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The Effect of Landowner Attitude on the Financial and the Economic Costs of Acquiring Land for a Large Public Works Project

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Research Report No. 3

THE EFFECT OF LANDOWNER ATTITUDE ON THE FINANCIAL
AND THE ECONOMIC COSTS OF ACQUIRING LAND
FOR A LARGE PUBLIC WORKS PROJECT

John Malvern Higgins, Jr.

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University of Kentucky Water Resources Institute
Lexington, Kentucky

Project Number A-006-KY
Dr. L. Douglas James, Principal Investigator

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INTRODUCTION

"The Effect of Landowner Attitude on the Financial and the Economic Costs of Acquiring Land for a Large Public Works Project" is based on research performed as part of a project entitled "The Economic Impact of Flood Control Reservoirs" (OWRR Project No. A-006-KY) sponsored by the University of Kentucky Water Resources Institute and supported in part by funds provided by the United States Department of the Interior as authorized under the Water Resources Research Act of 1964, Public Law 88-379.

The overall project is examining the economic consequences which resulted from the construction of four existing reservoirs in the hope of being able to suggest improved economic evaluation techniques. This is the second of a series of reports on the project and deals with the interrelationship between landowner attitude and the financial and economic cost of acquiring right-of-way for reservoir construction.

Any comments the reader might have on the research problem, the approach described in this report, or the findings described are encouraged and should be directed to L. Douglas James, Project Director.

ABSTRACT

The purpose of this study was to examine the various economic and financial costs relating to the acquisition of property required for the construction of three reservoirs and to determine if any correlation could be made between the attitudes of the landowners selling property and the costs. Rough River Reservoir, Dewey Reservoir, and West Fork of Mill Creek Reservoir were studied. The costs involved in purchasing right-of-way were classified qualitatively and quantified to the extent possible. A procedure was devised to quantify 15 factors influencing attitude and an equation was derived to predict the landowner's attitude from these determining factors. Two plots were made of attitude versus the associated costs in order to observe the effect of attitude on costs.

The results indicate that although the problem is complex, it is possible and practical to quantify the landowner's attitude and to define the relationship between this attitude and the associated costs.

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Chapter I

THE COSTS OF LAND ACQUISITION

SCOPE OF THE PROJECT

PROJECT DESCRIPTION

On September 1, 1965, the Water Resources Institute of the University of Kentucky began a five-year project entitled "The Economic Impact of Flood Control Reservoirs." The project objective is "to examine through case studies four existing flood control reservoirs to determine the economic consequences of their construction and from the analysis develop improved methods for estimating the benefits and costs of future projects" (1, p.93). This project is subdivided into a number of topical studies conducted by graduate students under the guidance of Dr. L. D. James.

The topical study included in this thesis deals with the financial and economic costs of acquiring the private real property needed for the construction of a reservoir and the effect of the owner's attitude on these costs. Whenever a reservoir is constructed, land, homes, and other property improvements must be purchased. In order to acquire the land, a financial cost is incurred amounting to the sum of the payments to the property

owners plus the cost to the purchasing agency of making the necessary surveys , dealing with the property owners , and executing the legal sale procedure. The economic cost of acquiring the property amounts to the sum of the net value of the property in alternative agricultural or other uses and the extra economic value the owner places on his property for various noneconomic reasons. Although the landowners are compensated at a price that is considered fair in the light of market prices for similar property , the intensity of the opposition from those who have been forced to move from their homes is very strong evidence that the land has a greater value to its owners than the cash they receive. Often they have lived there for many years and have psychological ties to the physical and social community which they are unwilling to surrender. The cost of breaking these ties is intangible but very real and determines the owner's attitude about giving up his property.

The financial cost of land acquisition is based on a price determined by negotiation between the owner and the purchasing agency. The negotiated price is dependent on the owner's attitude. The economic cost of land acquisition depends on the value the owner places on his property. This value too depends on owner attitude. This study examines the financial and economic costs incurred in acquiring right-of-way for three Corps of Engineers'

Reservoirs and relates these costs to attitude characteristics of the landowners and of the local population.

PROJECTS STUDIED

The three reservoirs considered were Rough River Reservoir, Dewey Reservoir, and West Fork of Mill Creek Reservoir. These reservoirs are located on the map on Figure 1. These three were selected because they were small enough for a detailed study to be made and because they were varied in size, time built, and type of surrounding communities. Thus, the effect of these factors could be observed.

Rough River Reservoir. This reservoir is located on Rough River in Central Kentucky between Breckinridge and Grayson Counties 60 air miles southwest of Louisville. The total area inundated at the spillway crest elevation is 10,260 acres with a backwater length of 45 miles. Drainage area above the dam is 454 square miles. Construction of the project was started in November, 1955, and completed in September, 1959. The estimated total cost through 1965 was \$9,835,000 (2, pp. 3-4).

The project required the acquisition of 13,877 acres of land at a cost of \$977,800 to the Corps of Engineers (3). The reservoir operates as a unit of the general reservoir plan for the Ohio River Basin to reduce flood stages at all points downstream.

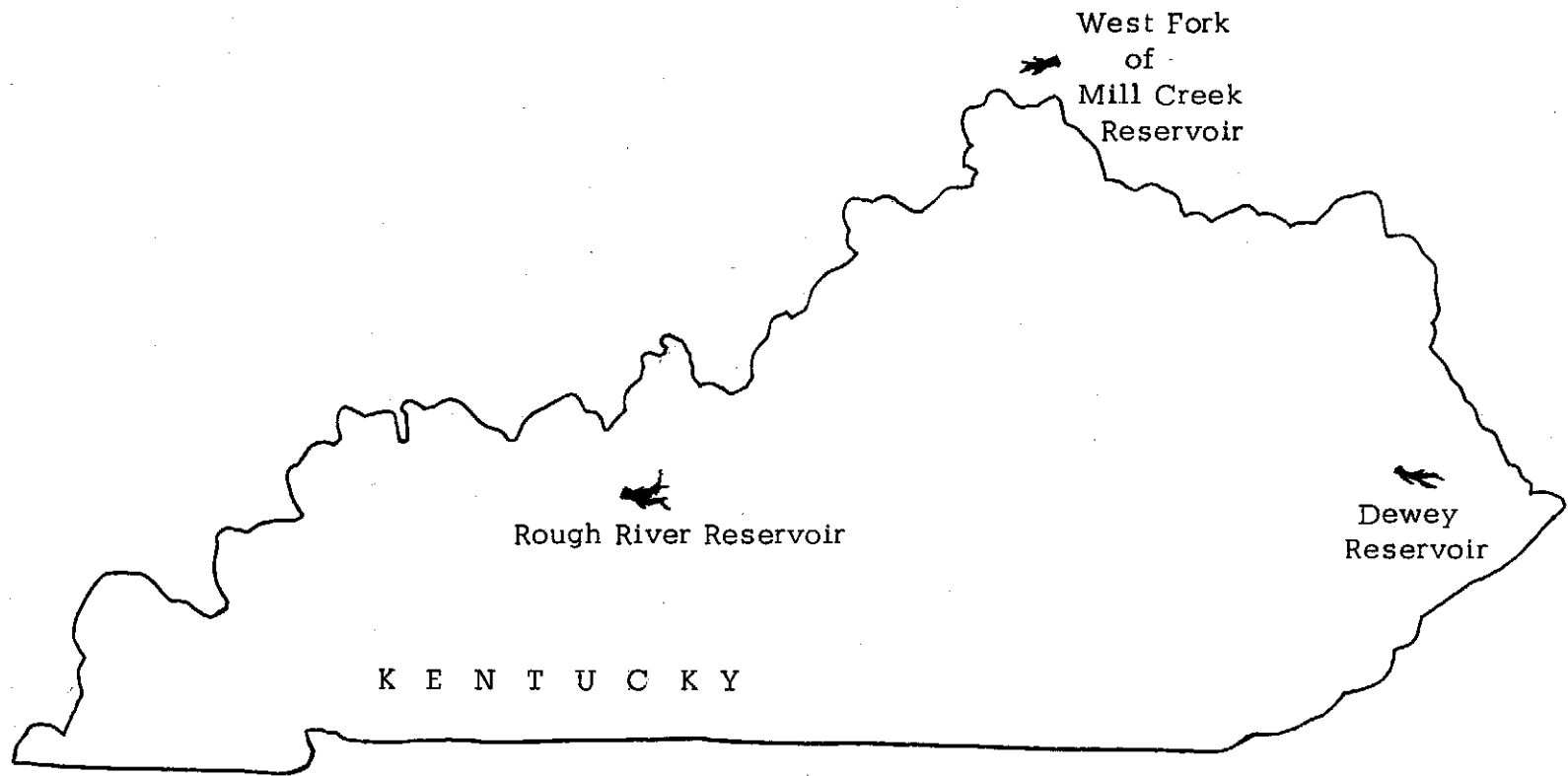


Figure 1. Reservoir Location

Recreation is a second project purpose. During project planning, it was estimated from the 1950 census that the population within a 25-mile radius of the reservoir probably did not exceed 60,000 persons. There are no towns of appreciable size in this area. Within the range of 25 to 50 miles of the project, the population was estimated at 480,000 persons. Located in this area are Owensboro, Fort Knox, Bowling Green, and Elizabethtown. Louisville and Henderson, Kentucky as well as Jeffersonville, Evansville, New Albany, and Clarksville, Indiana, with a combined population in excess of 645,000 are located just outside the 50-mile range. There were no state parks within a 50-mile radius of the project, although Mammoth Cave National Park is only 30 miles away. At that time, the nearest similar recreation facilities were at Herrington Lake, 95 miles due east, and Lake Cumberland, 110 miles to the southeast. Since then, Nolin Reservoir has been built about 20 miles south.

The resources in this area are similar to those throughout Central Kentucky and are well developed. The area is predominantly agricultural with about 45 percent of the total land cleared. About two-thirds of the cleared land is in crop production, primarily hay, corn, and tobacco. Considerable livestock is also raised, and dairying became significant a few years prior to the project. There are very few tracts of virgin timber remaining, and lumber

production is generally limited to small portable mills. There are no industries located within the immediate vicinity of the reservoir. Leitchfield, Elizabethtown, Hardinsburg, Bowling Green and Owensboro, the nearest towns, have industries which provide off-farm employment to supplement seasonal farm income. The dam site is located 50 miles northeast of the West Kentucky coal fields, which now have a relatively large output. The oil and gas resources in the Rough River Basin have been extensively developed (4, pp. 2,4,6).

The average farmer in the Rough River area owned about 120 acres of land on which he could produce enough for his own needs and a reasonable income. Since most of the good farm land and the buildings were on the rolling hills, the floodplain land required for the reservoir was usually the poorer part of the farm. Most farmers retained their better land on higher ground, and relatively few had to move. The people had an average education and were close enough to large metropolitan areas to be informed on outside happenings. The road system was adequate, although many of the roads were gravel.

Dewey Reservoir. Dewey Reservoir lies on John's Creek in Floyd and Pike Counties in Eastern Kentucky about midway between the Ohio and Tennessee borders. Total area inundated at the spillway crest elevation is 3,125 acres with a backwater length of 30.5 miles. The drainage area is 207 square miles. Dewey

Reservoir is operated primarily for the control of floods on the Levisa Fork and the Big Sandy River. The project also forms an integral unit in the comprehensive plan for flood control on the Ohio River (5, p. 3). Recreation and low flow augmentation are the other project purposes. Construction of the dam was initiated in March, 1946, and was completed in July, 1949. At the end of the 1953 fiscal year, the entire project was 98 percent complete and had had a total cost of \$6,422,000 (6, p. 1335). Project right-of-way amounted to 13,328 acres of land and cost \$1,651,800 to the Corps of Engineers (7). A much larger area around the reservoir periphery was purchased than what was around the other reservoirs because of the land acquisition policy in effect at that time.

In 1949, 513,000 people lived within a 50-mile radius of the project site. Ashland, Kentucky, and Huntington, West Virginia, were within two hours drive and had a combined population of about 113,000. There was no federal or state park or recreational project within this area. The nearest similar facilities were at Dix River Dam, 200 miles away (5, Recreational Development, pp. 3-4).

The topography around Dewey Reservoir is very different from the rolling hills around Rough River Reservoir. The land is forested by low quality timber on steep slopes separated by

narrow hollows. Lumbering is carried on in this region, however, with the forest land devoted to hardwood species, supplemented by small amounts of pine and cedar (5, Acquisition of Land, p. 6). The land suitable for cultivation and pasture is only 14 percent of the total area and is almost exclusively located in bottom lands along the streams. The main crops are corn, hay and vegetables (5, Appendix 1, Exhibit A, p. 4). Although coal is mined commercially in this region now, at the time of project construction most of the coal was mined by individuals for domestic purposes. Oil and gas production was significant in this area in the 1940's but has since declined. The economy of the region has also suffered from poor roads and utilities, and a lack of industrial development.

Most of the people affected by the land acquisition owned a small subsistence farm of about 40 acres and lived in the floodplain. For this reason, they often had to sell all their land and leave their homes. They were usually poor and often had other jobs to supplement their farm income. Poor education and relative isolation also hindered the local economy.

West Fork of Mill Creek Reservoir. The third reservoir to be considered in this study is situated on West Fork of Mill Creek in Hamilton County in Southwest Ohio about ten miles

north of Cincinnati. The West Fork of Mill Creek Reservoir is operated primarily for the purpose of flood control and recreation. It reduces flood stages in the Mill Creek Valley and also reduces pumping requirements at the barrier dam of the local flood protection works at Cincinnati, Ohio. Total area inundated at the spillway crest elevation is 557 acres with a backwater length of 3.9 miles. The drainage area above the dam is 29.5 square miles (8, p. 3). Construction of the project was started in March, 1949 and essentially completed in December, 1952. The total cost through 1955 was \$3,003,000 (9, p. 880).

Of the 1,392 acres required for this reservoir, only 269 acres were purchased from private citizens since much of the land had been acquired by the government in 1936 for a public housing development which was never built. The price paid for the 269 acres of private property was \$349,100. Total cost of all 1,392 acres was \$562,800 (10).

The reservoir is only ten miles from downtown Cincinnati and almost entirely encircled with suburban development. The population within a 20-mile radius of the project was estimated to be over 750,000 in 1949. Closeness of the reservoir to a large population has resulted in very extensive use of the recreation facilities at the site. The site is locally known as Winton

Woods Park and operated by the Hamilton County Park District.

The area taken for this project was comprised of small farm units and potential urban home sites. Although the farms contained good grazing and crop land with very little rough or barren land, their market value was largely determined by their potential as building sites. Extensive construction of urban homes, the acquisition of approximately 6,000 acres of land in this area by the Federal Government (Public Housing Administration), and various other projects associated with rapid community growth greatly increased land value in this area (11, Appendix 9, p. 2).

IMPORTANCE OF THE STUDY

LAND USE

Resource Allocation. To understand the importance of properly estimating land acquisition cost in the economic evaluation of a public works project, one must review the fundamentals of resource allocation. The basic goal of economic analysis is to utilize the available resources as efficiently as possible. Use of land for reservoir construction means the land will be withdrawn from alternative uses. The importance of land allocation among alternative uses is pointed out by Gladwin E. Young, Deputy Administrator of the Soil Conservation Service.

If the nation's total economy is to grow to an estimated \$2,000 billion gross national product by the year 2000, and if a population of 370 million is to be as well fed as at present, increased agricultural production must come essentially from land already in use . . . With such an outlook, resource conservation and resource development must be given first priority (12, p. 18).

Determining Best Use. The need to use land efficiently is obvious. In a free economy the basic land use decisions are left primarily to the individual property owners. To the degree the basic assumptions of the pure competition model hold, the owner operates to maximize his profit by using the land in the manner which yields him the highest return, and the land resources of the nation will be used optimumly. Situations arise, however, where individual landowners will not utilize their land most efficiently because of various discrepancies between prevailing conditions and a freely operating land market. One example is land use having a value to the community of a kind for which the owner cannot collect revenue. Because the landowner is not normally able to profit from the use of his land for water resources development, it becomes necessary for government agencies to acquire the private lands needed for flood control, recreation, water supply, and other water development purposes.

A key problem in water resources development is selecting

which land is best taken for project construction and which is best left in alternative uses. The criteria of economic efficiency provide one method of solving this problem. Krutilla and Eckstein define economic efficiency as

a situation in which productive resources are so allocated among alternative uses that any reshuffling from the pattern cannot improve any individual's position and still leave all other individuals as well off as before (13, p. 16).

The decision as to the best use for land (i.e., one which will be economically efficient) can only be made by accurately estimating to everyone involved the benefits and cost of putting land to various uses. Thus, inability to estimate the benefits and costs of resource allocation, limits the ability of those planning water resources projects to fulfill the objective of economic efficiency.

LAND ACQUISITION

Importance of Land Acquisition. The cost of acquiring land is one of the main factors to be considered when planning a public works project. It is vital to economic analysis in order to determine where or whether a project should be built. It is also vital to the financial problem of raising money to pay for the project because a large portion of total project cost is for land acquisition. Both kinds of cost depend on the type and size of the project and the alternative uses available for the land. According to

cost data supplied by the Corps of Engineers, land acquisition costs were 16.4, 32.1, and 17.7 percent of the total financial project cost for Rough River, Dewey, and West Fork of Mill Creek Reservoirs respectively (14,15,16).

Financial Cost of Land Acquisition. The financial cost of land acquisition equals the sum of the amount paid the landowner and administrative cost of executing the purchase. The cost paid the owner to acquire the land is determined by a business agreement or settlement between him and the government at the time of acquisition and cannot always be accurately forecast during project planning. The procedure is for the government to pay the fair market value for the property being acquired. Fair market value is

the highest price in terms of money which a property will bring when exposed on the free and open market for a reasonable length of time from a well-informed, able and willing seller to a well-informed and willing buyer, neither of whom is compelled to act (17, p. 212.0.3).

Appraisers are hired to determine the fair market value of the property to be purchased based on their knowledge of current sales prices of real property. Negotiators bargain with the owner starting with this value.

Where a mutually satisfactory settlement cannot be achieved at the appraised value, it shall be the policy to attempt, through negotiations, to secure settlement satisfactory to both parties (17, p. 213.3.1).

Therefore, if the owner is not satisfied with the price he is offered, he may prolong negotiations for a higher price and, if he cannot bargain a satisfactory price, take the matter to court for settlement. The higher the value the owner places on the property relative to its appraised value, the less likely a settlement will be reached through bargaining; and this leads into a discussion of economic cost.

Economic Cost of Land Acquisition. Economic criteria guide the decisions required to determine which reservoirs should be built and how much land should be taken. A project should be built if the resulting benefits to whomsoever they may accrue exceed the costs required to provide the facilities. Benefits are normally evaluated in terms of "willingness-to-pay" on the part of the beneficiaries for the goods and services they receive. To be symmetrical, the costs should likewise be evaluated in terms of "willingness-to-pay" of those sacrificing their land to be able to keep their property. The economic value of the land to its owner is the sum of the present worth of the rental value of the property and of the special value the owner as an individual places on the property or living in the community for personal or sentimental reasons. The second of these two values, which may be called the private value, is economic to the degree it is reflected in

"willingness-to-pay," needs to be considered in the economic evaluation of alternative projects, and is a direct function of owner attitude. A major goal of this study is to guide the planner in estimating the relative magnitude of the private value of real estate.

Effect of Attitude. Although the fair market value is not affected by the individual's attitude, the final negotiated cash settlement and the administrative cost of making the purchase are. For the reservoirs studied, administrative costs were as much as sixty percent of the total property cost. Because the financial cost of land is influenced by these attitudes, they are more difficult to estimate accurately than are construction costs for which competitive bidding among contractors stabilizes the cost of standard contract items. The economic cost of land is even more closely tied to attitude and consequently even harder to evaluate.

