to neutral)	5.9	7
Medium (somewhat positive to positive)	28.6	34
High (very positive)	65.5	78
	100.0	119

In Table 4.9, favorability levels are compared with preferences for land uses on the site in public ownership. A park or recreation area was most preferred by all three groups.

Correlation coefficients and significance levels of several variables related to the favorability index are given in Table 4.10. As shown, there is a strong correlation between a stated change in opinion about living in the area near the reclaimed land and high favorability toward reclamation. Neither stage-in-life cycle nor level of education appear to be related to favorability. Favorability toward the project is linked to perceptions of publicity that Staunton received and stated desires to visit the mine area.

Only 5.9% of respondents believed that there would be a site-specific problem with developing the site for preferred uses, as shown in Table 4.11. Many saw no problems, and some cited supervisory and maintenance problems, reflecting awareness of recent problems with vandalism and maintenance in local recreation clubs. The remainder stated that other developmental or distance problems could be associated with the site.

Reclamation is viewed very favorably by the majority of the respondents, but there is very little stated awareness of site-specific environmental problems with developing reclaimed sites for various uses. Changes in opinion about living near the reclaimed site, a willingness to visit the area for recreation, and perceptions of increased publicity for Staunton as a result of reclamation appear to be indicators of favorability toward reclamation in this case. A high percentage of very favorable respondents also desired recreation on the site, and respondents were more favorable toward reclamation close to home than elsewhere in the state.

4.5 EVALUATION OF RECLAMATION

Two willingness-to-pay questions were included after orientation about the site. The first question asked simply if the respondents thought that the reclaimed area was now worth more to them in some way. Regardless of their answer to this question, they were then asked how much it was worth to them in dollars per month, assuming contributions were solicited.

Table 4.8. Cross-Tabulation of Favorability Index with Preferences for Use in Private Ownership

	Preference for Land Use[a]								
Favorability	Premine Use	Agriculture	City Housing	Acreages	Leave as is Now	Private Recreation	Private Commercial	Other	Total
Low	1.7	0.8	0.8	0.0	0.0	0.8	0.0	1.7	5.8
Medium	4.2	3.4	7.6	0.8	1.7	6.7	2.5	1.7	28.6
High	10.9	5.0	13.4	4.2	5.0	16.0	5.9	5.0	65.4
Total	16.8	9.2	21.8	5.0	6.7	23.5	8.4	8.4	100.0

[a]In percent of respondents.

Table 4.9. Cross-Tabulation of Favorability Index with Preferences for Use in Public Ownership

	Preference for Land Use[a]								
Favorability	Premine Use	Community Facility	Nature Preserve	Park or Recreation Area	Fair-Grounds	Leave as is Now	Education	Other	Total
Low	0.8	0.0	1.7	1.7	0.0	0.8	0.8	0.0	5.8
Medium	0.8	0.0	1.7	22.7	0.0	1.7	0.8	0.8	28.5
High	1.7	5.9	10.1	40.3	0.8	2.5	3.4	0.8	65.5
Total	3.3	5.9	13.5	64.7	0.8	5.0	5.0	1.6	100.0

[a]In percent of respondents.

Table 4.10. Correlation Coefficients for Favorability toward Reclamation and Test Variables

Test Variables	Correlation with Favorability Index (Significance Level)
Opinion changed about living in area	0.3192 (.001)
Stage-in-life cycle	0.1059 (.225)
Education	0.1299 (.131)
Publicity increased	0.1530 (.061)
Willingness to visit mine area	0.1684 (.044)

Table 4.11. Perceived Problems Associated with Land in Preferred Public Use

Category	Percent of Respondents[a]
Developmental (e.g., funding)	13.4
Supervisory and maintenance	21.8
Site-specific, environmental	5.9
Distance, other	16.8
No problem	39.5
Uncertain	2.5
Total	100.0

[a]Totals may not add to 100% due to rounding.

It was found that 78.2% (N = 93) of the respondents thought the reclaimed area was worth more to them now, in some way, than before it was reclaimed. When a monetary value was requested, only half (N = 46) of those who had said it was worth more would actually state a value other than zero. Responses ranged from zero to $50 per month, with 61.3% saying zero, 12.6% from zero to $1, 18.5% from $1 to $5, and 7.6% willing to pay $5 and up per month. The average willingness to pay of the entire sample is $2.06 per household per month. Staunton households alone were willing to pay an average of $1.69 per household per month, with a range of zero to $27.50 per month.

The high number of zero responses is unusual compared to other willingness-to-pay studies; however, there are several possible reasons for this response. Previous studies have focused on the willingness to pay of users of the resource in question (Davis, 1963; McConnell, 1977; Smith et al., 1978). Among resource users, the effect of change on their use may readily be imagined and responded to in terms of monetary value. In this case, willingness to pay was elicited for the environmental improvement as it is now, i.e., without any use. The value of certain uses of the site was not in question. Upon being asked to evaluate the reclamation as a public good, much as one would evaluate clean water or air, it might be expected that a large number of respondents would bid zero, although psychological and other factors may be operating despite precautions taken to prevent overstatement or understatement of bids (see Appendix A). Because the photographs showed the site before and after reclamation, respondents should have been able to imagine exclusion from the resource. Part of the zero response might be explained by some respondents' difficulty with settling on a particular value without some idea of where to start. The time constraint and other pressures inherent in the interview might also have contributed to their choosing the easiest answer, i.e., zero. The high proportion of low-income retired people in the sample suggests that their responses may have been zero because of income constraints. It was found, however, that there was no consistent difference between their response and that of higher-income people. The results of these willingness-to-pay questions suggest the need for more careful design and ordering of questions and a closer look at factors influencing respondents' views of reclamation and willingness to pay.

Because it was generally known that recreational use of the site had been considered by the city, a possible link between willingness to pay and preferred use of the site was examined. Table 4.12 shows that the greatest percentage of those willing to pay an amount in both public and private ownership prefer recreational use. The result suggests that willingness-to-pay responses may not be an evaluation of the aesthetic improvement alone, but are based on the potential recreational value of the land as well.

Recreation, wildlife preservation, and environmental education are the proposed uses of the site which were publicized in the local newspaper. Since a high percentage (67.2%) of those who are willing to pay desired recreational use of the reclaimed site, it might be inferred that those respondents are willing to pay only if recreational use of the site is adopted. An additional 19.4% of those willing to pay stated preferences for a nature preserve and educational use. The other choices listed in Table 4.12 for public ownership may not have seemed as attractive as the recreational option, although it is assumed that the stated preference is a real desire uninfluenced by the question design. If willingness to pay in this case is tied to desires for the proposed uses of the site, there could be a reduction in willingness to pay by about 5% of the sample.*

*From Table 4.12, "Public Ownership." The sum of those willing to pay for converting land to premine use, community facility, leaving as is now, and other is 4.9%.

