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WATER RESOURCES

Flooding on Easement Lands Within the Red Rock, Iowa, Reservoir





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**Resources, Community, and
Economic Development Division**

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The Honorable Max S. Baucus
Chairman
The Honorable John H. Chafee
Ranking Minority Member
Committee on Environment
and Public Works
United States Senate

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Committee on Public Works
and Transportation
House of Representatives

In response to section 343 of the Water Resources Development Act of 1992, this report discusses (1) whether the property within the Red Rock reservoir's boundary has been inundated beyond the levels permitted by easements allowing occasional flooding and whether compensation for the easements should be renegotiated with the landowners and (2) what actions have been taken to implement section 108(b) of Public Law 99-190, which authorized the U.S. Army Corps of Engineers to purchase property with easements from those landowners who are willing to sell.

We are sending copies of this report to the appropriate Senate and House committees; interested Members of Congress; the Secretaries of Defense and the Army; the Director, Office of Management and Budget; the Chief, U.S. Army Corps of Engineers; and other interested parties. We will make copies available to others on request.

This work was performed under the direction of James Duffus III, Director, Natural Resources Management Issues, who can be reached at (202) 512-7756. Major contributors to this report are listed in appendix III.

Keith O. Fultz
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Executive Summary

Purpose

Before the Red Rock Dam and Lake Project near Des Moines, Iowa, began operating in 1969, the U.S. Army Corps of Engineers purchased easements from landowners on 29,000 acres within the reservoir's boundary. The easements give the Corps the right to occasionally flood the easement lands during periods of high water when the dam is operated to control flooding downstream by holding back water upstream in the reservoir. Because heavier-than-expected rainfall occurred during the 1970s and early 1980s, the easement lands flooded more frequently than the Corps had estimated. In response to the landowners' complaints that flooding has occurred more frequently than what the owners were paid for, the Congress in 1985 authorized a buyout program for easement landowners who were willing to sell their lands to the Corps. However, few owners have been interested in selling, and the landowners' complaints have persisted.

Concerned about this situation, the Congress in the Water Resources Development Act of 1992 directed GAO to

- determine whether the property within the Red Rock reservoir's boundary has been inundated beyond the levels permitted by the easements;
- recommend whether compensation for the easements should be renegotiated with landowners; and
- report on the actions the Corps has taken to implement the buyout program.

Background

The Red Rock Dam and Lake Project was constructed in the 1960s at a federal cost of nearly \$89 million. To reduce flood damage downstream on the Des Moines and Mississippi rivers, the project retains water in the reservoir during periods of high rainfall to reduce the downstream water levels. The Corps purchased lands within the reservoir's boundary that were going to be frequently or permanently flooded as a result of the project and also purchased easements on lands expected to be occasionally flooded.

The land and easement acquisitions took place between 1959 and 1967. The acres below the elevation of 760 feet were bought outright by the Corps because they were expected to be flooded permanently or more frequently than once every 5 years. For the lands between 760 and 783 feet, the Corps paid the landowners for what is called an "occasional" easement, giving the Corps the right to overflow these lands.

The 1985 buyout program required the Corps to purchase easement lands from willing sellers at Red Rock. In November 1988, the Corps began to develop plans to make offers on the 29,000 acres of land. It has acquired some acreage and is in the process of appraising or negotiating with landowners to buy other acreage.

Results in Brief

The Red Rock easement documents did not specify a permitted flooding frequency, level, duration, or timing—only that the flooding would be occasional. Since the project began operating in 1969, flooding has occurred on easement lands, depending on elevation, about 2 to 4 times more frequently than the Corps estimated. Corps officials told GAO that, over the long term, the flood-frequency estimates will prove to be correct, because more rain fell during the first 25 years of Red Rock's operation than normal. Landowners disagree, stating that the flooding has exceeded what they were paid for and that more compensation is due.

The easement documents do not provide for renegotiating easement compensation if the flooding is greater than what was expected. Whether additional compensation should be provided to the landowners is a policy decision for the Congress. Arguments for compensation relate to the farm losses already incurred by the landowners in excess of their easement payments. GAO estimated that for the flooding that has already occurred, the present value of crop and other losses the landowners have suffered may have exceeded the easement payments they received. GAO estimated that the gross crop losses exceeded the easement payments by up to \$2.3 million but could not estimate the amount of net losses because of the many variables that can reduce the amount of gross revenues. In addition, GAO's analysis raises the possibility that the Corps' long-term flooding estimates are too low. On the other hand, a court held in 1987 that owners of lands subject to occasional flooding easements in another Corps project were not entitled to additional compensation because of several years of high precipitation. In addition, the Corps has stated that too few years have passed since the beginning of Red Rock's operation to judge the validity of the flood-frequency estimates.

Starting in 1988, the Corps' Rock Island District developed and began implementing plans to acquire the easement lands. Few landowners—7 percent—have sold their lands after the Corps surveyed, mapped, and appraised them to estimate their current fair market value. The landowners generally believe that the Corps' offered purchase prices are too low to allow them to buy comparable farmland nearby and

continue to farm. In addition, the landowners have cited access difficulties to the rest of their property if they sell only the easement segments of their farms. The Assistant Secretary of the Army for Civil Works has said that a landowners association's proposal that the Corps lease the lands back to those owners who are willing to sell should be considered.

Principal Findings

Flooding Has Been Higher Than Expected

On the basis of 45 years of streamflow and other data, the Corps projected that, over the long term, land at 760 feet above sea level would be flooded on average once every 5 years, while land at 783 feet above sea level would be flooded on average once every 45 years. The Corps paid the landowners about \$5.5 million for the occasional easements on the 29,000 acres within the reservoir's boundary that are located at elevations of 760 feet and higher. This compensation was based on estimated average flooding frequencies and such factors as crop losses, fence damage, soil erosion, and expenses for cleaning up debris.

Flooding has occurred on part of the easement lands in 9 of the last 25 years through 1993. The Corps' records show that the average annual precipitation was 12 percent higher than normal during this period. The frequency of flooding that has occurred at four of the five elevations GAO studied seems to be unusually high, given the Corps' estimates. It is possible, however, that over a longer period of time, the actual flood rates may move closer to the Corps' estimates.

Compensation Issue Is Difficult to Resolve

The landowners' representatives believe that the price the Corps originally paid for the easements was unfair because the frequency of flooding has exceeded the Corps' estimates, causing the landowners to suffer much higher losses than they expected. The landowners understood the Corps' estimates to mean that flooding would occur no more often than once every 5 years at 760 feet and less frequently at higher elevations. The easement documents that the landowners signed do not provide for renegotiating easement compensation. According to a Corps district official, the landowners were told that the flooding estimates were based on historical streamflow data and were not guarantees of future flooding frequencies.

On the basis of its analysis of Iowa crop production and pricing data for the nine floods that occurred between 1969 and 1993, GAO estimated that the gross revenue losses in crop production for the easement landowners were likely to be about \$7.8 million when discounted to their 1963 present value, or up to \$2.3 million higher than the \$5.5 million paid for the easements. The net crop losses were probably lower, however. GAO cannot compute the net crop losses because the amounts would vary depending on the timing of the flooding and the costs and revenues of individual easement owners. In some years, farmers lost their planting costs as the result of flooding on easement lands and did not incur harvesting costs. In other years, they may have avoided both planting and harvesting costs. It is possible that in some years farmers may have been able to plant and harvest a second crop to partially offset their losses. In addition, in flood years farmers incurred additional, but not readily estimated, losses as the result of the floods' effects on the lands—fence damage, soil erosion and depletion, drainage damage, debris requiring cleanup, sand and salt deposition, and other factors.

The issue of additional compensation because of increased flooding of occasional easement lands was addressed in a 1987 court decision relating to a Corps flood control project in Missouri. The court ruled that because the flooding was caused primarily by high precipitation and not the Corps' operation of the dam, the landowners should be refused additional compensation.

The easement landowners' association in Red Rock wants the Corps to either renegotiate additional compensation with each landowner, on the basis of the actual incidence of flooding since 1969, or purchase the lands using a formula that may increase the fair market price being offered under the buyout program. The Corps does not agree with these proposals.

Status of the Buyout Program

Starting in 1988, the Corps developed and implemented plans to acquire the easement lands from owners willing to sell. However, the Corps did not meet a congressionally imposed deadline set in 1992 to make offers by October 31, 1993. The Corps advised GAO that there was not enough time or funding to meet the deadline.

As of March 1994, the landowners of 7 percent of the 29,000 acres had sold their lands to the Corps. The landowners of another 4 percent were negotiating with the Corps. The landowners of another 36 percent had

indicated an interest in an offer by the Corps, and the Corps was mapping and appraising their lands before beginning negotiations.

As for the owners of the other 53 percent of the easement lands, 10 percent told the Corps that they were not willing to sell, 10 percent rejected the Corps' formal offer for their lands, and 33 percent had not responded to the Corps' letter informing them of their opportunity to sell.

The landowners' representatives told GAO that the Corps' proposed prices are too low to allow them to buy comparable farmland nearby and have proposed increasing the prices offered. In addition, they said that selling easement lands can create difficulties with the access to lands surrounding them. So that the landowners can continue to farm the easement lands and access surrounding lands, the representatives have also proposed that the Corps allow willing sellers to lease the lands sold back from the Corps at a fair market rent. The Assistant Secretary of the Army for Civil Works has stated that this proposal deserves consideration if it is based on fair market value.

Agency and Landowners' Association Comments

GAO requested and received written comments on a draft of this report from the Department of Defense and from representatives of the easement landowners. While they generally concurred with the report, each raised comments about particular data or analyses in the report. The Department of Defense stated it does not agree with what it said was an implication that the Corps' determination of flooding frequency is not accurate. The report does not say that the frequency determination is inaccurate. Rather, it points out that the probability that the Corps' long-term flooding estimates will be correct is low, given the flooding that has already occurred, but states that the possibility exists that the Corps' estimates may be accurate over a longer period. The Department also stated it does not fully agree with the methodology GAO used to determine the value of agricultural losses and the implication that landowners were not adequately compensated for existing easements. GAO revised the report to more clearly recognize the crop losses that may have been incurred. The easement landowners' representatives made various suggestions to clarify the report. In particular, the representatives questioned the average amount originally paid for easements and the average remaining value of easement lands. GAO revised the report to address the suggestions.

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Abbreviations

DOD	Department of Defense
GAO	General Accounting Office

Introduction

In reaction to a series of disastrous floods affecting wide areas, the Congress established as a nationwide policy in the Flood Control Act of 1936 that flood control is in the interest of the general public welfare and that the federal government would participate with the states and local entities to carry out flood control activities. The purpose of flood control is to reduce the susceptibility of property to flood damage and to relieve human and financial losses. During the past 59 years, the U.S. Army Corps of Engineers has invested over \$23 billion nationwide in flood control projects. More than 600 projects are now operated by the Corps, which has built reservoirs and thousands of miles of levees, floodwalls, and channel improvements. Flood control reservoirs often serve multiple uses, such as municipal and industrial water supply, navigation, irrigation, hydroelectric power, conservation of fish and wildlife, and recreation.

The Red Rock Project

First authorized by the Flood Control Act of 1938 (Public Law 75-761), the Red Rock Dam and Lake project is an integral unit of the comprehensive plan for reducing flood damage in the Upper Mississippi River Basin. It was conceived to reduce flooding downstream (southeast) of the project. The dam is located on the Des Moines River in south-central Iowa, about 143 miles above the confluence of the Des Moines and Mississippi Rivers and about 60 miles downstream from the city of Des Moines. The other major flood control project on the Des Moines River—the Saylorville Dam and Reservoir—was authorized and funded later. The locations of the Red Rock and Saylorville reservoirs are shown in figure 1.1. Figure 1.2 depicts the Red Rock reservoir's surface area at the maximum flood control pool.