The attitude of the people in the local community other than those from whom land is purchased also affects the cost of a project. When a project is proposed for an area, the local reaction has much to do with whether it ever becomes a reality or not. Local attitude also plays an important role in determining the time lag after construction is completed before the project output is fully utilized and thus in the benefits received. The local public attitude, however, only affects the cost of land acquisition as it influences

the attitude of the individual property owners.

PRESENT METHODS OF EVALUATING LAND ACQUISITION COST

Effect of Attitude Excluded. Because it is so closely entwined with owner attitude, estimating the cost of obtaining lands is a difficult procedure. At present, the method is to estimate the fair market value of the property and to add to it an estimated administrative cost of buying the property. In other words, financial cost is equated to economic cost in project planning. No quantitative consideration is given to a major influencing factor, how the attitude of the individual toward selling his property affects the cost.

It should also be noted that an individual's attitude toward selling his property is influenced by the events surrounding the sale. A proper understanding of the factors influencing attitude on the part of the purchasing agencies would help in promoting a more favorable attitude. Because the success of any public works project is dependent on the action and reaction of the local people, it is difficult to estimate actual benefit in advance. It is evident, however, that any measures which could be taken by the purchasing agency to reduce opposition to the project and encourage favorable reactions from the property owners involved would reduce project cost and increase project utilization. This would mean a more efficient project.

Future Needs Require Better Methods. The welfare of future generations requires economically efficient use of the nation's resources. This calls for more accurate methods of determining the economic costs and benefits resulting from alternative uses so the best use can be selected. To this end, the purpose of this study is to examine the effect of property owners' attitudes on the financial and economic costs of land acquisition. With a better understanding of the factors determining this attitude and of the relationship between attitude and cost, better cost estimates can be made, and a program can be developed for dealing with the local people in a manner which minimizes the cost of land acquisition for and maximizes the benefits resulting from a given project.

OBJECT OF STUDY

As has been stated, the general purpose of this study is to examine the economic and financial costs of land acquisition and the effect of the owners' attitudes on these costs. However, due to the complexity of the problem and because little other research has been done in this area, a complete and thorough study is impossible with the time and money available. Therefore, the more limited objectives will be to:

1. Determine the total economic and financial costs of land acquisition for the reservoirs being considered.

2. Determine the factors which influenced the attitude of those people selling land.
3. See if any quantitative relationship exists between the two.

RELATED STUDIES

Although the people owning land required for the construction of a reservoir and the local community as a whole have a very definite effect on the financial and economic costs of a reservoir, very little research has been conducted to study the attitudes involved, the factors affecting these attitudes, or the effect of these attitudes on costs. Related studies have been made by the University of Tennessee, Mississippi State University, and Purdue University.

UNIVERSITY OF TENNESSEE STUDY

In 1957 David W. Brown and Joseph E. Winsett conducted a study entitled "Organizational Problems of Small Watersheds." The purposes of this study were: (1) to review the problems encountered in organizing small watershed projects proposed under the P.L. 566 program of the Soil Conservation Service and (2) to indicate the means whereby landowners might more effectively organize to assess their flooding and water management problems to meet their needs. Although the attitudes of the landowners

in the three watersheds considered were studied in detail, the type of projects and watersheds were much smaller in size and scope than those considered in this study (18).

MISSISSIPPI STATE UNIVERSITY STUDY

A study which began in 1966 similar to the Tennessee study is now being conducted by Kenneth P. Wilkinson. The study is entitled "Local Action and Acceptance of Watershed Development." The objective of the study is to examine the influence of community structure on the effectiveness of local watershed development programs. Participants in the program and rural residents within each watershed are being interviewed and a correlation analysis will be used to identify factors which are statistically related to program accomplishment (19).

PURDUE UNIVERSITY STUDY

A brochure entitled "Your Land and Public Reservoir Development" was written by C. A. Sargent and L. T. Wallace in 1963. Its purpose was to answer questions on the legal rights of landowners whose land is needed for reservoir construction, the public's right to take land, the steps involved in land procurement, and the measures taken by the government to insure fair payment for property taken (20).

Chapter II

APPROACH

In order to accomplish the project objectives, it was necessary to collect data on cost, attitudes, and various factors influencing attitudes. An analysis to reveal any correlation among these variables requires a detailed study of the financial and economic costs of land acquisition, of the economic value of the land in alternative uses, of the attitudes involved, and of the various factors believed to influence attitudes. The financial cost of land involves consideration by individual parcel of the amount paid for property, the appraised value of the property, and the procedure followed in purchasing. The individual selling his land may suffer an economic cost if his property is worth more to him than he is paid (i.e., private value is greater than public value). This, of course, depends on the type of property he is selling and how much he is paid. The community may suffer economic cost if project construction is delayed, if use of the project output is retarded, or from the loss of secondary and indirect benefits from the production from the land taken for the project. The determination and the prediction of the landowner's attitude and its influence on these costs also requires a study on an individual basis of actual

attitudes and of the important factors contributing to these attitudes.

In order to explore these subjects in a quantitative manner, the available sources of data were examined, and pertinent information was collected. With this information, the total cost of land acquisition was divided in a manner convenient to this study and the factors influencing landowner attitude were determined.

DATA COLLECTED

KINDS OF DATA NEEDED

Data was collected from the District Offices of the U. S. Army Corps of Engineers in Huntington, West Virginia, and in Louisville, Kentucky, from the county court houses near each project, from the individual property owners selling land, and from the local citizens of the area surrounding the reservoirs. Information was needed to determine:

1. The kinds of economic and financial costs associated with buying right-of-way.
2. The relative magnitude of each kind of cost.
3. The factors affecting attitude.
4. The actual attitude of the individuals.
5. The amount of effect each factor had on the attitude of the people being studied.

The nature of this study required detailed information, not only on the cost and attitudes involved, but also on the historical transactions between the government and the landowners when the required right-of-way was purchased. Due to the confidential nature of some of this information and the restrictions on time and money available, all of the above data could not be collected to the extent necessary for a complete and thorough study of this subject. However, most of those contacted were cooperative, and the data obtained was sufficient to produce some very interesting and informative results.

DATA COLLECTED FROM THE CORPS OF ENGINEERS

Much of the needed data were obtained from the Corps of Engineers Office for the District in which the reservoir is located. Dewey Reservoir is in the Huntington, West Virginia, District. West Fork of Mill Creek Reservoir and Rough River Reservoir are in the Louisville, Kentucky, District. Facts were collected on the procedure of purchasing the land, on the sources of cost to the Corps, and on the individual parcels of property that were sold.

The procedure of purchasing land was learned from interviews with members of the Real Estate Division of the Huntington District Office. This information explains some of the administrative costs associated with purchasing right-of-way. Knowledge

of this procedure was also necessary in order to see how an individual who is against selling his property affects administrative costs.

By the same token, the purchasing procedure must be known to determine the ways in which the owner's attitude is influenced by the buyer.

Information was needed not only to explain the sources of the financial cost of buying property, but also to determine the magnitude of these costs. Design memorandums and definite project reports are written by the Corps of Engineers before any project is built. These were available and contained a detailed description of the preliminary estimates of the cost involved. Annual reports and cost and progress summaries explained the actual costs incurred.

For each parcel of land that is bought, the Corps of Engineers keeps a file describing the transactions between the owner and the government. These files are considered confidential, and free access to them was not possible. However, most of the necessary information was extracted by government employees and made available to this study. This information was the starting point for analyzing the attitude of individual landowners. The following useful facts were obtained for every landowner at Dewey Reservoir and for the owners of all parcels at Rough

River Reservoir except those valued at less than \$35.00. The files for West Fork of Mill Creek Reservoir were not available.

1. Tract number.
2. Name of owner.
3. Address of owner before property was sold.
4. Total acres sold.
5. Number of acres in buildings.
6. Number of cultivated acres.
7. Land use (farm, range, woodland, idle, business, industry, or public use).
8. Type of occupant (none, owner, nonowner).
9. Whether or not the property was inherited.
10. Type of transaction (fee, easement, or mineral rights).
11. Whether or not the purchase was taken to court.
12. Number of families required to move.
13. Price paid for the property.
14. Market value of buildings on the property as appraised by the Corps of Engineers.
15. Appraised value of land.
16. Appraised value of minerals.
17. Severance damages.

Other information which was available for part of the parcels is listed below:

1. Owner's new address if he moved.
2. Assessed value of the property sold.
3. Actual amount of money the owner received.
4. Whether or not the Corps of Engineers' negotiator judged the landowner to be cooperative.

DATA COLLECTED FROM COURT HOUSES

Using the information obtained from the Corps of Engineers as a starting point, it was the plan to collect additional data from the individuals selling property and from other local citizens. The problems arose, however, of locating these landowners and of selecting local citizens who lived in the area before the project was built. Construction of Dewey and West Fork of Mill Creek Reservoirs began nearly twenty years ago. Many of the property owners who did not move because of the reservoir had since done so for other reasons or had died. Therefore, the 20-year-old addresses obtained from the Corps of Engineers did not always lead to those who sold the property. Rough River Reservoir was more recent and addresses were more reliable.

One source of additional information on current addresses was the local telephone directory. This was found to be of very

little use for Dewey Reservoir because only a few of the people had telephones. For Rough River Reservoir, this source was of more use but for various reasons did not yield many addresses. The telephone directory for Cincinnati was the most useful as far as the percent of total people found. This was due to the fewer number of people involved and their tendency to remain in the Cincinnati area.

A better source of information was found to be the local county court house. Voter registration records gave the present addresses of many property owners who had sold land for project construction. These records also gave the years a voter had lived in the community. Therefore, a random sample of local citizens that had lived in the area since before project construction could be selected. Other information useful in determining the factors influencing the attitude of those selling land was also obtained from this source; specifically, the age of the seller when the project was built and the consistency with which he voted prior to the project. Property deeds located in the county court houses were also consulted at various times.

DATA COLLECTED FROM PEOPLE SELLING PROPERTY

After obtaining the names and addresses of the people who had sold land, steps were taken to contact them and find out

their opinion of the project. Although it was evident that the data would have to be collected through questionnaires, the questions which should be asked were not so obvious. Approximately thirty people around Dewey and Rough River Reservoirs whose land was acquired by the government were interviewed before the questionnaires were formulated. The purpose of these interviews was to gain some knowledge of: (1) the factors which determine a person's attitude toward the project and toward selling his land, and (2) the factors making the private cost to the individual different than the fair market value. In addition to asking these people 20 definite questions, they were encouraged to express their personal feelings in more general terms. From this information, a letter of explanation (Figure 2) and a questionnaire (Figure 3) were developed.

A letter, a questionnaire, and a stamped, addressed return envelope were sent to the landowners for whom addresses were found. The return of the questionnaires was scattered over a three-month period from the time they were sent. The actual numbers sent and results can be found on Table 1. The total number of parcels and property owners was taken from the tract register for the particular reservoir (3,7,10).

DATA COLLECTED FROM LOCAL CITIZENS

To get some idea of the opinion of the community toward the

UNIVERSITY OF KENTUCKY
Lexington, Kentucky 40506

Water Resources Institute

Dear Sir:

The University of Kentucky Water Resources Institute is conducting a study of Rough River Reservoir and State Park. One of the purposes of this study is to see what effect the lake had on the surrounding area. The study is to find out just how it has helped or harmed the community and to compare these findings with the estimated benefits and costs before the lake was built. By doing this, better ways for determining the effect of a reservoir on an area can be used in the future.

When planning a reservoir, thought should be given to people like you whose land may be flooded by the lake. You should not be forced to move unjustly or paid too little for your land. In order to determine whether or not this is the case, one area of this study will take a closer look at people who are forced to move or sell property because of the lake. This is why we are sending you this questionnaire.

We will appreciate your time and effort in answering these questions and returning them to us and are also glad to give you the opportunity to express your opinion where it can be counted.

Sincerely,

Johnnie M. Higgins, Jr.

Johnnie M. Higgins, Jr.

Figure 2. Sample Letter Sent to Landowners

NAME _____ ADDRESS _____

1. What was your first impression or reaction when you heard the dam was to be built? FOR X AGAINST _____
2. What was your first reaction to selling your property?
FOR _____ AGAINST X EXPLAIN 'to sell part and keep part. We owned 5 tracts, our home tract was the best one, which was sold.'
3. At first, did you believe the lake would benefit the community?
YES X NO _____
4. Did you believe that your land would be more valuable because of the lake? YES X NO _____
5. Did you have to move? YES X NO _____ If so, how did your new home or farm compare with the old one? BETTER _____
EQUAL _____ WORSE X
6. How long had the land you sold been owned by your family?
"18 years"
7. Considering all factors, what you received for your property, the cost of moving or losing part of your land, the time and trouble it caused you, your new home as compared with your old one, etc., did you at the time consider yourself any better off or feel that it was worthwhile? YES _____ NO X
In what ways? "We owned and operated a general store which was discontinued and all of the bottom land was barren."
8. Do you feel that you received enough for your property? YES _____
NO X
9. If you feel that you did not get enough, how much more do you feel you should have gotten? \$9,300.00
10. In what ways do you think the reservoir has benefitted the community? _____

Figure 3. Sample Questionnaire and the Landowner's Answers

11. In what ways do you think it has harmed the community? "The required land which is mostly bottom has grown up in brush and has become a hazard place."
12. Has your life been enriched or have you benefitted in any way from the Dewey Lake? YES NO How? _____
13. Are you glad it was built? YES NO
14. Did you take this to court? YES NO
15. If you had it to do over, would you go to court? YES NO
Why? "on account of expenses and difficulty in preparing for trial."
16. How did selling your property affect your income? INCREASE
DECREASE STAYED SAME
17. How did it affect your farming or gardening operations? "bad by requiring the best land and destroying fences and giving access to poachers."
18. Do you feel that the appraisers should have contacted you sooner than they did? YES NO
19. Do you feel that you were properly informed as to what was going on before the dam was built? YES NO
20. Do you feel that your neighbors got a better deal on their property than you did? YES NO WHY? "farmers that owned the small tracts was paid the best prices."
21. If you were unhappy about selling your property, what were the main reasons you felt as you did? "did not get enough to restore me as good as I was before the dam was build."

COMMENTS: "We hope to see the good rich bottom land in Dewey Lake cleaned up and sowed in grass and roads build."

Figure 3. Continued

TABLE 1
QUESTIONNAIRES TO PROPERTY OWNERS

WASHINGTON WATER RESEARCH CENTER LIBRARY	Rough River	Dewey	West Fork of Mill Creek
Number of parcels of property acquired by government	1324	440	24
Number of property owners involved	559	292	21
Number of property owners that were sent questionnaires	215	129	11
Number of questionnaires returned with- out reaching addressee	27	11	0
Number of property owners receiving questionnaires	188	118	11
Number of questionnaires answered	48	43	4
Percent of property owners receiving questionnaires	33.6	41.0	52.4
Percent of questionnaires received that were answered	25.5	36.4	36.4
Percent of property owners answering questionnaires	8.6	14.9	19.1

project, local citizens other than those selling property were sent post card questionnaires to answer and return. Names and addresses were obtained from voter registration records in the local court houses. As with the questionnaires, some people in this group were first interviewed to help determine the questions to put on the post cards. Only about ten local citizens were interviewed,

however, since this group was not so directly involved in the quantitative portion of this study.

Post card questionnaires were sent to two groups of local citizens. One group consisted of those people in the floodplain below the dam. These people were considered to be the ones most directly benefitting from the project because of reduction in flood damage to their property. The second group was comprised of local people downstream, upstream, and on both sides of the project. The questions asked the second group were somewhat different from those asked the first group. The questions asked the people in the floodplain and the questions asked the general public in the area can be found on Figure 4. The specific numbers of questionnaires sent and returned are shown on Table 2. A letter similar to the one sent with the questionnaires was sent to explain the purpose of the post cards.

KINDS OF COST

It was evident early in the analysis that attitude affects different kinds of cost in different ways. Therefore, it was necessary to subdivide the total land acquisition cost into four parts. These were:

1. The financial cost of the property or the amount of money paid by the government to the landowner.

People in Floodplain

1. Were you glad when you first heard the lake was to be built? yes
2. Did you then believe the lake would benefit the community? yes
3. Do you now believe that it has? yes
How? _____
4. Have you benefitted in any way from the lake? no
How? _____
5. Are you glad that it was built? yes
6. Do you believe that there has been less flooding damage since the dam was built? yes
7. Do you think the reservoir has caused new homes or buildings to be built in the floodplain? yes

COMMENTS "Though we do not live in the vicinity of the lake and are not profitted by it, we believe it is wonderful."

Local Citizens in General

1. Were you glad when you first heard the lake was to be built? yes
2. Did you then believe the lake would benefit the community? yes
3. Do you now believe that it has? yes
How? "Recreation and Tourist Trade"
4. Have you benefitted in any way from the lake? yes
How? "Boating"
5. Are you glad that it was built? yes
6. Are you in favor of the Corp of Engineers building more projects like this in Kentucky? yes

COMMENTS _____

Figure 4. Sample Post Card Questionnaires and the Local Citizen's Answers

TABLE 2
POST CARDS TO LOCAL CITIZENS

	Rough River	Dewey	West Fork of Mill Creek
PEOPLE IN FLOODPLAIN			
Number of floodplain residents that were sent post cards	56	50	47
Number of post cards answered	14	4	10
Percent of post cards answered	25.0	8.0	21.3
LOCAL CITIZENS IN GENERAL			
Number of local people that were sent post cards	155	150	150
Number of post cards answered	26	22	34
Percent of post cards answered	16.8	14.7	22.7

2. The administrative cost to the government of purchasing the property.
3. The economic cost to the property owner of giving up his property.
4. The economic cost to the local community of obtaining the project and of losing benefits from alternative uses of the land.

FINANCIAL COST OF THE PROPERTY

The financial cost of the property according to the "fair market

value" concept is dependent on several factors. The market value of a property parcel depends on the use for which it is best suited, its quality in that use, and the local demand for property of its type. Reservoir right-of-way requires the purchase of land, buildings, and mineral rights. The quality of each affects its price. The local demand also plays a large role in determining the fair market value. An acre of land near West Fork of Mill Creek Reservoir might be physically similar to an acre near Rough River Reservoir, but it is much more valuable because it is located in a highly populated area and, therefore, can be put to a different use. Since full ownership of all the land ever inundated by the reservoir or used in dam construction is not required, the cost of property depends on the property rights which are purchased.

The alternatives to a simple fee purchase are easement, lease, license or permit (3). "An easement is an instrument which grants an estate in the land and is not revocable except as may be provided in the instrument" (17, p. 215.4.1). A perpetual flow easement involves the right to flood the land when necessary. Easements are most often purchased to acquire the right to inundate land surrounding the reservoir pool but located at an high enough elevation to only be underwater for short periods during very rare floods. Allowing this land to remain in alternative agricultural or

other uses increases the economic value derived from it. "A lease is an instrument by which lands and tenements are conveyed for a term of years or at will for any less interest than that of the lessor, usually for a specified rent or compensation" (17, p. 215.5.1).

"A license is an instrument granting authority to do an act or acts on land . . ." (17, p. 215.6.1). These acts include such things as construction and placement of a road, pipeline or telephone line. "A permit is an instrument giving a personal privilege or authorization by consent which usually will be temporary and revocable" (17, p. 215.7.1). Permits have usually been identified with the authorization for the removal of sand, gravel, and other materials used in dam construction. Mineral rights provide ownership of oil and gas, coal, or other minerals underlying the property. A mineral right may include all minerals or just certain minerals specifically listed in the right.