Table 4.12. Willingness to Pay Related to Preferred Uses of Land in Public and Private Ownership

Public Ownership				Private Ownership			
Preferred Use	Percent of Sample Preferring Use	Percent Willing to Pay an Amount (N = 119)	Percent Who Stated Area is Personally Worth More	Preferred Use	Percent of Sample Preferring Use	Percent Willing to Pay an Amount (N = 119)	Percent Who Stated Area is Personally Worth More
Premine	3.4	0.8	1.7	Premine	16.8	5.9	11.9
Community Facility	5.9	1.7	4.2	Agriculture	9.2	2.5	7.6
Nature Preserve	13.4	6.7	9.3	City Housing	21.8	5.8	16.9
Park or Recreation Area	64.7	26.0	54.2	Acreages	5.0	1.6	4.2
Fairgrounds	0.8	0	0.8	Leave as is Now	6.7	5.0	6.8
Leave as is Now	5.0	1.6	3.4	Private Recreation	23.5	13.4	19.5
Educational	5.0	0.8	4.2	Commercial Development	8.4	0.8	5.9
Other	1.7	0.8	0.8	Other	8.4	3.4	5.9
Not Willing to Pay	___	61.3	21.1	Not Willing to Pay	___	61.3	21.2
Total[a]	100.0	100.0	100.0		100.0	100.0	100.0

[a]Totals may not add to 100% due to rounding.

Several variables thought to be possible explanatory variables on willingness to pay were recoded where necessary and submitted for the correlation shown in Table 4.13. A socioeconomic scale (SES) was developed after Nie et al. (1975), combining income, education, and occupational status variables when it was found that family income was not itself significantly related to willingness to pay (Appendix C). Occupation was recoded from an earlier version of this paper (Bernard, Jacalyn, Reclamation of Land from Coal Mining for Recreation: A Case Study, Michigan State University, M.S. Thesis, 1979) to reflect occupation of the spouse of housewife respondents. Thus, family income and occupational status contained a more direct relationship in SES than found previously. Also included was the favorability index.

As shown in the table, SES is significantly related to willingness to pay an amount ($\tau = 0.1561$). Contrary to what was expected, years of residence in the area and memberships in organizations were not related to stating higher amounts of payment. This may be because many years of residence usually means retirement and reduced ability to pay and to use, while involvement in organizations apparently does not necessarily imply a commitment to pay for environmental improvements.

Higher payment amounts were given by those respondents who were highly favorable toward reclamation, said the area was worth more to them in some way, and strongly agreed that they would visit the area for recreation. A positive change in opinion about living near the area was also related to higher amounts that respondents were willing to pay. Respondents with children were more likely to pay an amount and more likely to want to visit the area for recreation. Their opinion about living near the area was not likely to change, possibly because of their perceptions of mobility. Although there was a positive correlation between favorability toward reclamation, personal worth of the project, and willingness to pay, respondents having children demonstrated neither a positive nor negative relationship to levels of favorability toward reclamation or to agreement that the reclaimed area is worth more to them than before. On the other hand, respondents with children had the highest significant relationship to wanting to visit the area. In contrast, highly favorable responses and stated increases in personal worth of the area were also significantly related to wanting to visit the area.

Thus, it appears that there may be two groups of respondents who are willing to pay amounts: those whose opinion has changed about living near the area are highly favorable toward reclamation and feel that the area is worth more to them; and those who have children and may wish to ensure the provision of public facilties for the future. The former group may also have been influenced by publicity about the reclamation, as may be indicated in Table 4.13. Both groups tended to have a higher SES than those who were not willing to pay amounts.

Table 4.13. Nonparametric Correlation of Test Variables[a]

	Willingness to Pay An Amount	Years of Residence	Publicity Increase	Visit for Recreation	Sex	Change in Opinion	Organization Memberships	Age	Favorability Index	Personally Worth More	Socioeconomic Scale
Years of Residence	-0.0857 (.234)										
Publicity Increase	0.0900 (.246)	0.0657 (.334)									
Visit for Recreation	0.2716 (.001)	-0.2331 (.001)	0.1012 (.177)								
Sex	-0.0781 (.369)	0.0871 (.253)	0.1202 (.143)	-0.2281 (.007)							
Change in Opinion	0.2094 (.014)	-0.0137 (.854)	0.0487 (.544)	0.0884 (.281)	0.0639 (.477)						
Organization Memberships	0.0406 (.605)	0.0845 (.219)	0.0094 (.900)	-0.0758 (.317)	0.1108 (.182)	-0.0524 (.518)					
Age	-0.1316 (.086)	0.3970 (.001)	0.0457 (.527)	-0.3622 (.001)	0.0978 (.227)	-0.0502 (.525)	0.1661 (.023)				
Favorability Index	0.2286 (.008)	-0.1316 (.083)	0.1530 (.061)	0.1684 (.044)	0.0148 (.872)	0.3192 (.001)	0.0763 (.357)	-0.1414 (.080)			
Personally Worth More	0.2942 (.001)	-0.1288 (.090)	0.2427 (.003)	0.1893 (.024)	0.0106 (.908)	0.2183 (.015)	0.0626 (.450)	-0.1120 (.165)	0.1348 (.140)		
Socioeconomic Scale	0.1561 (.035)	-0.0746 (.249)	-0.0528 (.449)	0.1539 (.031)	0.0276 (.724)	0.0184 (.810)	-0.0037 (.958)	-0.4063 (.001)	0.2060 (.008)	0.1215 (.119)	
Stage in Life	0.2508 (.002)	-0.1591 (.028)	-0.0317 (.685)	0.2474 (.002)	-0.2533 (.004)	-0.1944 (.023)	-0.0198 (.803)	-0.3714 (.001)	0.1059 (.225)	-0.0198 (.821)	0.1051 (.162)

[a]Kendall's tau_b. Significance level shown in parentheses.

5 RECOMMENDATIONS FOR USE OF THE SITE

Considering the high percentage of respondents who expressed that they would visit the area if it had a preferred recreational use, and the general findings in Tables 4.2-4.5, it is fairly clear that there are several recreational options receiving a high level of support. It must be remembered, however, that many options not explored in this survey may also be desirable.

It is recommended that the reclaimed area near Staunton be developed initially as a low-intensity-use park, containing modest facilities for picnics and perhaps a playground. Part of the site could be devoted to a nature preserve with a short nature trail bordering the area nearest Cahokia Creek. A bicycle trail from Staunton to the park is also suggested. These developments can be achieved without unduly disturbing the reclamation while using highly attractive areas of the site. Other uses that respondents deemed as important to have in or near Staunton, such as campgrounds and playing fields, are possible but not compatible with the limitations on site use at this time.