Figure 1.1: Des Moines River
Reservoirs

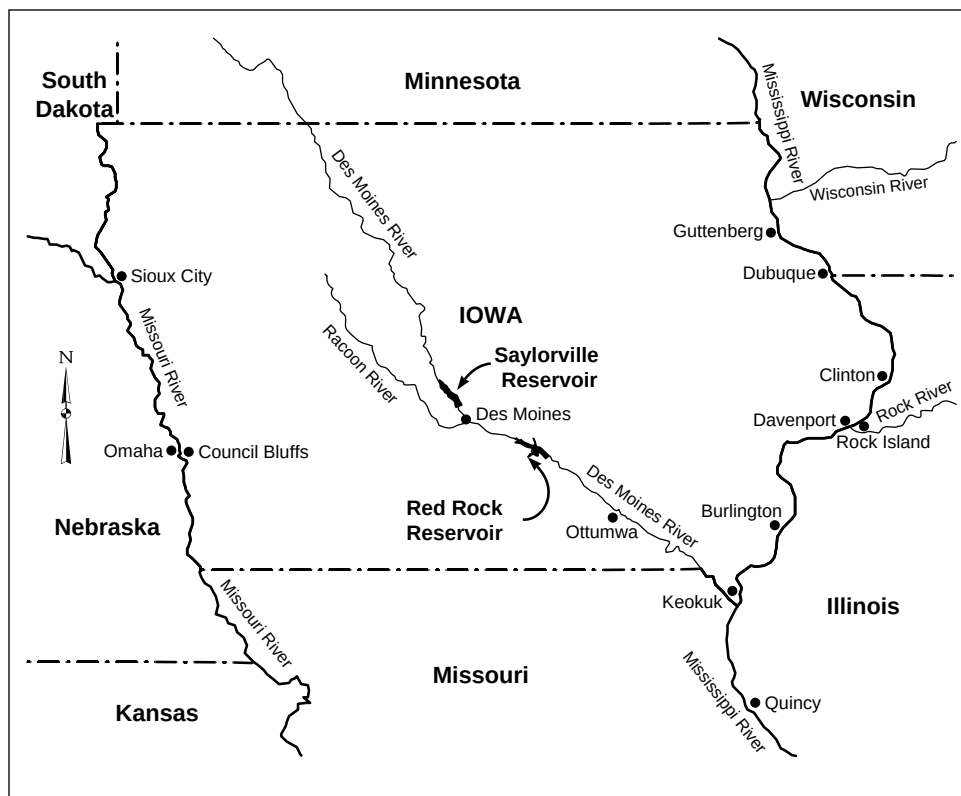
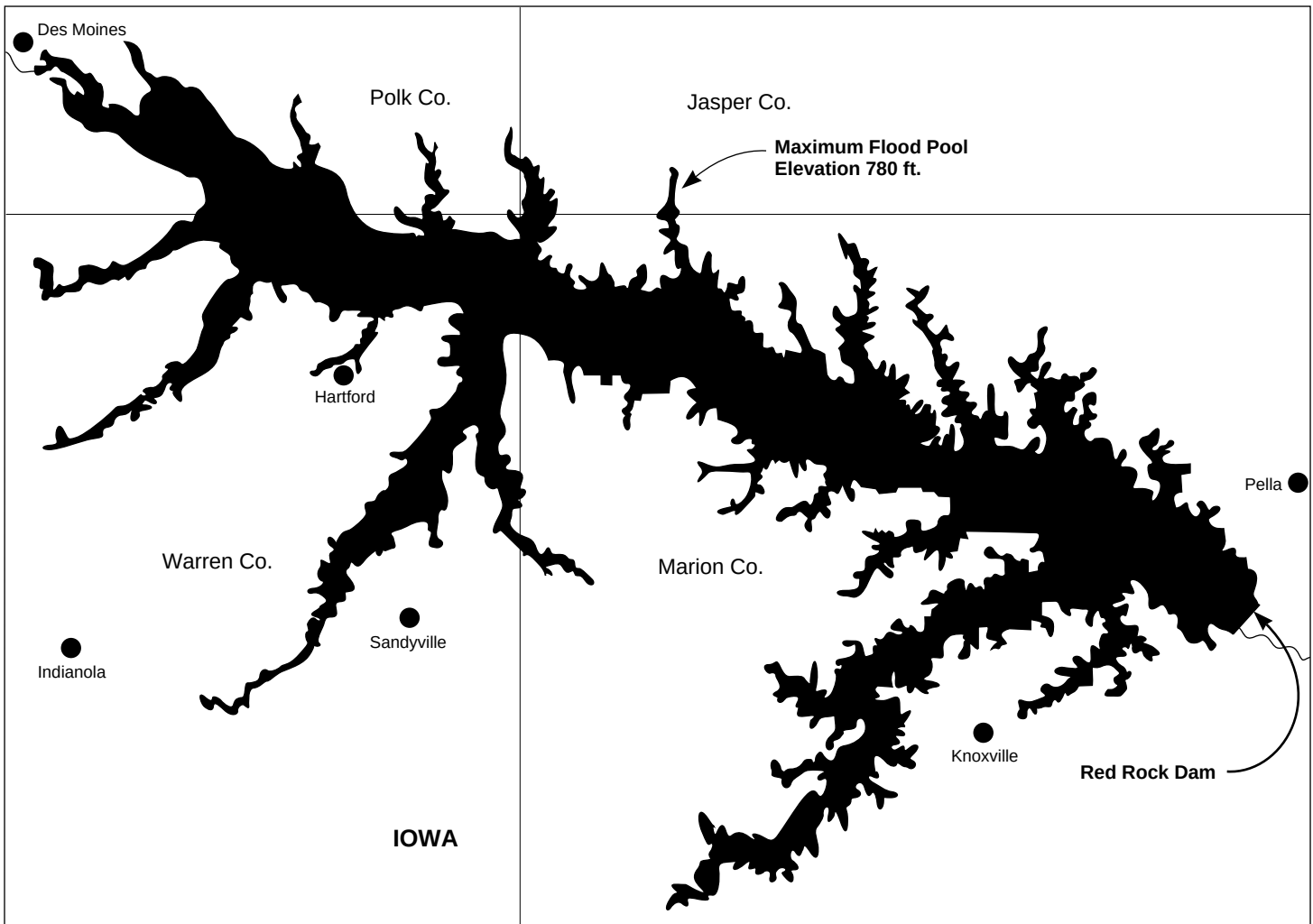


Figure 1.2: Map of Red Rock Lake's Surface Area at the Maximum Flood Pool



The Red Rock Dam and Lake project provides flood protection to 36,000 acres of agricultural lands in the Des Moines River Basin and to the cities and towns of Ottumwa, Eldon, Eddyville, Keosauqua, and Farmington. Downstream from the mouth of the Des Moines River, levee districts and cities along the Mississippi River also benefit. These cities include Quincy, Illinois, and Canton, La Grange, and Hannibal, Missouri.

Land acquisitions at Red Rock took place between 1959 and 1967 under the Joint Army-Interior Land Acquisition Policy—also called the “Eisenhower policy”—which was established in 1953. Under the Eisenhower policy, the Department of the Army acquired lands up to the 5-year flood-frequency line, which at Red Rock is at an elevation of 760 feet. For lands between the 5-year flood-frequency line to the maximum reservoir flood control pool line plus freeboard (783 feet),¹ easements were acquired.

On the basis of the project plan that the Corps developed and that the Congress authorized, the Corps acquired the following interests in lands for the Red Rock Dam and Lake project: 47,600 acres in fee title, 100 acres in permanent easements, and 29,000 acres in occasional easements. Construction of the project, with its mile-long earthen dam, began in May 1960, and the project became operational for flood control in January 1969. Originally authorized principally for flood protection, the project is now also used for recreation, for fish and wildlife management purposes, and for augmenting the river’s flow during drought.

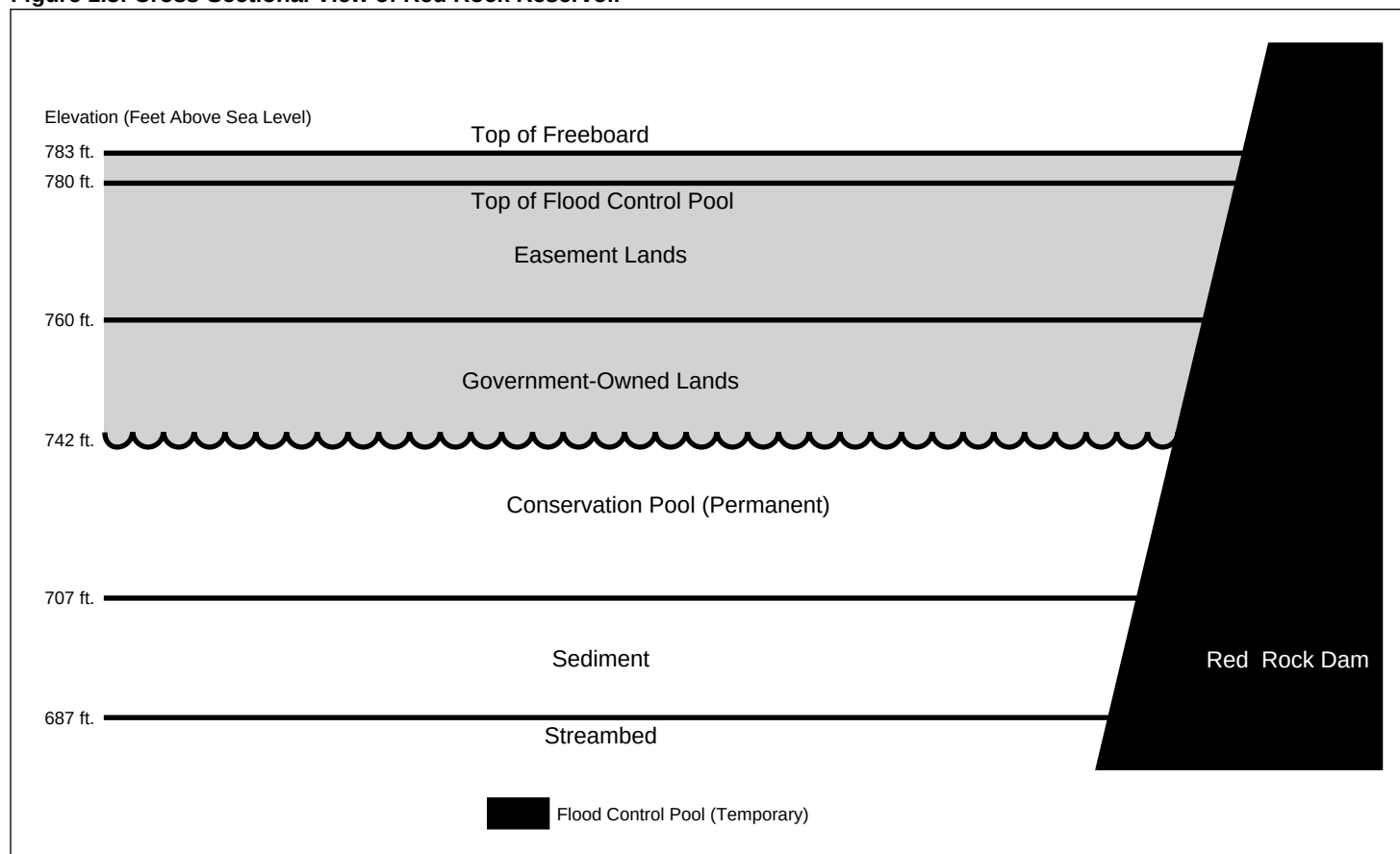
With a standard elevation of 742 feet above sea level, Red Rock Lake is Iowa’s largest lake, with 19,100 surface acres of water. But when heavy rains occur on the lake’s 12,300-square-mile watershed, the lake can triple in size. In 1984, for example, flooding pushed the lake to a height of nearly 780 feet above sea level and expanded the lake’s surface area to 65,400 acres.

Rises in the conservation pool² were anticipated in the original project design to maintain a constant water storage level as sedimentation occurred. The Red Rock conservation pool, which was 725 feet above sea level in 1969, was raised to 728 feet in 1976, 734 feet in 1988, and 742 feet in 1992. In addition, the maximum releases from the Saylorville project upstream from Red Rock were increased in 1979. With each rise of the conservation pool or other change, the Corps changed the dam’s water release rates or the dates of release in order to mitigate flooding from the reservoir. The Corps has stated that none of these changes have increased the flood frequencies projected for any of the easement lands. Figure 1.3 represents a cross-sectional view of the Red Rock reservoir.

¹Freeboard is the elevation between the top of flood storage and the top elevation acquired—usually 3 to 5 feet—that protects against wave wash, saturation, and the like.

²The conservation pool is that reservoir storage, other than flood control storage, that stores water for future use such as water supply, recreation, navigation, and minimum releases to maintain in-stream flows.

Figure 1.3: Cross-Sectional View of Red Rock Reservoir



Source: GAO's drawing based on Corps of Engineers' data.

Objectives, Scope, and Methodology

Section 343 of the Water Resources Development Act of 1992 directed us to (1) determine whether the property within the Red Rock reservoir's boundary has been inundated beyond the levels permitted by the easements, (2) recommend whether compensation for the easements should be renegotiated with the landowners, and (3) review the actions taken to implement section 108(b) of Public Law 99-190, which authorized the Corps to purchase lands with easements from those landowners who are willing to sell.

We conducted our work primarily at the Corps' Washington, D.C., headquarters; at the Corps' district office in Rock Island, Illinois; and in the area surrounding the Red Rock Dam and Lake project near Des

Moines, Iowa. At these locations, we interviewed Corps officials; representatives of the Red Rock Easement Landowners' Association and the association's consultant; a representative from the Iowa Farm Bureau Federation in Des Moines, Iowa; and others knowledgeable about the flooding of easement lands at Red Rock.

To determine whether the landowners' properties have been inundated beyond the levels permitted by the easements, we collected and analyzed the Corps' and landowners' documents on the estimated and actual flooding frequencies, the original land acquisition processes and practices, and the Red Rock project's design and operations. To provide a perspective on whether the number of floods occurring over the past 25 years was consistent with the Corps' estimated long-term flood rates, we used the binominal probability distribution.³ We researched the relevant federal policies in effect both during and after the easement acquisitions, and we reviewed examples of the easements signed by the landowners. We discussed flood damage with the representatives of the landowners' association, a representative from the Iowa Farm Bureau Federation, and a professor of economics at Iowa State University. We calculated the approximate gross revenue loss in crop production for the easement lands within the Red Rock reservoir and converted these amounts into their present value at the time of acquisition, tested the sensitivity of our results to the choice of an interest rate, and considered other variables. We also observed and photographed easement lands from the air and the ground, both during and after the 1993 flooding.

To determine whether compensation for easements should be renegotiated with the landowners, we interviewed the representatives of the landowners' association, the Iowa Farm Bureau Federation's representative, and Corps officials in the Rock Island District Office and in the Washington, D.C., headquarters office. We also reviewed relevant law and court decisions.

To review the actions taken by the Corps to implement the current buyout program, we interviewed representatives of the landowners' association; Corps officials in Rock Island and Washington, D.C.; and the Iowa Farm Bureau Federation's representative. We also reviewed documents supplied by the Corps and the landowners' association pertaining to program authorization, funding, and activities.

³The binomial probability distribution determines the probability of observing as many floods as occurred in the past 25 years, given the Corps' flooding probabilities.