Cash settlements are also made with property owners for severance damage. "Severance damage is any loss in the value of the remaining property occasioned by the taking of a portion of an ownership" (17, p. 212.0.4). Severance damage is not a part of the value of the land taken but is a measure of the reduction in value of the remaining land as a result of the partial taking. This results when a partial taking leaves the remainder

of such size, shape, or with such reduced access that its use by the owner is restricted.

Although the official governmental policy is to pay the "fair market value" for property, the actual amount paid is influenced by the owner. Cases have arisen where owners were so eager to have a project that they were willing to donate their land. At the other extreme if the owner for various personal reasons values his property at a price higher than the appraised value, or if he believes the appraisal does not reflect the full market value, he may refuse to sell at the price offered. The government must then either try to reach a satisfactory agreement with the owner or condemn the property and let the court decide on a fair price. The government may offer a slightly higher price to avoid court costs. If the case goes to court, the settlement may be either more or less than the original appraisal. Therefore, the owner may receive more for his land than the appraised value. Although there are varying degrees between the owner willing to donate his land and the one who refuses to sell and forces the government to take the matter to court, it is clear that the individual citizen has a definite voice in determining the sale price.

ADMINISTRATIVE COST OF PURCHASING THE LAND

The administrative cost of purchasing right-of-way can be

broken into three classes. These are the cost of work contracted to private firms, the cost of government personnel engaged in the purchasing procedure, and office overhead cost. Much of the detailed work required for land acquisition, such as surveys, mapping, and title evidence, may not be done by regular government employees but rather by contract to private firms which specialize in the particular task. The work done by government employees is varied and involves many different people. This ranges from the negotiator, who may spend two years on one project contacting each landowner, to the secretary, who spends five minutes typing a letter concerning the project. It is often necessary to establish field offices near the project. Office overhead costs include the expense of establishing and maintaining the field offices as well as the portion of the cost of the permanent offices allocated to the project.

It is evident that the administrative cost of land acquisition is related to the cooperation received from the landowners, but a quantitative relationship could only be established by a thorough analysis of the related office activities. The less ambitious approach used here is to review from start to finish the procedure of acquiring the right-of-way and to consider how this procedure is altered or influenced by the property owner.

The procedure described below is taken from verbal information supplied by the Land Acquisition Office of the U. S. Army Corps of Engineers, Huntington, West Virginia, and from the Bureau of Reclamation instructions on land acquisition (17, p. 213).

Before any work is started on a proposed project, certain preliminary steps must be taken. Feasibility studies are first conducted to determine whether or not a proposed project will be worthwhile (i.e., if the benefits exceed the cost). If the project is found to be feasible, it is sent to Congress for authorization and funding. Congress then compares alternative projects and reviews the budget to determine which projects should be built. After funds are made available, work can begin.

The successful completion of a large project is, of course, a complex procedure requiring close coordination among the various phases. The same is true within the phase of land acquisition. Many different jobs must be carried on simultaneously so that the land will be available when construction is ready to begin. Figure 5 indicates the jobs which had to be coordinated within the land acquisition phase for Dewey Reservoir.

In preparation for the land acquisition process, field offices are established for the project. The field office for Dewey Reservoir was in Pikeville, Kentucky. There were up to 20 employees

Figure 5. Land Acquisition Coordination

Item of Work	Month* Started	Month Completed
SECURE RIGHTS OF ENTRY		
Secure rights of entry on priority areas and notify District Engineer	1	1
Prepare and forward condemnation assembly on entire reservoir area to Office, Chief of Engineers	2	5
Secure possession of entire reservoir area by filing condemnation proceedings, under appropriate River and Harbor Act	4	6
GENERAL REQUIREMENTS		
Organize and equip Real Estate Project Office in reservoir area	1	2
Prepare maps showing lands, highways and utilities affected	1	2
Prepare and submit to Office, Chief of Engineers, revised gross appraisal on entire reservoir to reflect present costs	1	1
Prepare preliminary land acquisition map	1	2
Establish taking line	2	9
LAND ACQUISITION		
Prepare Forms CR28, CR30 and legal descriptions for priority areas	1	1
Prepare Forms CR28, CR30 and legal descriptions on balance of reservoir area	2	9
Contract for, order and obtain title evidence on all tracts in reservoir area	2	8
Obtain tract appraisals for all priority areas and submit to Office, Chief of Engineers for approval	2	2
Obtain tract appraisals for balance of reservoir area and submit to Office, Chief of Engineers for approval	3	10

*Construction started at end of Month 1

Figure 5. Continued

Item of Work	Month Started	Month Completed
LAND ACQUISITION (Continued)		
Office, Chief of Engineers, approved appraisals for priority areas received in Division Office	3	3
Office, Chief of Engineers, approved appraisals for balance of reservoir area received in Division Office	4	12
Negotiate options or submit condemnation assemblies on priority areas	3	5
Negotiate options or submit condemnation assemblies on balance of reservoir area	5	14
Division Office accepts options or forwards condemnation assemblies on priority areas to Office, Chief of Engineers	4	6
Division Office accepts options or forwards condemnation assemblies on balance of reservoir area to Office, Chief of Engineers	5	15
Pre-closing curative work	4	17
Closing operations	7	22
Preparation of final land acquisition map	2	23
RELOCATIONS		
Prepare maps showing highways and utilities to be abandoned or relocated	3	6
Work out plan of relocation or abandonment of roads with Kentucky officials	3	11
Work out plan of relocation or abandonment of utilities with respective owners	3	11
Prepare cost estimates for relocations	4	9
Negotiate relocation or abandonment agreements with interested parties	4	12
Submit signed agreements for approval	8	13
Completion of acquisition activities except trials	2	23

working in this office with the number depending on the current status of the acquisition process. The trained personnel and the office equipment were supplied through the Office of the District Engineer, Huntington, West Virginia (5, Acquisition of Land, p. 4). Field offices remain in operation until completion of the project.

The initial step in the formal acquisition process is the designation by the design engineers of the lands which may be required. During the preliminary planning phases, the cost of land for alternative reservoir sizes and locations is considered in formulating the final project. Preliminary field surveys are made for a rough cost evaluation of alternative lands and rights-of-way. After the reservoir has been designed and its location determined, specific lands are designated for purchase in fee or the purchase of some lesser interest.

After it has been determined which lands need to be acquired, a concern is contracted to make segment maps and legal descriptions. The segment maps show information such as tract boundary, taking line, tract number, owner, and acreage for all the needed land. The legal description must identify the land definitely and clearly and be sufficient to enable a competent surveyor or engineer to retrace the property on the ground. Initial land acquisition proposals describing land required for construction

purposes and the segment maps must be prepared within six months prior to the issuance of specifications.

Within six months after Congress has authorized construction of the project, a reasonable effort must be made to advise owners and occupants of land in the project area as to the probable time lands will be acquired. Public meetings are conducted at locations convenient to owners and occupants affected to advise them of proposed plans and to afford them the opportunity to comment and ask questions. Information pamphlets are prepared and distributed at these meetings covering such things as general information on land acquisition methods, appraisal considerations, and condemnation actions.

The government also executes a contract to have the title to each parcel examined. Property ownership must be determined before a transaction can take place. If there is uncertainty as to the rightful property owner, the property is condemned and the determination of ownership is settled by the court. Special regulations issued by the Department of Justice govern the preparation of title evidence in land acquisitions by the United States. All acquisitions of lands and land interest by purchase must be consummated in accordance with the preliminary title opinions of the Attorney General. This requires that a certificate of title be prepared and submitted.

The next step in the acquisition process is to appraise the market value of the property. It is the policy for staff appraisers or contract appraisers to appraise all the lands to be acquired. Initial appraisals are subject to review by a high level reviewing appraiser and other authorized officials prior to negotiations with the landowners. Professional appraisers are selected who are familiar with approved appraisal practices, who are qualified to appear in court as witnesses as to valuation matters, and who will not derive directly or indirectly any personal benefit from the appraisal. The job of these appraisers is to estimate the fair market value of the property being purchased.

Three methods of estimating the fair market value are recognized. They are: the market data approach, the income approach, and the cost approach. The market value approach takes value at the cost of acquiring an equally desirable substitute property, assuming no costly delay in making the substitution. The cost approach assumes no man is justified in paying more for a property than that amount by which he can obtain, by purchase of a site and construction of a building without undue delay, a property of equal desirability and utility. The income approach assumes value equals the investment necessary to acquire, without undue delay, a comparable substitute income property offering an equally desirable net income return (21, p. 28).

No single method of arriving at a value is fully adequate or appropriate for all types of land. The appraiser must consider all three approaches when appraising improved properties for purchase. After appraising the land, the appraiser completes his report on a standardized format and submits it to the Real Estate Office for approval.

With the approved appraisal report, the negotiator, a full-time government employee, contacts the landowner to close the deal between the landowner and the government. The price, the timing of taking the property, the relocation of building and improvements, additions to the project to reduce severance damages, the nature of required easements, and many other matters are discussed. An offer is made to the owner on the basis of the appraised value, and negotiation begins on the price and other transaction details. Where a settlement cannot be achieved at the appraised value, an attempt is made to reach a mutually satisfactory agreement. Sufficient time is allowed to negotiate an agreement with the landowners who indicate a willingness to sell at a reasonable price.

If all reasonable efforts fail to result in a land purchase contract, consideration is given to the desirability of obtaining a second appraisal by another appraiser. Depending on the results of a re-examination of the case, an additional offer may be made. Thereafter, if condemnation action appears necessary, a report

containing a full case history and a Declaration of Taking is sent to the Attorney General. During the entire condemnation proceedings, close cooperation is maintained with the Department of Justice. The amount of money considered to be just compensation is deposited in the name of the owner and a court order giving the United States possession of the property is secured. Construction or any necessary work may then be started on the property. After allowing sufficient time for both sides to prepare their case, the case between the owner and the government is settled in a federal court.

The preceding describes the general process of obtaining private land for public use. The actual procedure, of course, varies by project and government agency. The procedure is flexible in many respects and the property owner is allowed various options such as removing his house from the land if he so desires. The negotiator is also allowed to agree to minor deviations in working out equitable settlements in specific situations. The administrative costs of land acquisition are the costs of executing the above procedure.

The degree to which an individual influences administrative cost is much greater than the degree to which he influences the price paid for his land. A certain minimum administrative cost exists whether the individual is so cooperative that he is willing

to donate his land or so resistant that the matter must be taken to court. The actual administrative cost of obtaining a parcel of land ranges upward from the minimum depending on the cooperativeness of the owner and the complexity of the transaction. A perfectly cooperative person may travel to town to sign the deed closing the transaction. On the other hand, a very resistant person may cause a delay in surveying his property, cause the negotiator to make several superfluous trips to see him, cause additional appraisals to be made, and finally force the court to settle the matter. Obviously, because of the additional proceedings and personnel involved, the major increase in cost comes when it is necessary to settle the conflict in court.

ECONOMIC COST TO THE PROPERTY OWNER

The economic cost borne by the individual selling his land amounts to the difference between the compensation he actually receives and that which he would have to receive to be in his own opinion equally well off after as he was before the sale. The cost when defined in this manner may be positive if the owner believes his lot to have worsened or negative if he believes it to have improved. Such a cost is hard to quantify because it is determined by the true opinion of the seller and not the expressions used in negotiation to try to obtain a better price.

Even though private economic cost is hard to estimate, it is very real. It may be tangible or intangible. A tangible cost would be the cost the owner has incurred in improving the property just the way he likes best but which improvements because of differences in tastes among individuals may not add to the selling price in the open market. The owner would again have to pay to make equivalent improvements to his new home. The intangible cost is largely tied to sentimental or psychological attachment to an old home. This cost is the most difficult to quantify, but is so real that in extreme cases older individuals have been known to die shortly after being forced to move.

One possible source of tangible cost to the owner is the loss of direct benefits derived from the property. These benefits may come in the form of cash income or subsistence gardening depending on the kind of property and its use. Economic theory shows how market prices tend to reflect marginal values of items to society. However, the value marginal to society is not marginal to the individual who surrenders all his land. Such an owner may be realizing a large consumer's surplus, a value received for which he does not have to pay.

A farmer who sells an acre of land has lost the benefits derived from that land. Although he is paid the fair market value and,

therefore, should be able to buy a similar acre of land restoring him to his original position, this is not always possible. He may not be able to obtain a similar acre of land for sale in the open market and may have to change to another type of farming with which he is less familiar, shift to an occupation which he enjoys less to support himself, or move to a distant community. Likewise, if a businessman is required to sell his place of business, he may suffer a loss in benefits derived from his property. This could come from loss of a good location, loss of established customers, or loss in operating time. Still another loss in benefits from the land might be from losing the mineral rights to the property.

Although the loss to two owners may be the same, the value of this loss to them may be different. A man with a large family, who lives off of what he can produce from the land, would place a higher value on a bushel of potatoes than a wealthy person who produced the potatoes to sell. In addition to the differences in value of these lost benefits to the owners, a difference in the present worth of identical future cash benefits to each individual may also be caused by differences in time preference (i.e., discount rate). A man of eighty might cut all the timber on his land in an attempt to maximize his present income; while a man of twenty might cut only the older trees,

saving the younger ones for future production. An older farmer considering retirement may be more inclined to sell than would a younger man needing to earn an income for many more years.

Other tangible costs accrue to the landowner if he is required to move. The government will pay for transportation, direct moving expense, time lost from employment, and damages to property. Expense to the individual may vary with mode of transportation, time and inconvenience, and improvement needing to be made to the new property. The cost in transporting belongings from one place to another borne by the owner depends on how the moving is accomplished and how far he moves. A major cost to the individual is the time and inconvenience of moving. He must find another house, see that it is made ready for occupancy, see that all of his belongings are transferred to his new house, and make certain adjustments to the new home. It may take several years for a farmer or businessman to develop a new property to the point where his income equals that from the old. Finally the individual may have to pay for certain repairs to his new home or for certain changes made because of personal preferences.

An individual may add greatly to his personal tangible cost if he refuses to make an agreement with the government and decides to settle the matter in court. While it is true that he may receive more money for his property by going to court, this is likely to be offset by legal fees, time, and trouble.

The intangible costs to the property owner are of major importance and are borne by the owner himself. These costs depend on the nature of the property sold, the owner's connection with it, and the owner's personality. Sentimental attachment to real property varies but it is usually true that a home has more sentimental value to the owner than does the land. It is also usually true that sentimental value increases with the length of time the owner or his family has owned or lived on the property. A piece of land or house may have sentimental value because of the memories it holds for the owner. The property might have a personal value because of the neighbors or the neighborhood in which it is located. The loss of the personal contentment and happiness of owning the property is a definite, although intangible, cost to the owner. The intangible cost for an owner having to move is intensified by a certain fear of the unknown or resistance to change that all persons seem to have. Other intangible costs may exist for the owner who loses items of personal value at his old home which cannot be replaced.

For example, perhaps the owner liked the creek which ran through his front yard, or the large tree outside his back door.

Many intangible values cannot be replaced by the individual; however, they generally cause the value of a property to an unwilling seller to exceed the theoretical price paid a willing seller by a willing buyer and on which appraised values are based. This excess of the private value of the property to the individual above the public or market value is a cost to the owner when he sells his property.

The individual's attitude toward selling his property obviously determines many of the intangible costs. One reason for this is that a person's attitude governs his effort to overcome or avoid these costs. A perfectly cooperative person helps accomplish the sale as quickly and smoothly as possible. He will follow directions given him and will be well informed on the procedures. This will give him the maximum amount of time to find the best possible replacement property and arrange moving details. The owner with greater resistance to selling his land is usually less well prepared psychologically for the change so that the adjustment process becomes more costly to him. While a happy person would tend to overlook many intangible costs, an angry person would tend to expand them to justify his antagonism. An extremely

angry person might refuse to have anything to do with the government and fight the matter to the fullest extent in court.

ECONOMIC COST TO THE LOCAL PUBLIC

As was the economic cost to the property owner, consideration of the economic cost to the local public can be a very complex matter. The two main subdivisions are the cost to the local community of getting the project built and the loss to the community of being deprived of the output from the land. These costs depend on the local attitude of the people toward the project, the difficulties encountered in getting it built, and the alternative uses open to the land were the project not built.

Before the building of a project is studied, the local citizens must express a desire for the project to the congressman from their district. He is largely responsible for securing authorization and funding for the project and his actions will be influenced by the opinions of the voters. The organization of groups favoring or opposing a project involves a cost to the local community. The amount of this cost will depend on the degree to which the project is supported or fought by the local citizens, factors which are determined by the intensity of the feelings of those affected. Other meeting and lobbying actions are continued throughout project development as special groups work to see that their rights

or ideas are considered.

The loss of future benefits may stem from several sources depending on the project. One such loss is the productive power of land flooded by a reservoir. The land could be used to produce crops or support other income-producing activities. The land may have valuable minerals which can no longer be claimed when the land is inundated. All such losses are an economic cost to the local community to the degree the local community is deprived of the secondary and indirect benefits of the resulting economic activity.

In the economic sense, the value of land equals the present worth of the future income it is expected to yield. If the benefit-cost criterion is to be used in economic evaluation of the project, it should be noted that the value placed on property by real estate appraisers understates the economic value of the property. If the cost is measured by a market implicitly discounting at a high rate of interest while the benefit-cost analysis uses a low public rate of interest to evaluate benefits, there is an asymmetry which overstates net benefit. Consistency could be achieved by measuring the cost of assets as the present worth of the income they yield discounted at the low public rate or else by applying the higher rate of interest in the capitalization of benefits (22, pp. 146-147).

A direct cost to the local community is incurred because of required contributions to the cost and upkeep of the project. The Flood Control Act of 1936 required that no federal appropriations be spent until states or local governments have committed themselves to meet their share of the cost. The local community may be required (1) to provide necessary lands, easements, and rights-of-way; (2) to assume responsibility for damages inflicted during construction, and (3) to maintain and operate the project after it is finished (22, p. 151).

Delayed or incomplete utilization of project output may result from a poor response or an unfavorable attitude on the part of the local community and could be considered as a cost to the community. If the project were built but use of the output were hindered in some way, it would cause a loss in future benefits. A delay in project construction caused by local opposition would, also, result in the loss of future benefits. The loss of these benefits are usually to the people within the area of the project and may be caused by a number of different factors.

The attitude of those selling their land affects the economic cost to the local public to the degree they influence the total local attitude. The number of meetings that are held, the speed with which the project is approved and constructed, and the

project buildup are all influenced by local public attitude toward the project.

FACTORS DETERMINING THE ATTITUDE OF PROPERTY OWNERS

To consider the matter of attitudes is to deal with an elusive variable. Attitudes may vary from person to person, from subject to subject, and from time to time. An attitude may only be defined by specifying all three. The person involved in this study is the property owner. The subject is selling his property for the project. The time attitude has the most effect on cost is during the actual transactions. Since an attitude is an abstract entity, it can only be studied in terms of causes and results. The causes or factors influencing a person's attitude are drawn from his entire environment since early childhood. To proceed, it was necessary to select factors which would reasonably bear an important influence on a person's attitude toward selling his land. It was hypothesized that the attitudes depended on the importance of the property to the owner, the conditions under which he sold it, and the personal characteristics of the owner.