Table 5.1 estimates the demand for recreation at the site based upon the results of the survey and estimates of recreational participation from the Illinois Outdoor Recreation Plan (1978) and the Heritage Conservation and Recreation Service reports. An evaluation of substitute sites for each activity in the area led to rough estimates of the proportion of participation in each activity that would be spent at the reclaimed area for the types of recreation proposed. Table 5.2 estimates the actual facilities the site may contain, and the use capacity of those facilities for a conservatively estimated season of use. The capacity of the facilities is then compared to the demand estimates derived from Table 5.1. These broad approximations show a possible need for expansion of picnic facilities if demand increases as a result of such factors as population increases in the area, shifts of population into the Parksville area, or unexpected increases in the demand for local recreation facilities of that type.

The costs of the proposed facilities for recreation on the site are estimated in Table 5.3. Careful planning of facility placement in keeping with site characteristics will prevent exposure of acid spoils and possible corrosion of underground elements of facilities. The cost of proposed recreation facilities on the site is estimated at $43,100 plus some annual maintenance, although this cost to Staunton could be reduced further if some facilities are constructed using donated equipment and labor, and if matching state or federal recreation funds are procured.

Table 5.1. Estimated Demand for Types of Recreation on Reclamation Site[a]

Activity	Recreational Preferences on Reclamation Area, Percent of Respondents[b] x	Expected Percent of all Annual Visits to Reclamation Area[c] v	Recreation Participants by Activity[d] 1975 r_1	1995 r_2	Demand in Recreation Days[e] 1975 D_1	1995 D_2
Picnic	45.3	10.0	7.68[f]	--	1239	--
Passive Outdoor:	5.9	5.0				
Camping			2.84	3.39	37	43
Nature Study			3.61[f]		38	--
Water Based:	38.7	10.0				
Fishing			3.38	5.00	575	827
Swimming			7.21	8.02	1227	1327
Indoor Active	13.4	20.0	--	--	--	--
Outdoor Games and Sports	45.4	20.0	17.38	--	5594	--
Indoor Passive	3.4	10.0	--	--	--	--
Events	8.4	10.0	8.88	--	263	--
Trails	8.4	10.0				
Bicycling			3.71	4.47	137	161
Hiking			3.09	3.80	114	137
Hunting	0.0	--	--	--	--	--

[a]In recreation days per year. A recreation day is one visitor spending all or part of a day in that activity.

[b]Reflects desires for use of the site, and to the extent that it may also reflect the desire for participation in those activities, is helpful in the measurement of demand. For example, it is inferred that 45.3% of the representative sample is expressing their desire to participate in picnic activities on that particular site.

[c]An estimate of the fraction of annual recreational visits from Staunton that the reclamation area will attract, based on a count of substitution sites in the area.

[d]From Illinois Department of Conservation (1978).

[e]Assumes that the sample is relatively representative of the Staunton area and that activity preferences (x) and availability of substitute sites (v) do not change from 1975 to 1995. Demand is determined according to:

$$D_1 = 4396\ xvr_1$$

$$D_2 = 4276\ xvr_2$$

where:

the 1975 and 1995 populations (note the decline) are adjusted for participation by (xvr) such that

x = the percent of respondents who stated that activity as a preference for the mine area;

v = the percent of annual participation in that activity which may occur at that site; and

r = the participation per person for that activity in 1975 and 1995.

[f]Illinois Department of Conservation (1974). The participation rates from the 1974 report are considered high compared to the 1978 report, but no reliable adjustment could be made. No inference could be made about participation increases in those categories.

[g]U.S. Bureau of Outdoor Recreation (1972). Used when no Illinois estimate was available.

Table 5.2. Estimated Supply and Demand for Recreation at Reclaimed Site[a]

Facility	Est. Facilities Capacity[b]		Survey Demand Estimate		Demand as Percent of Probable Supply[c]	
	Per Weekend Day	Per Season (32 Weekend Days)	1975	1995	1975	1995
Picnic Area (8 Tables)	64	2048	1239	---	60.5	---
Hiking/Walking Trail - 0.8 km	20	640	114	137	17.8	21.4
Bicycle Trail 1.6 km	80	2560	137	161	5.4	6.3
	---	----	----	---	----	----
Total	164	5248	1490	---	40.8	---

[a]In recreation days, i.e., visitors spending all or part of a day in that activity.

[b]Sources of estimates: Illinois Department of Conservation (1974); U.S. Bureau of Outdoor Recreation (1970,1973). A weekend day is a unit used to estimate peak use of a recreational area.

[c]Demand estimates from Table 5.1.

Table 5.3. Estimated Cost of Recreational Facilities on Reclaimed Area

Facility	Description	Estimated Cost[a]
Non-Interpretive hiking trail	0.8 km	$ 4,820
Bicycle trail	1.6 km	17,450
Picnic tables	8 @ $135 each	1,080
Stoves	4 @ $95 each	380
Toilets, pit type	2 @ $1415 each	2,830
Parking lot (10 car - 14 m^2/car)	$13.40/$m^2$	1,880
Water supply	1 @ $4,940	4,940
Permanent park benches	4 @ $95 each	380
Garbage cans, incinerator	---	670
Signs and markers	---	60
Contingency, 25%	---	8,720
TOTAL		$43,210
Annual maintenance cost 1 student @ $600 for the summer (12 weeks)		

[a]Present (1980) value, using 6% interest rate. Equipment cost does not include installation.

Sources: U.S. Bureau of Outdoor Recreation (1973); Adams et al. (1973); Lane Stewart Co. Uninstalled Park and Playground Facility Estimates, 1978; and A. Weber, Landscape Architect, Illinois Department of Conservation.

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6 SUMMARY AND CONCLUSIONS

6.1 PREFERRED USE OF THE RECLAIMED AREA

A sample survey of residents in Staunton showed that recreational use of the nearby reclaimed mine area is preferred over other public or private uses. Frequently mentioned types of recreational facilities desired on the site were for outdoor games and sports, picnics, and a playground. Although water-based recreation was also a desired use of the area, the characteristics of the site preclude development of that water resource base in the near future. The majority of respondents, and especially those with low to middle incomes and/or those raising children, stated that they would visit the mine area if it had a recreational use that they liked.

6.2 VIEWS OF RECLAMATION

Reclamation is viewed very favorably by most respondents. In general, those who stated a positive change in opinion about living near the area, showed a willingness to visit the area for recreation, and thought that Staunton had received a great deal of publicity as a result of reclamation were also very favorable in their evaluations of the reclamation. A high percentage of those with a very favorable response also desired recreation on the site. Favorability toward reclamation for problem areas throughout the state of Illinois, however, was less strong than that toward reclamation on nearby sites.

There is little evidence of respondent awareness of site-specific environmental problems (such as toxic materials exposure) that may be encountered in developing reclaimed sites for various uses.

6.3 EVALUATION OF RECLAMATION

More than three-fourths of the sample thought the reclaimed area was now worth more to them, in some way, than before reclamation. Only half of those respondents were actually able to state a monthly value they would be willing to pay to have the area reclaimed to its present state. No particular use of the site was associated with the request for willingness to pay, although two-thirds of those willing to pay desired public recreational use of the site. It appears that those with higher socioeconomic status are willing to pay higher amounts.

