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A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota

United States Congress

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A REVIEW OF THE ENVIRONMENTAL, ECONOMIC AND INTERNATIONAL ASPECTS OF THE GARRISON DIVERSION UNIT, NORTH DAKOTA

TWENTY-EIGHTH REPORT

BY THE

COMMITTEE ON GOVERNMENT OPERATIONS

JULY 2, 1976.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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LETTER OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
Washington, D.C., July 2, 1976.

HON. CARL ALBERT,
Speaker of the House of Representatives,
Washington, D.C.

DEAR MR. SPEAKER: By direction of the Committee on Government Operations, I submit herewith the committee's twenty-eighth report to the 94th Congress. The committee's report is based on a study made by its Conservation, Energy, and Natural Resources Subcommittee.

JACK BROOKS, *Chairman.*

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JULY 2, 1976.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BROOKS, from the Committee on Government Operations, submitted the following

TWENTY-EIGHTH REPORT

BASED ON A STUDY BY THE CONSERVATION, ENERGY, AND NATURAL RESOURCES SUBCOMMITTEE

On June 30, 1976, the Committee on Government Operations approved and adopted a report entitled "A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota." The chairman was directed to transmit a copy to the Speaker of the House.

I. SUMMARY

This report, entitled "A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota", is based on an investigation by the Conservation, Energy, and Natural Resources Subcommittee.

The Garrison Diversion Unit is a multi-purpose water resource project being constructed in North Dakota by the Bureau of Reclamation. The initial stage of the project, as authorized in 1965, is estimated to cost $496 million (1975 prices) and is expected to divert water from Garrison reservoir to provide 250,000 acres of irrigation and municipal water supplies for 14 cities and towns. The Bureau also claims various flood control, recreational and wildlife benefits will be derived from project operation.

The concept of a Missouri River diversion project to irrigate lands in North Dakota has its roots in the early days of statehood, and hardships experienced by North Dakota farmers during the dust bowl days of the thirties gave greater impetus to the need for a diversion system.

The report examines the background of the Garrison controversy, major project benefits and costs, status of construction, and major objections to the project that have been raised by environmental groups, neighboring states and Canada, farmers, and various state and Federal Government agencies.

Construction of the project is presently 19 percent complete. A Final Environmental Statement was published by the Bureau in January 1974.

The report finds the Bureau's environmental assessment effort is inadequate.

The Final Environmental Statement was meant to serve only as a general programmatic statement. As construction proceeds over the next three years, the Bureau of Reclamation plans to release site-specific statements for the three major irrigation areas of the project—the Souris Loop, the Central North Dakota, and the Oakes-LaMoure Sections. The draft statement for the most controversial portion of the project, the Souris Section, is scheduled for release as late as November 1978.

The Committee has determined that this "segmented approach" to environmental assessment has prevented significant information concerning the environmental impacts of the Garrison project on Canada, Minnesota, South Dakota, and the national wildlife refuge system from being available in a timely fashion to guide decisionmaking. This information is presently needed by the International Joint Commission, the State Department, Minnesota, South Dakota, the Congress, and the Department of the Interior to determine whether and how the present plan should be altered in order to minimize environmental and economic impacts.

The Bureau's water quality model, which is used to determine the water quality impact of the project on major rivers, represents the current state-of-the-art in modeling techniques. However, the Environmental Protection Agency and the Minnesota Pollution Control Agency have determined that some assumptions controlling the model's output are based on ideal, rather than realistic conditions in the project area. Accuracy of future return flow studies depends on, among other things, the use of realistic assumptions about the prevailing conditions in the project area.

Canada objects to continued construction of the Garrison project, claiming that it will violate the Boundary Waters Treaty of 1909, which prohibits pollution of international waters to the injury of health and property. Failing to reach an agreement on Garrison, the United States and Canada referred the matter to the International Joint Commission (IJC) for study and recommendation. The IJC report is due in October 1976. It is possible that some alteration in the present Garrison Project plan may be necessary to accommodate Canadian concerns. This could require eventual reauthorization of the project by Congress.

The Minnesota Pollution Control Agency and the South Dakota Legislature have also expressed concerns over the present Garrison plan. They fear that return flows from the project could pollute and flood the Red and James rivers.

The U.S. Fish and Wildlife Service testified before the subcommittee that the 146,000-acre Garrison wildlife mitigation plan, even as revised, will be inadequate to replace the wetland and wildlife losses expected from construction. Also, in a special study prepared for the subcommittee, the Service estimates that eight National Wildlife Refuges will be adversely affected by construction and operation of the present project plan. It is possible that the project will require substantial alteration to protect the Federal investment in these wildlife refuges.

Despite concerns experienced by various environmental organizations, the North Dakota Farmer's Union, various Federal agencies, and the Canadian Government, the Committee has determined that broad-based support for the Garrison Project continues to exist in North Dakota.

Numerous major recommendations are contained in the report, several of which should be considered by the Congress in conjunction with the congressional consideration of the FY 1977 Public Works Appropriations bill. These are:

Land acquisition and construction on the Oakes-LaMoure, Central North Dakota, and Souris sections of the Garrison Diversion Unit (and associated canals and reservoirs) not proceed until proposed supplemental environmental impact statements have been completed and published for all three areas.

Land acquisition and construction of the Lonetree Reservoir feature of the Garrison Diversion Unit be deferred until the Canadian and United States Governments have agreed upon an acceptable alternative to the present project plan.

The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, identify alternatives to the Garrison Diversion Unit project plan that will eliminate adverse impacts to the national wildlife refuge system. If such alternatives should increase the cost, reduce benefits, or require major alteration of the present project plan, the Bureau of Reclamation should notify the appropriate committees of Congress and promptly return to Congress for reauthorization of the project.

The Bureau of Reclamation update the budget jurisdiction documents for the Garrison Diversion Unit prior to completion of congressional consideration of the project's 1977 budgets requests, making adjustments in the authorized cost ceiling and the estimated total Federal obligations as recommended in House Report 94–852.

All alternatives short of construction of expensive desalinization plants be considered by the United States Government as a means of mitigating the current water quality dispute with Canada. If such alternatives should increase the cost, reduce benefits, or require major alteration of the present project plan, the Bureau of Reclamation should notify the appropriate committees of Congress and promptly return to Congress for reauthorization of the project.

II. INTRODUCTION

The findings and recommendations contained in this report stem from an investigation by the Conservation, Energy, and Natural Resources Subcommittee, chaired by Representative Leo J. Ryan of California. The subcommittee began its investigation of the Garrison Diversion Unit in the first session of the 93rd Congress in the midst of rising public debate over the environmental and economic feasibility of the project.[1] Congressional interest was further prompted by Canada's request to the State Department on October 23, 1973, for a moratorium on project construction on the basis that irrigation return flows from the project would violate Article IV of the Boundary Waters Treaty of 1909.

In late 1973 the subcommittee asked the General Accounting Office (GAO) to review several aspects of the Garrison project, including rising construction costs and the impact of the project on Canada. The GAO subsequently issued to the subcommittee four reports,[2] which concluded, among other things, that Congress needed more information concerning the planning and construction of the Garrison Diversion Unit in its decision-making.