It should be pointed out that in this study it is assumed that each influencing factor is independent of the other factors, and the individual's total attitude is determined by the combination of his feelings about each factor. The reasoning behind this assumption

is that no two factors , as subsequently defined, are related, although the effect of one factor on the individual's attitude may depend on another factor. This may be explained by the before and after concept . The attitude being considered is that before the transaction is completed; therefore, only the events which happened previously are definitely known. However, the individual's attitude is determined not only by what happens before, but also by what he thinks will happen after the sale. For example, take an acre of land away from a farmer and he will be unhappy. When he is paid for this land, the payment will determine what he can buy to replace the acre taken. Thus, the effect of one factor in determining his attitude is offset by another compensating factor. Therefore, correctly evaluating both, independently, and combining them would give the overall effect on the individual's attitude.

IMPORTANCE OF PROPERTY TO OWNER

The importance of the property to the owner determines his attachment to it and is usually the major factor influencing his attitude. A farmer losing swampland is less concerned than when he loses good cropland. A farmer losing land which has been in his family for generations is more concerned than a farmer who bought the land solely for investment purposes. The first property is

important to the owner because it is useful. The second is important because of sentimental attachment.

Most individuals attach more importance to their home than to any other real property they own. Loss of a home will cause a major change in one's life. Such a change will intensify feelings above those of one losing other real property. The effect losing a home would have on an individual's attitude depends partly on sentimental attachment to the building and grounds and to friends and neighbors, but the usefulness of the home is also important. The usefulness of a home to an individual depends on how well it supplies his needs for a home. Even though individuals vary in what they expect from a home, the degree to which the home meets their needs depends primarily on its size and location and the availability of utilities. Individuals will vary in what they expect from a home, but the attitude one has toward losing his home will depend on what he considers his need to be and how he feels his home fulfills these needs.

A property may be useful to the owner as a source of income. The manner in which it supplies an income depends on how it is used. It may be used to produce food, timber, or minerals, as a place of business, as rental property, or as an investment for speculative purposes. The degree to which this factor influences

the owner's attitude depends on how much it disrupts or decreases his present income and on the opportunity he has to recover the lost income from alternative investment.

Although a particular property is not used as a home or source of income, it may have a personal value to the owner. A certain property may be located in the country; and although the owner does not live there, it may be of use to him as a place of escape from the city. The owner may enjoy fishing in a river bordering the property. Perhaps, he plans to retire and build a house on the land. Uses such as these are of value to the owner, although the land may be idle. Whatever the use of the property, the attitude of the seller, as far as the influence of usefulness is concerned, is largely determined by the opportunity he has for acquiring alternative property of equivalent usefulness.

The importance of property to the owner depends not only on its usefulness, which can usually be replaced, but also on its sentimental value, which is usually irreplaceable. When a person lives and works on his inherited family home or land, it may keep alive memories of the past which in some lives can never be replaced. The same is true to a lesser degree for people who live in one place for many years, although it is not inherited. Property containing a family cemetery also involves strong sentimental feelings on the part of the owner. This may be due to the

memories of or out of respect for the persons buried there.

Memories of the past are not the only sources of sentimental attachment to a particular property. An owner may have strong feelings about the property because he may have worked hard upgrading and repairing the place, and, therefore, takes great pride in the results of his efforts. The person required to move may like his neighbors and the neighborhood, and thus, be unhappy about moving. In any event, the sentimental value of the property to the owner depends on the past and the present conditions as interpreted by the owner.

CONDITIONS UNDER WHICH PROPERTY WAS SOLD

In addition to the importance of the property to the owner, consideration must be given to the conditions under which he sold it. Even when a property is extremely important and valuable to the owner, there may be conditions or circumstances in which he would be glad to sell it. Therefore, the conditions of the sale are vitally important in determining the attitude of the owner toward selling. The conditions which are most important are the owner's reasons for selling, the specifics of the transaction, and the current availability of property to replace what is lost.

In this study, the reason for selling is always the same and does not affect relative attitudes. The understanding and

acceptance of this reason, however, does vary according to the personal characteristics of the owner as considered in the next section. In other cases, the reason for selling a property can be the most important factor in determining the owner's attitude. An individual with a good home in an attractive location might voluntarily sell it because his job requires his moving. Low farm prices or poor crops might cause a farmer to sell his farm and move to town. Cases might arise where a person needs a large sum of money in a hurry, forcing him to sell a valuable piece of land. These are all cases of an owner who does not want to sell his property until a reason for selling arises which outweighs his desire not to sell.

The details of the actual sale also have an important influence on attitude. The major detail of the transaction, as far as the owner's attitude is concerned, is the amount of money he is paid for his property. The property being sold has to the owner a private value which is difficult if not impossible to calculate. No attempt is made to pay the owner the private value of his property. He is paid the fair market value. Although this is not unreasonable, it does affect the owner's attitude if he does not receive what his property is worth to him as contrasted to what it is worth to a probable buyer on the open market.

Therefore, the effect of compensation on the owner's attitude will depend on the difference between the private and public value of the property.

The portion of his total holdings which he must sell is another important factor in determining the owner's attitude. It is reasonable to suspect that a person selling ten percent of his land would be less concerned than a person selling all of it. A farmer selling most but not all of his land may be concerned because the parcel left is too small to earn a satisfactory income while the property left is enough so that he cannot move completely away and start over. The relative importance of the portion taken would probably depend on the value of that sold as a portion of the total value of all the individual's property.

The interest in the property sold (i. e. , whether the property is bought in fee simple, easement, leased, etc.) is also important. The effect would depend on the use of the land and how the owner thinks the specific transaction will impair its use. All use of land bought in fee is lost, but many uses can be made of land on which an easement is purchased. In the case of a perpetual flow easement on cropland, the use after the easement was taken would depend on how often, how severely, and when the land was flooded. Most crops could be grown if the flooding occurred

only rarely or outside the growing season. Around every reservoir there is an area inundated only by the spillway design flood, a flood so rare that no frequency can be assigned. Use of such land is hardly restricted at all.

Since the actual transaction is executed through negotiations between the owner and the government, the personal and professional characteristics of the appraisers and negotiators are important. Characteristics considered important are professional experience and know-how, tactfulness, and a pleasing appearance and personality. If a bad first impression is made on the owner or if he thinks his interests are not being properly considered, all future negotiations will be handicapped.

The government's consistency in appraising and negotiating with the different owners also affects attitudes. The manner in which this factor influences individuals depends on whether or not all property owners are treated equally and how much the owner learns of the dealings with others. If, for instance, the government paid every owner the fair market value, some would probably get more than the minimum they would have been willing to accept. Others would feel that they did not get enough. The result of uniform treatment of each owner would leave some people happy and some unhappy. If on the other hand, the

government negotiated with each owner until a price acceptable to the owner was reached, all the owners would be satisfied until they began to compare notes to find different individuals had obtained different prices for land of equivalent market value. If the people knew in advance this method were to be used, there would be those who would try to bargain for more than they would have originally been happy to accept. The purchasing agency may pay a property owner who is very adamant about receiving a higher price more for equivalent land in order to reduce the administrative cost of prolonging negotiations than it does a more docile owner. However, such variation in amount paid would be far less than the variation in private values of property. Government consistency affects the owner's attitude in a way that it depends on the government's policy and the owner's understanding of it.

The final important detail of the specific transaction is the portion of the price paid for the property that the owner actually receives. Because of outstanding taxes or debts, the owner may not receive all that is paid for his property. A person who sells a \$10,000 house may have borrowed \$9,500 using his home as collateral. When the home is purchased, he will only receive \$500 and find himself without a home or enough money to make a down payment on a new one.

In addition to the reason for selling and the details of the transactions, the availability of equivalent property to replace that which is sold has an important influence on the attitude of the seller. If a person sells his farm and can turn around and buy one of similar quality and at a suitable location without any difficulty, he would be less concerned about the sale than if no farm was available to replace the one he lost. The availability of replacing property depends not only on the supply of similar property, but also on the demand for it. The effect on the local land market of government acquisitions of large amounts of land must be considered. When several thousand acres of land are bought from several hundred people, this may significantly reduce the supply and increase the demand for land in the area and thus the cost to the owner of replacing what he had to sell.

PERSONAL CHARACTERISTICS OF OWNER

The third major factor influencing the attitude of a landowner toward selling his property to be considered here is the personal characteristics of the owner. These characteristics may be subdivided between the characteristics of the person as an individual and the relationships between the individual and others.

The characteristics of an individual considered most important are age, education, personal convictions, and disposition.

Although personal convictions and disposition are more abstract than age and education, they are important factors and should be included. While all of the factors are considered to be independent, the effect they have on the owner's attitude depends not only on the individual but also on the other factors which have already been discussed. For example, an older person would be more resistant to moving than a younger person. However, an older person might be ready to retire and, therefore, be less resistant to selling his farm or business. A person's age is important in determining the value he places on future benefits and to some extent the ease with which he can adjust to the change made in his life by selling his property.

A person's education is important in that it aids in his understanding of the project, its purpose, and how it affects him. A person's personal convictions also influence his acceptance of the project. One person might be for all government projects because he believes them to enhance general welfare, while another might be against all projects because he thinks the government is spending too much money. Some people might think it unfair that they sacrifice their land for the benefit of lowlanders, city people, or other groups while others will recognize the project as being in the general public interest. Finally,

a person's disposition is important. It determines the ease with which negotiations can be carried on and how well he will be able to adjust to the new situation created by the sale of his property.

The individual's contact with others includes the size of his family and their ages, his concern for the community, and his knowledge of the project. The size of a person's family and their ages is important when he must move. It is considerably more trouble to move a large family with children than it is to move only one or two people. A person's concern for the community governs his willingness to make a personal sacrifice for the general good. This concern is illustrated in the individual's participation in community affairs, his voting and church record. A person's knowledge of the project is important since he should be informed of the benefit to the community and of how he will be affected. It will also enable him to make plans and take whatever steps necessary as soon as possible to replace the property he sells.

SUMMARY

To summarize, the factors hypothesized as being important in determining the individual's attitude toward selling his property are listed below.

- I. Importance of Property to Owner
 - A. Usefulness

Factor 1. If he moves , the size of his old house relative to his need .

Factor 2. If he moves , the location of his old house relative to his need .

Factor 3. If he moves , the conveniences in his old house relative to his need .

Factor 4. The reduction to his present income caused by selling his property .

Factor 5. The degree to which the owner believes he can overcome this reduction in income .

Factor 6. If the property is not being used directly, the value of the personal use that the owner receives indirectly or plans to make of the property in the future .

B. Sentimental Attachment

Factor 7. The number of years the property has been in the family .

Factor 8. The number of family graves that are disturbed .

Factor 9. If the owner moves , his feelings about the neighborhood he is leaving .

Factor 10. The personal pride the owner has in the property being sold .

II. Conditions Under Which Property is Sold

A. Reason for Selling

Factor 11. The reason the property is being sold (the understanding the seller has as to the importance of the project to be built on his land).

B. Details of the Transaction

Factor 12. The compensation the owner is paid.

Factor 13. The actual amount of money he receives.

Factor 14. The portion of his total holdings that are sold.

Factor 15. The interest in the property being sold.

Factor 16. The ability of the negotiating agents to get along with the seller.

Factor 17. The consistency of the government in dealing with the various owners.

C. Availability of Property to Replace That Which is Sold

Factor 18. The local supply of property similar to that which was sold.

Factor 19. The local demand for such property.

III. Characteristics of the Owner

A. As an Individual

Factor 20. The age of the owner.

Factor 21. The education of the owner.

Factor 22. The personal convictions of the owner.

Factor 23. The disposition of the owner.

B. As Associated With Others

Factor 24. The size of the family.

Factor 25. The owner's participation in civic activities
and groups.

Factor 26. The owner's knowledge of the project.

FACTORS DETERMINING THE LOCAL PUBLIC ATTITUDE

Another important local attitude is that of the people in the community as a whole toward the project before, during, and after the project's construction. Consideration of the relationship between local public attitude and project cost involves different attitudes and costs than those influenced by the people selling property. Quantitative analysis of both relationships would involve more time than is reasonable for this study. The local public attitude is in this study, therefore, considered only as it relates to the landowner's attitude. The degree of association can be determined by comparing the attitude of the individuals selling land to that typical of the entire community.

INDIVIDUALS IN THE COMMUNITY

The overall public attitude is the sum of all the individual attitudes in the community. However, the sum must be weighted since some individuals feel more deeply than others. A few join local groups that take a definite stand on the project. The attitude of the individuals within the community depends on his knowledge of the purposes and expected economic performance of the project and on the way in which the project will affect him and those with which he is acquainted. Normally, one would expect the direct beneficiaries of the project to be strongly in favor, those forced to sell land to be strongly opposed, and those less directly affected to have opinions less intense and largely determined by their contact with members of the first two groups.

Individuals may benefit from a project in many ways. The project construction and operation may offer him either part-time or permanent employment. The business community may anticipate sales to construction workers or in providing construction materials. Landowners adjacent to the stream downstream from the reservoir may benefit directly from the decrease in flooding. Other people will enjoy the recreational and the aesthetic values of the reservoir. These are examples of ways an individual might benefit directly from the project and as a result affect the formulation of his feeling toward it.

The project might also involve a personal cost to individuals other than those who sell land. In most projects, the local community is required to bear certain costs. This requires the use of community funds which may necessitate increased taxes to raise the needed money.

The individual's concern for the community and his knowledge of the project are other factors influencing his attitude toward the project. An individual's concern for the community is reflected by the extent of his involvement in community affairs. A person interested in local matters usually belongs to local civic groups and a church and votes regularly. A person's concern for the community affects his knowledge of the project because a person more interested in local happenings will make it a point to learn about the project. Attitude will also vary depending on whether the individual takes the viewpoint of only the local community or the viewpoint of a larger area such as the state or nation. Some individuals in a community where much land is removed from the tax rolls may favor the project as they think of downstream benefits.

THE COMMUNITY AS A WHOLE

The attitude of the community as a whole is the aggregate of the attitudes of the individuals. The manner in which the project benefits and costs affect community attitude depends on the actual

benefits realized locally. These benefits may come in the form of jobs, flood reduction, tourist attraction, recreation, or aesthetic value. The effect of these benefits on the attitude will depend on the number and the influence of the people suffering from the adverse conditions that are corrected by the project and local opinion as to the severity of the adverse conditions.

The cost to the community is another major factor in determining attitude toward the project. The effect depends on the direct cost to the community and on the groups of people who are adversely affected. Direct cost to the community could be from supplying right-of-way, paying for relocations, or from the responsibility for operation and maintenance, depending on the particular agreements. The people adversely affected may include property owners who love their land, sportsmen and conservation groups wishing to preserve the natural stream, and groups opposed to government spending. The effect of these costs on the local attitude depends on their magnitude and the portion of the total people they involve.

Finally the local knowledge and understanding of the project is important. It is vital that the people understand as fully as possible beforehand the effects that the project will have on the local community. The very existence of unknown quantities tends to increase opposition. A lack of knowledge of the benefits of the

project would obviously work against a favorable public attitude.
A misunderstanding of the local cost may increase public resistance to the project. The public may be kept better informed by the use of local newspapers, local meetings, and pamphlets supplied by the government agency in charge of the project.

Chapter III

METHOD OF ANALYSIS

CORRELATION OF ATTITUDE AND COST

After qualitatively enumerating the various land acquisition costs and the factors determining the landowner's attitude, it was the purpose of this study to attempt to quantify these variables for the three reservoirs being studied and see if it was possible and practical to determine the relationship between them. This involved the formulation of a theoretical method of correlating cost and attitude and the practical application of this theory to the data. For various reasons, it was necessary to base the analysis largely on the data that had already been collected. These reasons will become obvious when the specific details of the proposed methods are discussed.

THEORETICAL RELATIONSHIP

A specific total cost of land acquisition would be associated with a particular project, built at a definite time and location, if all of the landowners involved had a neutral feeling toward the project. However, never are all of the landowners neutral about selling their property. Their feelings vary between active acceptance

and determined opposition, and their reactions vary between perfect cooperation to extreme resistance, depending on the factors discussed in detail in the previous chapter. The hypothesis is that the degree to which the actual land acquisition cost deviates from the cost under normal conditions ("N" in Figure 6) depends on the property owner's attitude. The cost under normal conditions is defined to be the cost of buying from a landowner with neutral feelings.

The primary emphasis of the analysis will be to relate variation in attitudes to variation in cost (ΔC). The attitude is measured from a neutral feeling and the variation in cost from the cost under

Figure 6. Cost Symbols

Kind of Cost	Base Cost ^a	Normal Cost ^b	Variation in Cost ^c
Financial Cost of Property	B_1	N_1	ΔC_1
Administrative Cost	B_2	N_2	ΔC_2
Economic Cost to Owner	B_3	N_3	ΔC_3
Economic Cost to Local Public	B_4	N_4	ΔC_4

^aA cost selected to neutralize the effect of property size and quality on the variation in cost

^bCost under neutral attitude conditions

^cDifference in the actual cost and the normal cost

normal conditions. Although the variation in cost is measured from the cost under normal conditions, the absolute magnitude of the normal cost does not have to be known to determine the variation. An example is the increase in administrative cost to the government when a property must be condemned. Knowing the administrative cost of obtaining the land under normal conditions is not necessary in order to find the increase in administrative cost because of condemnation proceedings. However, since the magnitude of the change in cost depends not only on the owner's attitude but also on the amount of property he owns, it is necessary to normalize the change in cost so that they can be applied to ownerships of varying size. For example, reappraising a \$10,000 property would cost more than reappraising a \$100 property because it is larger and more complicated in nature.

A base value or base cost ("B" in Figure 6) is used for normalizing. If the change in cost (ΔC) is divided by the ideal base cost (B), the effects of property size and complexity on the change in cost can be eliminated. One base cost which might be used is the cost under normal or neutral conditions. However, such a base cost is not easily found because of the difficulty in defining and applying it in actual cases. Another base cost whose value is more readily available and which is also independent of the

owner's attitude is the appraised value of the property. This base will be used in the following analysis.

The attitude of the owner is more difficult to quantify than is the associated cost. Since attitude is an abstract concept and depends on variables which are, at best, difficult to evaluate, arriving at a reasonable quantitative value for a particular attitude is not a simple matter. In order for the correlation to proceed, however, the attitude must be defined quantitatively.

The measure of attitude need not be on an absolute scale since the change in cost is to be compared with the change in attitude. Attitude is, therefore, set up on a relative scale. Zero attitude is defined as a neutral attitude. A person with negative attitude is defined as being favorably disposed toward the project while a person with positive attitude opposes it. The worse an owner's attitude, the more resistance he will offer to the transaction. The better his attitude, the greater will be his acceptance of the project. The numerical value of an attitude will be determined by combining estimated numerical values for the various determining factors described in Chapter II in a manner explained in detail later.

After determining each individual's attitude and the associated cost of obtaining his property, a plot will be made of the two

variables as shown on Figure 7. The ordinate will be the change of the normalized cost ($\Delta C/B$). The abscissa is the attitude with a more antagonistic attitude plotting further to the right and a more cooperative attitude plotting further to the left. The curve should have the general shape shown on Figure 7. This approach was applied in detail only to the economic cost to the landowners, but a less thorough analysis was used to plot attitude versus the increased financial cost of the property.