We conducted our review between June 1993 and July 1994, in accordance with generally accepted government auditing standards. We did not determine whether the Corps operated the reservoir in accordance with its operating plan, since it was beyond the scope of this assignment.

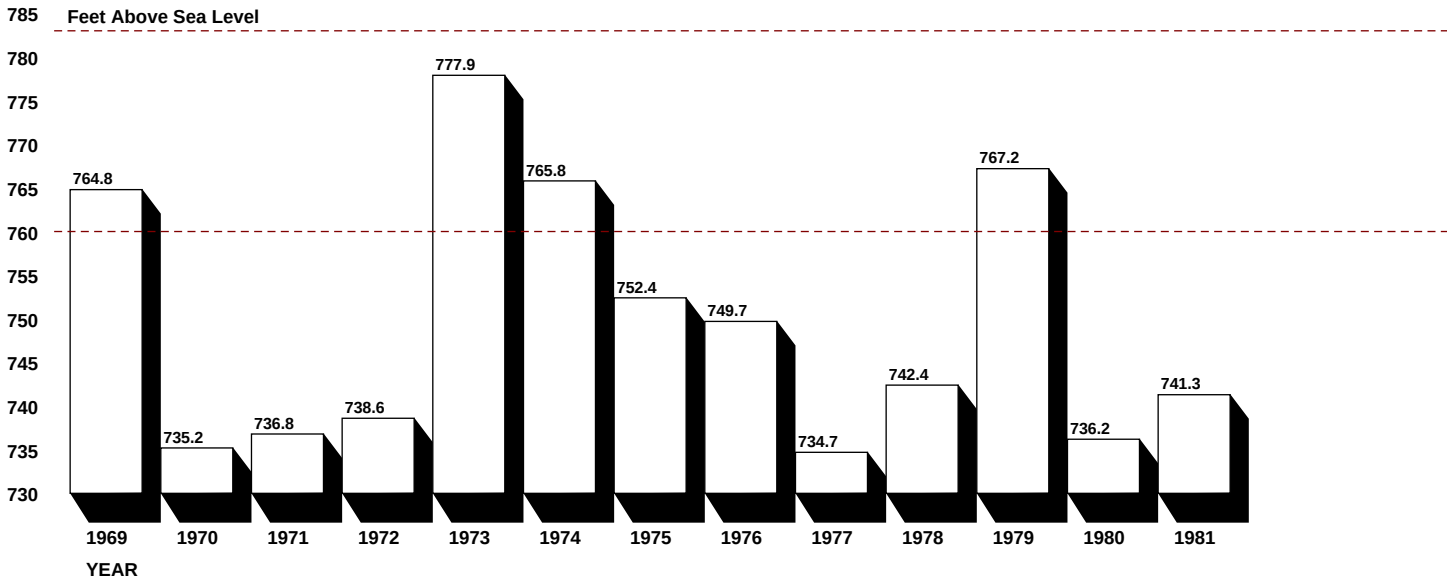
Flood Frequency and Compensation Issues at Red Rock Reservoir

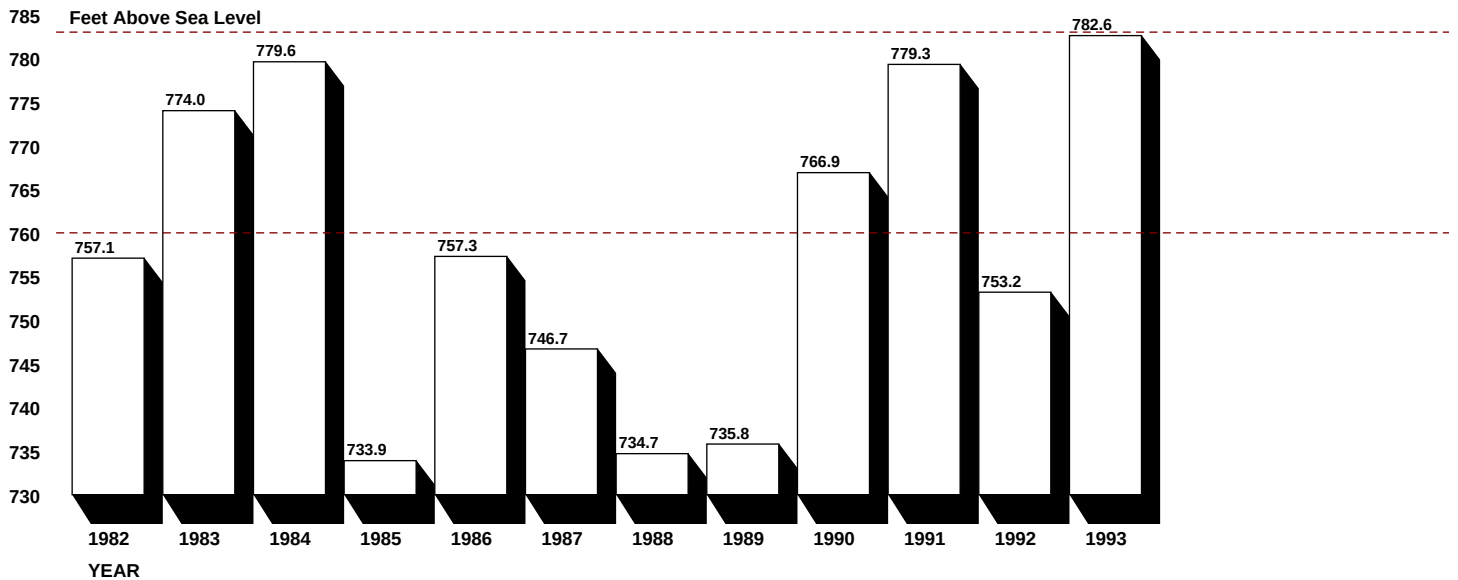
Since the Red Rock project began operating in 1969, flooding has occurred on easement lands, depending on elevation, at about two to four times the frequency estimated by the Corps. According to representatives of the Red Rock Easement Landowners' Association, the greater-than-expected frequency of flooding has caused crop losses and damage beyond those on which the easement compensation was based. On the other hand, the Corps believes that even though flooding has occurred more frequently than estimated over the past 25 years, the original flooding estimates and the original compensation will prove to be valid over the long term. Nonetheless, with the flooding that has already occurred, the present value of crop production and other losses that easement landowners have suffered may have already exceeded the easement payments they received. The easement documents do not provide for renegotiating easement compensation. These and other factors make the question of additional compensation for the landowners a difficult one to resolve. There is no clear-cut answer on whether or not easement landowners should receive additional compensation.

Flooding Has Occurred More Frequently Than Expected

On the basis of 45 years of streamflow data and the plan of operation for the dam, the Corps estimated in 1961 that over the long term (for example, over a 100-year period), easement lands would flood, on average, once every 5 to 45 years, depending on elevation. That is, land at 760 feet above sea level would be flooded, on average, once every 5 years, while land at 780 feet above sea level would be flooded, on average, once every 45 years. As shown in figure 2.1, flooding has occurred on part of the easement lands in 9 of the last 25 years.

Figure 2.1: Frequency of Flooding and Maximum Elevation Reached by Water at Red Rock Dam and Lake Project, 1969-93



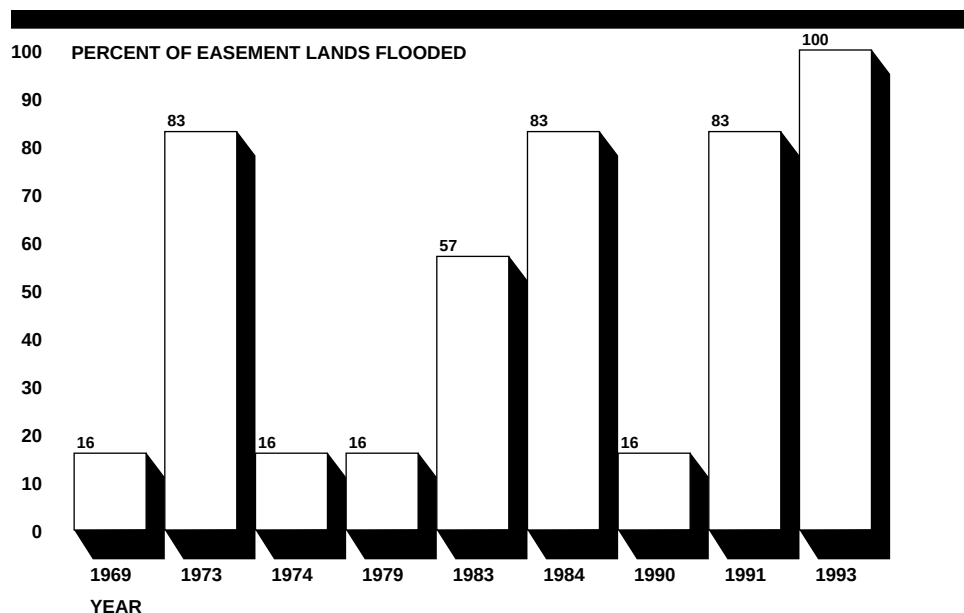


Source: Corps of Engineers.

The elevation of the easement lands ranges from 760 to 783 feet above sea level; therefore, the percentage of acreage damaged depends on the elevation attained by each flood. Only the flood of 1993 reached an elevation of almost 783 feet, flooding 100 percent of the easement lands; three others (in 1973, 1984, and 1991) attained an elevation of almost 780 feet. Conversely, four floods (in 1969, 1974, 1979, and 1990) reached about 765 feet—5 feet above the elevation at which flooding of easement lands begins.

Figure 2.2 shows the percentage of easement lands inundated by flooding during each of the 9 years.

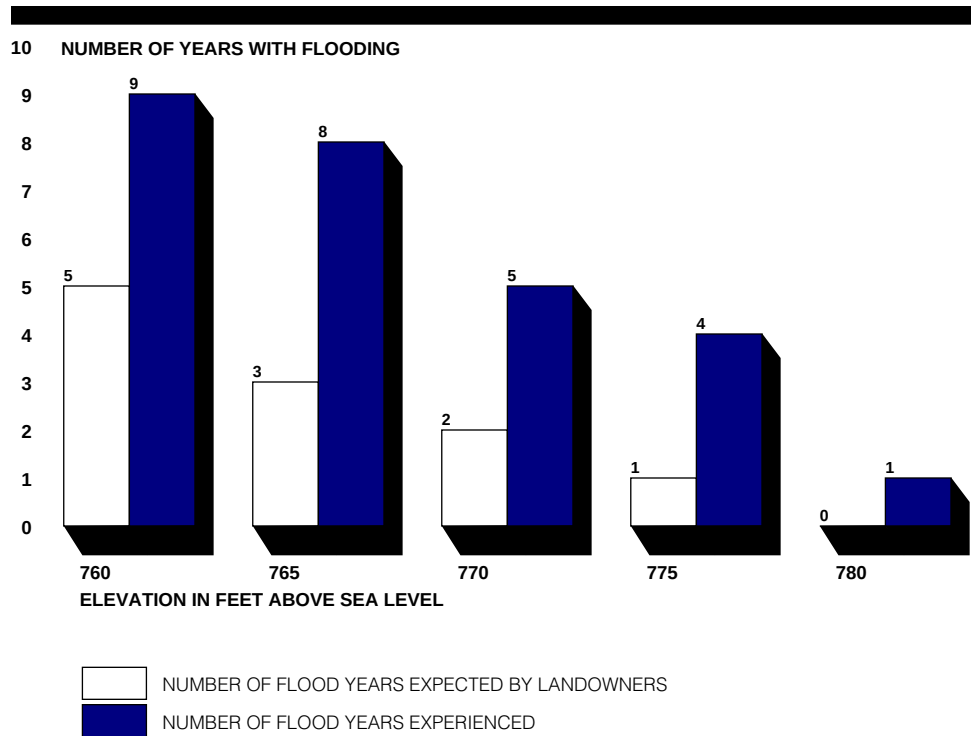
Figure 2.2: Percent of Easement Lands
Flooded, Per Flood Year, 1969-93



Source: Corps of Engineers.

Depending on elevation, flooding has occurred about two to four times more frequently than the landowners expected on the basis of the Corps' estimates. Figure 2.3 compares the number of flood years expected by landowners, given the elevation of their easement lands, to the number of flood years experienced since the completion of the project in 1969.