During House consideration of the Public Works Appropriations Act of 1975, it was determined that additional information was needed on the possible impacts of Garrison on Canada, Minnesota, and South Dakota.[3] The House agreed to a two-pronged approach to the problem: it included $1,000,000 in additional funds for the Bureau of Reclamation to accelerate irrigation return flow studies on the Souris, Red, and James Rivers and urged the Conservation, Energy, and Natural Resources Subcommittee to convene field hearings on the Garrison project in North Dakota.

The subcommittee subsequently held two days of hearings on the Garrison project, one on September 15, 1975, in Bismarck, North Dakota, and another in Washington on November 19, 1975.[4] Representative Mark Andrews of North Dakota participated in the Bismarck hearings at the request of the subcommittee. In addition, the subcommittee solicited the views of North Dakotans, South Dakotans,

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[1] The Conservation and Natural Resources Subcommittee became the Conservation, Energy, and Natural Resources Subcommittee at the beginning of the 94th Congress. (Prior to February 1975 the subcommittee was chaired by Rep. Henry S. Reuss of Wisconsin. Rep. William S. Moorhead of Pennsylvania chaired the subcommittee from February 1975 to May 1976.)

[2] Two of the four reports were formal published GAO reports; the other two were letter reports. The reports are as follows: (a) May 15, 1974 (B–164570), hereinafter referred to as "GAO report, May 15, 1974."; (b) November 25, 1974, "Congress Needs More Information on Plans for Constructing the Garrison Diversion Unit in North Dakota" (B–164570), hereinafter referred to as "GAO report, November 24, 1974."; (c) December 31, 1974 (B–164570), hereinafter referred to as "GAO report, December 31, 1975."; and (d) November 7, 1975, "Bureau of Reclamation Procedures and Practices for Computing Authorized Cost Ceilings and Project Cost Estimates Need Improvement" (RED–76–49), hereinafter referred to as "GAO report, November 17, 1975."

[3] Congressional Record, June 24, 1975, 94th Cong., 1st sess., pp. H6088–89.

[4] The subcommittee's hearings of September 15 and November 19, 1975, are entitled "The Garrison Diversion Unit Irrigation Project: Its Potential and Problems," and are hereinafter referred to as Hearings (Part 1), Sept. 15, 1975, and Hearings (Part 2), Nov. 19, 1975.

Minnesotans, Canadians, Members of Congress, Federal officials and affected public interest groups. In all, the subcommittee heard formal testimony from more than thirty individuals, organizations, and Federal, State, and local representatives [5] and received numerous other letters and statements for inclusion in the hearing record. The subcommittee's investigation encompassed virtually every problem that has been raised concerning Garrison—economic, environmental, and international—as well as the potential benefits of the project for the citizens of North Dakota.

The issue of the adequacy of the Bureau of Reclamation's cost ceiling indexing procedures (which grew out of the Garrison investigation) was of such immediate concern to the committee that a separate report was issued on this subject on February 26, 1976.[6] The report included findings and recommendations to the Department of the Interior and the Congress. Based on an earlier General Accounting Office report,[7] the Committtee's study determined that the Bureau's inflation indexing procedures had allowed congressionally established cost ceilings to be excessively inflated through indexing costs that had already been incurred. It was determined that estimated total Federal obligations for the Garrison project were in excess of its authorized cost ceiling by $46 million. (Eighteen other reclamation projects also were found to be in excess of their cost ceilings.)

The committee's investigation of Garrison has attempted to separate fact from fiction in order to report accurately to the Congress the true status of Garrison, its prospects and its problems. In the words of former subcommittee Chairman Moorhead,

> * * * Our investigation is in no way intended as either an attack upon, nor a defense of, the project. Our intention is to take a steady, clear look at an expensive and complex water resource project which already has, and promises to have even further, far-reaching effects not only in North Dakota but in the Northern Great Plains region as a whole.[8]

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[5] Rep. Mark Andrews; National Audubon Society; South Dakota Department of Natural Resource Development; Garrison Diversion Conservancy District; Lincoln Valley Irrigation District; Wildlife Management Institute; Mayor Hentges of Fargo, N. Dak.; Committee to Save North Dakota, Inc.; Izaak Walton League; Manitoba Environmental Council; Governor Link of North Dakota; Bureau of Reclamation; North Dakota Farmers Union; Carrington Irrigation Branch Station, North Dakota State University; United Family Farmers; University of Montana; Mayor Reiten of Minot, North Dakota; Mayor Ryan of Harvey, North Dakota; North Dakota Farm Bureau; North Dakota State Department of Health; Minnesota Pollution Control Agency; Council on Environmental Quality; Environmental Protection Agency; Fish and Wildlife Service; and Department of State.

[6] House Report 94–852, 14th report by the Committee on Government Operations, "Bureau of Reclamation's Indexing Procedures Conceal Information That Water Resource Projects are in Excess of Their Authorized Cost Ceilings," February 26, 1976.

[7] GAO report November 17, 1975.

[8] Hearings (Part 2), November 19, 1975, p. 2.

III. BACKGROUND

The concept of a Missouri River diversion has its roots in the early days of North Dakota statehood, when farmers began looking for ways to secure a dependable source of water to irrigate the dry semi-arid farmland in the central and western parts of the state. The idea of a Missouri River diversion is documented as early as 1899. when North Dakota's constitutional convention requested that the Congress consider a plan to construct a canal from the Missouri River in Montana to divert water for irrigation across North Dakota to the Red River of the north, on Minnesota's western boundary.[9]

The idea of a diversion was given greater emphasis when the harsh effects of the dust bowl of the thirties began to be felt in North Dakota. During the Great Depression, North Dakota experienced a debilitating drought that destroyed vast acreages of productive farmland and caused hardship and suffering for many North Dakotans. Many farmers were forced to abandon their farms and their homes, and many small businesses relying on the farm trade were forced to close down. A vivid description of the effects of the Dust Bowl on North Dakota is contained in the following excerpt from Tweton and Rylance's "The Years of Despair: North Dakota in the Depression":

> North Dakota suffered immensely during the years of the depression. The average value of farm land per acre plummeted from $22 in 1930 to $12 in 1940. Foreclosure forced about one-third of North Dakota farmers off the land between 1930 and 1944. Per capita income was less than half of the national average. The thirties robbed the state's farmers of an estimated $1,340,000,000. Population declined as thousands sought a better life elsewhere. Between 1935 and 1940, 86,699 North Dakotans fled the state, and by 1940 the population had dropped to 642,000. Forty-three of the fifty-three counties suffered losses as the farm population decreased 17 percent.
>
> Tied to a one-crop economy, North Dakota fell victim to drought. The depression was severe, but the drought delivered the knockout punch. North Dakota could not have survived without huge federal subsidy. The federal government became the state's main business during the Thirties. Federal programs expended $266,000,000 in the state between 1933 and 1940. Citizens occasionally grumbled about the massive bureaucracy which had enveloped them, but they also realized that federal money alone meant survival.[10]

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[9] Environmental Assessment Project of the Institute of Ecology, A Scientific and Policy Review of the Final Environmental Impact Statement for Initial Stage, Garrison Diversion Unit (North Dakota), vol. 1, January 1975, p. 1.