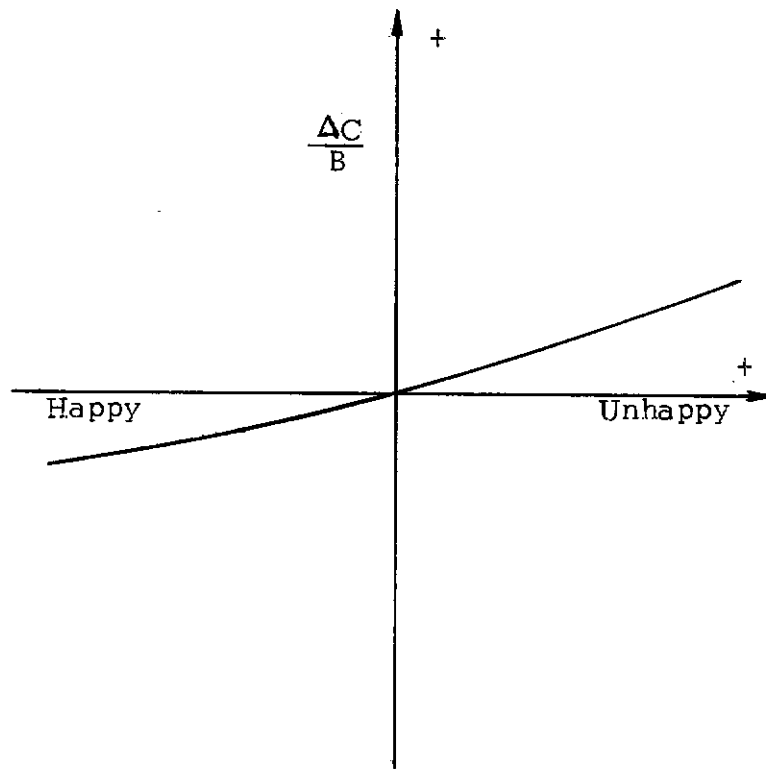


Figure 7. Normalized Change in Cost Versus Attitude

PROCEDURE FOR EVALUATING SPECIFIC ATTITUDES

As part of the procedure of establishing a numerical value for the attitude of each landowner, the influencing factors were examined and evaluated on an individual basis. A method was devised to assign a value for each of the factors based on the data collected from the Corps of Engineers, the local court houses, or the questionnaires. Values were assigned such that a positive value indicated resistance. Although all of the factors previously discussed could not be included specifically in the study, most of them were incorporated in a general manner by the methods used to evaluate those factors which were considered. The relative influence of these factors on attitude was then determined by least squares regression in a manner described later.

SENTIMENTAL FACTOR

The sentimental factor must measure the memories associated with a property, the pride the owner has in it, and his tie with the surrounding property owners. These values are intangible and the data available did not provide means to consider them individually. The numerical value for this factor was based on the length of time the property had been in the owner's family. The assumption being that the longer a property had been in a particular family the greater would be the owner's memories, pride, and

friendship with his neighbors associated with the property.

$$A_1 = \text{Number of Years Property Had Been in Family}$$

CEMETERY FACTOR

There is also strong personal attachment to a family cemetery. The actual value, of course, depends on the particular individual and his relationship to the people buried there. The only information readily available was whether or not a cemetery on the property was relocated or not. Therefore, this factor was assigned an arbitrary value of one if a cemetery was relocated and of zero, signifying no effect on attitude, if no cemetery was involved.

$$A_2 = \begin{array}{l} 0 \text{ If No Cemetery was Relocated} \\ 1 \text{ If a Cemetery was Relocated} \end{array}$$

HOME FACTOR

When a person has to sell his home, he is greatly affected. The degree to which he is affected depends on his need for a home and on the particular home he owns. Two factors concerning the home could be ascertained from the data available. One factor (A_3) expressed whether or not the owner had to move. No matter what quality of home one may have, he is likely to object to being forced to move. The second factor (A_4) expressed the market value of the home involved. It was thought that the

strength of the objection might be influenced by the quality of the home.

$A_3 =$ 0 If the Owner Did Not Move
 1 If the Owner Did Move

$A_4 =$ Market Value of the Home Sold

INCOME FACTOR

The income factor was a measure of how the owner's income was affected by the sale. Since most of the property sold was farmland, the loss in income could usually be estimated from the lost production on cropland and pastureland. Available data indicated the fraction of the individual farm which was cultivated. Where future income from urban subdivision had to be considered at West Fork of Mill Creek, the entire parcel was assumed to be equally suitable for subdivision. In some cases, lost income was offset by the opportunity to take advantage of the new economic opportunities created by the project, such as renting lake front lots. The owner's evaluation of the effect of the project on his income was obtained from Question 16 of Figure 3. The approach used was to assign an arbitrary value for the income increase and deduct the lost farm production from this.

$$F = \frac{\text{Income Producing Acres Sold}}{\text{Total Income Producing Acres Owned}}$$

$$A_5 = \begin{cases} F & \text{If Income Decreased} \\ 0 & \text{If Income Stayed the Same} \\ F - 0.5 & \text{If Income Increased} \end{cases}$$

PROPERTY AVAILABILITY FACTOR

The availability of equivalent property for purchase by displaced landowners depends on supply and demand. The relative supply was estimated by comparing the percent of the particular type of land in the state with the percent of that type in the county.

$$S = \frac{\% \text{ of C Land in County}}{\% \text{ of C Land in State}}$$

C is the classification of the particular type of land the owner wished to replace. The demand was based on the population density. Use of the fourth root improved the correlations described later.

$$D = \text{Population} / \text{Square Mile}$$

$$A_6 = \sqrt[4]{D} / S$$

COMPENSATION FACTOR

The effect of this factor on the owner's attitude depends on how the amount he is paid compares with the private value of the property to him.

$$A_7 = \frac{\text{Private Worth to Owner}}{\text{Amount Paid}}$$

Although compensation is a major factor influencing a person's attitude, Factor A_7 was not carried into the statistical analysis because all of the other factors combine to determine the private worth of the property to the owner. If it is assumed that all of the owners receive the fair market value for compensation (Denominator of A_7), the compensation factor is implicitly included in the other factors.

PROPERTY SOLD FACTORS

The amount of property which the owner has to sell has a definite influence on his attitude. However, the amount which an individual has to sell can be measured in different ways. Four methods were considered here. Homes were excluded from this factor since they had already been considered.

The property worth factors measured the worth of the property sold and what portion of the owner's total property was sold.

$$A_8 = \text{Value of Property Sold}$$

$$A_9 = \frac{\text{Acres Fee} + E_w \text{ (Acres Easement)}}{\text{Total Acres Sold}}$$

Since selling a perpetual flow easement involves only a restriction in the use of property and not a complete loss of it,

the effect on the owner's attitude is different than when the land is purchased in fee. The term E_w above was a weighting factor used to convert easement property to an amount of fee property having an equivalent effect on the owner's attitude. The method used was to assume that the relative value to the owner of giving an easement was indicated by the ratio of the payment he received to the full market value of that property.

$$E_w = \frac{\text{Cost/Acre Easement}}{\text{Cost/Acre Fee}}$$

The costs used were those for the individual property where data giving reasonable results were available. Otherwise, the average cost for the project was used.

The property damage factor measured the amount of damage in terms of usefulness to the owner that was done to that property which was involved in the sale. All use of property sold in fee was lost, but property on which easements rights were sold could still be put to certain uses. Crops could be planted at the risk of having them flooded in times of high water.

$$A_{10} = \frac{\text{Acres Fee} + E_d (\text{Acres Easement})}{\text{Total Acres Sold}}$$

E_d was used to express the relative risks to the owners involved. It was a measure of what portion of the easement would

be flooded if the lake was filled to capacity.

$$E_d = \frac{\text{Easement Acres Below Spillway Elevation}}{\text{Total Easement Acres}}$$

The property classification factor was a measure of what portion of the property sold contributed to the income of the owner.

$$A_{11} = \frac{\text{Contributing Acres Sold}}{\text{Total Acres Sold}}$$

PERSONAL FACTOR

The important personal characteristics of the owner are his age, education, personal convictions, and disposition. The most important of these factors was considered to be the owner's age. It was used as a measure of the owner's personal characteristics by assuming that the older people in an area have as a group had less education and are more resistant to changes.

$$A_{12} = \text{Owner's Age}$$

COMMUNITY INTEREST FACTOR

A person's interest in the community can be measured by his participation in local affairs. For this study it was assumed that the interest an individual had in his community was expressed by the fraction of the time he voted in local elections.

$$A_{13} = \frac{\text{Times Voting}}{\text{Chances to Vote}}$$

PERSONAL TREATMENT FACTOR

A person's attitude may also be affected by the personal treatment he receives during the actual transactions. An evaluation of how the owner thought he was treated by the government was based on the answers he gave to questions 18 and 20 from the questionnaire (Figure 2).

$$A_{14} = \frac{\text{Questions Answered Unfavorably} - \text{Questions Answered Favorably}}{\text{Questions Answered}}$$

KNOWLEDGE OF THE PROJECT FACTOR

The owner's knowledge of the project was a measure of his realization of the need for the project and its benefits. A value for this factor was based on his answers to questions 1, 3, and 19 of Figure 2.

$$A_{15} = \frac{\text{Questions Answered Unfavorably} - \text{Questions Answered Favorably}}{\text{Questions Answered}}$$

RELATIVE WEIGHTING OF THE FACTORS

Before plotting attitude versus cost from data collected on the specific properties purchased for constructing the three reservoirs studied, attitude had to be quantified. By assuming each attitude depended on the factors that had been evaluated, the problem was: given n attitude factors, $A_1, A_2, A_3, A_4, \dots, A_n$,

to find the best method of combining them to reflect their relative importance. For example, perhaps the sentimental value of a property is influenced by the person's age, whether or not he had to move, and the years the property had been in the family, such that the best expression for the sentimental value was $A_1 A_3 A_{12}$. The effect of the income factor might be expressed best as the square root of the factor ($\sqrt{A_5}$). These are examples of how the various factors might be combined to form the most significant expressions. If an expression for the sentimental value is more significant, then it should be multiplied by a coefficient which gives it more weight. After determining the interrelationship between the various factors and their relative importance, an equation of the form

$$\text{Attitude} = C_1 X_1 + C_2 X_2 + C_3 X_3 + C_4 X_4 + C_5 \quad (1)$$

can be written, where X_1 , X_2 , X_3 , and X_4 are expressions of the combined factors and C_1 , C_2 , C_3 , and C_4 are constants expressing their relative importance.

The method used to find such an equation involved estimating a value for each owner's attitude based on his own description of his feelings as expressed in the questionnaire he answered. This value or number was obtained by evaluating the owner's answer to questions 1, 2, 3, 10 and 11, 13, 19, and 21 of

Figure 3. Each answer was given a value depending on the feeling it reflected. The values were:

Very Happy	-2
Slightly Happy	-1
Neutral	0
Slightly Unhappy	1
Very Unhappy	2

The estimated attitude was the sum of the values given each answer. Because questions 10 and 11 were evaluated together, the attitudes could range from -14 to +14. It was not possible to determine the landowner's attitude exactly in this way, but a reasonable estimation of his feelings relative to the other owners could be made. With this value for the overall attitude and the values for the 15 attitude factors, a stepwise multiple regression analysis¹ could be made to determine by trial and error the best way to combine various factors and for the factors chosen the best constants to use to indicate their relative weighting.

Although the selection of the best combinations of factors was based on logic and judgment, it was a trial-and-error process and would have been too time consuming without the use of a

¹"Multiple regression is used in data analysis to obtain the best fit for a set of observations of the independent and dependent variables by an equation of the same form as Equation 1" (23, p. 71).

computer. The problem was run on the IBM 7040 Computer using stepwise multiple regression library program entitled MULTR, as obtained from the statistical library of the University of Kentucky Computing Center. The program allows different groupings and transformations to be made on the independent variables (i.e., the attitude factors). Different combinations of the factors were tried with the best one giving the highest coefficient of correlation between the attitude estimated from the questionnaires and the attitude predicted from the factors.

In addition to correlating the estimated attitudes with the factors determining these attitudes, the computer program was also used to correlate the factors directly with the change in cost. By doing this, the contribution to change in cost could be estimated for each factor. This correlation would give the importance of each factor in affecting the cost, whereas, the other correlation would give the importance of each factor in affecting the owner's attitude.

EVALUATING THE COST OF LAND ACQUISITION

The next step in the analysis was to evaluate costs. The procedure was to first determine a suitable base cost for each property to neutralize the effect of property size and type on the variations in costs. The next step was to determine, where possible, the actual amount the cost associated with a particular

individual varied from the neutral cost.

FINANCIAL COST OF PROPERTY

The financial cost of the property was considered to be that price which was paid by the government for the property. The base cost was taken as the initial appraised value of the property which by the "willing buyer-willing seller" concept should be the normal cost. The actual property cost may vary from this value because of additional payment allowed during negotiation to avoid extra administrative cost, additional payments made through court proceedings, or savings due to certain properties being donated.

The appraised value as well as the actual amount paid was available for each individual property at Rough River and Dewey Reservoirs. Most of the data on the individual tracts at West Fork of Mill Creek Reservoir, however, had been destroyed and the appraised values were not available. Therefore, the ordinate of the graph as shown in Figure 7 could not be determined for properties located at this reservoir.

ADMINISTRATION COST OF BUYING PROPERTY

The base cost associated with the administration cost of buying each property should be the normal cost of appraising, negotiating and purchasing the particular property under neutral conditions. The amount the actual cost varies from this base

cost depends on changes caused by the individual's eliminating some of the normal cost or because his resistance causes extra steps to be taken to acquire his property. The extra steps, such as extending negotiations or taking the matter to court, have already been discussed.

Although administrative cost is probably the one most affected by the owner's attitude, the cost accounting procedures followed by the Corps of Engineers do not permit determining this cost on an individual property basis. To consider on an individual parcel basis the cost of such things as: the field and office work of the appraiser, the visits of the negotiators, the office work of the employees preparing reports, the surveying, and the operation of the federal court trying a case would be a complex matter requiring evaluation of the administrative procedures while they are under-way. No method could be found for evaluating these costs for the three reservoirs studied.

ECONOMIC COST TO PROPERTY OWNER

The most practical base cost to be used for evaluating the economic cost to the property owner is again the appraised value of the individual property. The amount of the economic cost equals the net change in his economic welfare resulting from loss of his property but allowing for the compensation he received. Before

the sale the owner has the public value of his property, the net additional personal value of his property, and the amount of personal happiness associated with his preconstruction environment. Afterwards, he has the money which he was paid, the public and personal value of the property not taken, and the amount of personal happiness associated with his new environment. In the process, he has sacrificed time and money in arranging the details and executing the sale of the old property, the acquisition of new property, moving, and resettling in a new community. The cost to the individual is the difference in the two conditions. Obviously, a firm estimate of this net difference would require detailed information which could only be obtained during the period of adjustment. A rougher estimate used in this study for the economic cost to the individual was the amount of money it would have taken to make him as happy after as he was before the sale, according to his estimate as obtained by questionnaire.

This information was available from the questionnaires if it was assumed that no one was overpaid. This assumption is necessary because question 9 (Figure 3) asked how much "more" rather than how much "more or less" do you think you should have received. The appraised value was only available for Rough River and Dewey Reservoirs; therefore, the curve

associated with this cost was based on these reservoirs.

ECONOMIC COST TO THE PUBLIC

Since, as pointed out earlier, the economic cost to the public depends on the attitude of the local community as a whole, the cost could not be broken down by individual parcel as could the first three costs. A more sensible approach would be to consider the cost to the community as a whole and the overall local public attitude for each reservoir, using these values to plot as one point on the curve of attitude versus cost. To plot the entire curve, therefore, would require studying numerous reservoirs. The problem is also complicated because changes in attitude with time cause a varying response to project construction. Quantitative analysis of the relationship between cost to the local community and local attitude is beyond the scope of this study. However, the cost may conceptually be broken down into three curves similar to those already discussed.

The first curve would be based on the economic cost to the local public caused by the project. The major cost not affected by attitude is the loss of secondary and indirect benefits which would result from alternative uses of the land. The local share of the project financial cost could be expected to vary with attitude in the same manner as the financial cost of right-of-way

discussed above because most local cost is for land acquisition. The other local cost affected by attitude is the cost special interest groups incur in promoting or fighting the project.

The second curve would be based on the costs of project delay and adjustment, which are a direct consequence of resistance offered to the project. If public resistance delays project construction, benefits which would have been realized had the project been completed earlier can be considered as a cost to the public. This loss in benefit may be supplemented by an increase in construction cost if the project is built at a later date. Public resistance can also cause modifications in project design. Minor shifts in the location of project facilities, upgrading relocations, and preservation of fishing or aesthetic sites are common changes caused by pressures from the local public. This involves the cost of modifying the plans and specifications plus any construction project cost added because of the modification.

A third curve would relate public attitude to the economic cost resulting from a delay in utilization of project output. If a project provides flood control, it will take a certain time after completion before the floodplain is developed to its most economic use because of various time lags in the economic response of the beneficiaries. The same principle applies for other project outputs.

An unfavorable attitude may retard this response. An example of retarded build-up is shown in Figure 8. From A to B the actual build-up is slower than normal because of local resistance to the project. From B to C the benefits received are lower than maximum because some people refuse to take full advantage of the facility. From C to D the actual benefits approach normal as the people against the project begin to change their minds or the benefitting areas change ownership.

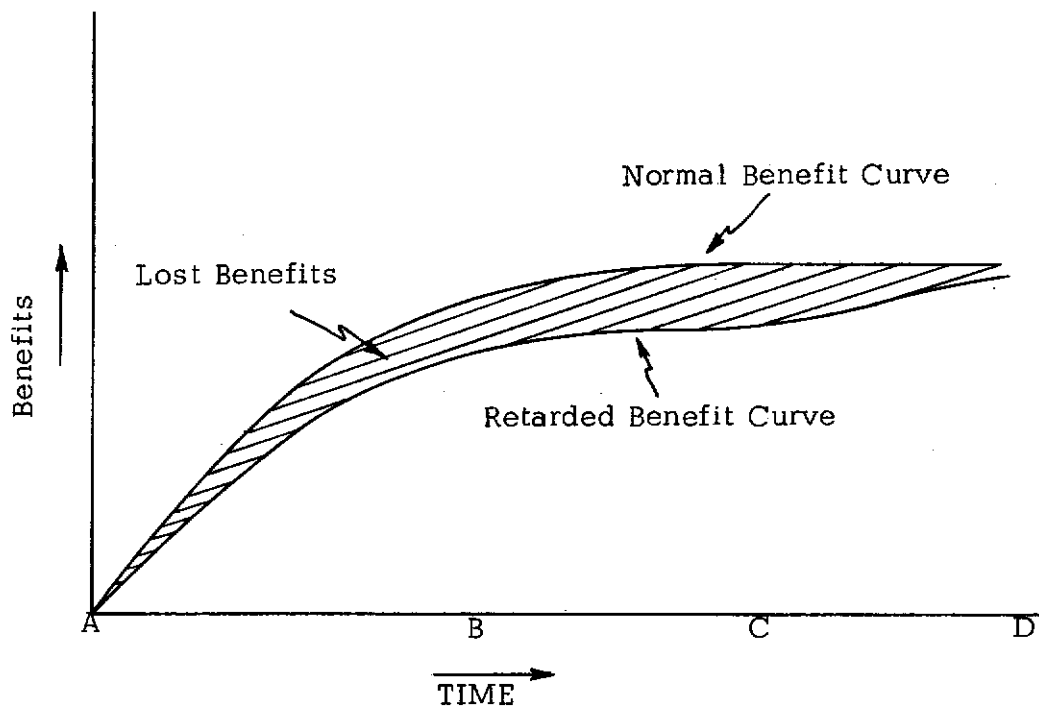


Figure 8. Example of Lost Benefits Because Project is Not Fully Utilized

USE OF QUESTIONNAIRES AND POST CARDS

QUESTIONNAIRES

In addition to supplying much of the data needed for the evaluation of individual attitudes and costs related to land acquisition, the questionnaires were also summarized to indicate general attitude trends. Consideration of the problem of land acquisition cost and the effect of attitude on this cost, requires certain suppositions. The summarized findings of the questionnaires help to clarify major trends. Another important use for this summarized data was to aid understanding of the differences in costs and attitudes which existed from one reservoir to another. The reservoirs studied had certain differences, such as size, location, time built, and type of surrounding community. The questionnaires aided in the determination of the effect of each of these on the cost and attitude.