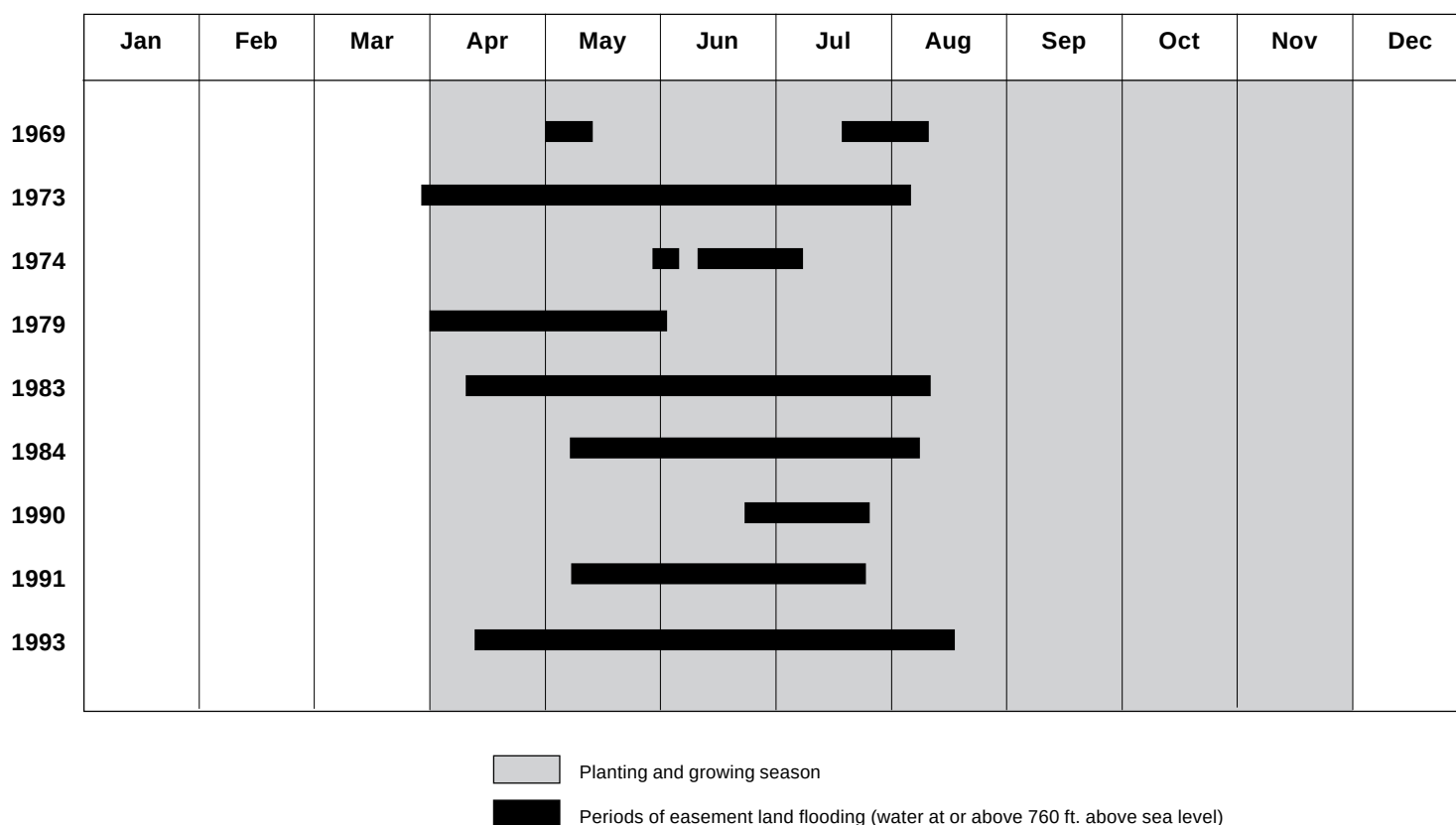
Figure 2.3: Number of Flood Years Expected by Landowners Versus Number of Flood Years Experienced, at Various Easement Elevations, 1969-93



Source: Interviews with landowners' association representatives and Corps of Engineers' data.

The duration of the flooding for the 9 years varied from year to year. However, the overall period during which the flooding occurred was about the same: April through August, which is about half of the planting and growing season. Figure 2.4 shows the duration and timing of flooding at the Red Rock Dam and Lake project for the nine flood events.

Figure 2.4: Duration and Timing of the Flooding in Nine Years at Red Rock Reservoir



Source: GAO chart based on Corps of Engineers' data.

Crop Losses From Flooding Were Greater Than Expected

To date, flooding has caused the landowners to suffer higher crop losses than they expected on the basis of the Corps' original flooding estimates. Depending on the interest rate used for discounting, the crop losses likely have been greater than the compensation the landowners received, even when the losses are converted to their present value at the time of the acquisition period. While the majority of the cost incurred by the landowners stemmed from crop damage or loss, flooding also caused damage to the easement lands that is harder to quantify.

A recent economic analysis of Red Rock, conducted at Iowa State University, found that a severe flood in even a single year can cause heavy

financial losses.¹ Our analysis of data on Iowa crop production and pricing showed that the flooding events on easement lands may have resulted in a gross revenue loss for crop production of up to \$31.4 million, including \$7.9 million in 1993 alone.² To develop the gross revenue loss for crop production for each flood year, we multiplied the portions of the easement land planted in corn and soybeans by the number of acres flooded in the particular year, by the yield per acre, and by the price per bushel. To make these figures comparable to the \$5.5 million paid for the easements at Red Rock, we converted the loss from each of the nine flood years into its 1963 present value, which is the middle of the 1959-67 acquisition period.³ We used the 1963 midpoint because the year-by-year amounts that were paid for easements were not readily available.

To calculate the 1963 present value of each crop loss, we selected the interest rate on 1-year Treasury securities for each year from 1963 to the year the loss was incurred to discount the nominal loss. Because the choice of interest rate is somewhat arbitrary, we tested the sensitivity of our results to our choice of interest rate by calculating present value using rates 1 and 2 percentage points higher. Using the 1-year rate, we calculated a 1963 present value for the \$31.4 million gross crop loss at about \$7.8 million, or up to \$2.3 million higher than the \$5.5 million paid for all of the easements. With interest rates 1 and 2 percentage points higher, we calculated 1963 present values of \$6.6 and \$5.7 million, respectively.⁴ The net losses for each flood year were probably lower. The exact amount depends on the timing of the flooding, the extent to which farmers may have avoided planting and harvesting costs, and on whether a second crop was successfully planted and harvested. A number of factors in addition to crop losses were considered in determining the original compensation for the easements, but they are not readily estimated with available data. These include the floods' effect on the land: fence damage, soil erosion and depletion, drainage damage, debris requiring cleanup, sand and silt deposition, and other factors.

¹Daniel Otto, Ph.D., "Community Impacts of Lost Acres in Red Rock Easement Area," Department of Economics, Iowa State University, Ames, Iowa.

²This estimate is based on the average expected yield per acre and average price per bushel for corn and soybeans in Iowa, 1969 through 1993, for the portion of easement lands being cultivated, according to data from Iowa State University.

³Present values must be used because the losses occurred over a long period, while the payments for easements were made before the beginning of the period. In order to make these amounts comparable by accounting for the effects of inflation and the time value of money, we converted them to their present value for the same year easements were purchased.

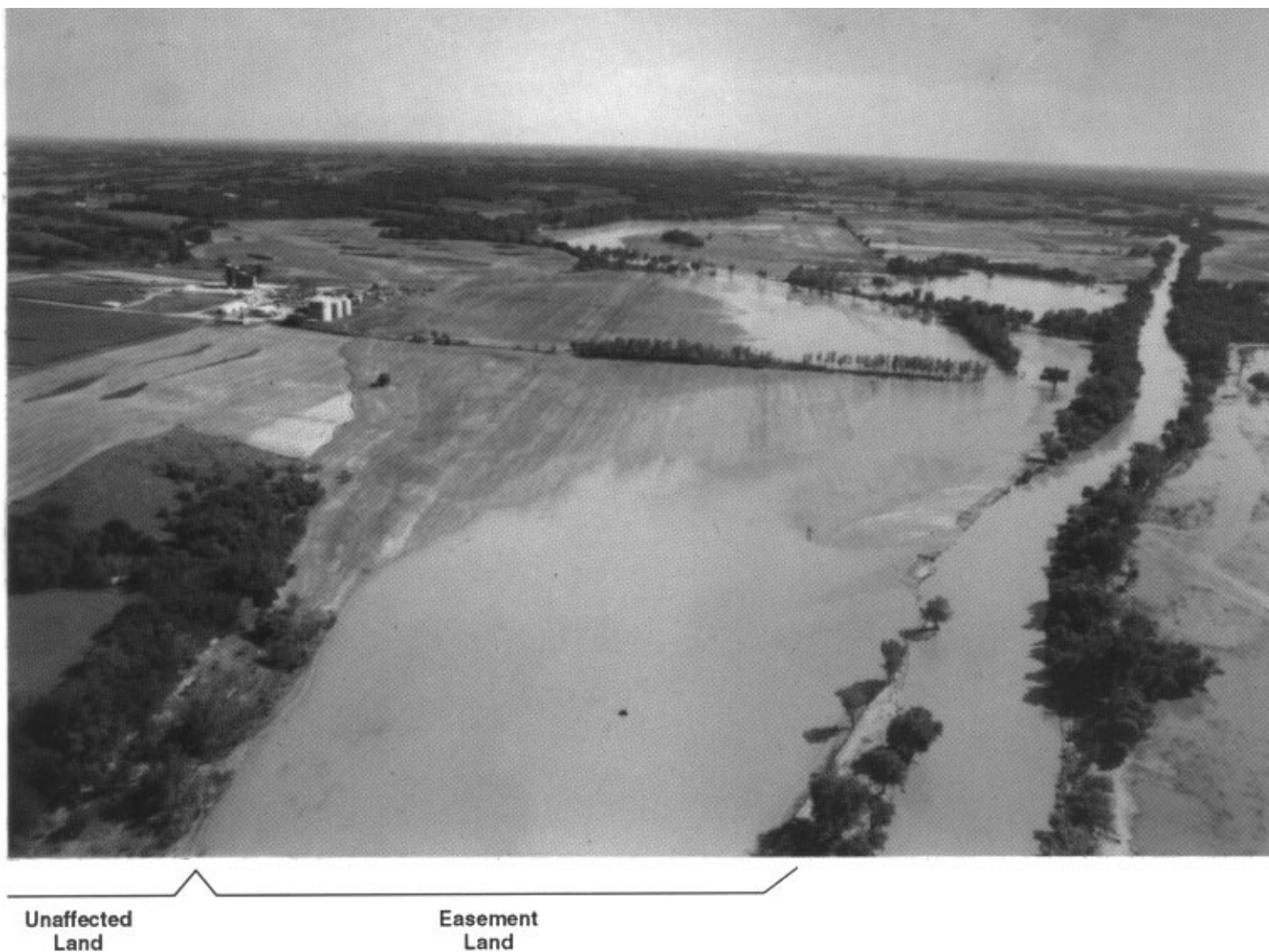
⁴We did not calculate present values using a rate lower than the rate on 1-year Treasury securities because the present value of the crop losses already exceeded the easement payments with that interest rate and a lower rate would only make this difference greater.

The landowners' association representatives said that financial losses are particularly hard to bear when flooding occurs in consecutive years, or in 3 out of 4 years, as has happened since 1990. Figure 2.5 is a photograph of flooding on a portion of easement land in July 1993. Figure 2.6 is an aerial photograph of a farm in the Red Rock reservoir area, which was taken in August 1993 shortly after high water covered all of the easement land.

Figure 2.5: Easement Lands Within the Red Rock Reservoir Boundary Inundated by Flood Waters in July 1993



Figure 2.6: Aerial View of Easement Lands Within the Red Rock Reservoir After the 1993 Flooding



The landowners' association representatives told us that landowners with easements have not collected any compensation from insurance because the insurance available to cover them for losses caused by events such as hail, drought, pests, and natural downstream flooding on easement lands specifically excludes losses caused by backwater flooding from the

reservoir. Backwater flooding is water turned back in its course by an obstruction, an opposing current, or the tide. The Red Rock Dam obstructs the water naturally flowing across the land. While a natural flood generally lasts for only a day or two and may not destroy mature crops, the backwater flooding from the reservoir usually remains on at least part of the land for weeks or even months, leaching nutrients from the soil and killing even the hardest crops.

Corps officials acknowledged that water from natural floods usually does not remain on the land as long as that from backwater floods. However, they said, a natural flood can have several “peaks,” or periods of high water, in a given year. Under such circumstances, farmers may plant a new crop after a peak subsides and could thus lose more than one crop a year. On the other hand, because a backwater flood does not exhibit the multiple-peak characteristic of natural floods, a backwater flood does not generally result in more than one lost crop.

The landowners’ association representatives also told us that landowners with easements have not received disaster assistance for crop losses or land damage caused by backwater flooding from the reservoir. Some easement owners did, however, receive an indirect benefit from the Federal Emergency Management Agency, which provided \$1.1 million for the repair of a flood-damaged levee owned by Drainage District No. 9 in Polk County, Iowa. The levee is primarily designed to protect a highway and utility lines, but it does protect some easement land as well, according to a drainage district trustee.

Compensation for Easements Was Based on Estimated Flooding Frequencies and Other Factors

Between 1959 and 1967, the Corps paid a total of \$5.5 million for easements on 29,000 acres of land, or about \$190 per acre, most of which was farmland. The price the Corps paid the landowners for the easements was based on the fair market value of the land, which considered anticipated flooding frequencies,⁵ which in turn varied with the land’s elevation. As discussed earlier, the lower the average elevation of a tract of land, the higher the likelihood of flooding and thus the higher the easement payment to landowners as a percentage of total value. Corps officials said that the best measure of compensation for a partial acquisition such as occasional easements is to determine the difference between the value of the whole parcel before the imposition of the easement and the value of the remainder after the easement is in place.

⁵Flooding frequencies, while calculated on the basis of 45 years of data, represent long-term projections of the flooding expected and are not calculated for any specific time period.

The Corps' Rock Island District provided each of its appraisers with data sheets reflecting the expected flooding frequency at each easement elevation. In addition to the anticipated frequency of flooding, the appraisers considered other factors in determining the fair market value of the land with the easements in place. These included the anticipated

- effect of flooding frequency and duration on crop loss and changes in crop rotation;
- expenses incurred due to flooding, such as fence damage, soil erosion, drainage problems, debris cleanup, and sand and silt deposits;
- the value of any buildings or other structures that had to be removed as a condition of the easement;
- difficulties encountered in managing and renting out easement lands;
- problems in accessing noneasement property during high water;
- lack of clear title to the property resulting from the easement; and
- change in "highest and best use."

All of these factors were considered as they applied to each individual property. Each property was different in location, access, and elevation, and each was subject to a different anticipated frequency and duration of flooding. As a result, the appraised value of, and the price offered for, each property varied.