[10] D. Jerome Tweton and Daniel F. Rylance, "The Years of Despair: North Dakota in the Great Depression" (Grand Forks, N.D.; Oscart Press), 1973, p. 16.

Determined to avoid another devastating drought, the political leaders of North Dakota began to look for ways to bring the Missouri River diversion to reality. According to retired Federal Judge C. F. Kelsch, who was one of the State leaders involved in initial efforts to obtain Federal support for a diversion project, the lack of capital available to the North Dakota state government made a Federal program necessary and resulted in appeals to Congress and the Corps of Engineers to develop and approve a diversion plan:

> * * * the state in the midst of a financial crisis was unable to provide the capital to construct dams, to impound and store waters that were so sadly needed to irrigate the parched lands and consequently it passed a resolution memorializing Congress to enact the necessary legislation and to appropriate the funds necessary to complete the Missouri River Diversion Project with the least possible delay. (Resolution S. L. 1937, page 541) In addition, the legislative assembly appealed to Congress to make funds available immediately to enable farmers to purchase the necessary seed and feed for their livestock upon which they were dependent for their survival. (Resolution S. L. 1937, p. 539)
>
> Beginning in 1935 appeals were made by the Governor, public officials, and interested citizens of this state to the appropriate federal agencies and the Congress for action. For example, in 1935, I, with others from the state, traveled to Washington, D.C., and made personal appearances before the Corps of Army Engineers. At that time we informed the Corps and made emphasis of the devastating effect of the destructive weather conditions in the state. We also informed the Corps that these weather conditions appeared to be leading to long-lasting massive problems regarding soil erosion, pasturing and crop production resulting in the undermining of the economic stability of the state—which at that time was almost entirely dependent upon the agricultural industry. The Corps of Engineers agreed to make an extensive investigation in coordination with the Department of the Interior to determine the economic soundness and engineering feasibility for the construction of a dam on the Missouri River in North Dakota at a site best suitable for that purpose. In 1936 the unprecedented weather conditions made the construction of a dam to impound the waters of the state an imperative necessity. Again, state appeals were made to appropriate federal agencies and the Congress for action.[11]

The Pick-Sloan Missouri River Basin Plan

While North Dakotans were attempting to gain Federal recognition of a Missouri diversion to western North Dakota, other states downstream were appealing to the Corps of Engineers and the Bureau of Reclamation to devise a plan to dam the Missouri River in several strategic locations to provide flood control, navigation, and irrigation

[11] Hearings (Part 1), September 15, 1975, p. 603.

benefits. In an attempt to solve the problems of both Upper and Lower Missouri River basin states, the Corps of Engineers and the Bureau of Reclamation reached agreement on a multipurpose plan, known as the Pick-Sloan Missouri River Basin Plan,[12] which envisioned the construction of six main stem dams and reservoirs and numerous reclamation projects affecting several states along the Missouri River and its tributaries. This plan included a scheme to divert water from the reservoir behind Ft. Peck dam in eastern Montana to irrigate 1.4 million acres of land in western and central North Dakota. Concomitantly, North Dakota land would be taken as the site for the Garrison Dam and reservoir, which would provide flood control and other benefits downstream.

Following the disastrous Missouri River flood in 1943, the Congress enacted the Pick-Sloan Missouri River Basin Program as section 9 of the Flood Control Act of 1944. However, while construction proceeded on the dam and reservoir, the diversion plan floundered due to the inability of the Bureau of Reclamation to find soils in the western part of North Dakota suitable for irrigation. As a result, the plan was revised by the Bureau to divert water from the Garrison Reservoir (which was completed in 1955) instead of Ft. Peck reservoir and to irrigate lands in the central and western portions of the state. Because of necessary alterations in the original plan and language in a 1964 Appropriations Act denying appropriations for any units of the Pick-Sloan Missouri Basin Program reauthorization of each by Congress (Act of August 14, 1964, Public Law 88–442, 78 Stat. 446), the Bureau of Reclamation was obliged to return to Congress for reauthorization of the revised Missouri-Souris diversion plan. Several versions of the Garrison Diversion Unit were submitted to the Congress in the decade following completion of Garrison Dam before Congress finally approved it in 1965 when it enacted Public Law 89–108.[13]

As early as 1955, the North Dakota State legislature had created the 25-county Garrison Diversion Conservancy District to act as the responsible state agency for implementing the Garrison Diversion Unit plan.[14] The district was granted the authority to levy a general tax over all property within the Conservancy District and to finance the repayment obligations for the project.

Congressional Consideration of Garrison

During House consideration of the Garrison Diversion Unit authorizing legislation in 1965, supporters of the Project pointed to the many benefits for North Dakota and the need to compensate North Dakota for land given up for the site of Garrison dam and reservoir. The latter case was argued eloquently at that time by Representative Mark Andrews of North Dakota during the floor debate in the House:

> In 1944, as has been pointed out, the proposition was made to North Dakota that downstream States needed flood protection and that, by locating dams in North Dakota the reservoirs of which would inundate about half a million acres of our best farmlands, downstream States could be saved millions—yes, billions—of dollars in flood damage. The proposi-

[12] See House Document 475 and Senate Document 247, 78th Cong., 2d sess. (1944).
[13] See House Document No. 325, Garrison Diversion Unit, 86th Cong., 2d sess., February 4, 1960.
[14] Hearings (Part 1), September 15, 1975, pp. 149–50.

tion was made that by doing this we would in turn get irrigation through diversion.

It was no fault of our people that the original point of diversion had been changed because of engineering and soil reasons. Our State has gone ahead, confident in the feeling that Congress would fulfill the commitment made in 1944 by reauthorization. Our legislature set up a conservancy district comprised of over 60 percent of the taxable valuation of our State, whose board of directors is elected by the people and which has the power to levy taxes on all real property in this part of our State. We did this because we realized that Garrison diversion would benefit all parts of our economy and felt the cost should be shared.