Further analysis of the relationships between willingness-to-pay responses and other variables revealed that two groups of respondents were stating amounts of payment. The first group is composed of those who expressed positive changes in opinion about living near the area, had very favorable evaluations of the reclamation, and thought the reclaimed area was worth more to them in some way. The second group appears to be composed of respondents who have raised or are raising children, and who state that they are willing to pay because they would visit the area for recreation.

6.4 CAVEATS

Prior knowledge of the reclamation project among respondents was expected, but its extent was unknown. The photographic display of the reclamation was supposed to provide a common basis from which respondents would answer questions, although respondents indeed may not have had enough information to determine who should pay and what problems of development may occur at the site. In addition, the photographs may have influenced the level of favorability toward the reclamation because of the marked contrast in appearance of the site before and after reclamation. Evaluated in terms of its present visual aspects, without knowledge of its previous state, the reclaimed area today differs little in character from the surrounding topography of cropland interrupted occasionally by pasture and small stands of trees.

Question order also may have influenced responses. For example, respondents were asked to state their willingness to pay for the reclamation after they were asked who should have paid for the reclamation. In addition, some of the land use choices that were offered were not clearly mutually exclusive, and the response scale of 1 to 7 provided too many increments to be useful to many respondents. The results reported from open-ended questions about recreational participation and specific desires for site use probably do not accurately represent the range of facilities that the community actually needs for recreation. The high number of requests for swimming facilities on the reclaimed area suggests that respondents were less concerned with the suitability of that location for swimming than with the present and perhaps only perceived opportunity to express desires for recreational facilities where they might be heeded.

In addition, the choice of an open-ended question about willingness to pay has resulted in uncertainty about the reliability of the response. For this reason, the resulting willingness-to-pay estimate should be regarded as a measure that, in the absence of others, provides a general indication of the value of aesthetic improvement and potential recreational use. Because of the ordering of questions about who should pay, it is suspected that willingness-to-pay bids are not overestimates of true willingness to pay. The relationship found between willingness to pay and socioeconomic status is in line with the findings of other willingness-to-pay studies, lending further credibility to these results.

6.5 RECOMMENDATIONS

The value of abatement of environmental damages is widely recognized by survey respondents, but general knowledge of potential uses and limitations on use of reclaimed areas is distinctly lacking among those who must help choose the land uses for these areas. To prevent difficulties with achieving maximum community satisfaction about development of publicly-owned reclaimed areas, an information package about the problems and potentials of reclaiming abandoned lands should be provided to communities involved in reclamation planning. Community desires for land uses out of character with the limitations imposed by the reclaimed material could then be reduced to a minimum.

In the case studied here, the desired uses of the site stated by informed city officials were also stated by sampled residents. This accord between decision makers and the public may not exist in other areas where reclamation of abandoned mines is to occur. Adequate study of the local structure of community relations could help determine suitable levels of public input required by P.L. 95-87. Finding the appropriate mix of facilities once the general land uses are determined for abandoned mine sites requires analysis of existing facilities and planning based on knowledge of community needs. Since most small communities affected by P.L. 95-87 do not retain the appropriate personnel for designing developments on reclaimed public areas, state support beyond the revegetation phase of reclamation may be necessary. Communities awarded reclamation projects in their area may suddenly be placed in the position of choosing among opportunities for development without having the capital improvements budget to adequately meet development desires. Assistance to communities in obtaining such funds may be needed if state reclamation programs are to be very effective.

6.6 CONCLUSIONS

Valuations of aesthetic improvements such as reclamation may be difficult to assign, as this study has shown. Association with the current or proposed use may occur despite statements asking for the value of the improvement alone. The overwhelming desire for recreational use of the reclaimed site studied here suggests that there is little hesitation on the part of people to consider using reclaimed areas, once properly developed.

As evidenced in this survey by respondents' willingness to pay for the reclaimed resource and their desire to use it for recreation, there are social benefits to be derived by providing for desired land uses through reclamation. This may be especially true for communities affected by mining, although it would be expected to hold true for all communities that have space to be reclaimed.

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REFERENCES

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APPENDIXES

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APPENDIX A

LEGISLATIVE AND LITERATURE REVIEW

BACKGROUND

Mining companies have generally taken the initiative in reclamation for recreational purposes on strip mines. Early demonstrations of recreational use of reclaimed land emphasized fish and game habitat development (Flowers, 1955; Riley, 1954), although the efforts by Halman Creek Coal Company in 1944 produced recreational lakes for swimming and a baseball field in addition to pheasant-raising facilities (United Electric Coal Companies, n.d.). It was not until the early 1960s that reclamation for recreation on coal-mined lands was officially endorsed by the American Mining Congress (American Mining Congress, 1961) in a wave of interest demonstrated by the U.S. Forest Service, university researchers, landscape architects, and others (Greiss and Deasy, 1961; Bowden and Meier, 1961).

West German reclamation programs were subsequently studied because reclamation is planned in accordance with community needs (Nephew, 1972). Reports of the Aberfan disaster in Wales in 1966, where about 140 people were killed by a slide of colliery shale, resulted in reclamation programs for public needs in Britain that eventually became a source of interest to reclamation researchers (Tandy, 1974).

By 1972, the U.S. Department of Interior had outlined a Surface Mined Lands for Recreation program whereby a land bank for organized recreational use of surface-mined lands could be developed (U.S. Department of Interior, 1973). As a result, seven demonstration projects were supported by Land and Water Conservation Funds through the former Bureau of Outdoor Recreation. Several states have since used Land and Water Conservation Funds to reclaim mined areas for recreation. Two notable cases of planned recreational developments on surface-mined lands are Moraine State Park, Pennsylvania (U.S. Department of Interior, 1970), and Friendship Park, Ohio (Manevál, 1975).

RECLAMATION IN ILLINOIS

Coal mining in Illinois began in the early 1800s, and the first strip mine opened near Danville in 1866. Regulation of coal mining followed the same path as that in most other mining states. Bills were introduced for surface-mining regulation as early as 1929 but were defeated until a law was finally passed in 1943, only to be later declared unconstitutional. In 1961, legislation for reclamation of operating surface mines was passed, amended in 1963 and 1968, and rewritten as the Surface Mined Land Conservation and Reclamation Act of 1971. This act provided for industry responsibility for reclamation plans and involvement of the public in approving plans. It did not, however, provide for reclamation of lands abandoned prior to the 1961 legislation.

The 1975 Abandoned Mine Reclamation Act did provide for reclamation of surface and underground mine lands that were abandoned before the 1961

law. This law applied to land that was not being mined or used for commercial purposes, and on which taxes were in default (Bergstrom, 1977). The state, through the Abandoned Mined Land Reclamation Council, provides funds for reclamation of abandoned lands under this Act. With the introduction of P.L. 95-87 (the federal Surface Mining Control and Reclamation Act of 1977), the funds available annually to the state for abandoned mine reclamation increased dramatically.