The easements give the Corps the right to flood the lands "occasionally," without otherwise specifying a permitted flooding frequency, elevation, duration, or timing.

The Corps Believes That Its Original Flooding Estimates Are Still Valid

In 1991, because of dissatisfaction with the Corps' explanations for the increased flooding, the landowners' association commissioned a private consultant to study the flooding at Red Rock.⁶ The consultant reviewed the operations of the dam and challenged the Corps' original flooding frequency estimates.

In 1992, the landowners' association representatives met with the Assistant Secretary of the Army for Civil Works to discuss the study's results and their concerns. The Assistant Secretary directed the Corps to review and evaluate the procedures it used in calculating flood frequencies and to report on the merit of the landowners association's concerns. On the basis of actual streamflow records from 1921 through 1991, the Corps

⁶Preliminary Study: Flooding of Red Rock Dam Easement Property, Separation Systems Consultant, Inc. (Houston, Texas: Nov. 29, 1991).

found no increase in the likelihood of flooding on easement lands from that estimated for the purpose of acquiring the easements. Consequently, the Assistant Secretary notified the landowners' association that landowners had already been fairly compensated for the easements.

To provide a perspective on whether the number of floods observed over the past 25 years was consistent with the Corps' estimated long-term flood rates, we used a statistical distribution.⁷ We determined, for various easement elevations, the probability that as many floods occurred as did occur, given the Corps' long-term flooding frequency estimates. For example, at the 760-foot easement elevation, flooding occurred in 9 of the last 25 years (or 36 percent), while the Corps estimated that the long-term chance of flooding is 20 percent. We calculated that there was less than a 5-percent chance of the Corps' estimate of flooding being correct at 760 feet. The calculations for each elevation are shown in table 2.1.

Table 2.1: Probability, by Easement Elevation, of the Corps' Flooding-Frequency Estimates Being Correct

Easement elevation (feet above sea level)	Corps' estimated flooding probability	Proportion of last 25 years with actual flooding	Probability of actual flooding given the Corps' estimated flooding probability (a)
760	.2000	.36	4.68 percent
765	.1315	.32	1.21 percent
770	.0833	.20	5.22 percent
775	.0465	.16	2.70 percent
780	.0222	.04	42.95 percent

^aThis assumes that the probability of flooding in each of the past 25 years equalled the Corps' estimate.

As shown in table 2.1, the probability of the high number of actual floods occurring in the last 25 years was about 5 percent or less in four of the five easement elevations. However, there is no way of knowing in advance whether or not the Corps' estimates will prove to be true. The possibility exists that the last 25 years may have had an unusually high frequency of flooding, as the Corps claims, and that over a longer period, the flooding patterns observed will confirm the accuracy of the Corps' estimates.

⁷We used a binomial probability distribution, which is defined in footnote 3 in chapter 1.

Landowners and the Corps Disagree on Whether Additional Compensation Is Due

The landowners' association representatives believe that the landowners' original compensation was insufficient, given the substantial damage and losses they have sustained as a result of more frequent flooding. Although Corps officials acknowledge that easement lands have been damaged by flooding, they still believe that the original easement payments fairly compensated the landowners for the occasional flooding of their lands.

Landowners Believe They Deserve Additional Compensation

Although representatives of the landowners' association state that they do not expect reimbursement for every dollar they have lost, they believe that the price the Corps paid them for the easements was unfair because the frequency of flooding has exceeded the Corps' estimates. The landowners' association representatives told us that the landowners understood the Corps' estimates to mean that flooding would occur no more often than once every 5 years at 760 feet above sea level, and even less frequently at higher elevations.

The landowners' association has suggested a remedy under which each landowner would choose one of the following two actions: (1) renegotiate with the Corps for additional compensation for the existing easements, on the basis of the actual incidence of flooding since 1969, or (2) have the Corps purchase the easement lands, basing the purchase price on the lands' fair market value at the time the easements were acquired, minus the amount paid for the easements, adjusted by 8 percent annually for inflation.

To illustrate the effect of the formula in the second option, we used a November 1966 appraisal for an individual case. In this case, easements were purchased on 536 acres for \$128,350, or an average of \$239 per acre excluding payments for buildings and other structures. Given that the average value of an acre of unencumbered land in the Red Rock area was then \$294, minus the average payment for easements of \$239 per acre, the remaining value averaged \$55 per acre in 1966. If the remaining value of \$55 was compounded annually for 26 years at 8 percent, it would amount to a payment of \$407 per acre in 1992. While this calculation shows the application of the landowners' formula in a specific case, it cannot be used to indicate the results for easement land in general.

The average 1992 fair market value for land in the Red Rock area unaffected by flooding and unencumbered by flowage easements was \$1,193. The Corps has paid an average of \$549⁸ per acre for flood-damaged,

⁸GAO calculated this average using the Corps' November 1993 data.

easement-encumbered land. On the basis of the calculation using the landowners' formula in the example above, the landowner would receive about one-third of the 1992 current fair market value of land unaffected by flooding and unencumbered by easements, or about three-quarters of the current fair market value of easement-encumbered, flood-damaged land.

**Corps Does Not Believe
That Additional
Compensation Is
Warranted**

Corps officials stated that the landowners are not entitled to additional compensation for the existing easements or to purchase prices greater than the current fair market value for flood-damaged easement land. Furthermore, they stated that while flooding has occurred more frequently than estimated, the increased incidence of flooding resulted from higher-than-average precipitation since the dam was completed, not from faulty Corps estimates or from project operations. To support the higher-than-average precipitation, Rock Island district officials provided precipitation data from the Corps' records. These data showed that the annual average precipitation during the 25-year period from 1969 through 1993 was 12 percent higher than normal. At the time the easements were acquired, according to the district's real estate chief who was an appraiser on the Red Rock project, the Corps' appraisers and negotiators were careful to explain to landowners that the flooding estimates were projections based on historical streamflow data, not guarantees of future flooding frequencies.

The Corps' position is further articulated in the response to the landowners' association proposal by the Acting Assistant Secretary of the Army for Civil Works. In a February 14, 1994, letter to Senator Charles Grassley, the Assistant Secretary confirmed the district office's position on additional compensation and fair market value purchase price. The Corps believes it is within its rights in flooding easement lands, even at increased frequencies, with no additional compensation to landowners.

The easements signed by Red Rock landowners give the Corps the right to flood the lands "occasionally." The easements did not specify a permitted flooding frequency, elevation, duration, or timing. While the Corps does not have a formal definition of occasional flooding, the Corps stated in its comments that it will defer to the factors courts have used to define occasional easements—projected frequencies, extent, and duration of flooding.

The meaning of “occasional flooding” was considered in Hendricks v. United States,⁹ in which landowners upstream from the Harry S. Truman Dam and Reservoir in Missouri filed suit for a taking without just compensation against the Corps, which had occasional easements on the land, because of increased flooding of their lands. In a preliminary ruling, the court determined that the term “occasionally” is inherently ambiguous and decided therefore that there were issues of fact to be resolved by a trial. These issues included the extent to which the plaintiffs’ property was taken and whether the government operated the dam improperly.

After the trial in the Hendricks case,¹⁰ the court concluded that the flooding “was within the ‘occasional’ limits of the flowage easements as purchased using the information shown in the defendant’s [Corps’] frequency and duration table.” In dismissing the landowners’ claim for additional compensation, the court indicated that the most significant factor causing the flooding was 6 years of high precipitation.

Even though every case is decided by the court on its own facts, the issues at Red Rock are similar to those in the Hendricks case. On the basis of that case, the Red Rock landowners would have to prove that dam operations rather than heavy precipitation were the most significant factor in the increased flooding.

The landowners’ association representatives told us in June 1994 that the Corps probably operates within its operating plan, but these parameters are so broad that they are often exercised to the detriment of the easement owners. In 1991, the association commissioned an analysis on the flooding of the Red Rock easement property. The consultant’s 1991 report concluded that the excessive flooding of easement lands since 1969 was not the result of chance or unusual weather conditions. The consultant’s preliminary models showed that if the conservation pool is raised and the dam is operated according to the Corps’ operating plan, then flooding will increase from current actual levels—both in the number of years flooded and in the duration of inundation. The consultant’s report stated that the Corps’ operating procedures have remained basically the same since the reservoir was built, even though flooding frequencies for easement lands grossly exceeded projections. The consultant concluded that the easement lands are expected to continue to be flooded at the same or greater frequencies experienced in previous years unless operating procedures are

⁹10 Cl.Ct. 703 (1986).

¹⁰14 Cl.Ct. 143 (1987).

changed significantly; current procedures have provided inadequate control of pool height.

The analysis of the consultant's report by the Corps' Rock Island District noted that the approved regulation plan was precisely followed during flood events. The plan provided for somewhat higher releases (22,000 versus 18,000 cubic feet of water per second) during summer operation when the pool was above the flowage easement level of 760 feet. When the pool's elevation exceeded 775 feet, the outflows were gradually increased in accordance with the emergency operation schedule to prevent overtopping of the dam.

The Corps also stated that some changes in the outflow constraints have been incorporated in the plan for the 742-foot pool; these changes will mitigate the adverse effects on easement lands by raising the pool. The net effect of these changes is that the easement lands lying above 760 feet are not adversely affected by the new operating level.

The Corps also challenged the consultant's assumption that the flooding of easement lands was caused by operational errors because total annual rainfall was not greatly above normal. The Corps noted that the floods were the result of snowmelt runoff and runoff from uncontrolled areas, which required cutbacks in outflow to reduce downstream flooding, and not from improper operation of the reservoir. As an example, the Corps pointed out that the 1983 flood was a result of snowmelt plus rainfall runoff.

Conclusions

The compensation the landowners received over 25 years ago was based in part on the Corps' estimates at that time of the extent to which the lands would be flooded over the long term. These estimates were based on 45 years of historic streamflow data. Clearly, over the last 25 years, the Red Rock reservoir area has received more rainfall than normal, resulting in more flooding than the Corps had estimated on the basis of available hydrologic records. Whether or not this rainfall level and the resulting flooding will continue over the long term is unknown. However, even if no more floods occur, the present value of the estimated net crop production and other losses incurred may have already exceeded the compensation the landowners received.

Under the Hendricks case criteria, in order to receive additional compensation for increased flooding, the landowners must establish that

the Corps' reservoir operations, rather than heavy precipitation or other factors, caused increased flooding beyond the scope of the occasional flowage easements. While the landowners' association and their consultant have asserted that reservoir operations and not heavy precipitation caused the increased flooding, precipitation was heavy in the Red Rock basin during the period, and the Corps said it followed its operating plans.

Whether additional compensation should be provided to the landowners because of the higher-than-estimated flooding is a public policy decision for the Congress. Providing the landowners with additional compensation for the existing easements would ease their concerns with past flooding being more frequent than they had anticipated. However, in the future the landowners could request additional compensation for the losses they incur, should further flooding occur.

Agency and Landowners' Association Comments

The Department of Defense provided comments making technical corrections and clarifications in chapter 2, which we have incorporated where appropriate. The Department also questioned the use of gross loss figures for crop production because they said certain deductions must be made to determine net income. Because detailed data to determine net income were not available, we listed factors that would reduce the gross loss and other factors that could add to it. The Department also provided a definition of "occasional easements," which we have reflected in the text. The Department's comments and our responses are presented fully in appendix I.

The easement landowners' representatives also provided comments. They said they had identified easement contracts providing for additional compensation in certain situations. However, the representatives did not provide us with these contracts. Rather, they provided only court decisions on condemnations. They objected to the conversion of loss figures to present value, which we explained is necessary in order to make these amounts comparable to the easement payments. The landowners' representatives also suggested clarification of the average payments for easements. On the basis of additional data, we have revised our illustration of the landowners' proposal using an actual appraisal rather than average prices per acre. The representatives' comments and our responses are presented fully in appendix II.

The Buyout Program Has Made Slow Progress

Public Law 99-190, section 108(b), enacted December 19, 1985, authorized a buyout program that required the Corps to acquire the easement lands from willing owners whose lands were subjected to periodic flooding in connection with the operation of the Red Rock Dam and Lake project. In 1992, Public Law 102-377 directed the Corps to complete real estate appraisals and to make offers under the 1985 buyout program no later than October 31, 1993.

To carry out the buyout program for the 29,000 acres of easement lands, the Corps developed a real estate acquisition plan to purchase lands from owners willing to sell. The October 31, 1993, deadline was not met because there was not enough time to make offers to all of the willing sellers, given the available funding and the Corps' plan for implementing the buyout. The last phase of the acquisition was not approved by Corps headquarters until December 1992.

As of March 1994, the Corps had purchased 7 percent of the 29,000 easement acres from willing sellers, is negotiating with landowners for another 4 percent, and will soon be making offers to landowners of another 36 percent of the acreage. The landowners holding 10 percent of the easement acres have rejected the Corps' formal offer for their lands. The landowners holding 33 percent of the lands have not responded to the Corps' question of whether they would be willing to sell, and 10 percent have indicated that they are not willing to sell. According to representatives of the Red Rock Easement Landowners' Association, landowners do not want to sell because the Corps' proposed purchase prices for the easement lands are too low and because of access problems.

The Program Is Directed at Willing Sellers

The conference report of December 19, 1985, on Public Law 99-190¹ noted several reasons why the purchase of easement lands from willing sellers would be in the interest of the landowners. First, at the time the original easements were acquired, the landowners were not provided with an opportunity to sell their lands because, under the federal policy then in effect, the Corps was required to purchase easements on lands that would be flooded only occasionally. Second, following the easement acquisitions, flooding had been more frequent than anticipated and had caused great financial losses for some landowners. And third, lands encumbered by easements that permit flooding could otherwise be difficult for the landowners to sell.