* * * * *

North Dakota has sincerely gone the full measure of meeting its share of the obligation incumbent upon developing this water project. We confidently hope that the House, in its wisdom, will recognize the need and approve this project.[15]

The Garrison project was, however, not without its critics. Chairman Wayne Aspinall of Colorado of the Committee on Interior and Insular Affairs while reluctantly supporting the project, alluded to the "mistake" that the Congress made in authorizing the Pick-Sloan Missouri River Basin Plan without an adequate understanding of the cost involved. Aspinall explained that:

* * * In a single subsection comprising seven lines in that act the Congress authorized works which today carry a cost of almost $5 billion. As I have said so many times before, this was a serious mistake and has been the cause of untold problems ever since. I will not go further into that story, but it is something you need to understand in considering the Garrison Unit. Suffice it to say that the Committee on Interior and Insular Affairs has called a halt to further construction of Missouri River Basin units by the Department of the Interior under the authority of the 1944 Flood Control Act until they have been reauthorized.[16]

Other members of Congress expressed concern about some of the same problems that face the Garrison project today. For example, the late Representative John P. Saylor of Pennsylvania, a member of the Interior and Insular Affairs Committee, was particularly critical of the economics of the project. In a strongly-worded minority view accompanying the House report, Mr. Saylor criticized the "history of failure" of the Missouri-Souris unit, arguing:

It is no wonder the Bureau of Reclamation comes to the unavoidable conclusion that the irrigators and the conservancy district will be able to pay only a token amount of the project cost. Even without interest, over a period of 60 years or more, including the 10-year development period, only about $19 million of the $263 million investment cost of the initial stage of the Garrison diversion unit or of the $199 mil-

[15] Congressional Record, June 16, 1965, p. 13813.
[16] Id., p. 13807.

lion allocated to irrigation can be repaid by the water users. The remainder will be charged against net power revenues that, as of this date, are still no more than a gleam in the eye. Reduced to dollars per acre, this boils down to an investment by the United States of $796 for each and every one of the 250,000 acres that are to be irrigated, a repayment by the property owners of $76 per acre, and a subsidy to them of $720 from revenue that is badly needed for other commitments that have already been made.

It makes no sense for the United States to be spending this sort of money on land that may grow alfalfa, oats, barley, flax, sugarbeets, potatoes, and the like. It makes even less sense in the absence of a clear and believable demonstration that the future financial picture of the Missouri River Basin project is going to be radically different in the future from what it has been in the past. The Interior Department says it will be. But how? There is a real question as to whether these lands in the environment of their climate can ever sustain an effective irrigation economy.[17]

Congressman Saylor also criticized the inadequate economic justification data supplied by the Department of the Interior, the unusually low interest rate employed in amortizing project benefits, and the nonreimbursable nature of wildlife mitigation costs associated with the project.[18]

Another critic, Representative Odin Langen of Minnesota, raised the question of the adverse impact of Garrison on fish and wildlife resources in North Dakota, charging that:

> * * * the project is actually going to destroy some of the very best waterfowl production habitat that we have in the country, thereby necessitating a further expenditure of over $21½ million in order to attempt to restore this habitat, which is very doubtful that we are going to be able to duplicate * * *.

A Summary of Problems

During the 11-year period since the Garrison Diversion Unit was approved by Congress, criticism of the project has grown.

Initially, many conservation and wildlife organizations, including the National Wildlife Federation and National Audubon Society, supported the Garrison Diversion Unit because they were convinced that the 146,000-acre wildlife mitigation plan it included would provide a beneficial increase in wetlands and waterfowl. Over the last few years, however, many of these groups have withdrawn their support for the project [19] on the grounds that project construction would destroy too many acres of naturally-occurring prairie potholes, degrade water quality of rivers, lakes, and streams in the area, flood wildlife habitat, and result in a net loss in waterfowl. However, some local environmental organizations continue to believe that the Garrison project

[17] Garrison Diversion Unit, Missouri River Basin Project, House Report No. 282, 89th Cong., 1st sess., May 4, 1965, p. 22.
[18] Id., pp. 20–25.
[19] Hearings (Part 2), November 19, 1975, p. 64.

will be beneficial to wildlife and wetlands. The Bismarck chapter of The Izaak Walton League, which testified in favor of the project,[20] and the Bismarck chapter (affiliate) of the National Audubon Society are two such groups.

North Dakota farmers in the path of construction have also expressed strong opposition to Garrison because in some cases it requires the taking of productive grain-producing farmland for project construction, wildlife mitigation, and rights-of-way. Many farmers have complained bitterly that they have had to abandon their productive farms, which their families spent years cultivating and developing, in order to irrigate farmland in another area of the state. Others have complained of poor treatment by the Bureau of Reclamation, inadequate compensation for land and farm buildings and inability of the Bureau to find suitable relocation farms.[21] The North Dakota Farmers Union [22] and the Committee to Save North Dakota [23] are two farm-oriented groups who have been strongly critical of the Bureau of Reclamation for its treatment of affected farmers. On the other hand, the N.D. Farm Bureau supports the project.

Soon after project construction began in 1968, the Canadian government began to make formal appeals to the Secretary of State that the irrigation return flows from the project entering the Souris and Red rivers could violate Article IV of the Boundary Waters Treaty. These appeals grew into a series of formal exchanges between the United States and Canada, in which the Canadian government asked for a moratorium on Garrison project construction.[24] As a result, the Department of State agreed that no construction would proceed on portions of the project potentially affecting Canada. This matter has recently been referred to the International Joint Commission for study and recommendation.

Recently, agencies of the Minnesota and South Dakota state governments have voiced concern about the effects irrigation return flows entering domestic streams would have on the environment and economy of their states. However, the Governors of South Dakota and Minnesota and the mayors of East Grand Forks and Moorhead, Minn., have expressed support for the project.

At the Federal level, both the Environmental Protection Agency and the President's Council on Environmental Quality began registering their concern in 1973 about the adequacy of the Bureau of Reclamation's Final Environmental Statement, which is required under provisions of the National Environmental Policy Act passed by Congress in December of 1969. Both of these agencies have taken the position that construction on the Garrison Diversion Unit should be halted until such time as the environmental impacts on the project have been adequately assessed. Concomitantly, the Fish and Wildlife Service has expressed concern that National Wildlife Refuge in North Dakota would be adversely affected by the project. Meanwhile, various Members of Congress and the General Accounting Office began questioning the rapidly increasing costs of the project, and two GAO re-

[20] Hearings (Part 1), September 15, 1975, p. 458. It should be noted, however, that the Izaak Walton League's national organization supports a moratorium on the Garrison Project. See Hearing (Part 1), p. 460.
[21] See miscellaneous letters to subcommittee reproduced in Id., Appendix 1, pp. 473–717.
[22] Id., p. 185.
[23] Id., p. 162.
[24] Id., Appendix 1.

ports were issued which, among other things, found Garrison to be in excess of its authorized cost ceiling.[25]

Local Support Continues

Despite concern expressed by various environmental groups, farm organizations, state governments, and Federal agencies, there appears to be continued broad-based support for the project among North Dakotans. During hearings in Bismarck, North Dakota, on September 15, 1975, the Conservation, Energy, and Natural Resources Subcommittee heard supporting testimony from Governor Arthur Link, U.S. Representative Andrews, the Director of the North Dakota State Health Department, the Garrison Diversion Conservancy District, and the mayors of Fargo, Harvey, and Minot, North Dakota.[26] Supporting testimony was also received for the record from the State Attorney General, Majority Leader of the North Dakota Senate, the Director of the North Dakota Game and Fish Department, and other political leaders.[27]

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[25] See General Accounting Office reports to Conservation, Energy, and Natural Resources Subcommittee, "Congress Needs More Information on Plans for Constructing the Garrison Diversion Unit in North Dakota" (B–164570, Nov. 1974) and "Bureau of Reclamation's Procedures for Computing Cost Ceiling and Project Cost Estimates Need Improvement" (RED–76–49, Nov. 17, 1975).