Early research on reclamation of mined land in Illinois concentrated on seeking plant species suitable for revegetating strip-mined lands. The University of Chicago, University of Illinois, and Illinois Agricultural Experiment Station were involved in this research in the 1950s. Alliances between the state, agencies such as the Wildlife Management Institute, and coal companies resulted in a project, started in 1953, to determine the potential of strip-mined lands for recreation (Klimstra, Vohrs, and Cherry, 1963).

The first survey of recreational developments on strip-mined areas in Illinois was made in 1960 by the Cooperative Wildlife Research Laboratory, Southern Illinois University. The same agency conducted a study in 1962 on potential recreational use of strip-mine lands (Roseberry, 1963; Roseberry and Klimstra, 1964). Parcels of mined land were identified, ownership ascertained, and utilization noted. It was found that 47 recreational areas were located on 6,500 ha of stripped land. An additional unknown amount of stripped land was used for unorganized or unauthorized recreation. The possibility of using mined land for public recreation (state acquisition) was assessed in this survey using field survey criteria. Approximately 6,000 additional ha were rated excellent or very good for recreational use, requiring little development. It appeared that recreation occurred wherever mines had bodies of water with suitably inclined accesses and haulage roads left after mining ceased. In most of these areas, natural revegetation had taken place and thus those areas were simply adapted for recreational use, often with minimal reclamation.

In 1971, the Cooperative Wildlife Research Laboratory surveyed all lands affected by surface mining for coal in Illinois (Haynes and Klimstra, 1975) to add to the information obtained in the 1962 survey. The State Department of Mines and Minerals, Division of Land Reclamation, has updated the records each year since 1971. The 1971 survey showed that 12,000 ha of strip-mined lands were being used for recreation, which does not include recreational homes, educational use, forests, or areas where unauthorized recreational use occurs. Various semiprivate, private, and employee clubs are located on mine areas, especially near the larger urban areas. There are also permit areas for fishing and youth camps on these lands. Public areas include the state facilities of Kickapoo and Pyramid State Parks and the DuQuoin State Fairgrounds. Two new state park additions that include mined land are Goose Lake Prairie State Park and Banner Marsh State Park.

About 3,000 ha of land surface in Illinois have been affected by underground mining (mostly by refuse piles), according to a survey completed in 1976 for the Illinois Institute for Environmental Quality (Nawrot et al., 1977). Twenty-six such sites surveyed are used for recreation; this is about 1.5% of the total number of sites. Considering that about 600 ha of

land affected by underground mining and at least 800 ha of strip-mine sites are near residential areas, there is some value in considering the needs of communities in proposing land uses for these abandoned areas.

Klimstra et al. (1977) suggest that recreational use of abandoned mines is a consequence of available water, but this may not always be true. In the case of areas around underground mines, water impoundments associated with them are indeed sometimes used for recreation (Bergstrom, 1977). However, there is also evidence that gob piles and steep mine spoils are used for shooting practice, hunting of rodents, and terrain for off-road vehicles. A number of abandoned strip mines are devoted to Illinois Lands for Wildlife and, as such, their recreational value may not strictly be dependent on available water.*

In general, abandoned mines may provide areas where the inherent human need for cover can be fulfilled (Darling, n.d.). Lack of cover is known to impose social problems in some urban areas and may even be a problem in rural communities where there is little public land nearby for town residents to go for privacy in the outdoors. Research into the effects of crowding suggests that the individual's architectural environment can fail to provide areas for privacy, a sense of control over one's environment, and establishment of personal territory (Loo, 1977). Certain abandoned mines near communities may fulfill these privacy functions, which by default often fall into the category of outdoor recreation.

On a more practical level, the Illinois Abandoned Mined Land Reclamation Council has identified several areas for research concerning recreation on reclaimed lands. These are: water quality improvements for recreation, habitat development for fish and wildlife, and development of areas for off-road vehicles, shooting areas, and shooting and archery ranges (Bergstrom, 1977).

Management problems can occur once mined land is used for recreation. Hallburg (1978) and Dickerson (pers. comm.) point out that there are often problems with access to bodies of water, that erosion can cause slippage of roads and hillsides because of unstable landforms, and that aesthetic value may remain low if vegetation does not establish itself well. To gain public respect, open spaces reclaimed from mining must appear to be well managed, and some effort must be expended to overcome public prejudice against reclaimed parks that are not as well manicured as municipal parks (Tandy, 1974). The reasons for not managing these areas as intensively as municipal parks is that land uses in reclaimed areas "are limited by the physical properties and chemical characteristics of the refuse material" being reclaimed (Zellmer and Carter, 1977). Nonetheless, the body of literature describing the popularity of parks on reclaimed mine areas to date indicates that people are willing to use these areas and that they do value them as public resources.

*Illinois Lands for Wildlife is a cooperative program between the state and private landowners.

Traditionally, costing of changes in the environment has been carried out using measures of productivity, property value, and health effects (Brookshire, Ives, and Schultz, 1976). The underlying assumption of willingness-to-pay measures is aptly put by Knetsch and Davis (1966, p. 452): ". . . there is an individual and collective limit to how much we will give up to enjoy. . . any outdoor recreation facility or preserve any scenic resource." In effect, if a project is economically viable, consumers should be willing to pay an amount that will (theoretically) compensate those who have thereby lost the opportunity to have the resource in question put to an alternative use. Dwyer et al. (1977) point out that it is difficult to delineate full compensation; it is often a matter of judgment. Net willingness to pay is operationally defined as the maximum amount consumers would be willing to pay to prevent their exclusion from a project or service.

Direct willingness-to-pay values for recreation were first obtained in a survey conducted by Davis (1963). He showed that the survey population's willingness to pay for recreation in Maine's Baxter State Park was a function of income, years of experience with the area, and length of visit. Average willingness to pay beyond what the visit presently cost was $2.98 per day per individual interviewed. The range of values was between zero and $16.66. Some of the willingness-to-pay studies that were subsequently completed concerned the value of wildlife recreation (Horvath, 1974), duck hunting (Hammack and Brown, 1974), beach use (McConnell, 1977), and recreational clamming (Smith, Conrad, and Storey, 1978).

A survey in the Four Corners area of the Southwest conducted by Randall, Ives, and Eastman (1974) elicited willingness-to-pay responses for changes in the aesthetic environment around a power plant. They found that higher-income respondents using a park were willing to pay a greater amount then lower income respondents for the same hypothetical level of abatement. This corresponds with Davis' finding that willingness-to-pay for recreation was related to income. Mean individual household willingness to pay for abatement was $50 per year for somewhat reduced damage and $85 for more reduced damage. One difficulty with comparing the results of such surveys is that there is little consistency in presenting results on a per unit basis. Thus, we are no closer to assigning particular values or ranges of values to environmental improvements except on a case-study basis.