¹H.R. Rep. No. 450, 99th Cong., 1st Sess. 364 (1985)

The conference report also noted that in acquiring the remaining ownership interest in the easement lands, the Corps should follow the usual appraisal principles, recognizing the percentage of total fair market value paid for the easements currently owned by the United States. Accordingly, the Corps has based its appraisals of easement lands on the sale of comparable easement-encumbered lands in the area.

Under standard federal real estate acquisition procedures that apply when the Corps' projects are built, if the Corps and a landowner cannot agree upon a purchase price through negotiation, the Corps normally can use condemnation proceedings, in which a federal court decides the amount of just compensation for the lands. In contrast, under the willing-seller provision of Public Law 99-190, if a purchase price agreement cannot be reached, the Corps cannot acquire the lands.

Buyout Program's Funding and Activities

Through March 1994, a total of \$6.75 million has been appropriated for the buyout program. Program funds were first appropriated in 1987 and received by the Rock Island District Office in 1988. Of the \$6.75 million in appropriations, the Corps has provided \$5.2 million to the program in the Rock Island District. Of the \$5.2 million, \$3.4 million had been spent as of April 1994—\$2.3 million on activities in preparation for purchasing the lands and \$1.1 million on land purchases.

The Corps has not established a completion date for the buyout program and has not included the program in its 10-year budget because it believes it has higher priority needs for its funds. Furthermore, the Corps believes that the Congress has not appropriated additional funds since fiscal year 1991 because such funding was not required. To date, landowners holding 53 percent of the easement lands have indicated that they are not interested in selling their lands to the Corps, have rejected the Corps' offer, or have not responded to the Corps as to their willingness to sell.

The Corps' Rock Island District Office began the initial phase of the buyout program by developing and approving in November 1988 a Real Estate Design Memorandum—the technical decision document for real estate acquisitions. Three other design memorandums were subsequently approved, the last in December 1992. To implement each memorandum, the Corps

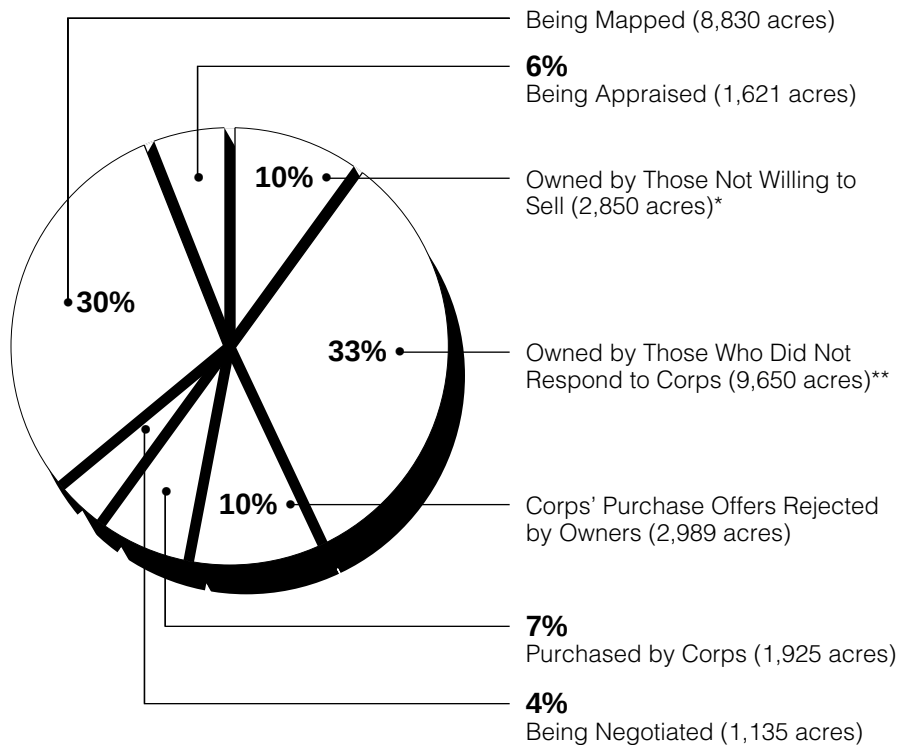
- contracted for aerial survey and mapping;
- compiled a preliminary list of landowners from county courthouses;

- contracted for tract ownership data for all 1,500 tracts of easement lands;
- attempted to contact all owners of record to ascertain their willingness to sell;
- conducted meetings of landowners;
- mapped and prepared legal descriptions for tracts owned by willing sellers;
- verified land titles for willing sellers; and
- conducted appraisals and negotiated purchases.

As shown in figure 3.1, the landowners of 47 percent of the 29,000 easement acres (13,500 acres) had sold their lands or were considering selling. The landowners of 7 percent of the acres sold their lands, and the landowners of 4 percent of the acres were negotiating with the Corps. The Corps was in the process of appraising 6 percent of the acres and mapping another 30 percent of the easement lands in preparation for negotiations with the landowners.

The landowners of the other 53 percent of the easement acres (15,500 acres) told the Corps that they were not interested in selling (10 percent), had rejected the Corps' offer (10 percent), or had not responded to the Corps' letter informing them of their opportunity to sell (33 percent).

Figure 3.1: Status of Red Rock Easement Acreage in the Buyout Program, by Percent and Number, March 1994



*Includes acreage owned by those individuals who, in their responses to the Corps' letter notifying them of the buyout opportunity, informed the Corps that they were not willing to sell.

**Includes acreage owned by those individuals who did not respond within 6 months to the Corps' letter notifying them of the buyout opportunity and asking them if they would be willing to sell.

Source: Corps of Engineers.

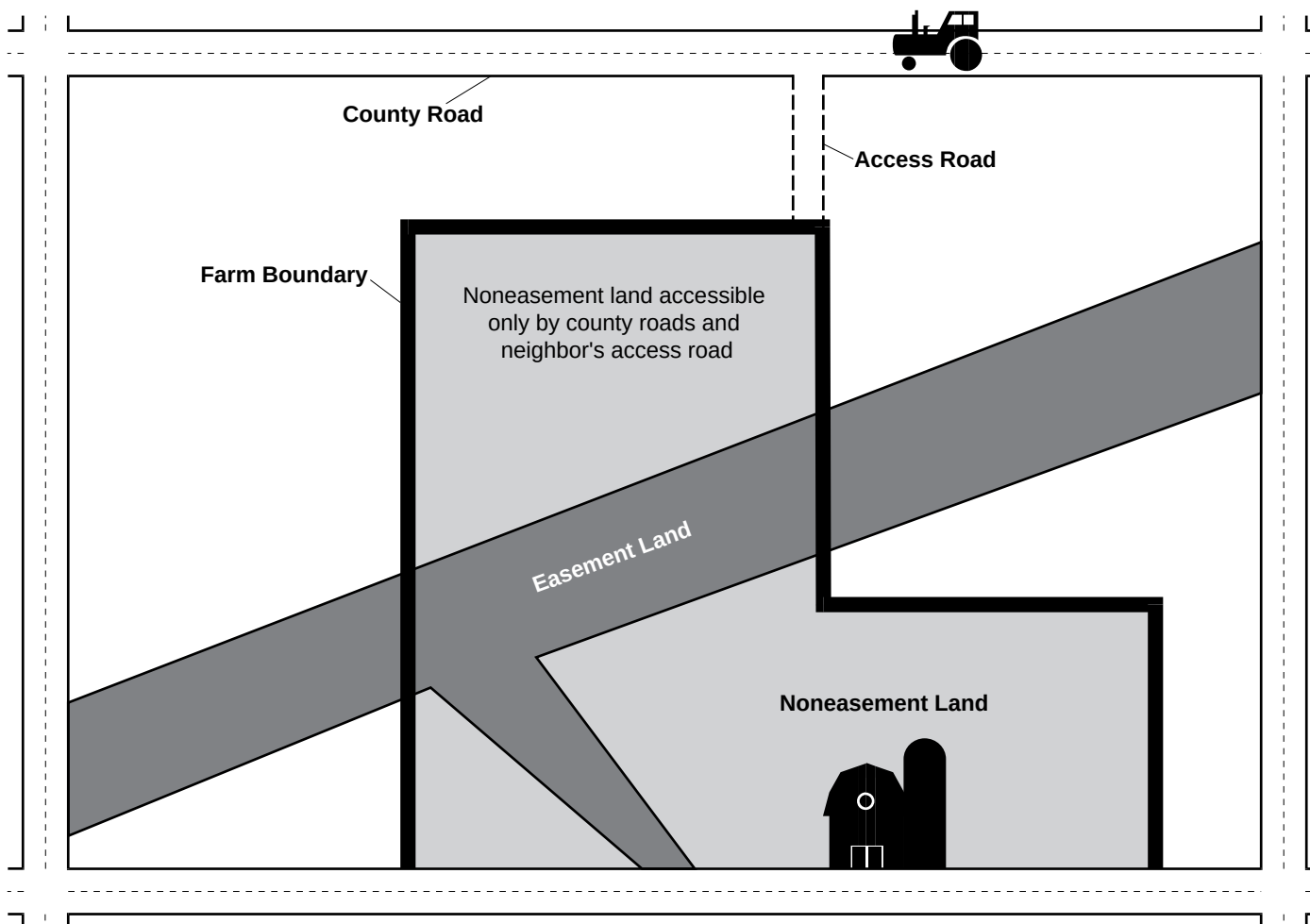
Both the Landowners and the Corps Have Concerns About the Buyout Program

The landowners' association representatives cited two reasons why the owners will not sell their lands. First, the landowners said the Corps is offering low prices for the lands. Because the easement acreage is subject to flooding, as well as encumbered by easements that were originally purchased by the Corps, the fair market value of the lands is only about one-third to one-half the amount the landowners would have to pay to buy the same amount of land outside of the flooding area. Thus, the landowners' representatives said they could buy only about half the number of acres sold to the Corps.

It should be noted that although the landowners currently selling their lands to the Corps are receiving only about half the amount needed to purchase lands outside of the flooding area, the landowners received \$5.5 million when the Corps bought the easements through 1969. The funds were in payment for the fair market value of the lands in consideration of the estimated losses caused by the flooding, for cleanup and flood-related expenses, and for other factors. In calculating the fair market value of the lands for the buyout program, the Corps determines the current value of the lands subject to the existing easement that the Corps purchased when the project was built.

The second reason for the landowners' not wishing to sell their lands, according to the landowners' association representatives, has to do with access difficulties. That is, because easements are generally on only part of a landowner's property, the sale of easement lands can divide the property, making access to the remaining lands difficult. Figure 3.2 shows that if easement acreage crossed a landowner's property, and this easement acreage were sold, then access to the lands beyond it would be possible only indirectly, such as by county roads or across an amenable neighbor's lands.

Figure 3.2: How the Sale of Easement Lands Can Impede Access to Privately Owned Property



Source: GAO's drawing based on data from Red Rock Easement Landowners' Association.

A landowners' association representative told us he estimates that about 67 percent of the landowners would have such difficulties. He said his estimate was based solely on his perception of the situation, not on any empirical data. On the other hand, a Corps district official estimated that only 3 to 5 percent of the landowners would be adversely affected by lack

of access. He said his estimate was based on his best guess at the time. No study has been conducted by the Corps to determine a precise number.

Alternatives to the Buyout Program: Leaseback and Condemnation

A landowners' association representative told us that one way to alleviate the landowners' concerns would be for the Corps to buy the easement lands at a price that would reflect inflation from the time of the original easement acquisition, and then have the Corps lease the lands back to the landowners at or around fair market rental value. The price per acre of easement lands would be calculated using the landowners association's suggested formula.

Additionally, a landowners' association representative told us that the landowners' concerns about access problems and having the ability to continue farming could be reduced if the Corps would grant them permanent crossing rights or a lease to the easement lands they sell. According to the representative, if these changes were made, more landowners might be willing to participate in the buyout program.

In a February 14, 1994, response to Senator Charles Grassley on the landowners' proposal, the Acting Assistant Secretary of the Army for Civil Works rejected most of the proposal but stated that the proposed leaseback of easement lands may be a viable area for further consideration, if the provisions are based on fair market value.

Corps district and headquarters officials also expressed reservations about the buyout program. According to these officials, the government, through the existing easements, has already acquired enough ownership interest in the lands to allow for increased levels of occasional flooding; therefore, additional land acquisition is unnecessary. Additionally, the willing-seller provision creates a patchwork pattern of public and private land ownership, with corresponding access and land management difficulties for both the Corps and the landowners.

Corps district officials told us that although they do not believe that additional land acquisition is necessary for operating the project, they are doing their best to comply with the legislatively mandated buyout program. These officials also told us that a solution to the land management problems created by the program's willing-seller provision would be to purchase all easement lands at their current fair market value, using the Corps' normal real estate acquisition procedures, which would give the Corps the right to take the lands by condemnation. The Corps

estimated in September 1991 that the total cost to buy all the lands would be about \$43.5 million. This includes the fair market value of the easement lands, acquisition expenses, land management, and contingencies.

Conclusions

While only 7 percent of landowners have sold their lands to the Corps, that number may increase significantly in the future after the Corps makes offers to the 40 percent of easement landowners who have indicated an interest in selling. Representatives of the landowners' association said some landowners believe the prices being offered by the Corps for their lands are too low because they cannot buy the same amount of land outside the flooding area, where fair market value has not been affected by flooding or by the encumbrance of easements. The landowners received compensation for the easements on their lands when the Corps purchased them many years ago.