[26] Hearings (Part 1), September 15, 1975, pp. 5, 2, 436, 149, and 153–162.

[27] Id., pp. 601, 702, and 462.

IV. PROJECT DESCRIPTION AND STATUS OF CONSTRUCTION

Findings

A. The Initial Stage of the Garrison Project is now 19 percent complete.

B. Though only the initial stage of the Garrison Project is authorized (250,000 acres), the Bureau of Reclamation has acquired sufficient right-of-way for the McClusky Canal to accommodate not only the initial stage but additional stages of the project development as well.

C. The 30,000-acre Lonetree Reservoir is designed and is being constructed for use on both the authorized initial stage (250,000 acres of irrigation) and the ultimate stages of project development, if approved by Congress (1,007,000 acres of irrigation). The size of Lonetree Reservoir could be reduced if the project design is altered to accommodate Canadian objections, unless offsetting irrigable acres can be found that do not involve return flows to Canada.

In 1965 the Congress authorized the Bureau of Reclamation, an agency within the Department of the Interior, to construct the Garrison Diversion Unit in North Dakota.[28] The purposes of the multipurpose project, as described in the House report accompanying the authorizing legislation, were to provide:

> * * * irrigation of 250,000 acres, municipal and industrial water supply for 14 towns and cities in the project area, full development of the fish and wildlife and recreation potential in the project area, and minor flood control benefits.[29]

The plan envisioned by Public Law 89–108 would consist of 1,800 miles of canals, four regulating reservoirs, 141 pumping plants, and over 2,800 miles of drains and laterals. The rights-of-way for these features would encompass 67,000 acres with an additional 146,000 acres being required to fulfill the requirements of a wildlife mitigation plan, which would consist of 36 major and several minor fish and wildlife areas and 9 recreational areas.[30]

A brief description of the operation of the Garrison Diversion Unit was provided by Bureau of Reclamation Regional Director Robert McPhail in testimony before the Conservation, Energy, and Natural Resources Subcommittee in Bismarck:

> * * * The diversion will be accomplished by the Snake Creek Pumping Plant, the McClusky Canal, and Lonetree Reservoir, all of which are now in various stages of construction. The Velva Canal will convey water northward from

[28] Act of August 5, 1965; Public Law 89–108.
[29] House Report No. 282, 89th Cong., 1st sess., "Garrison Diversion Unit Missouri River Basin Project," May 4, 1965, p. 3.
[30] The Garrison Diversion Unit project plan as authorized by Public Law 89–108 is presented in detail in House Document No. 282, 89th Cong., 1st sess., May 4, 1965.

Lonetree Reservoir to irrigate 116,000 acres in the Karlsruhe and Souris areas. Irrigation return flows from these areas will flow through the project drainage system into the Souris River.

The New Rockford Canal will extend eastward from Lonetree Reservoir to provide a water supply for 134,000 acres in the central and southern sections of the project. The James River will be utilized to convey water from the New Rockford Canal to the southern section. Return flows from the New Rockford area and approximately 60 percent of the Warwick-McVille area will flow into the Red River via the Sheyenne River. The balance of the Warwick-McVille area will drain into the closed Devils Lake Basin. Return flows from the LaMoure and West Oakes area will accrue to the James River. Return flows from the East Oakes area will accrue to the Red River via the Wild Rice River. The entire project distribution system is being designed to accommodate sprinkler irrigation methods.[31]

The Snake Creek Pumping Plant, the McClusky Canal, the Lonetree Reservoir, Lonetree Dam, the Wintering Dam, and the James River Dike are generally referred to as the principal supply works. The principal supply works comprise the essential features required to convey Missouri River water to a point where it can be controlled and allocated to the four major irrigation areas in the north, central, and southern parts of the state.

Status of Construction

Construction began on the principal supply works in 1967 and is continuing at the present time, with most construction activity centering on the McClusky Canal and the Lonetree Reservoir features of the project. Construction on the project is approximately 20 percent complete. Preconstruction planning is being conducted on canals, reservoirs, laterals, and drains associated with the three major sections of the project: the Souris Loop, Central North Dakota (including Lincoln Valley), and the Oakes-LaMoure areas.

The following is a status of construction and land acquisition that has occurred on the various features of the project.

Snake Creek Pumping Plant

Located on the northeastern shore of Lake Sakakawea, the Snake Creek Pumping plant will pump water from the lake through three 11-foot diameter discharge lines approximately 450 feet long into Audubon Lake, from which the McClusky Canal will convey the water to additional storage and distribution facilities. Since the pumping plant is located within the boundary of the lake formed by Garrison Dam, land acquisition was not required. Construction began in 1967 with the award of a contract for the pumps and motors. Construction of the pumping plant structure itself started in 1968. Costs to June 30, 1975, totaled $18,153,230. All contracts for the pumping plant are reported by the Bureau of Reclamation to be complete or essentially complete at this time. Present schedules indicate the pumping plant could be ready for operation any time after July 1976.

[31] Hearings (Part 1), September 15, 1975, p. 13.

McClusky Canal

The 73.7-mile-long McClusky Canal will convey water from Lake Audubon to the Lonetree Reservoir (under construction) located on the divide among the watersheds of the Souris, James, and Sheyenne Rivers. Reaches 3A and 3C of the canal are finished and Reaches 1, 2, and 4C are in the final stages of completion. Reach 4B of the canal is 65 percent finished with completion expected in September 1976. Completion of Reach 3B, now 60 percent finished, is anticipated in November 1977. Now 34 percent complete, Reach 4A is scheduled for completion in January 1978. Land acquisition for the 12,305-acre right-of-way began in mid-1968 and is considered essentially completed, at a cost of $1,859,207. Construction began in 1970 and is scheduled to be completed in mid-1978. Present schedules call for the canal to be in operation by the fall of 1978. Rights-of-way sufficient to enlarge the McClusky Canal to accommodate subsequent stages of the project are being acquired. However, the canal specifications are designed to accommodate the initial stage only, or 250,000 acres of irrigation.[32]

Lonetree Reservoir and Dam

Lonetree Reservoir will be formed by Wintering Dam, Lonetree Dam, and the James River Dike, and water from the reservoir will be released as needed through a system of canals and pipelines. Land acquisition on the reservoir was initiated in mid-1968 and is scheduled to be completed in 1978. It will have a capacity of 410,000 acre-feet and is designed to accommodate both the initial stage (250,000 acres of irrigation) and ultimate stages of development (1,007,000 acres of irrigation).[33]

As of June 30, 1975, a total of 19,087 acres of land have been acquired for the Lonetree Reservoir at a total cost of $3,327,111. Under the present schedule, the reservoir would begin filling in autumn 1978, with initial operation expected in the spring of 1981.

Construction on Wintering Dam, which will form the northern boundary of the Lonetree site, began in August 1975 and is 43 percent complete. Completion of construction is scheduled for November 1977. Award of the contract for Lonetree Dam and Dikes is scheduled for late in fiscal year 1976, with a scheduled completion date of August 1978. (The James River Dike construction schedule is the same as that of Lonetree Dam and Dike.)