POST CARDS

The post cards that were sent out to the local citizens were used only to provide a general indication of the attitude of the community as a whole. This was to serve three uses. The general public attitude could be compared with the property owner's attitude to determine the effect of selling property on attitude in general. The second use was to make a comparison of the general public's attitude between the different reservoirs.

The third use was to contrast attitude of beneficiaries located in the floodplain with the attitude of the community at large.

In order to facilitate making these comparisons the post cards were evaluated in two ways. The first was to simply summarize the answers that were given by the individuals. This would aid in determining the reasons for the differences between the local public and property owners and the local public at different reservoirs. The second method of evaluating the answers was to figure a numerical value for the public attitude in each case to aid in determining the relative differences involved. The procedure used was to subtract the favorable answers from the unfavorable ones and divide by the number of questions answered.

Chapter IV

FINDINGS AND RESULTS

GENERAL FINDINGS

Before describing the analysis of specific costs and individual attitudes, it is useful to review the quantitative details surrounding the acquisition of the required lands. The information found on Table 3 is based on data supplied by the Louisville and Huntington Offices of the Corps of Engineers. This table indicates that although a slightly larger total acreage was involved at Rough River Reservoir than at Dewey Reservoir and although the land at Dewey Reservoir was purchased nine years earlier, the financial cost of acquiring the real estate was less for Rough River Reservoir. It also shows that more homes, families, court cases, parcels taking an entire tract of land, and acres purchased in fee were involved at Dewey Reservoir.

LANDOWNER'S ATTITUDE

SAMPLE STUDIED

Since most of the information used to determine the landowner's attitude was obtained from a questionnaire, the attitude analysis was limited to those owners returning questionnaires, excluding two owners whose answers were not suitable for use in the analysis.

TABLE 3

GENERAL INFORMATION

	Rough River	Dewey	West Fork of Mill Creek
Project Construction Started	1955	1946	1949
Number of Acres Acquired	13,877	13,328	1,392
Percent Privately Owned	100	100	19.2
Percent in Buildings	0.4	2.1	N.A.*
Percent Cultivated	46.4	16.3	N.A.*
Percent Woodland and Pasture	53.2	81.6	N.A.*
Acres Purchased in Fee	9,217	12,185	1,351
Acres Purchased in Easement	4,660	1,143	41
Dollars Paid for Fee Purchase	864,500	1,217,800	481,700
Dollars Paid for Easement Purchase	113,300	321,400	81,100
Dollars Paid for Mineral Rights Purchased Separately	0	112,600	0
Dollars Paid to Administrative Land Acquisition	593,800	430,500	132,000
Total Real Estate Cost to Corps of Engineers	1,571,600	2,082,300	694,800
Number of Parcels of Land Acquired	1324	440	24
Number of Tracts of Land Involved	662	400	22
Percent of Parcels Involving an Entire Tract of Land	3.2	55.4	N.A.*
Percent of Parcels Condemned	10.3	49.3	29.2
Percent of Parcels Involving a Home	2.4	62.8	N.A.*
Percent of Parcels Involving Inherited Property	34.2	59.3	N.A.*
Number of Land Owners	559	292	21
Number of Families Required to Move	28	220	N.A.*

*N.A. - Data Not Available

The actual numbers of questionnaires sent and answered are given on Table 1 for each reservoir. A total of 93 landowners were studied in detail, including 48 from Rough River Reservoir, 41 from Dewey Reservoir, and 4 from West Fork of Mill Creek Reservoir. These samples were 8.6, 14.0, and 19.1 percents, respectively, of the owners selling land for each reservoir. In addition to the differences in owner characteristics among the three reservoirs, each sample included owners ranging from those selling only an easement on a small portion of their property to those selling their home and entire farm. The owners represented properties scattered throughout each project area. The properties studied were also varied in their particular use including farm land, subdivision sites, future retirement sites, a sportsman hunting club, and idle wasteland.

ESTIMATED ATTITUDE FACTORS

Associated costs, attitudes, and factors determining attitude were studied on an individual basis for the 93 landowner's being considered. In each case, a value was calculated for each one of the 15 attitude factors discussed in Chapter III, although only 14 were used in the correlation.¹ Example 1 illustrates the use

¹The compensation factor was excluded. See page 84.

of the formulas given in Chapter III in calculating these factors. The average values of the factors for each reservoir are shown on Table 5. These results indicate that the people at Dewey Reservoir were affected more by the project and were less satisfied with the compensation they received. The people at Rough River Reservoir were less affected and could replace the property they sold easier.

ESTIMATED ATTITUDES

In order to find the correct means of combining these factors so as to determine their relative importance in predicting the owner's attitude, an estimate was made of the actual attitude of each of the 93 owners. An illustration of the method used to do this is given in Example 2. The average of the estimated attitudes for the 48 landowners at Rough River Reservoir was -1.38. For the 41 owners at Dewey Reservoir the average estimated attitude was 6.10. For the 4 owners at West Fork of Mill Creek, it was -0.25. The range in individual attitudes varied from +14 to -14 with the negative indicating a good attitude and the positive indicating a bad attitude.

CORRELATION OF FACTORS AND ATTITUDE

With the values for the 14 factors and the estimated attitudes having been calculated on an individual basis, the computer program MULTR was used with attitude as the dependent variable and the

EXAMPLE 1

CALCULATION OF ATTITUDE FACTORS

This example applies the equations given in Chapter III for estimating the attitude factors of a particular individual to the sample data given in Figure 3 and Table 4.

1. SENTIMENTAL FACTOR: Property had been in family 18 years.

$$A_1 = 18.0$$

2. CEMETERY FACTOR: No cemetery was involved.

$$A_2 = 0.0$$

3. HOME FACTOR (1): Owner's home was taken.

$$A_3 = 1.0$$

4. HOME FACTOR (2): Market value of home was \$3070.

$$A_4 = 3070.0$$

5. INCOME FACTOR: Owner discontinued his general store after it was sold and all of his cultivated land was sold. Therefore, his entire income producing property was involved.

$$A_5 = 1.0$$

6. AVAILABILITY FACTOR:

Supply: 11.3% of land in the county and 47.8% of land in the state was suitable for productive farm use. These figures were based on data found in (24).

$$S = \frac{11.3}{47.8} = 0.236$$

Demand: The 1950 population per square mile for the local county was 130.3.

$$D = \sqrt[4]{130.3} = 3.38$$

EXAMPLE 1 - Continued

$$A_6 = \frac{3.38}{0.236} = 14.32$$

7. COMPENSATION FACTOR: The private worth to the owner was taken as the amount paid plus the extra he thought he should have received.

$$A_7 = \frac{17740 + 9300}{17740} = 1.523$$

8. PROPERTY WORTH FACTOR (1): Appraised value of the property was \$17,740.

$$A_8 = 17,740.0$$

9. PROPERTY WORTH FACTOR (2)

Easement Worth Equivalent: Easement rights were purchased on 8.18 acres at a cost of \$1,450. The cost of the 135.5 acres purchased in fee was \$6,180. The total acreage owned was 461.38.

$$E_w = (1450 / 8.18) / (6180 / 135.5) = 3.89$$

This number is greater than one because the easement was mostly bottomland along the stream while the total property included a great deal of less valuable hillside land.

$$A_9 = \frac{135.5 + 3.89(8.18)}{461.38} = 0.363$$

10. PROPERTY DAMAGE FACTOR:

Easement Damage: 0.667 of the land involving an easement was below the spillway elevation.

$$E_d = 0.667$$

$$A_{10} = \frac{135.5 + 0.667(8.18)}{135.5 + 8.18} = 0.982$$

EXAMPLE 1 - Continued

11. PROPERTY CLASSIFICATION FACTOR: Of the 143.38 acres involved 22.5 acres were cultivated.

$$A_{11} = \frac{22.5}{143.38} = .1568$$

12. PERSONAL FACTOR: The owner was 44 years old when the sale was made.

$$A_{12} = 44.0$$

13. COMMUNITY INTEREST: The owner voted every time possible during the 10 years prior to the project.

$$A_{13} = 1.0$$

14. PERSONAL TREATMENT FACTOR: The owner answered question 18 favorably and question 20 unfavorably.

$$A_{14} = \frac{1 - 1}{2} = 0.0$$

15. PROJECT KNOWLEDGE FACTOR: The owner answered questions 1 and 3 favorably and question 19 unfavorably.

$$A_{15} = \frac{1 - 2}{3} = -0.333$$

TABLE 4

SAMPLE DATA ACQUIRED FOR AN INDIVIDUAL PROPERTY OWNER

Appraised Value of Buildings Sold	\$ 6,365
Appraised Value of Land Purchased in Fee	\$ 6,180
Appraised Value of Mineral Rights	\$ 3,030
Appraised Value of Easement Rights	\$ 1,450
Severance Damages	\$ 715
Total Paid to Individual	\$ 17,740
Appraised Value of Home if Purchased	\$ 3,070
Acres Purchased in Fee	135.50
Acres Involving Easement Rights	8.18
Total Acres Owned	461.38
Acres Used for Buildings	2.50
Cultivated Acres Purchased	22.50
Total Cultivated Acres Owned	22.50
Fraction of Easement Property Below Spillway Crest Elevation	0.667
Number of Families Required to Move	1
Was Property Condemned	No
Was Property Inherited	No
Was Cemetery Involved	No
Age of Owner	44
Percent of Times Possible Owner Voted During a 10-Year Period Prior to Project	100

TABLE 5
AVERAGE FACTOR VALUES

Attitude Factor	Information Expressed by Average Factor	Rough River	Dewey	West Fork of Mill Creek	Combined Data
A ₁ - Sentimental Factor	Average Number of Years Property Had Been in Family	35.4	60.0	28.7	45.8
A ₂ - Cemetery Factor	Fraction of Properties Involving A Cemetery	0.021	0.122	0.0	0.067
A ₃ - Home Factor (1)	Fraction of Properties Involving A Home	0.229	0.671	0.0	0.427
A ₄ - Home Factor (2)	Average Value of Homes Involved Per Owner Involved	718.1	1436.8	0.0	1004.0
A ₅ - Income Factor	Average Portion Income From Property Owned That Was Lost	0.122	0.528	0.370	0.310
A ₆ - Availability Factor	Average Supply and Demand for Property*	2.19	19.95	18.65	10.73
A ₇ - Compensation Factor	Average Ratio of Private Worth to Amount Paid	1.75	2.44	1.40	2.02
A ₈ - Property Worth Factor (1)	Average Value of Property Sold Per Owner	3,170	5,330	19,740	4,830

*A relative number

TABLE 5 - Continued

Attitude Factor	Information Expressed by Average Factor	Rough River	Dewey	West Fork of Mill Creek	Combined Data
A ₉ - Property Worth Factor (2)	Average Portion of Total Property Owned That Was Sold	0.336	0.585	0.370	0.447
A ₁₀ - Property Damage Factor	Average Fraction of Property Sold That Was Rendered Useless to Owner	0.827	0.778	1.0	0.812
A ₁₁ - Property Classifica- tion Factor	Average Portion of Property Sold That Was Useful to Owner	0.494	0.225	1.0	0.430
A ₁₂ - Personal Factor	Average Age of Owner	52.8	47.4	46.0	50.2
A ₁₃ - Community Interest Factor	Average Fraction of the Time the Owners Voted	0.254	0.220	0.360	0.246
A ₁₄ - Personal Treatment Factor	How Well the Average Owner Felt he was Treated*	-0.087	0.329	0.0	0.105
A ₁₅ - Project Knowledge Factor	How Well the Average Owner Felt he was Informed*	-0.295	0.577	-0.582	0.107

*A relative number

EXAMPLE 2

ESTIMATION OF LANDOWNER'S ATTITUDE

The following example illustrates the method given in Chapter III of estimating a landowner's attitude from the information shown in Figure 3.

Question	Evaluation
1.	-1
2.	+1
3.	-1
10. and 11.	+2
13.	+1
19.	+1
21.	<u>+1</u>
Estimated Attitude =	4.0

factors as the independent variables. The objective being to determine whether a reasonable correlation exists between the factors and the corresponding attitudes and, if so, to determine the best method of combining the factors to predict the attitudes. The best method was considered to be the one which gave the highest coefficient of correlation between the predicted and actual attitudes.

The correlation between each factor, considered individually, and the estimated attitudes is given on Table 6. In some instances where the correlation was low, it was possible to improve the correlation by creating new variables through transformations made on the old variables. The main objective of these

TABLE 6
SIMPLE CORRELATION COEFFICIENTS

Attitude Factor	Simple Correlation Coefficients
A ₁ - Sentimental Factor	0.358
A ₂ - Cemetery Factor	0.329
A ₃ - Home Factor (1)	0.782
A ₄ - Home Factor (2)	0.599
A ₅ - Income Factor	0.591
A ₆ - Availability Factor	0.443
A ₈ - Property Worth Factor (1)	0.446
A ₉ - Property Worth Factor (2)	0.518
A ₁₀ - Property Damage Factor	0.236
A ₁₁ - Property Classification Factor	0.291
A ₁₂ - Personal Factor	-0.014
A ₁₃ - Community Interest Factor	0.140
A ₁₄ - Personal Treatment Factor	0.902
A ₁₅ - Project Knowledge Factor	0.576

transformations, however, was to increase the coefficient of correlation between the actual and the predicted attitudes rather than the correlation between the particular factor and the actual attitudes.

A total of 17 different correlations were tried in an attempt to determine the best combination of factors to predict the attitudes being considered. On each run various transformations were made, each time noting which factors or combination of factors was the most significant. The transformations which seemed logical were tried before making the final run. On the final run those transformations which had been found to be the best were made and all variables with less than a 95% probability of being related to the dependent variable were eliminated.

On each computer run two multiple regression analyses were made. One analysis included all of the variables while the other excluded the personal treatment factor (A_{14}) and knowledge of the project factor (A_{15}). The reasons for this were: (1) it is impossible to estimate these factors during the preliminary planning stage of a project; and (2) these factors can be adjusted during the actual transactions to meet the individual situations. The results of these two analyses from the final computer run are given on Tables 7 and 8.

TABLE 7
REGRESSION ANALYSIS INCLUDING ALL FACTORS

Significant Factors	F - Level ¹	Coefficient	Standard Error of Coefficient
A ₁₅	379.7	4.88	0.48
A ₃	30.1	3.17	0.82
A ₅ A ₁₀	11.1	3.63	0.91
A ₆ A ₉ A ₁₀ A ₁₁	5.3	0.34	0.17
A ₁₄	2.4	0.62	0.40
Total F Level	142.8	R Square	0.90
Standard Error of Attitude	2.5	Constant	-1.26
Equation:			
$ATT. = 4.88A_{15} + 3.17A_3 + 3.63A_5A_{10} + 0.34A_6A_9A_{10}A_{11} + 0.62A_{14} - 1.26$			

TABLE 8
REGRESSION ANALYSIS EXCLUDING FACTORS A₁₄ AND A₁₅

Significant Factors	F - Level ¹	Coefficient	Standard Error of Coefficient
A ₃	144.3	6.69	1.29
A ₅ A ₁₀	15.6	6.73	1.38
$\left[\frac{A_2}{5.0} + A_3 + A_9A_{10} A_1 \right]^{\frac{1}{2}}$	4.5	0.29	0.14
A ₆ A ₉ A ₁₀ A ₁₁	2.1	0.29	0.26
Total F Value	61.6	R Square	0.75
Standard Error of Attitude	3.9	Constant	-4.36
Equation:			
$ATT. = 6.69A_3 + 6.73A_5A_{10} + 0.29 \left[(0.2A_2 + A_3 + A_9A_{10}) A_1 \right]^{\frac{1}{2}} + 0.29A_6A_9A_{10}A_{11} - 4.36$			

¹The variance-ratio of an independent variables is a measure of its relative significance in "explaining" the variance of the dependent variable (23, p. 68).

As indicated on Table 7, when all of the factors are considered the most significant is A_{15} , the owner's knowledge of the project. The reason was probably because the method used in this study to determine the owner's knowledge of the project was based on his description of what he knew about the project, which could have been influenced by other factors. For example, the owner's answer to the question "At first, did you believe the lake would benefit the community?" was probably based not on his knowledge of the project benefits, but rather on whether he considered the benefits that he knew about to be greater than the cost he knew about. If he and all of his neighbors had to sell their farms and leave their homes, he probably considered these costs much greater than downstream benefits with which he was less acquainted. Perhaps, with a greater understanding of the project, he would consider the costs justified.

The second most significant factor was whether or not a person's home was involved (A_3). The value of his home was not found to be significant, just whether or not he had to move. Next in order of importance was the effect on the individual's income, as expressed by ($A_5 A_{10}$). This expression was a combination of the fraction of the owner's income producing land that he sold (A_5) and the extent to which the owner lost use of this land (A_{10}).

The land availability factor influenced by the amount of usable land lost ($A_6 A_9 A_{10} A_{11}$) and the personal treatment factor (A_{14}) were fourth and fifth, respectively, in order of significance. The expression ($A_6 A_9 A_{10} A_{11}$) was a measure of the portion of the owner's property which was affected ($A_9 A_{10} A_{11}$) and the ease with which he could replace it (A_6).

On the analysis excluding A_{14} and A_{15} , A_3 and $A_5 A_{10}$ went from second and third to first and second in importance respectively. The expression $\left[(0.2A_2 + A_3 + A_9 A_{10}) A_1 \right]^{\frac{1}{2}}$ relating the years the property had been in the owner's family (A_1) and an expression for his personal loss, $(0.2A_2 + A_3 + A_9 A_{10})$, was third in importance. The availability of land ($A_6 A_9 A_{10} A_{11}$) ranked fourth in significance. There is no way to tell whether the remaining factors were found to be insignificant because they were actually insignificant, because the effects they represent were already included in the other variables, or because of an inadequate methodology.

It should be noted that 100 percent correlation was not possible because the attitudes used were discrete variables and the factors were continuous variables. For this reason and because the actual attitudes could not be estimated precisely, the attitudes predicted by use of the correlation equation on Table 8 were used in the determination of the relationship between attitude and cost.

Correlation between cost and attitude predicted from the factors is helpful in project formulation because it is based on facts which a project planner can obtain.

LAND ACQUISITION COST FINDINGS

Estimates made from the data available of the financial cost of the property, the administrative cost to the Corps of Engineers of purchasing the property, the economic cost to the landowners, and the economic cost to the local public are shown on Table 9. Only the major items of all the costs discussed in Chapter II, relating to these four kinds of costs, are included since detailed estimates of all of the costs would have been beyond the scope of this study. The methods used in estimating the various costs are discussed below.

FINANCIAL COST OF PROPERTY

The total financial cost of property for the three reservoirs as shown on Table 9 is the sum of the amounts paid for each parcel as taken from data supplied by the Corps of Engineers (3, 7, 10). The influence of the individual landowners in determining this cost depended on the extent of the negotiations and on whether or not the owner took the matter to court. Data was available on the difference between the appraised value and the amount paid and on the extra money the landowner received if

TABLE 9
ESTIMATED COST

	Rough River	Dewey	West Fork of Mill Creek
Financial Cost of Property	\$ 977,800	\$ 1,651,800	\$ 562,800
Administrative Cost of Making Purchase	593,800	430,500	132,000
Total Real Estate Cost to Corps	1,571,600	2,082,300	694,800
Economic Cost to Land- owners Studied	99,700	188,400	31,500
Total Paid for Properties Studied	152,000	218,900	79,900
Economic Cost to all Land- owners	641,200	1,421,400	139,500
Present Worth of Economic Cost to Local Public of Lost Farm Production	3,445,000	1,186,000	N.A.