The leaseback arrangement that the landowners' association has suggested might encourage more landowners to sell their lands to the Corps because the owners would be able to stay on their lands and continue farming without access problems to adjacent lands. If the leaseback option was implemented and proved attractive, the Corps may incur more land acquisition costs under the buyout program and any administrative costs created by the leaseback program.

Agency and Landowners' Association Comments

The Department of Defense generally concurred with the information presented in this chapter. The Department provided technical corrections, which were incorporated as appropriate. The easement landowners' representatives said they did not agree with our conclusion that the sale of lands by landowners will increase significantly in the future. We stated that the amount sold may increase significantly above 7 percent after the Corps makes offers to the 40 percent of the landowners who indicated an interest in selling their lands to the Corps.

Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108



REPLY TO
ATTENTION OF

31 OCT 1994

Mr. Keith O. Fultz
Assistant Comptroller General
Resources, Community, and
Economic Development Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Fultz:

This is the Department of Defense (DOD) response to the General Accounting Office (GAO) draft report entitled "WATER RESOURCES: Flooding on Easement Lands Within the Red Rock, Iowa, Reservoir," dated September 19, 1994 (GAO Code 140883), OSD Case 9657. The DOD generally concurs with the report.

Although DOD agrees with most of the information contained in the draft report, DOD does not agree with report implication that the Corps determination of flooding frequency is not accurate. In addition, DOD does not fully agree with the methodology GAO used to determine the value of agricultural losses and the implications that those losses indicate that landowners were not adequately compensated when the existing easements were acquired.

The detailed DOD comments on the GAO draft report findings are provided in the enclosure.

Sincerely,

John H. Zirschky
Acting Assistant Secretary of the Army
(Civil Works)

Enclosure

GAO DRAFT REPORT - DATED SEPTEMBER 19, 1994
(GAO CODE 140883) OSD CASE 9657

"WATER RESOURCES: FLOODING ON EASEMENT LANDS
WITHIN THE RED ROCK, IOWA, RESERVOIR"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

FINDING A: The Red Rock Project. The GAO reported that in reaction to a series of disastrous floods affecting wide areas, the Congress established as a nationwide policy in the Flood Control Act of 1936, that flood control is in the interest of the general public welfare and that the Federal Government would cooperate with the states and local entities to carry out flood control activities. The GAO reported that during the past 59 years, the U.S. Army Corps of Engineers (Corps) has invested over \$23 billion nationwide in flood control projects. The GAO noted that more than 600 projects are now operated by the Corps, which has built reservoirs and thousands of miles of levees, floodwalls, and channel improvements.

The GAO reported that the Red Rock Dam and Lake project was authorized by the Flood Control Act of 1944 (Public Law 78-534), and is an integral unit of the comprehensive plan for reducing flood damage in the Upper Mississippi River Basin. The GAO explained the dam is located on the Des Moines River in south-central Iowa, about 143 miles above the confluence of the Des Moines and Mississippi Rivers, and about 60 miles downstream from the City of Des Moines. The GAO further explained that the Red Rock Dam and Lake project provides flood protection to 36,000 acres of agricultural lands in the Des Moines River Basin.

The GAO reported that land acquisitions at Red Rock took place between 1959 and 1967, under the Joint Army-Interior Land Acquisition Policy--known as the "Eisenhower policy"--which was established in 1953. The GAO explained that under the Eisenhower policy, the Army acquired land up to the 5-year flood frequency line--which is 760 feet at Red Rock--while for land between the 5-year flood frequency line to the maximum reservoir flood control pool line plus freeboard (783 feet), easements were acquired. The GAO reported that the Red Rock Dam and Lake project was then constructed at a Federal cost of nearly \$89 million. (pp. 2-3, pp. 10-15/GAO Draft Report)

DOD RESPONSE: Concur. The DoD separately provided several technical corrections for the purpose of emphasizing the

Second p. ref. now on pp.
10-14.

See comment 1.

distinctions between fee acquisition, permanent easement, and occasional easement.

FINDING B: Flooding Has Occurred More Frequently Than Expected.
The GAO reported that on the basis of 45 years of streamflow data and the plan of operation for the dam, the Corps estimated in the 1950s that, over the long term, easement lands at 760 feet above sea level would flood on average once every 5 years, while land at 783 feet above sea level would flood on average once every 45 years. The GAO noted that the Corps paid the landowners about \$5.6 million for the occasional easements within the reservoir's boundary that are located at elevations of 760 feet and higher, based on these estimates average flooding frequencies, and factors such as crop losses, fence damage, soil erosion, and expenses for cleaning up debris.

The GAO reported that flooding has occurred on part of the easement lands in 9 of the last 25 years through 1993, and Corps records indicated that the average annual precipitation was 12 percent higher than normal during that period. The GAO observed that the frequency of flooding that has occurred at four of the five elevations it reviewed seems to be unusually high, given the estimates made by the Corps.

The GAO found that the flooding has caused the landowners to suffer higher crop losses than originally expected, based on the original Corps flooding estimates--perhaps as much as \$31.4 million through 1993. In addition, the GAO reported that landowner association officials also cited losses due to (1) degraded soil, requiring nutrient replenishment; (2) damaged fences and drainage systems; and (3) deposited debris that had to be cleared. The GAO reported that, according to landowners association representatives, landowners with easements have not collected any compensation from insurance because the available insurance specifically excludes losses due to backwater flooding from the reservoir. The GAO concluded that, although the exact amounts may be uncertain, the original Corps appraisals of the impact of future flooding may have been underestimated. (pp. 4-5, pp. 18-27. p. 36/GAO Draft report)

DOD RESPONSE: Concur. The Department agrees that there has been above average rainfall in the area during the period since the Red Rock Reservoir became operational. However, it should be recognized that the flooding frequency analysis performed by the Rock Island District was based on a 75 year period of record from 1917 to 1991, not a 45 year period.

First p. ref. now on p. 4.
Second p. ref. now on pp.
17-26. Third p. ref. now on
pp. 38-39.

See comment 2.

FINDING C: Compensation for Easements Was Based on Estimated Flooding Frequencies and Other Factors. The GAO found that the \$5.6 million price the Corps paid the landowners for the easements was based on the fair market value, considering anticipated flooding frequencies, which in turn varied with the land's elevation. The GAO found that in addition to the expected flooding frequency at each easement elevation, the Corps appraisers considered other factors in determining fair market value, such as the anticipated:

- effect of flooding frequency and duration on crop loss and changes in crop rotation;
- expenses incurred due to flooding, such as fence damage, soil erosion, drainage problems, debris cleanup, and sand and silt deposits;
- difficulties encountered in managing and renting out easement lands;
- problems in accessing non-easement property during high water;
- lack of clear title to the property resulting from the easement; and
- change in "highest and best use."

The GAO pointed out that the factors were considered as they applied to each individual property in determining the appraised value.

The GAO reported that in 1991, a consultant commissioned by the landowners association reviewed the operations of the dam and challenged the original Corps flooding frequency estimates. The GAO reported that the Corps then reviewed the basis it used for the original estimates and found no increase in the likelihood of flooding on easement lands from that used in acquiring the original easements.

To provide a perspective on whether the number of floods observed over the past 25 years was consistent with the Corps estimates, the GAO reported it used a statistical distribution to determine flood probabilities. The GAO determined that the probability of the high number of actual floods occurring in the last 25 years was about 5 percent or less in four of the five elevation easements. The GAO observed that there is no way of knowing whether or not the Corps estimates will prove to be true in the long run, but acknowledged that the possibility exists that last 25 years may have had an unusually high frequency of flooding, as

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First p. ref. now on p.4.
Second p. ref. now on pp.
26-28.

See comment 3.

the Corps claims, and that over a longer period flooding patterns observed will confirm the accuracy of the Corps estimates.
(p. 5, pp. 27-31/GAO Draft Report)

DOD RESPONSE: Concur. When discussing the appraisal process, it should be understood that the valuation of easements includes consideration of the use, utility, rights, and value of the remainder or residual property. Federal courts have long held that the appropriate measure of compensation in a partial acquisition case is the difference between the value of the whole parcel before the acquisition (imposition of the easement) and the value of the remainder after the acquisition (imposition of the easement). Adherence to the process permits the proper consideration of benefits or severance damages.

FINDING D: Landowners and the Corps Disagree on Whether Additional Compensation Is Due. The GAO reported that the landowners' association representative believe that the original compensation provided to the landowners was insufficient, given the substantial damage and losses they have sustained as a result of the increased flooding. According to the GAO, the landowners association representatives explained that the landowners understood that the Corps estimates meant that flooding would occur no more often than once every 5 years at 760 feet above sea level, and even less frequently at higher elevations. The GAO noted that the landowners association has suggested a remedy whereby the landowner would choose one of two options--either renegotiate additional compensation with each landowner on the basis of actual flooding since 1969, or purchase the land for an amount that would effectively double the fair market price being offered under the buyout program.

The GAO reported that Corps officials stated that the landowners are not entitled to additional compensation for existing easements or to purchase prices greater than the current fair market value for flood-damaged easement land. The GAO reported that the Corps officials further stated that while flooding has occurred more frequently than estimated, the increased incidence of flooding resulted from higher than average precipitation since the dam was completed, not from faulty Corps estimates or project operations.

The GAO explained that the easements signed by Red Rock landowners give the Corps the right to flood lands "occasionally," but did not specify a permitted flooding frequency, elevation, duration, or timing. According to the GAO, Corps officials maintain that "occasional" means anything other than permanent and that the easement lands have not been permanently flooded.

The GAO reported that the issue of additional compensation because of increased flooding of occasional easement land was addressed in a 1987 court decision relating to a Corps flood control project in Missouri. According to the GAO, the court ruled that because the flooding was caused primarily by high precipitation and not operation of the dam by the Corps, the landowners should be refused additional compensation. The GAO observed that even though every case is decided by the court on its own facts, the issues at Red Rock are similar to those in the 1987 Missouri case. The GAO further observed that on the basis of that case, the Red Rock landowners would have to prove that dam operations, rather than heavy precipitation, was the most significant factor in the increased flooding.

The GAO reported that an analysis prepared by a consultant commissioned by the landowners association in 1991 concluded that

the excessive flooding of the easement lands was not due to chance or unusual weather conditions. The GAO noted that the consultant's report stated the Corps operating procedures have remained basically the same, even though flooding frequencies from the easement lands grossly exceeded projections, and concluded that the flooding is expected to continue at the same or greater frequencies, unless the Corps operating procedures are changed significantly. In response to that analysis, the GAO reported that the Corps District stated that the approved regulation plan was precisely followed during flood events and that some changes have been incorporated into the plan that will mitigate the adverse effects on easement lands by raising the pool. The GAO reported that the Corps also challenged the consultant's assumption that the flooding was caused by operational errors because total annual rainfall was not greatly above normal. The GAO explained that the Corps claimed that floods resulted from snowmelt runoff and runoff from uncontrolled areas, which required cutbacks in outflow to reduce downstream flooding, not from improper operation of the reservoir. The GAO observed that if the landowners were provided with additional compensation for the existing easements, their concerns about increased flooding would be addressed. The GAO also concluded, however, that in the future the landowners could request additional compensation due to the losses they incur from further flooding. (pp. 5-6, pp. 31-37/GAO Draft Report)

DOD RESPONSE: Partially concur. A distinction needs to be made between just compensation under the 5th Amendment to the U.S. Constitution and tort damages. When flooding of land is permanent, frequent, and inevitably recurring, the flooding constitutes a taking and just compensation is due under the 5th Amendment. The measure of damages is the fair market value of the land taken based on an appraisal of the property which includes many factors. In the case of Red Rock, the occasional easements were appraised based on a before and after methodology, i.e., the value of the whole parcel before the acquisition (imposition of the easement) and the value of the remainder after the acquisition (imposition of the easement).

By focusing on crop damages, the report implies that since the landowners have suffered crop losses, the just compensation they received for the original occasional flowage easements is inadequate. One of the many factors taken into account in the original appraisal of the occasional flowage easements was the effect of flooding frequency and duration on crop damages, as stated on page 28 of the draft report. The DoD maintains that Red Rock landowners have received proper compensation for crop losses.

In addition, the GAO use of gross crop values is not appropriate. Although the farmers/landowners may have experienced losses during flood events, the method of measurement utilized does not

First p. ref. now on pp.
4-5. Second p. ref. now on
pp. 29-33.

See comment 4.

See comment 5.

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See comment 6.

present a calculation of that loss in terms of real dollars. Average expected yields per acre, times average price per bushel, produces potential gross income. Vacancy and collection losses, operating expenses, fixed expenses, and management must be deducted from potential gross income to determine net income. Further, it is a well-established economic principle that labor, capital, and management must all be paid prior to the land receiving any income.

The Department does not agree with the statement on page 34 of the draft report, "Corps officials maintain that 'occasional' means anything other than permanently flooded." In defining occasional flowage easements, the Courts and the Corps look at many factors, primarily the projected frequency, extent, and duration of the flooding.

Although Red Rock landowners have suffered crop losses, they have not proven that their crop damages are in any way related to the operation of the project. As the GAO concluded, under Hendricks v. United States, the landowners would have to prove that the crop damages were related to the operation of the project in order to recover on the basis of a 5th Amendment taking. At Red Rock, over 70 claims for crop damages were filed and all were denied by the U.S. Army Claims Service. Those landowners still have the right to pursue their claims under the Federal Tort Claims Act.

FINDING E: Basis For the Buyout Program. The GAO reported that Public Law 99-190, authorized a buyout program requiring the Corps to acquire easement lands from willing owners whose lands were subjected to periodic flooding in connection with the Red Rock project. The GAO reported that Public Law 102-377 directed the Corps to complete real estate appraisals and make offers under the buyout program no later than October 31, 1993.