Other Project Facilities

The State Department and the Bureau of Reclamation have assured the Canadian Government that no construction will begin on portions of the Garrison project potentially affecting Canada until the Bound-

[32] March 17, 1976, Congressional Research Service memorandum to staff, Conservation, Energy, and Natural Resources Subcommittee, concerning capacity of principal supply works, p. 1. Also see: June 29, 1976, letter report from Henry Eschwege, General Accounting Office to Subcommittee Chairman Ryan concerning size of McClusky Canal and Lonetree Reservoir, [hereinafter cited as "GAO letter report, June 22, 1976]. The GAO found that while the Bureau has the necessary authority to acquire land for the ultimate stage development, the original Garrison plan as authorized in 1965 provided for only 11,000 acres of land for ultimate development of McClusky canal rights-of-way. However, slumping problems along the canal made it necessary to enlarge the canal right-of-way. As a result, the Bureau has acquired 12,305 acres and additional acres are expected to be needed to enlarge the canal to accommodate 1,000,000 acres of irrigation, if approved by Congress.

[33] GAO letter report, June 29, 1976.

ary Waters Treaty dispute has been resolved.[34] Construction of a number of project facilities—which the Bureau claims will not affect nor contribute to return flows accruing to streams flowing into Canada—is scheduled to be initiated following construction of the principal supply works. These are:

Project facilities	Contract award	Estimated completion
Lincoln Valley irrigation facilities	October 1977	September 1979.
Oakes Pumping Plant	February 1978	December 1979.
New Rockford Canal—Reach 1	April 1978	December 1980.
New Rockford Canal—Reach 2	May 1978	Do.
Oakes section—west side	February 1978	Do.
LaMoure irrigation facilities	March 1978	Do.

The irrigation areas eventually to be served by these facilities include the Lincoln Valley, Oakes-LaMoure, Warwick-McVille, and New Rockford irrigation areas, which constitute 54 percent of the planned initial stage irrigation acreage. For purposes of the commitment to Canada, the Bureau claims that the New Rockford canal will be necessary to serve the Oakes-LaMoure irrigation area regardless of the fate of the Warwick-McVille and New Rockford areas. Lincoln Valley and West Oakes and LaMoure return flows will either be returned to domestic lakes and reservoirs or deposited into the James River, flowing into the South Dakota, and eventually the Missouri River. However, the New Rockford canal features will also serve the Warwick-McVille and New Rockford areas, from which return flows will drain into the Sheyenne, Wild Rice, and Red rivers, flowing across the border into Canada. Clearly these features do potentially affect Canada. If adjustments are necessary in portions of the project plan affecting this area to accommodate Canadian interests or to mitigate concerns of neighboring states, the capacity and location of these features could require alteration.

Lincoln Valley Area

The present schedule calls for the initiation of land acquisition in Lincoln Valley in October 1977, with construction scheduled to start in March 1978. A supplemental Environmental Impact Statement is scheduled to be filed in September 1976, which will provide detailed information on the impacts of the Garrison Project construction in the Lincoln Valley area. The completion date for the area is scheduled for September 1979, with initial operations set for May 1979. Most of the return flows from this area will drain back into the Lonetree Reservoir.

Warwick-McVille—New Rockford Area

Land acquisition in the Warwick-McVille—New Rockford area is scheduled to begin in January 1979 and construction is scheduled to begin in March 1980. The draft supplemental Environmental Impact Statement is scheduled for filing with the Council on Environmental Quality by November 1977. Scheduled completion date and initial operations in the area are scheduled after 1981.

[34] Hearings (Part 2), November 19, 1975, p. 3.

Oakes-LaMoure Area

Oakes-LaMoure land acquisition is scheduled to begin in February 1978, and the supplemental Environmental Impact Statement was scheduled to be filed with the Council on Environmental Quality by March 1976, and the final EIS is not scheduled until early 1977. (The draft supplemental statement for Oakes-LaMoure was not filed until June 7, 1976.) Portions of Oakes-La Moure are scheduled for initial operations by May 1980, but the scheduled completion date for the entire Oakes-LaMoure area is after 1981.

Middle Souris-Karlsruhe Area

The Velva Canal and the Middle Souris-Karlsruhe area land acquisition and construction schedule is set for 1981. The Bureau of Reclamation and the State Department have assured the Canadian government that construction will not proceed on these features until the Canadian issue is resolved.[35] The return flow study for this area was completed by the Bureau in 1974. Nevertheless, the draft supplemental Environmental Impact Statement is not scheduled for filing with CEQ until November 1978. Canadian objections to this section of the project are substantial.

Garrison Wildlife Mitigation Plan

The Bureau of Reclamation's feasibility report for the Garrison Diversion Unit recognized that more detailed investigations of the wildlife mitigation plan would be required and some minor changes could be made in it.[36] The Fish and Wildlife Service is nearing completion of those investigations, which have resulted in a decision to revise the wildlife plan to change the mitigation concept from one of developing substantial large water areas to benefit migratory waterfowl to a concept for acquisition and restoration of drained natural wetlands and uplands to benefit many wildlife species. While this new concept, which is in the final stages of completion and is supported by the Bureau of Reclamation, the Fish and Wildilfe Service, the Garrison Diversion Conservancy District, and the North Dakota Game and Fish Department, there is some disagreement as to whether the revised mitigation plan will offset wetland losses due to construction. (It is hereinafter referred to as the "revised wildlife mitigation plan.")

Land acquisition to date for wildlife mitigation (acquired prior to 1975) totals 8,501 acres along right-of-way of the principal supply works. An additional 4,366 acres is required to complete the mitigation of the principal supply works construction. Acquisition and planning costs to June 30, 1975, totaled $2,369,588. Costs associated with the transfer of Devils Lake lands are $1,600,000, bringing the total fish and wildlife expenditures to $3,969,588 as of June 30, 1975. There have been no construction costs to date, and no management structure has been devised to manage and control the acquired acreage for wildlife mitigation purposes. In short, full mitigation is not occurring because no management plan has been developed for the 8,500 acres acquired.

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[35] Id., p. 3.
[36] Statement of Assistant Secretary of the Interior, Nathaniel Reed, Id., p. 68.

V. PROBLEMS OF ENVIRONMENTAL ASSESSMENT

Findings

A. The Bureau of Reclamation has determined that an environmental impact statement in compliance with the National Environmental Policy Act of 1969 (NEPA) is necessary for the Garrison Diversion Unit even though the project was authorized prior to the enactment of NEPA.

B. The Bureau of Reclamation published a Final Environmental Impact Statement in January of 1974 for the overall project and announced plans to issue detailed supplemental environmental statements for the project's three major irrigation areas.

C. The adequacy of the Garrison Final Environmental Impact Statement has not been judicially determined.

D. Both the Environmental Protection Agency and the Council on Environmental Quality have found the Final Environmental Statement to be inadequate.

E. In the absence of further environmental information either in the form of supplemental environmental statements or return flow studies, it is not possible to determine adequately the full scope of environmental impacts of the project.