N.A. - Not available since the highest use of land was not farming.

he went to court. However, since it was impossible to tell whether the difference in the appraised value and amount received was a result of negotiation over the value of the property or over whether buildings should be moved and other specific items should be included in the sale, the only reliable data on the owner's effect on property cost was the extra awarded in court.

Of the 93 landowners studied, ten took their cases to court and all received more money for their property. In order to make a

correlation between this cost data and the owner's feeling about selling his property, two approaches were taken. A regression analysis was made between the extra awarded in court and the attitude factors and a plot was made of the predicted owner's attitudes versus the fraction of people taking the matter to court.

In all four attempted correlations, the attitude factors were the independent variables. In the first two runs, the factors were correlated with the amount of extra money awarded in court, and in the final two runs, with the extra awarded as a fraction of the appraised value of the property. The most successful run correlated the factors with the extra awarded in court and had a coefficient of correlation of 0.66. The significant factors in the order of their importance were:

- A_8 - The market value of the property;
- A_2 - The cemetery factor;
- A_1A_4 - An expression combining the sentimental factor (A_1) and the value of the home involved (A_4) and measuring the owner's sentimental attachment to the property sold;
- A_1A_3 - An expression also measuring sentimental value but including whether or not a home was sold rather than its value.
- A_4 - The market value of the home involved;
- A_3 - The factor expressing whether or not a home was involved.

The correlation is expressed by the equation:

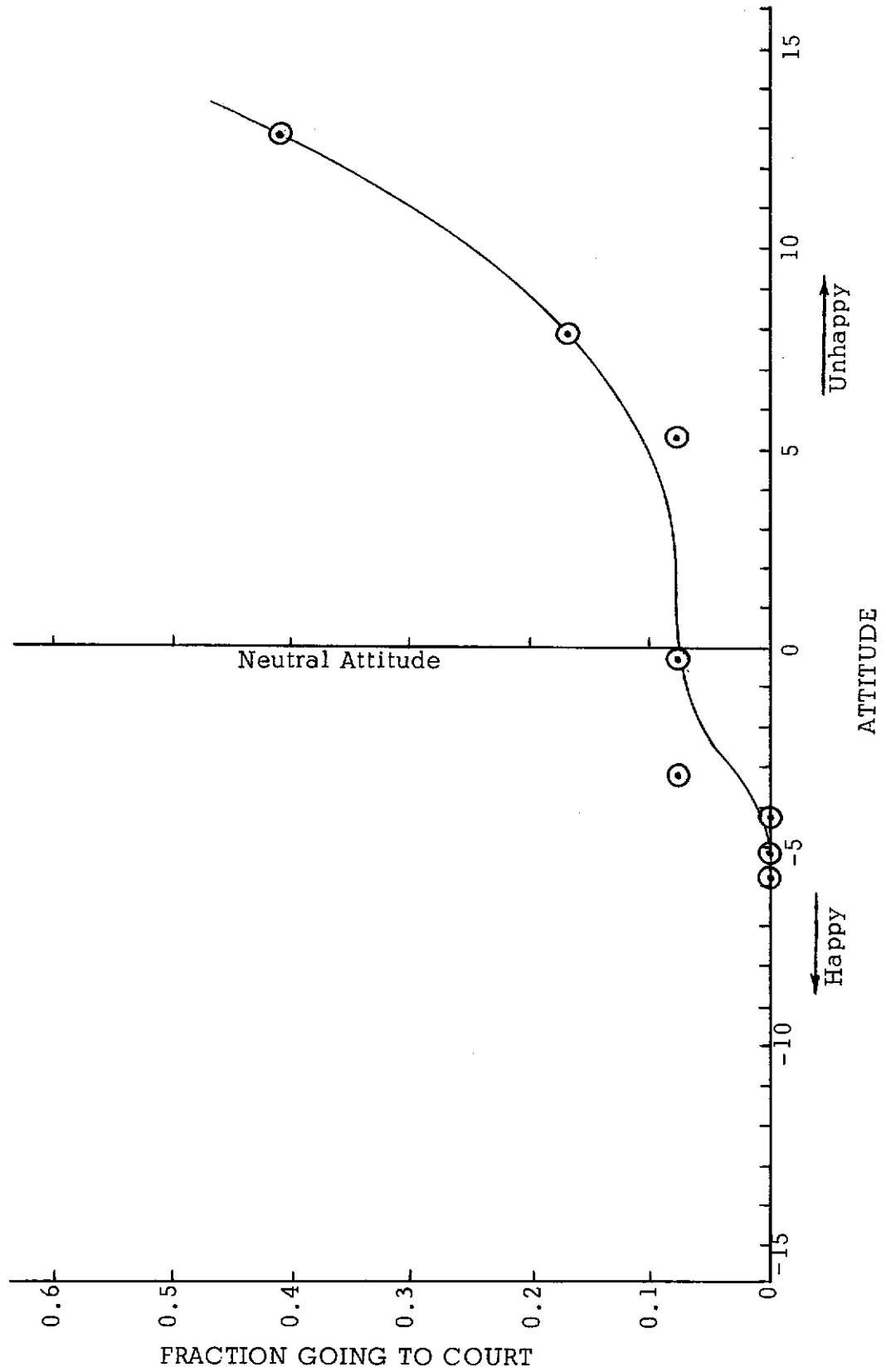
$$\begin{aligned} \text{Court Award (in dollars)} = & 0.0634 (A_8) + 867 (A_2) + 0.00764 (A_1 A_4) \\ & - 17.1 (A_1 A_3) - 0.329 (A_4) + 725 (A_3) - 142 \end{aligned} \quad (2)$$

Although there were not enough data available to well define the relationship between attitude and the probability an acquisition would be taken to court, a plot of the data that was collected is shown in Figure 9. The landowners were divided into 7 groups of 12 and one group of 9, beginning with the 12 unhappiest, 12 next unhappiest and continuing to the 9 happiest. The fraction of each group taking the matter to court was plotted against the average attitude of that group. The plot indicates a definite increase in court cases as the people got madder.

ADMINISTRATIVE COSTS

The administrative cost shown on Table 9 are the differences in the total real estate costs (14, 15, 16) and the amount awarded to the property owners (3, 7, 10). Due to the complexity of administrative procedures, the administrative costs were not determined on an individual basis. For this reason, and because different administrative procedures were involved at each reservoir, no correlation was made between attitude and administrative costs.

Figure 9. Attitude Versus Fraction Going to Court



ECONOMIC COST TO THE LANDOWNERS

The economic cost to the 93 landowners for whom detailed data were available was taken as the additional amount of money which would be required to make them as happy as they were before selling their property. The ratio of this number to the price paid for these 93 properties was used to project the economic cost to all of the landowners involved at a given reservoir as indicated on Table 9. In addition to estimating the total economic cost to the landowners, regression analyses were made between the attitude factors for each individual and the extra amount of money he felt he should have received and a plot was made of attitude versus extra wanted.

The six regression analyses made correlated the attitude factors with the extra amount of money wanted and with the extra wanted as a fraction of the amount paid for the property. The most successful run correlated the factors with the extra amount of money wanted. The coefficient of correlation was 0.52.

The significant factors in the order of their importance were:

- $A_5 A_{10}$ - An expression for the effect of the sale on the owner's income which combined the income factor (A_5) and the property classification factor (A_{10});
- A_{13} - The market value of the property;
- A_3 - The home factor expressing whether or not a home was involved.

The correlation is expressed by the equation:

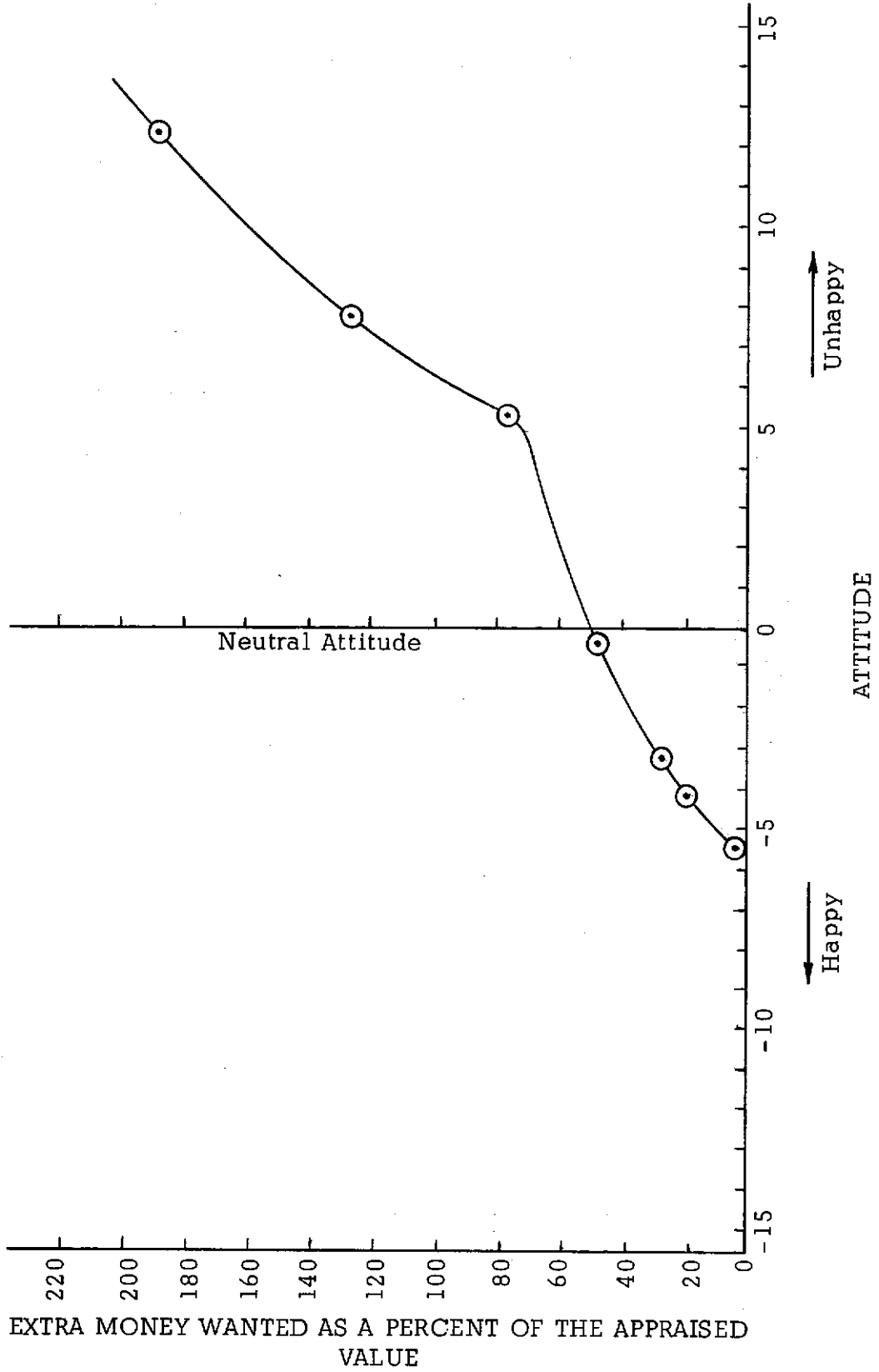
$$\begin{aligned} \text{Extra Wanted (in dollars)} = & 3944 (A_5 A_{10}) + 0.3593 (A_{13}) \\ & + 1757 (A_3) - 9.4 \end{aligned} \quad (3)$$

The plot of attitude versus cost is shown in Figure 10. Since 9 of the 93 landowners did not give a value for the amount of money required to make them as happy as they were before the project, only 84 individuals were considered in making the plot. These people were divided into 7 groups of 12 beginning with the 12 unhappiest and continuing through the 12 happiest. The average economic cost to each group as a fraction of the appraised value of their property was the ordinate and the average attitude was the abscissa. The plot shows the economic cost to increase as the people become more unhappy but at a decreasing rate up to an attitude of between 4 and 5. There it begins to increase sharply as the attitude gets worse. The region around an attitude of 4 or 5 seems to be the separation point between those owners not selling their home and those who do. Past this point the intangible cost resulting from the loss of a home became increasingly important.

ECONOMIC COST TO THE LOCAL PUBLIC

It is evident that the sources of economic cost to the local

Figure 10. Attitude Versus Extra Money Wanted



public are numerous. Although it was not practical to consider all of these costs in this study, an estimate was made of the economic value of the farm production lost from the inundated land. The loss of this income would have various adverse secondary consequences to the local community. The land at Rough River Reservoir and Dewey Reservoir was used for and best suited for farming. Therefore, the economic value of the lost production was taken as the present worth of the lost net farm income. Because of the greater complexity of evaluating income from land in urban uses, the economic cost of inundating the land at West Fork of Mill Creek Reservoir was not considered.

It was not in the scope of this study to make a detailed study of the agricultural capabilities and production potentials of these areas. However, a rough estimate was made of the annual net income from the land inundated based on the agricultural statistics of the counties surrounding the reservoirs, assuming that these statistics were reasonably representative of the area inundated. The data and estimates are shown on Tables 10, 11, 12, 13, and 14. The present worth of the income lost discounted at 3.125 percent is indicated on Table 9.

The economic value of the lost production is independent of the attitude of any individual or groups of individuals. Other

TABLE 10
FARMLAND USE*

	Cropland		Total Cropland	Total Pasture	Total Woodland	Other	Total Land in Farms
	Harvested	Not Harvested					
ROUGH RIVER RESERVOIR							
Breckinridge Co. (Ac.)	64,698	29,087	93,785	135,906	65,195	17,043	311,931
Grayson Co. (Ac.)	48,927	26,144	75,071	97,612	48,279	14,399	235,361
Total Acres	113,625	55,231	168,856	233,518	113,474	31,442	547,292
Percent of Total Farmland	20.76	10.09	30.85	42.67	20.73	5.75	100.00
DEWEY RESERVOIR							
Floyd Co. (Ac.)	28,068	6,671	34,739	68,391	54,621	5,721	163,472
Percent of Total Farmland	17.17	4.08	21.25	41.84	33.41	3.50	100.00

*Data on this table were derived from information taken from (25 and 26).

TABLE 11

CROPS PLANTED AND VALUES*

ROUGH RIVER RESERVOIR	Total Planted	Corn	Hay	Tobacco	Soybeans
Breckinridge Co. (Ac.)	65,180	24,288	26,246	3,019	594
Grayson Co. (Ac.)	51,783	22,795	20,849	1,412	717
Total	116,963	47,083	47,095	4,431	1,311
State Production (\$)	369,161,283	82,812,956	44,381,951	196,164,690	9,263,034
State Acreage (Ac.)	4,012,962	1,650,060	1,465,337	211,692	224,626
Value (\$)/Acre	91.99	50.19	30.29	926.65	41.24
Production Cost/Unit	-	66.55	61.10	659.50	-
Value/Unit	-	94.00	90.00	1500.00	-
Cost/Value (%)	-	70.80	67.89	43.97	70.00**
Cost (\$)/Acre	-	35.53	20.56	407.45	28.87
Percent of Total Acres Planted	-	40.25	40.26	3.79	1.12
Net Productive Value/Acre of Crop/Year	-	14.66	9.73	519.20	12.37
Net Productive Value/Acre of Land/Year	-	5.90	3.92	19.68	.14

*Based on data from (25, 26, 27, and 28)

**Approximate values

TABLE 11 - Continued

ROUGH RIVER RESERVOIR	Wheat	Other Grains	Seed	Sorghum	Vegetables
Breckinridge Co. (Ac.)	3,817	1,700	5,002	428	86
Grayson Co. (Ac.)	1,919	1,315	1,388	1,217	171
Total	5,736	3,015	6,390	1,645	257
State Production (\$)	6,785,300	3,301,488	4,474,083	2,505,677	3,952,280
State Acreage (Ac.)	158,388	130,174	180,138	41,385	13,763
Value (\$)/Acre	42.84	25.36	24.84	60.55	287.08
Production Cost/Unit	35.55	35.30	42.90	-	-
Value/Unit	64.00	38.50	58.00	-	-
Cost/ Value (%)	55.55	91.69	73.97	70.00**	70.00**
Cost (\$)/Acre	23.80	23.25	18.37	42.39	200.96
Percent of Total Acres Planted	4.91	2.58	5.46	1.41	0.22
Net Productive Value/Acre of Crop/Year	19.04	2.11	6.47	18.16	86.12
Net Productive Value/Acre of Land/Year	.93	.05	.35	.26	.19
NET PRODUCTIVE VALUE/ACRE/YEAR = 31.42					

** Approximate Values

TABLE 11 - Continued

DEWEY RESERVOIR	Total Planted	Corn	Hay	Tobacco	Soybeans
Floyd Co. (Ac.)	28,321	16,521	4,875	2	4,134
State Production (\$)	363,627,559	77,265,503	42,239,603	180,350,805	4,134,297
State Acreage (Ac.)	5,322,477	2,422,405	1,527,220	372,438	131,125
Value (\$)/Acre	68.32	31.89	27.66	484.24	31.53
Production Cost/Unit	-	49.95	53.85	632.60	-
Value/Unit	-	99.00	88.00	1200.00	-
Cost/Value (%)	-	50.45	61.19	52.67	50.00**
Cost (\$)/Acre	-	16.09	16.93	255.05	15.77
Percent of Total Acres Planted	100.00	53.33	17.21	0.01	14.60
Net Productive Value/Acre of Crop/Year	-	15.80	10.73	229.19	15.76
Net Productive Value/Acre of Land/Year	-	8.43	1.85	.02	2.30

** Approximate values

TABLE 11 - Continued

DEWEY RESERVOIR	Wheat	Other Grains	Seed	Sorghum	Vegetables
Floyd Co. (Ac.)	0	803	13	30	1,943
State Production (\$)	11,136,037	3,695,672	989,721	502,823	8,512,587
State Acreage (Ac.)	406,773	157,556	53,105	21,250	62,847
Value (\$)/Acre	27.38	23.46	18.64	23.66	135.45
Production Cost/Unit	42.48	43.68	42.20	39.00	-
Value/Unit	76.00	54.00	50.00	90.00	-
Cost/Value (%)	55.89	80.89	84.40	43.33	70.00**
Cost (\$)/Acre	15.30	18.98	15.73	10.25	94.82
Percent of Total Acres Planted	0	2.84	0.04	0.11	6.86
Net Productive Value/Acre of Crop/Year	12.08	4.48	2.91	13.41	40.63
Net Productive Value/Acre of Land/Year	0	.13	0	.01	2.79
NET PRODUCTIVE VALUE/ACRE/YEAR = 15.53					

** Approximate values

TABLE 12

COST OF LIVESTOCK AND LIVESTOCK PRODUCTS
AS A PERCENT OF THEIR VALUE *

	Cost/Unit	Value/Unit	Cost/Value (%)
ROUGH RIVER RESERVOIR			
Dairy Cows	383.00	435.00	88.1
Beef Cows - Calf	338.50	357.00	94.8
Beef Feeder Steers	523.90	560.00	93.5
Beef Feeders	168.00	170.00	98.8
Brood Sows	609.95	723.20	84.3
Feeder Pigs	325.80	352.00	92.5
Sheep	26.95	27.00	99.8
Average			93.1%
Poultry	5,160.00	6,924.00	74.5%
DEWEY RESERVOIR			
Dairy Cows	360.95	415.00	86.9
Beef Cows - Calf	326.40	367.10	89.0
Beef Feeders	487.24	492.00	99.0
Brood Sows	683.45	757.12	90.2
Feeder Pigs	346.60	378.40	91.5
Sheep	27.57	30.30	90.9
Average			91.2%
Poultry	743.00	800.00	92.9%

*Based on data from (27 and 28).