The GAO explained that the conference report on Public Law 99-190 noted several reasons why the purchase of easement lands from willing sellers would be in the interest of the landowners:

- At the time the original easements were acquired, the landowners were not provided with an opportunity to sell their lands because, under the Federal policy, the Corps was required to purchase easements on lands that would be flooded only occasionally;
- Following easement acquisitions, flooding had been more frequent than anticipated and had caused great financial losses for some landowners; and
- Land encumbered by easements that permit flooding could otherwise be difficult for the landowners to sell.

In addition, the GAO stated that the conference report indicated that the Corps should follow the usual appraisal procedures in acquiring the ownership interest in the easement lands, recognizing the fair market value of the easements currently owned by the U.S. The GAO reported that as a result, the Corps has based its appraisals of the easement lands on the sale of comparable easement-encumbered lands in the area.

The GAO pointed out that under standard Federal procedures, if the Corps and a landowner cannot agree upon a purchase price, the Corps normally can use condemnation proceedings. The GAO explained that in contrast, under the willing-seller provision of Public law 99-190, if a purchase price agreement cannot be reached, the Corps cannot acquire the land. (p. 6, pp. 38-39/GAO Draft Report)

DOD RESPONSE: Concur.

FINDING F: Status of the Buyout Program. The GAO reported that to carry out the buyout program, the Corps developed a real estate acquisition plan to purchase land from owners willing to sell. The GAO found, however, that the October 31, 1993 deadline imposed by Public Law 102-377 was not met, because there was not enough time to purchase land from all the willing sellers, given the available funding and the Corps plan for implementing the buyout. The GAO noted that the last phase of the acquisition plan was not approved by the Corps headquarters until December 1992.

The GAO found that through March 1994, a total of \$6.75 million had been appropriated for the buyout program, of which \$5.2 million had been provided to the Rock Island District Office.

The GAO also found that as of April 1994, \$3.4 million of that amount had been spent--\$2.3 million on activities in preparation for purchasing the land and \$1.1 million on land purchases. The GAO reported that the Corps has not established a completion date for the buyout program and has not included the program in its 10-year budget because the Corps believes it has higher priority needs for its funds. In addition, the GAO reported that the Corps believes the Congress has not appropriated additional funds since FY 1991 because such funding was not required.

The GAO found that as of March 1994, 47 percent of the landowners had sold their land or were considering selling--7 percent had sold, 4 percent were negotiating with the Corps, and the Corps was in the process of appraising or mapping another 36 percent in preparation for negotiations. The GAO found that 53 percent of the landowners had told the Corps they are not interested in selling (10 percent), had rejected the formal offer of the Corps for their land (10 percent), or had not responded to the Corps within the six months from the time of their letter from the Corps informing them of their opportunity to sell. (p. 6, pp. 40-42/GAO Draft Report)

DOD RESPONSE: Concur.

First p. ref. now on pp.
5-6. Second p. ref. now on
pp. 35-37.

FINDING G: Concerns About the Buyout Program and Possible Alternatives. According to the GAO, the landowners association representatives cited two major reasons why the landowners will not sell their land. The GAO reported that the first reason was that the landowners said the Corps proposed prices are too low to allow them to buy comparable farmland nearby. The GAO pointed out, however, that although those landowners selling their lands to the Corps are receiving only about one-half the amount needed to purchase land outside the flooding area, the landowners received about \$190 per acre when the Corps bought the easements through 1969, in payment for the fair market value of the land in consideration of the estimated losses caused by the flooding and for cleanup and flood-related expenses.

The GAO reported that the second major reason for the landowners not selling their land concerns access difficulties. The GAO noted that a landowners association representative estimated about 67 percent of the landowners would have such difficulties, although a Corps official estimated only 3 to 5 percent of the landowners would be adversely affected.

The GAO reported that a landowners association representative suggested one way to alleviate the concerns of the landowners would be for the Corps to buy the easement lands at a price that would reflect inflation from the time of the original easement acquisition, and then have the Corps lease back the lands to the landowners at near fair market value. In addition, the GAO reported the association representative said that the concerns over access problems and the ability of the landowners to continue farming could be reduced if the Corps would grant them permanent crossing rights or a lease to the easement lands they sell. The GAO reported that in February 1994, the Army rejected most of the landowners' proposal, but stated that the proposed lease back of easement lands may be a viable area for further consideration if the provisions are based on fair market value.

The GAO reported that the officials explained that through existing easements, the Government has already acquired enough ownership interest to allow for increased levels of occasional flooding. The GAO reported the officials also cited the patch-work pattern of public and private land ownership created by the willing-seller provision, resulting in access and land management difficulties for both the Corps and the landowners. The GAO noted that the Corps official suggested one solution would be to purchase all easement lands at current market value, using normal Corps acquisition procedures, thereby giving the Corps the right to take the land by condemnation. The GAO pointed out that a September 1991 Corps estimate indicated the total cost to buy all the land would be about \$43.5 million.

The GAO concluded that the leaseback arrangement suggested by the landowners association might encourage more landowners to sell

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First p. ref. now on p. 6.
Second p. ref. now on pp.
37-41.

See comment 7.

their land, since the owners would be able to stay on their land and continue farming without access problems to adjacent land. The GAO also concluded that if the leaseback option was implemented and proved attractive, the Corps may incur more land acquisition costs under the buyout program and any administrative costs created by the leaseback program. (p. 7, pp. 42-47/GAO Draft Report)

DOD RESPONSE: Concur. The DoD also separately provided several technical corrections

The following are GAO's comments on the Department of Defense's (DOD) letter dated October 31, 1994.

GAO Comments

1. We have incorporated DOD's suggested wording changes as appropriate, for the purpose of clarity.
2. The 45-year period referred to on page 17 is the period used by the Corps district to calculate the flood-frequency projection for the original acquisition of real estate for the Red Rock project. This frequency projection is very significant because the Corps used it to determine where fee title, permanent easements, or occasional easements would be acquired. In addition, the 45-year projections of the extent of future flooding were used in appraisals and negotiations with the landowners for purchase of the easements. The 75-year record that the Corps refers to is apparently the data that it used in the 1992 re-analysis of the flood-frequency projections for the Assistant Secretary of the Army for Civil Works. This is discussed in chapter 2.
3. The essence of the suggested paragraph was added to the discussion in chapter 2 to further explain the appraisal process.
4. The report reflects the technical distinction in terminology between a taking of property and payment for losses as a result of government actions.
5. We have revised the report to reflect that we have calculated only the gross revenue loss for crop production. We have clarified the appropriate sections of the report to reflect the factors that would adjust the gross revenue loss for a net crop loss figure. Because detailed data to determine net income were not readily available, we list only factors that would reduce or increase the gross loss.
6. The Corps has no written definition of "occasional easements." During our review, Corps headquarters officials told us their definition of occasional easements was "anything other than permanent." The report has been revised to reflect the Corps' explanation of occasional easements referring to court interpretations of the term.
7. We have incorporated DOD's suggested wording changes as appropriate, for purposes of clarity.

Comments From Landowners' Association

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

October 19, 1994

Mr. James Duffus III
U.S. General Accounting Office
441 G Street N.W., Rm. 1842
Washington, D.C. 20548

Dear Mr. Duffus:

As the executive committee representing the Red Rock Easement Landowners Association, we are commenting on the draft report entitled Water Resources: Flooding on Easement Lands within the Red Rock, Iowa, Reservoir (GAO-RCED-94-216).

First, let us thank you for the opportunity to review the draft and make comment on its contents. Overall we believe that the document appropriately recognizes and substantiates damage to landowners beyond the value of the original easements. For this reason, we endorse the basic findings of the study and the resultant draft.

In particular though, we will briefly comment on six areas of the document. We will describe our concerns and suggest corrections.

Now on p. 3.

See comment 1.

See comment 2.

Now on pp. 4 and 23.

1. At several places within the document (for instance at the top of page 4) it states that "the easement documents do not provide for renegotiating easement compensation if the flooding experience is greater than what was expected." We have identified easement contracts that include language providing redress should actual damages surpass that expected from projected rainfall amounts or should changes occur in the Red Rock Dam operations plan. In fact, both of those scenarios have occurred. The stated "2 to 4 times more frequently flooded" language at the bottom of page 3 occurred even though rainfall history shows a relatively minor 12 percent increase in participation over the time period. The record also clearly relates operation plan revisions over the years for several reasons, including revisions in project purpose (recreation versus flood control), siltation of the lake bottom resulting in loss of storage capacity, and the upriver construction of Saylorville Dam. If the government signed and recognized redress responsibilities in some contracts, it should apply to all. We believe the language should in the draft be stricken and redrafted to acknowledge parameters for renegotiated easements. That process was transacted under similar circumstances in the Coralville watershed above Iowa City, Iowa.
2. We find fault with the discounting of \$31.4 million in damages to the \$7.8 million figure to reflect 1963 present value (bottom of page 5 and page 24). While we understand the need to establish some kind of common baseline in real dollars over the 20 plus years of the project, losses incurred in later years, especially through the farm debt crisis years 1980-1987, were current dollars that spelled disaster and bankruptcy for some association members. High real interest rates of up to 18-21 percent and high input costs combined with major or complete crop losses due to

See comment 3.

Now on p. 41.

See comment 4.

See comment 5.

Now on p. 29.

See comment 6.

Now on p. 29.

See comment 7.

flooding resulted in extreme financial distress. As a result, farmers forced to leave the farm and farmers barely hanging on are not fairly treated when discounting the current economics back to 1963. We would like you to reassess that thinking.

3. While we applaud your description of the buyout program in Chapter 3 of the document, we do not believe that sale of land by landowners will increase significantly in the future as concluded on page 46. The dollars offered per acre are not high enough to facilitate landowner alternatives. If 10 plus years of negotiation has not resulted in significant settlements, why would it change in the future? We believe only those with forced financial situations, estate settlements, or extremely frustrated individuals who have lost hope of a fair settlement will agree to such low per acre prices.

4. We submit that the right to flood the land "occasionally" (meaning anything other than permanently according to the Corp) is something very different from the understanding landowners were given by the Corp at the project initiation. We were told the flooding frequency would be a maximum of flooding one out of five years.

We would like to see more information provided at this point in the report relating to what flooding frequency projections were when provided by the Corp at project initiation on which farmers had to make original easement decisions. The definition of "occasionally" makes a big difference here and strongly impacted farmer decision-making at project initiation.

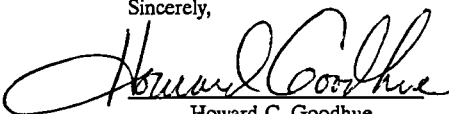
5. Finally, on page 32, we believe the figures in the next to the last paragraph are in error and do not reflect actual averages. We cannot find easement payments that would average anywhere close to \$192 per acre. However, we are at a loss to correct those numbers since landowners were never allowed access to the body of data which included original land appraisals or easement payments. We did suggest a settlement formula in July of 1993 that mirrors the one referred to on page 32, but without actual numbers. Most easement payments we have identified were below \$100 per acre, many considerably below. We suggest errors could derive from per acre settlements versus damage/severance payments and bare land settlements versus land with homes, structures, and acreage attributes. We would like you to reconsider and to verify these numbers. The numbers used would lead to the conclusion that 2/3 of the original land value was compensated for when in fact we believe less than 1/3 of the value was justly compensated.

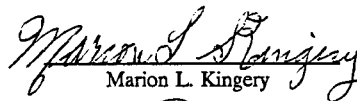
6. We suggest the use of strong definitive action words instead of "soft" words such as may and should within the document. Since this was a fact finding exercise expected to produce concrete results, we should have hard action words suggesting congressional response.

We would like to thank Art Trapp and his associates in Denver for their fair, comprehensive and amiable investigation of this project. We have had numerous and uninhibited opportunities to present our side of the issue. We appreciate that.

We feel that the corp must face up to the fact that the easement owner was not "justly" compensated for the easement which was taken from him and guidelines must be set by Congress for a just solution for all parties.

Sincerely,


Howard C. Goodhue


Marion L. Kingery


Loren Krichau


Dan Bartelma


Larry Hunt

The following are GAO's comments on the easement landowners representatives' letter dated October 19, 1994.

GAO Comments

1. We requested but were not supplied with the easement contracts that provide for renegotiating easement compensation. None of the easement contracts we reviewed contained specific language providing for redress if project operations change. The landowners provided copies of court decisions on condemnations that occurred during the acquisition of the Red Rock easements. We have identified a court decision on another project that makes a point similar to the condemnation decisions. The Hendricks case discussed in chapter 2 stated that a claim for additional compensation could be made if a change in operations caused additional flooding. The Corps states that operational changes that have occurred at Red Rock have been adequately mitigated and contends that operations have not increased the frequency of flooding on easement lands.
2. We have further explained the concept of present value of dollars and the need to convert crop losses incurred over many years.
3. The report does not say that the number of landowners selling will increase. Rather, it states that the number may increase significantly after the Corps makes offers to the 40 percent of landowners who have indicated an interest in selling their lands to the Corps.
4. We have reflected these views in the text of chapter 2.
5. The extent of information we obtained from the Corps about the flood frequencies discussed with the landowners during negotiations is the frequency projection table the Corps developed in 1961, using 45 years of record.
6. The Corps told us that part of the \$5.5 million was for structures. We have added this factor to the list of appraisal factors in chapter 2. The Corps has no readily available estimate of the portion of the \$5.5 million that was paid for buildings and other structures. To show how the landowners' proposed formula would work, we used an actual appraisal that identified the value of the buildings and other structures.
7. The wording we used reflects the fact that many of the numbers are estimates based on assumptions.

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