Interpretation of these results requires caution because there are many problems inherent in such studies in addition to the methodological problems involved in designing surveys. Fischer (1975) states that people might exaggerate their willingness-to-pay answers if they see any systematic relationship between their answers and what they might actually have to pay. Individuals may understate their value if they believe payment will result; they may overstate their value if they believe payment is not linked to their answer; and, if they believe that the government will pay for the program regardless of their response, they may state their value as zero.

The variation of individual perceptions of the environment also contributes to bias in willingness-to-pay studies. People frequently have no comparative basis upon which to state payment because they have never had to pay for such goods. The amount of information the individual has about

the resource in question may change over time, and thus willingness to pay may change, rendering it an unreliable measure. Fischer also criticized the fact that many willingness-to-pay studies do not account for those who are directly involved in using the resource but who still have a demand for an improved environment, including future generations. This latter criticism, however, is a common problem with all current economic evaluation methodologies. Nonetheless, it is generally agreed that willingness-to-pay measures can provide useful figures for evaluating the efficiency of resource management, controlling as much as possible for its inadequacies.

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APPENDIX B

QUESTIONNAIRE: PREFERENCES FOR USE OF RECLAIMED LAND NEAR STAUNTON, ILLINOIS

Hello. My name is _____ and I'm from Argonne National Laboratory. Did you receive a letter from us asking you to participate in our survey? I have a letter here from the Mayor and Chief of Police in Staunton stating that your participation is confidential; your name and address will not be used in any way.

_____ (1-3)

1. Just to be sure that we both will be talking about the same place in this interview, what is the name of the community you live in?

1 2 3 (4) Staunton _____ 1 Parksville _____ 2 Other _____ 3

2. What do you feel is most pleasing about living in this community? _____

_____

1. economic 2. health 3. social 4. environmental

1 2 3 4 (5) 5. dislike or nothing pleasing

3. Are most of your friends living in this community?

1 2 (6) Yes _____ 1 No _____ 2

4. Is most of your family living in this community?

1 2 (7) Yes _____ 1 No _____ 2

5. How long have you lived in this community?

_____ (8-9) _____ years

6. About how many times per year do you travel just north of Staunton on Highway 4?

_____ (10-12) _____/year

7. About how many times per year do you travel west from Staunton on Bunker Hill Road?

_____ (13-15) _____/year

8. Have you noticed any changes in that area over the past couple of years?

1 2 (16) Yes _____ 1 No _____ 2

If yes, what changes? _____

_____

1 2 (17) 1. Reclamation project 2. Other

Here are some pictures of the old mine number fourteen northwest of Staunton before it was regraded in 1976.

(Set 1) The picture at the top shows an air photo of the entire mine area in 1976. (Point out Highway 4 and Bunker Hill Road.) The bottom picture shows the reclamation work in progress. There are three sections to the mine area. (Point out slag pile, drainage ditch, slurry pond areas.)

(Set 2) The top picture here is the slag pile before it was reclaimed. The bottom shows what it looks like now.

(Set 3) The top shows the drainage area (refer to Set 1) before, the bottom shows it as it is now.

(Set 4) At the top is an area of the slurry pond before reclamation, at the bottom is what it looks like now.

9. How did you first come to know about this change?

1 2 3 4 5 6 7 (18)

1 _____ in this interview
2 _____ word of mouth
3 _____ newspaper
4 _____ radio
5 _____ television
6 _____ driving by
7 _____ other

10. Approximately how long ago did you first hear about the change out there?

1 2 3 4 5 (19)

1 _____ more than two years ago
2 _____ about two years
3 _____ about a year
4 _____ a few months
5 _____ less than a month

11. How important is it to you personally that the old mine area has been changed to what it is now? I'd like you to answer on a scale (show card #1) that we're going to use quite a bit in this survey. Really important is the number 1, important is 2, a little bit important is 3; really unimportant is 7, unimportant is 6, and a little bit unimportant is 5 (repeat question).

1 2 3 4 5 6 7 (20)

Important 1 2 3 4 5 6 7 Unimportant

12. On the same scale (card #2), how good or bad do you think it is that this change has taken place (explain scale again)?

1 2 3 4 5 6 7 (21)

Good 1 2 3 4 5 6 7 Bad

13. Do you think that changing the land to what is now has changed your opinion about living in that area?

1 2 3 (22)

Yes _____ 1 No _____ 2 No Answer _____ 3

Why? _____

14. Who do you think should have paid for the change as shown in the pictures?

_____

_____

1 2 3 (23)

1. government 2. mine company 3. other

_____ (24-26) 15. Do you consider the mine area to be worth more to you now than before it was reclaimed:

Yes _____ 1 No _____ 2

16. Suppose that you were in a situation where you were asked to contribute an amount of money per month to have the mine area changed from what it was to what it is now. Would you have contributed anything per month, and if so, what would that amount be?

_____/month

17. If you owned the land in the mine area now, which one of the uses listed on this card (#3) would you most like to see there? Which is your second choice?

1 2 3 4
5 6 7 8 (28)

1 _____ what it was before mining -- timber and pasture
2 _____ agriculture (rowcrops, pasture)
3 _____ city housing
4 _____ acreages
5 _____ leave as is now
6 _____ private recreation
7 _____ private commercial development
8 _____ other (please state)

1 2 3 4
5 6 7 8 (29)

18. Since the city of Staunton owns that land, that is, it is public land, which use on this card (#4) would you most like to see there? Which use is your second choice?

1 2 3 4
5 6 7 8 (30)

1 _____ what it was before mining (forest and pasture)
2 _____ community facility
3 _____ nature preserve
4 _____ park or recreation area
5 _____ fairgrounds
6 _____ leave as is now
7 _____ educational use
8 _____ other (please state)

1 2 3 4
5 6 7 8 (31)

19. What do you think are the problems, if any, with using this area for (#13 preferred choice)?

1 2 3 4 5 (32)

_____

_____

1. developmental 2. supervisory and maintenance
3. site specific and environmental 4. distance, other
5. no problems

20. The next question has several parts concerned with what you think about the change in the mine area. We are going to use the same scale as before (card #5) so that you can tell me the number which best describes how much you agree with each of the statements that I will read to you.

a) Other piles near Staunton should have similar work done on them as shown in the pictures.

1 2 3 4 5 6 7 (33) Agree 1 2 3 4 5 6 7 Disagree

b) Other piles in Illinois should have similar work done on them as shown in the pictures.

1 2 3 4 5 6 7 (34) Agree 1 2 3 4 5 6 7 Disagree

c) The state government should have been involved in reclaiming the mine area.

1 2 3 4 5 6 7 (35) Agree 1 2 3 4 5 6 7 Disagree

d) The town of Staunton received alot of publicity because of the mine area being changed.

1 2 3 4 5 6 7 (36) Agree 1 2 3 4 5 6 7 Disagree

e) The change has had <u>no</u> impact on the Staunton area.