TABLE 13
USE OF PASTURE AND VALUE*

	Livestock and Products (Except Poultry)	Poultry and Products	Total
ROUGH RIVER RESERVOIR			
Breckinridge Co. (Ac.)	-	-	135,906
Grayson Co. (Ac.)	-	-	97,612
Total Pasture (Ac.)	-	-	233,518
Breckinridge Sales (\$)	3,468,064	163,595	3,631,659
Grayson Sales (\$)	2,514,879	876,038	3,390,917
Total Sales (\$)	5,982,943	1,039,633	7,022,576
Cost/Value (%)	93.1	74.5	-
Total Cost (\$)	5,570,120	774,527	6,344,647
Net Income (\$)	412,823	265,106	677,929
Net Productive Value /Acre/Year			2.90
DEWEY RESERVOIR			
Floyd Co. (Ac.)	-	-	68,391
Sales (\$)	183,329	30,383	213,712
Cost/Value (%)	91.2	92.9	-
Cost (\$)	167,196	28,226	195,422
Net Income (\$)	16,133	2,157	18,290
Net Productive Value /Acre/Year			0.27

*Based on data from (25, 26, 27, and 28)

TABLE 14
YEARLY PRODUCTION LOST*

	Land Acquired	Cultivated Land Acquired	Cropland		Pasture	Woodland	Other
			Harvested	Not Harvested			
ROUGH RIVER RESERVOIR							
Corp Data (Ac.)	13,877.17	6,463.91	-	-	-	-	-
Area Land Use (%)	100.0	46.58	20.76	10.09	42.67	20.73	5.75
Acquired Land (Ac.)	-	-	2,880.9	1,400.2	5,921.4	2,876.7	797.9
Net Productive Value (\$) /Acre/Year	-	-	31.42	0	2.90	0	0
Net Productive Value (\$) /Yr.	-	-	90,517.88	0	17,172.06	0	0
TOTAL YEARLY PRODUCTIVE VALUE LOST - \$107,689.94							
DEWEY RESERVOIR							
Crop Data (Ac.)	13,327.73	2,171.86	-	-	-	-	-
Floyd Co. Land Use (%)	100.00	16.30	17.17	4.08	41.84	33.41	3.50
Acquired Land (%)	-	-	2,288.4	543.8	5,576.3	4,452.8	466.5
Net Productive Value (\$) /Acre/Year	-	-	15.53	0	0.27	0	0
Net Productive Value (\$) /Yr.	-	-	35,538.85	0	1,505.60	0	0
TOTAL YEARLY PRODUCTIVE VALUE LOST - \$37,044.45							

*Based on figures given in preceding 4 tables

economic costs of the project to the local public are affected by attitude, but the influencing attitudes can hardly be attributed to a particular individual or determined on an individual basis. For this reason and because of the complexity of these economic costs, no correlation between attitude and these costs was made here.

QUESTIONNAIRES AND POST CARDS

QUESTIONNAIRES

Although only 93 questionnaires were used in the attitude analysis, 95 were returned. Of the two that were returned unanswered, one had been sent to a couple who had died several years after having to leave their home because of the project and was returned by their son. The other was returned unanswered by a person who thought this study was a waste of the taxpayer's money. A summary of the results from all of the questionnaires returned is given on Table 15. These results show that most of the landowners considered at Rough River Reservoir were for the project and were glad it was built; while most of the ones at Dewey, even after more than 20 years, were not glad it was built and thought it had harmed the community more than it had helped. The sample from West Fork of Mill Creek Reservoir was small but indicated a favorable feeling about the reservoir. The answers also show that the majority of the landowners at all three reservoirs was against

TABLE 15

SUMMARY OF QUESTIONNAIRE ANSWERS

Question	Reservoir	Answer		
		FOR	AGAINST	NO ANSWER
1		FOR	AGAINST	NO ANSWER
	Rough River	28	13	7
	Dewey	9	33	1
	West Fork	3	0	1
2		FOR	AGAINST	NO ANSWER
	Rough River	18	21	9
	Dewey	4	35	4
	West Fork	1	2	1
3		YES	NO	NO ANSWER
	Rough River	31	14	3
	Dewey	9	32	2
	West Fork	3	0	1
4		YES	NO	NO ANSWER
	Rough River	29	17	2
	Dewey	9	32	2
	West Fork	3	1	0
5		YES	NO	NO ANSWER
	Rough River	11	35	2
	Dewey	29	13	1
	West Fork	0	4	0
		BETTER	EQUAL	WORSE
	Rough River	0	2	9
	Dewey	0	4	25
	West Fork	0	0	0
7		YES	NO	NO ANSWER
	Rough River	14	23	11
	Dewey	2	36	5
	West Fork	1	2	1
8		YES	NO	NO ANSWER
	Rough River	22	24	2
	Dewey	0	41	2
	West Fork	1	1	2

TABLE 15 - Continued

Question	Reservoir	Answer		
9		VALUE GIVEN	NO VALUE GIVEN	
	Rough River	22	26	
	Dewey	32	9	
	West Fork	1	3	
10		HAS	HAS NOT	NO ANSWER
	Rough River	30	10	8
	Dewey	14	26	3
	West Fork	3	0	1
11		HAS	HAS NOT	NO ANSWER
	Rough River	25	12	11
	Dewey	34	5	4
	West Fork	1	2	1
12		YES	NO	NO ANSWER
	Rough River	22	24	2
	Dewey	5	37	1
	West Fork	2	1	1
13		YES	NO	NO ANSWER
	Rough River	32	16	0
	Dewey	7	33	3
	West Fork	2	1	1
14		YES	NO	NO ANSWER
	Rough River	2	43	3
	Dewey	6	36	1
	West Fork	2	1	1
15		YES	NO	NO ANSWER
	Rough River	15	27	6
	Dewey	21	21	1
	West Fork	2	1	1
16		INCREASED	DECREASED	
	Rough River	8	15	
	Dewey	0	28	
	West Fork	0	0	
		STAYED SAME	NO ANSWER	
	Rough River	18	7	
	Dewey	12	3	
	West Fork	2	2	

TABLE 15 - Continued

Question	Reservoir	Answer		
		DID	DID NOT	NO ANSWER
17	Rough River	11	27	10
	Dewey	33	9	1
	West Fork	0	3	1
18	Rough River	17	25	6
	Dewey	29	12	2
	West Fork	1	1	2
19	Rough River	25	19	4
	Dewey	10	31	2
	West Fork	2	1	1
20	Rough River	17	27	4
	Dewey	18	21	4
	West Fork	1	1	2
21	Rough River	21	27	
	Dewey	38	5	
	West Fork	2	2	

selling their property. Time seems to have had little effect on the attitudes of the unhappy landowners.

POST CARDS

An estimation of the attitude of the local public as a whole was made using the answers given by local citizens to the post card questionnaires. A quantitative expression of the local public attitude for each reservoir was determined using the difference in the favorable and unfavorable answers and the number of questions that were answered. The results were:

1. Rough River Reservoir. -0.764
2. Dewey Reservoir -0.875
3. West Fork of Mill Creek Reservoir . -0.715

The negative sign was used to indicate a favorable attitude. These relative magnitudes indicate the local public surrounding Dewey Reservoir have the most favorable attitude.

The same method was used to obtain a quantitative value for the attitude of those people in the floodplain and those people living near the lake. These values made it possible to compare the attitudes of the two groups. The results were:

1. Rough River Reservoir
 - a. General Residents -0.730
 - b. Floodplain Residents -0.817

- 2. Dewey Reservoir
 - a. General Residents -0.917
 - b. Floodplain Residents -0.678
- 3. West Fork of Mill Creek Reservoir
 - a. General Residents -0.721
 - b. Floodplain Residents -0.699

These values indicate that at Rough River the floodplain residents were happier while at the other reservoirs the people nearer the reservoir were happier.

In order to explain the differences in these local attitudes, Table 16 summarizes the answers given as a percent of those answering. These findings indicate that nearly everyone was in favor of the project and felt that it had benefitted the community. A lesser number, however, had actually benefitted directly from the project. The largest percentage of those benefitting personally and of those believing the project had benefitted the community was in the area near Dewey Reservoir.

COMPARISONS AND CONCLUSIONS

LANDOWNER'S ATTITUDE

A significant finding of this study is the varying attitude of the landowners as related to the characteristics of the several reservoir

TABLE 16

POST CARD RESULTS AS A PERCENT OF THOSE ANSWERING

FLOODPLAIN RESIDENTS:									
Questions	Rough River (14)*			Dewey (4)*			West Fork of Mill Creek (10)*		
	YES	NO	NO ANSWER	YES	NO	NO ANSWER	YES	NO	NO ANSWER
	1	100.0	0.0	0.0	75.0	25.0	0.0	90.0	0.0
2	100.0	0.0	0.0	75.0	25.0	0.0	80.0	10.0	10.0
3	92.9	0.0	7.1	100.0	0.0	0.0	90.0	10.0	0.0
4	64.3	27.6	7.1	50.0	50.0	0.0	60.0	30.0	10.0
5	100.0	0.0	0.0	100.0	0.0	0.0	90.0	10.0	0.0
6	92.9	0.0	7.1	100.0	0.0	0.0	90.0	10.0	0.0
7	64.3	14.3	21.4	75.0	0.0	25.0	70.0	10.0	20.0
GENERAL LOCAL RESIDENTS:									
Questions	Rough River (26)*			Dewey (22)*			West Fork of Mill Creek (34)*		
	YES	NO	NO ANSWER	YES	NO	NO ANSWER	YES	NO	NO ANSWER
	1	84.6	7.7	7.7	100.0	0.0	0.0	82.4	0.0
2	92.3	7.7	0.0	95.5	4.5	0.0	76.5	8.8	14.7
3	92.4	3.8	3.8	100.0	0.0	0.0	91.2	8.8	0.0
4	65.4	34.6	0.0	81.9	13.6	4.5	70.6	23.5	5.9
5	88.5	7.7	3.8	100.0	0.0	0.0	91.2	5.9	2.9
6	84.6	7.7	7.7	90.9	0.0	9.1	76.5	8.8	14.7

*Number of returns

sites. The averages of the landowners' predicted attitudes were found to be:

1. Rough River Reservoir -1.02
2. Dewey Reservoir 5.70
3. West Fork of Mill Creek Reservoir . . 0.36

Some of the reasons for these differences are evident from the data that has been given on the property that was purchased. Other reasons are more general in nature.

It is apparent from the information given on Tables 3 and 5 that the owners at Dewey Reservoir were affected more extensively by the project than were the landowners at the other projects.

Many more homes were lost. More entire properties and cemeteries were taken. The incomes of the people selling property at Dewey Reservoir were affected more than those of people at either of the other reservoirs. They also had owned their property longer and were more likely to have a greater sentimental attachment to it. Because on the average these landowners had to give up more of what they owned, they were on the average much more unhappy.

Another factor which helps explain the different average attitudes is the availability factor. This is a measure of the supply and the demand for property similar to that sold. The people at Dewey Reservoir not only had to sell a large portion of what they owned,

but also found it hard to replace their loss with similar property in the local area. Although the people at West Fork of Mill Creek Reservoir did not have to sacrifice near as many things of personal value, the land they did sell was high-class subdivision land for which there was a great demand. They probably figured that if they could hold the land a few years, it would yield a very good return on their investment.

The fact that Rough River Reservoir was constructed six to nine years after the other two projects may have had an influence. Different purchasing procedures and general policies were used and probably played a definite part in reducing the resistance to the Rough River Reservoir project. New guide lines allowed the purchasing agency more freedom to negotiate with the owner. At Dewey Reservoir the policy was to buy the entire valley where the lake was to be built while at Rough River Reservoir only the required lands were purchased. This explains why more entire tracts were taken at Dewey Reservoir.

Another possible reason for the more favorable attitude at Rough River Reservoir is greater recognition of the recreational value of a reservoir. Because of the increase in the amount of leisure time and of income in recent years, people have begun to utilize the recreational facilities available more and have in

the process become more aware of the benefit of a reservoir for recreation. Many landowners at Rough River probably conceived of the possibilities of increasing their income by selling or leasing their land for recreational use after the reservoir was completed. In 1946 the farmers around Dewey Reservoir spent most of the daylight hours working. They probably cared very little about the recreational value of a lake they would never use. This fact is evident by the number of landowners who said they had never used the lake and did not think it had benefitted the community in any way. People around Cincinnati and the people around Rough River Reservoir (10 years later) were probably much more conscious of the recreational value of a reservoir.

COSTS

The cost per acre of property was greatest for West Fork of Mill Creek Reservoir and least for Rough River Reservoir. The land around Cincinnati obviously cost more because it was more valuable. That around Dewey Reservoir while not as valuable as the land around Rough River Reservoir cost more mainly because more homes and other buildings were purchased. However, as Figure 9 indicates the increased resistance offered by the landowners must be included as a factor contributing to the increased property cost.

The administrative cost was greatest for Rough River Reservoir and least for West Fork of Mill Creek Reservoir. The fact that more parcels were involved, that more skilled personnel were probably used and that inflation occurred in the intervening years are the most apparent reasons for the differences. However, the purchasing procedures of buying less of the land in fee may have increased the administrative costs.

The differences in the economic cost to the landowners is largely attributed to the attitude differences explained above. The difference in the economic cost to the local public of the inundated lands was dependent on the quality and the use of the land that was taken.

LOCAL PUBLIC ATTITUDE

Although the landowners' attitudes were worse at Dewey Reservoir, the attitude of the local people in general was better than for either of the other two reservoirs. The conclusion drawn from these findings is that the local citizens at Dewey Reservoir were affected more and were benefitted more per person than at the other reservoirs. This seems reasonable since the lake is located in a fairly remote area where it is the principal source of recreation and attracts a relatively large number of visitors into the area. At Cincinnati where there are many recreational facilities, the

small lake, although it has the highest use per acre of water than any other lake in the United States, had the lowest public attitude rating of the three lakes studied and probably the least effect on the area where it is located.

In comparing the different groups at each reservoir (i.e., general and floodplain residents), it was found that at Rough River the floodplain residents were happier than the residents nearer the lake. At the other two reservoirs the opposite was found to be true. It was concluded that the local residents near Rough River Reservoir were more aware of the flood control value of the reservoir while those near Dewey and West Fork of Mill Creek Reservoirs were more aware of the recreational value of the reservoir.

CHAPTER V

SUMMARY

DESCRIPTION OF STUDY

The purpose of this study was to examine the various economic and financial costs relating to the acquisition of property required for the construction of three reservoirs and to determine if any correlation could be made between the attitudes of the landowners selling property and the costs. Also studied was the effect on attitudes of 15 characteristics of the property and of the owner. These factors included such things as the age of the owner and the income potential of the land sold. Data was collected and analyzed for Rough River Reservoir between Grayson and Breckinridge Counties, Kentucky; Dewey Reservoir in Floyd County, Kentucky; and West Fork of Mill Creek Reservoir in Hamilton County, Ohio.

The financial costs considered in the study were the total amount of money paid to landowners and the total cost to the Corps of Engineers of making the purchase including appraisal, negotiation, and administration. The economic costs considered were the total value of the property to the individual and the economic

loss to the local community of being deprived of the secondary benefits from producing land. The attitudes considered in detail were those of the landowners during the purchasing transactions toward selling their land for the project. Consideration was also given to the attitude of the community as a whole as it compared to the landowners' attitudes.

APPROACH USED

After preliminary studies to organize the approach, data were collected from the District Office of the Corps of Engineers responsible for each project on the financial cost of land acquisition, the procedures followed in purchasing right-of-way, and specific details relating to the parcels of land and landowners involved. This data became the starting point for examining the attitudes and costs related to the property owners involved.

Questionnaires were then sent to the landowners selling property needed for reservoir construction to obtain the additional information required to complete the analysis. Questions were asked related to the economic costs to the owner, to the details of the sale, to his attitude toward the project and selling his property, and to the reasons he felt as he did.

Questionnaires in the form of post cards were also sent to the citizens within the local community but not selling land for the

project. Included in two separate groups were people living in the floodplain downstream from the reservoir and people living outside the floodplain. They were questioned about individual and general project benefits and about their opinion of the reservoir before and after it was constructed.

From these data, the costs involved in purchasing right-of-way were classified qualitatively and quantified to the extent possible. The attitudes of those landowners replying to the questionnaires were determined on an arbitrary scale. However, those estimating economic cost in project planning will not have access to information on landowner attitudes. Therefore, it was hypothesized that these attitudes are determined by various characteristics of the landowner as an individual and of the property being sold. Many factors were considered, and 15 specific ones were quantified.

Multiple regression analysis was used to analyze the relationship between the hypothesized factors and both attitudes and costs. Runs were made correlating the factors for each individual with the associated costs to determine the relative importance of each factor in influencing cost. Major emphasis was given, however, to correlating these attitude factors with the estimated attitudes in order to determine the best combination and relative importance of the factors in predicting a landowner's attitude.

The result was an equation derived to predict the landowner's attitude from the determining factors.

Using this equation, the predicted attitudes were calculated for the owners being studied. A plot was made of these attitudes versus the associated costs in order to observe the effect of attitude on costs. Two plots of attitude versus cost were made. One showed the change in the financial cost indirectly by indicating the fraction of those with that attitude going to court. The other showed the economic cost to the landowner. An evaluation was made of the general local public attitude toward the project. This was done in order to make a comparison of the local public attitude among the different reservoirs and between the local public and the landowners that were affected.

SIGNIFICANCE OF FINDINGS

The findings of this study indicate very clearly that the economic cost of reservoir right-of-way is not the same as the financial cost of purchasing the property. The discount rate used to evaluate future project benefits is not the same as that implicit in land sales between a willing buyer and a willing seller. The value of land to an unwilling seller is shown to exceed the market price by the very fact that he is unwilling to sell at that price. Many of the economic costs represent intangible values to the

landowners involved and are difficult to approach in a quantitative manner. However, these costs are very real and should be considered to the fullest extent possible. At present, project reports usually contain a summary of the positions taken in public hearings by those opposed to a project. Those required to sell their land are usually the most vocal such group. Eckstein concluded, "It would appear logical and consistent to give a verbal statement of these intangible costs with an emphasis equal to statement of tangible cost. The clearest way to do so would be to include an intangible analysis, featured as prominently as the economic and financial analysis" (22, p. 146).

To this end this study is significant in that it discusses in detail the kinds of intangible costs to the landowner and the factors which influence these costs. A better understanding of the factors associated with intangible costs would increase the reliability of the estimates of these costs. In addition to a discussion of the kinds of costs and factors, this study included a correlation between the factors and the costs in order to determine the most significant factors and their relative importance. Adequately defining all the relationships quantitatively would require much research, but it is believed that this study is a step in that direction.

Because the landowner's attitude is closely associated with the economic sacrifice he must make but for which he is not compensated, his attitude influences the economic cost of reservoir construction. The determination of this attitude and its relationship to the various costs is of major importance in project evaluation. Although many have realized the existence of these economic costs, no one has previously tried to quantify the relationship. This study attacks the problem of exploring the possibilities of evaluating attitude and its effect on costs and develops several preliminary relationships. It was concluded that, although the problem is complex, it should be handled much better in project planning than it is now. More research along this line could produce a more accurate method of estimating the attitudes involved and a better relationship between attitude and cost. This would make it possible to evaluate landowner attitude and determine the associated financial and economic costs while planning new reservoirs.

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