F. The Bureau's schedule for preparation of supplemental environmental impact statements for segments of the project does not provide for an adequate or timely assessment of the project's environmental impacts or alternatives.

G. The supplemental environmental impact statement for the Souris Loop section is not scheduled for publication by the Bureau until 1978. The Bureau of Reclamation has a responsibility to publish the Souris supplemental statement promptly to assist the International Joint Commission in determining the impact of Garrison on Canada and to assist the State Department in determining whether IJC recommended alternatives will be environmentally and economically acceptable to the United States.

H. Supplemental environmental statements for the Central North Dakota and Oakes-LaMoure sections are needed to assess the environmental impacts of the project on South Dakota, Minnesota, and affected Federal wildlife refuges.

Garrison Impact Statement Status

While the Garrison Diversion Unit was authorized prior to the enactment of the National Environmental Policy Act of 1969,[37] the Bu-

[37] Public Law 91-190, January 1, 1970, 42 U.S.C. 4331 et seq. The National Environmental Policy Act (NEPA) requires that an environmental impact statement be "included in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment." The statement is to include information on environmental impacts of the proposed action; any adverse environmental impacts which cannot be avoided should the proposal be implemented; alternatives to the proposed action; and any "irreversible or irretrievable commitments of resources" which would be involved in the proposed action.

reau of Reclamation has determined that planning and construction of Garrison is a major Federal action affecting the environment and therefore requires an environmental impact statement.

In response to lawsuits brought by the Committee to Save North Dakota,[38] which alleged that an environmental impact statement was required for Garrison but none had been prepared, the Bureau of Reclamation issued a draft environmental impact statement on April 5, 1973, and a final statement on January 10, 1974.[39] The statement serves two functions: (1) As an overall impact statement for the Garrison Unit and (2) as a site specific statement for the principal supply works, including Snake Creek Pumping Plant, McClusky Canal, Lonetree Reservoir, Lincoln Valley irrigation area, and associated fish and wildlife areas.[40]

Proponents of Garrison have argued on numerous occasions in the past that the adequacy of the Garrison environmental impact statement has been upheld by the courts. The Committee's investigation has determined otherwise. During the subcommittee's November 19 hearing, Subcommittee Chairman Moorhead asked Mr. John Busterud, a member of the President's Council on Environmental Quality, whether the 1973 court suit involving Garrison upheld the environmental impact statement on its merits. Mr. Busterud responded:

> No, sir, not on its merits. The courts did deny a motion for preliminary injunction and there has been some publicity attributed to that. But the case on the merits has not been heard.[41]

While this does not suggest that the impact statement is necessarily deficient, it merely shows that the impact statement has not been legally tested for its sufficiency.

Segmented Environmental Assessment

The Bureau of Reclamation has chosen to utilize a segmented approach to environmental assessment which allows continued construction of portions of the Garrison project while environmental assessment proceeds on others. This approach was outlined by the Bureau of Reclamation in the final Garrison environmental impact statement, which stated that "additional detailed statements on portions of the Unit are believed to be desirable" and indicating that "detailed statements are planned for the three major sections of the project beyond the principal supply works, namely, the LaMoure and Oakes section, the Central North Dakota section, and the Souris section."[42] The Bureau's schedule for issuance of these supplemental impact statements is as follows:[43]

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[38] *Committee to Save North Dakota et al.* v. *Rogers C. B. Morton,* Civil Case No. 1198, filed December 11, 1972.

[39] Bureau of Reclamation, "Initial Stage, Garrison Diversion Unit Final Environmental Statement," January 10, 1974.

[40] Id., p. I–1.

[41] Hearings (Part 2), November 19, 1975, p. 33.

[42] "Garrison Diversion Unit, Final Environmental Statement," pp. I–1, I–2.

[43] January 21, 1976, letter from Warren Jamison, Garrison Project Manager, Missouri-Souris Project Office, Bureau of Reclamation, to Peter Gove, Director, Minnesota Pollution Control Agency.

Section, draft and final environmental impact statement

Oakes-LaMoure, March 1976,[44] January 1977.

Central North Dakota, November 1977, September 1978.

Souris Loop, November 1978, September 1979.

The segmented approach to environmental assessment has generated criticism from the Institute of Ecology, the Audubon Society, the Minnesota Pollution Control Agency, the Environmental Protection Agency (EPA), the President's Council on Environmental Quality (CEQ), and others. Broadly stated, these organizations allege that the environmental impact statement is inadequate because it does not provide sufficiently detailed information on the impacts of the project on wetlands, wildlife, neighboring states, and Canada early enough in the decisionmaking process to properly consider alternatives and make adjustments.

The Council on Environmental Quality's objections to the Garrison Project go back to June 1973 when that agency's initial comments were made on the draft environmental statement.[45] At that time, CEQ noted in a letter to Interior Secretary Rogers Morton the existence of "a number of serious omissions and problems with respect to the environmental impact statement and the project itself" and urged the Secretary to suspend the project until environmental questions have been resolved.[46]

CEQ testified before the Conservation, Energy, and Natural Resources Subcommittee that this continues to be its position today, During the hearings, Mr. John A. Busterud, a member of the Council, outlined six major reasons why CEQ is of the opinion that the Garrison environmental impact statement was not adequate:

> * * * One: Saline irrigation return flows from the project will have severe adverse impacts on water quality of both United States and Canadian waters. As you have heard, the United States and Canadian Governments have referred the transboundary aspects of this issue to the International Joint Commission. In recognition of this problem, the Bureau of Reclamation has under consideration a number of possible project modifications, which it has not yet made public. These alternatives may reduce adverse impacts on Canadian waters but are likely to increase project costs and adverse environmental impacts in the United States, particularly if additional return flows are diverted to the James and Red Rivers. Neither these possible project modifications nor their environmental impact are discussed in sufficient detail in the existing final environmental impact statement.
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> Two: Project construction will adversely affect large areas of existing fish and wildlife habitat including several State and national wildlife refuges; the adequacy of proposed mitigation measures has been questioned by several experts.
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> Three: The project will consume large amounts of electric power for pumping and irrigation, and will reduce the use of water for power generation and other purposes; these impacts have not yet been adequately evaluated.

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[44] The Oakes-LaMoure supplemental statement had not been filed as of April 15, 1976.

[45] June 15, 1973, letter from Russell E. Train, Chairman of the Council on Environmental Quality, to Rogers C. B. Morton, Secretary of the Interior, Hearings (Part 2), November 19, 1975, pp. 20–21.

[46] Id.

Four: Project construction and operation will not put new lands into agricultural production; rather, it will consume nearly 70,000 acres of presently productive land for construction of project features and will divert production on much of the irrigated lands from the production of small grains such as food crops suitable for export to the growth of feed for livestock with consequent reductions in caloric efficiency.

Five: The project will have as yet undetermined disruptive effects on groundwater in areas adjacent to the main canals and reservoirs.