1 2 3 4 5 6 7 (37) Agree 1 2 3 4 5 6 7 Disagree

f) The town of Staunton should decide what the mine area should be used for.

1 2 3 4 5 6 7 (38) Agree 1 2 3 4 5 6 7 Disagree

g) The mine area should have been left alone as shown in Picture 1.

1 2 3 4 5 6 7 (39)

Agree 1 2 3 4 5 6 7 Disagree

h) Tourists from outside of the Staunton area would be welcome here.

1 2 3 4 5 6 7 (40)

Agree 1 2 3 4 5 6 7 Disagree

i) You would visit the mine area if it had a recreational use you liked.

1 2 3 4 5 6 7 (41)

Agree 1 2 3 4 5 6 7 Disagree

21. The next few questions are about your recreation in Staunton and vicinity. On this card (#6) are several words describing something about your recreation, which you may enjoy in general. Please tell me which item you usually enjoy the most during your recreation away from home.

1 _____ socializing with friends/family
2 _____ being away from home or work
3 _____ being outdoors
4 _____ travelling
5 _____ activity
6 _____ meeting people
7 _____ relaxing
8 _____ using good recreation equipment
9 _____ learning about nature, history, etc.

1 2 3 4 5 6 7 8 9 (42)

22. If, in Staunton, you had any type of recreation you could want, and you were given a day off during the week for recreation, what would you like to do? _____

_____

23. When you do have a few hours to spend with your family in recreation away from home, what do you like to do? Where do you go to do those things?

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

24. What kinds of recreation, if any, would you like to see on the old mine area?

_____

_____

_____

25. How important is it to you that each of the following kinds of recreation are available in or near Staunton? Please tell me the number on this card (#7) that best shows how important or unimportant you think it is to you to have each type of recreation that I name (explain scale if necessary)?

(43)	nature center	Important	1	2	3	4	5	6	7	Unimportant
(44)	wildlife preserve		1	2	3	4	5	6	7	
(45)	city park		1	2	3	4	5	6	7	
(46)	museums		1	2	3	4	5	6	7	
(47)	campground		1	2	3	4	5	6	7	
(48)	fishing		1	2	3	4	5	6	7	
(49)	motorcycle track		1	2	3	4	5	6	7	
(50)	playing fields		1	2	3	4	5	6	7	
(51)	bicycle or hiking trails		1	2	3	4	5	6	7	

(52)	shooting range	Important	1	2	3	4	5	6	7	Unimportant
(53)	off-road vehicle park		1	2	3	4	5	6	7	
(54)	picnic area		1	2	3	4	5	6	7	

26. About how far does the highest income earner of this household travel to work each day?

(55-57) _____ miles one-way _____ no or variable travel

27. Could you please indicate the last grade of school you completed? (card #8)

(1) _____ 0-8 years (jr. high)
(2) _____ 9-12 years (high school)
(3) _____ 13-15 years (jr. college plus)
(4) _____ 16 years (college)
(5) _____ 17 years (graduate)

1 2 3 4 5 (58)

28. If you have any children, what are their ages?

1. retired, no children
2. retired, at least one child about 18 yrs.
3. at least one child above 18
4. at least one child 6 to 18 yrs.
5. at least one child below 6
6. no children

1 2 3 4 5 6 (59)

29. Do you or anyone in your family belong to any clubs or organizations and if so, what are they?

Club or Organization

_____

_____

_____

_____

_____

0 1 2 3 4 5 6 7 8 9 (60)

30. Do any of them meet in Staunton?

1 2 (61) Yes _____ 1 No _____ 2

31. Have you ever served as an officer in any of those clubs?

Yes _____ 1 No _____ 2

1 2 (62) Which ones? _____

32. Do you rent or own your home?

1 2 (63) Own _____ 1 Rent _____ 2

33. If you don't mind, could you please indicate (card #9) which one of the following before tax income brackets your family is in?

(a) _____ 0-4,999
(b) _____ 5,000-9,999
(c) _____ 10,000-14,999
(d) _____ 15,000-19,999
(e) _____ 20,000-24,999
(f) _____ 25,000-29,999
(g) _____ 30,000-49,999
(h) _____ 50,000 and up

1 2 3 4
5 6 7 8 (64)

34. What is your occupation? _____

1. trades, professional
2. housewife
3. retired
4. mining, manufacturing, transportation
5. government and service
6. sales

1 2 3 4
5 6 (65)

35. Could you please tell me which age range you are in as listed on this card? (card #10)

(1) _____ less than 20
(2) _____ 20-29
(3) _____ 30-39
(4) _____ 40-49
(5) _____ 50-59
(6) _____ 60-69
(7) _____ 70-79
(8) _____ 80-89+

1 2 3 4
5 6 7 8 (66)

36. Note sex:

1 2 (67) Female _____ 1 Male _____ 2

37. Housing type:

	1	2
	1 _____ house	1 _____ city
1 2 3 (68)	2 _____ trailer	2 _____ fringe
1 2 3 (69)	3 _____ apartment	3 _____ farm

Thank you. That concludes our interview. Your cooperation is much appreciated. Do you have any comments about the interview that you would like to add?

INFORMATION PRESENTED TO RESPONDENTS ON CARDS

CARD 1

Important _____ _____ _____ Neutral _____ _____ _____ Unimportant
1 2 3 4 5 6 7

CARD 2

Good _____ _____ _____ Neutral _____ _____ _____ Bad
1 2 3 4 5 6 7

CARD 3

a. what it was before mining (timber and pasture)

b. agriculture (rowcrops, pasture)

c. city housing

d. acreages

e. leave as now

f. private recreation

g. private commercial development

h. others (please state)

CARD 4

a. what it was before mining (timber and pasture)

b. community facility

c. nature preserve

d. park or recreational area

e. fairgrounds

f. leave as is now

g. educational use

h. other (please state)

CARD 5

Agree _____ _____ _____ Neutral _____ _____ _____ Disagree

1 2 3 4 5 6 7

CARD 6

a. socializing with friends/family

b. being away from home or work

c. being outdoors

d. traveling

e. activity

f. meeting people

g. relaxing

h. using good recreational equipment

i. learning about nature, history, etc.

CARD 7

Important _____ _____ _____ Neutral _____ _____ _____ Unimportant
1 2 3 4 5 6 7

CARD 8

a. 0-8 years (jr. high)

b. 9-12 years (high school)

c. 13-15 years (jr. college plus)

d. 16 years (college)

e. 17 years (graduate)

CARD 9

a. 0-4,999

b. 5,000-9,999

c. 10,000-14,999

d. 15,000-19,999

e. 20,000-24,999

f. 25,000-29,999

g. 30,000-49,999

h. 50,000 and up

CARD 10

a. less than 20

b. 20-29

c. 30-39

d. 40-49

e. 50-59

f. 60-69

g. 70-79

h. 80-89

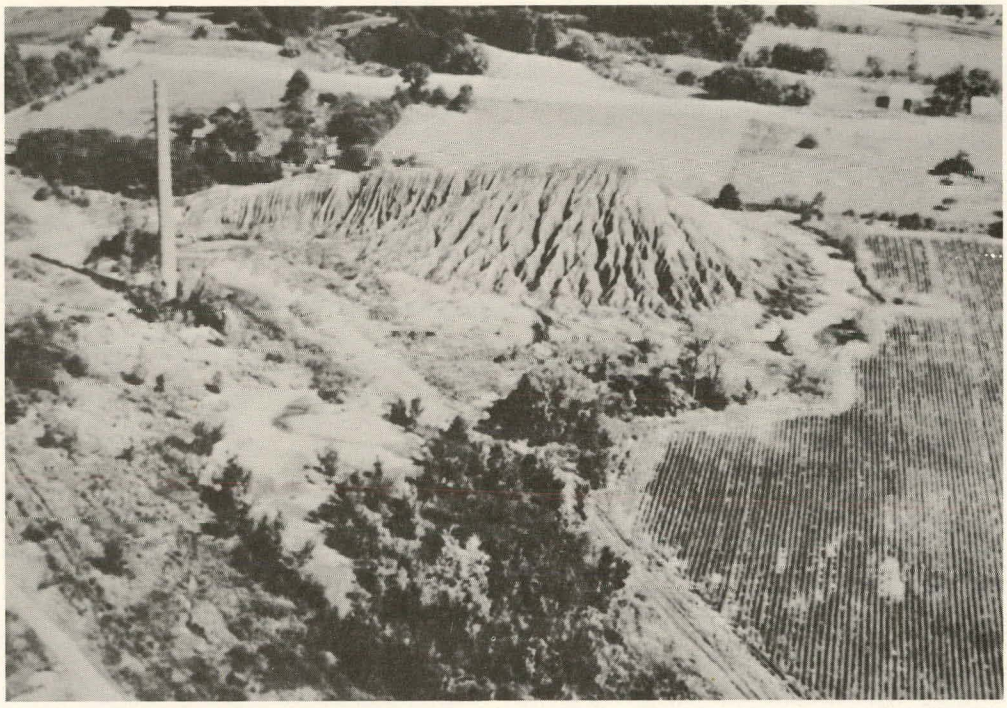

Fig. B-1. Aerial View of Project Area before Reclamation, 1976

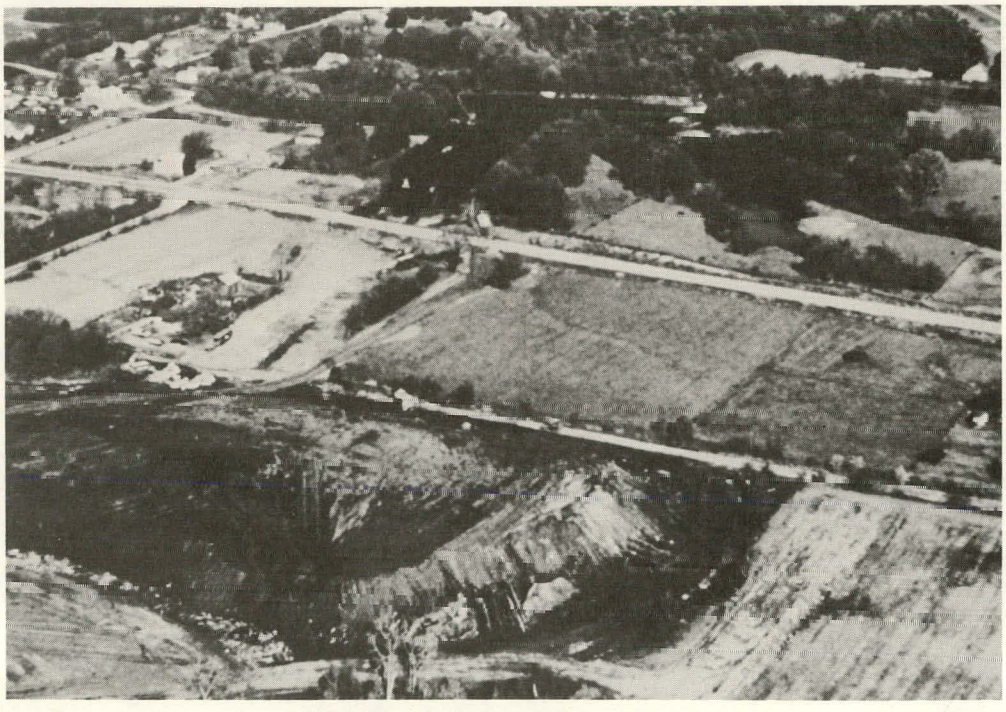

Fig. B-2. Aerial View of Project Area during Reclamation, 1976

Fig. B-3. Parcel 1: Gob Pile before Reclamation

Fig. B-4. Parcel 1: Gob Pile after Reclamation

Fig. B-5. Parcel 2: Before Reclamation

Fig. B-6. Parcel 2: After Reclamation

Fig. B-7. Parcel 3: Before Reclamation

Fig. B-8. Parcel 3: After Reclamation

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APPENDIX C

DATA TRANSFORMATIONS

Computations of Favorability Index

Recoding: For all variables in Table 4.6 except the last, the coding was reversed to read: strongly disagree (or very bad, etc.) = 1; strongly agree (or very good, etc.) = 7.

Favorability Index = Q. 11 + Q. 12 + Q. 20A + Q. 20B + Q. 20G
(all variables in Table 4.6 after recoding)

Because respondents were generally favorable, categories were grouped as:

	Score Range	Recoded
Low (strongly negative to neutral)	0 to 20	1
Medium (somewhat positive to positive)	21 to 30	2
High (very positive)	31 to 35	3

Computations of Socioeconomic Scale

Recoding of occupation (Q. 34) to reflect increasing income/status.

housewife	= 1	government and service and sales	= 4
retired	= 2	trades, professional	= 5
mining, manufacturing, transportation	= 3		

SES = Q. 27 + Q. 33 + Q. 34

education + income + occupational status

Public Views of Reclaiming an Abandoned Coal Mine: The Macoupin County Project. J. R. Bernard. Argonne National Laboratory Report ANL/LRP-7.

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Program Summary:

The Land Reclamation Program is addressing the need for coordinated applied and basic research into the physical and ecological problems of land reclamation, and is advancing the development of cost-effective techniques for reclaiming land mined for coal. This program is conducting integrated research and development projects focused on near- and long-term reclamation problems in all major U.S. coal resource regions, and is evaluating and disseminating the results of related studies conducted at other research institutions. These activities involve close cooperation with the mining industry. Regional and site-specific reclamation problems are being addressed at research demonstration sites throughout the country, and through laboratory and greenhouse experiments.

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