Six: The high capital and operational costs of sprinkler-type irrigation will have social and other secondary impacts on existing family farm operations that have not yet been carefully studied.[47]

Mr. Busterud said that information on these environmental problems and possible alternatives to mitigate them should be available to Federal decisionmakers in advance of construction to prevent irreversible commitments of time and money to an undesirable alternative.[48]

The Deputy Administrator of EPA, John Quarles, expressed similar reservations about the adequacy of the Garrison EIS during his testimony before the subcommittee. He said "many environmental issues of a serious nature are yet to be resolved," and agreed with CEQ that the final Garrison environmental impact statement was inadequate:

* * * While the final EIS for the Garrison Diversion Unit presents more information than was contained in the draft EIS, we do not feel that the final EIS adequately addresses the "overall, cumulative impacts" of the projects.

In summary, EPA has very serious objections of an environmental nature regarding the completion of the Garrison Diversion Unit as outlined in the final EIS. Pending the resolution of the major environmental issues discussed in our attached comments, we are concerned about forthcoming construction activities which would commit the Bureau of Reclamation to an irreversible course of action, notwithstanding adverse environmental effects.[49]

EPA pointed to the inadequacies of the Garrison EIS in its comments on both the draft and the final versions of the statement. In its comment on the final environmental statement, the EPA said the document was "much improved" over the draft statement but that the many unresolved environmental problems left to future study necessitated EPA's classifying the statement as "category 3—inadequate." [50]

As mentioned earlier, the Bureau of Reclamation's environmental assessment strategy, as evidenced by their supplemental environmental impact statement schedule, is to continue construction of the principal supply works on the basis of the final Garrison EIS while continuing detailed environmental assessment work on outlying portions of the project that impact Canada, Minnesota, South Dakota, and Federal

[47] Id., p. 27.
[48] Id.
[49] Id., p. 111.
[50] August 1, 1973, letter from EPA Regional Administrator John A. Green to Gilbert G. Stamm, Commissioner, Bureau of Reclamation, Hearings (Part 2), November 19, 1975, Appendix 6, p. 284.

wildlife refuges in North Dakota. The Department of the Interior strongly defended this approach in testimony before the subcommittee. Assistant Secretary of the Interior Jack O. Horton disagreed that the Garrison environmental impact statement is inadequate and argued that "both the procedural requirements and the substantive requirements of the impact statement have been met in full." [51]

Mr. Horton's testimony to the contrary, the fact that the Bureau of Reclamation has recognized the need for supplemental environmental statements for the three major sections of the project is sufficient indication to the Committee that much of the environmental information necessary to determine the cumulative impacts of the project is lacking at this time. Further proof of the inadequacy of Interior's environmental assessment of the Garrison Diversion Unit is evidenced by the need for an International Joint Commission study of the environmental and economic impacts of Garrison on Canada; the absence of return flow studies on four of the five major rivers to be affected by Garrison; the absence of information as to how increased return flows in the Souris River will affect Federal wildlife refuges downstream from the irrigation area; and the serious concern of the Fish and Wildlife Service that the Garrison wildlife mitigation plan will not offset the wildlife and wetland losses from Garrison construction. Clearly, in the absence of detailed environmental analyses and data awaiting treatment in the proposed supplemental environmental impact statements for the Souris, Central North Dakota, and Oakes-LaMoure sections of the Garrison project, it is not possible for the Department of the Interior to determine adequately the full scope of the environmental impacts of the project.

The Committee therefore recommends that:

> Land acquisition and construction on the Oakes-LaMoure, Central North Dakota, and Souris sections of the Garrison Diversion Unit (and associated canals and reservoirs) not proceed until supplemental environmental impact statements have been completed and published for all three areas.

Absence of Information on Canadian Impacts

The Committee is particularly concerned that the International Joint Commission (IJC) will not benefit from detailed environmental assessment information on the Souris section. The Canadian-United States dispute over possible violations of section IV of the Boundary Waters Treaty of 1909 is not a recent international controversy.[52] The environmental questions raised by the Canadian government were well known to the State Department and the Bureau of Reclamation long before the draft environmental impact statement was published.[53] The water quality study for the Souris area was not forthcoming until

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[51] Hearings (Part 2), November 19, 1975, p. 60.

[52] Section IV of the Boundary Waters Treaty of 1909 contains an agreement between the United States and Canada that neither party will pollute the waters crossing the U.S.-Canadian boundary to the detriment of health and property of the other. The Canadian Government has objected to the Garrison Diversion Unit on grounds that irrigation return flows from the project would violate the treaty by causing harm to health and property of Canadians.

[53] Canadian Embassy notes to Department of State, No. 313 of October 19, 1971, and No. 35 of Jauary 25 1973, concerning the effect of water quality in the Souris River of proposed Garrison Diversion Unit.

May of 1974, five months after the final environmental statement was filed with CEQ. Furthermore, the Souris Loop draft supplemental environmental impact statement is last on the list for completion by the Bureau and will not be available until early 1978—almost three years after the IJC is scheduled to complete its study of the impacts of Garrison on Canada.

The untimely scheduled issuance of an impact statement on the Souris section of the Garrison project, nearly three years after the completion of the ongoing International Joint Commission study, is a matter of particular concern to the Council on Environmental Quality. Council member John A. Busterud, in an exchange with Chairman Moorhead, suggested that the IJC study might have been avoided had the Bureau done an adequate job on its initial impact statement:

> Mr. MOORHEAD. Is the International Joint Commission going to be studying the environmental effects of Garrison that should have been properly addressed in either the overall or supplemental environmental impact study?
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> Mr. BUSTERUD. Well, it's our feeling (t)hat if the impact study had been prepared properly and as we have suggested in our various exchanges of correspondence, the IJC reference might not have been necessary. I would not want to pass judgment on whether that would be true or not because when you have transboundary problems and the problem of credibility on each side it is sometimes necessary to make reference of this kind in any event.
>
> But we do feel the need for reference might very well have been reduced.[54]

The Committee agrees with the Council on Environmental Quality that inadequate information on environmental impacts perhaps contributed to, if not necessitated, an IJC reference by the State Department and the Canadian Government on the Garrison issue. The reference agenda (Appendix 1) agreed to by the two negotiating parties and the environmental and economic questions to be considered lies well within the Department of the Interior's responsibility to determine under the requirements of NEPA. The failure of Interior to develop and provide this information at this late date is inexcusable.

This matter is of even greater importance when considered in light of possible alternatives in the project necessary to accommodate Canadian concerns. The Bureau has already proposed at least nine different alternatives to the Garrison Diversion Unit which could eliminate or reduce irrigation return flows from entering Canadian waters.[55] Each of these alternatives carries with it a different set of environmental impacts, domestic and international. Almost all of them affect the Souris section of the project since this area represents the largest source of return flows to Canada under the present project plan. Whether the International Joint Commission looks favorably on one of the Bureau's suggested alternatives or whether it chooses its own, a knowledge of the environmental impacts of the present plan is essen-

[54] Hearings (Part 2), November 19, 1975, p. 33.
[55] Hearings (Part 1), September 15, 1975, pp. 75–77.

tial before the State Department can determine whether domestic environmental problems will be increased as a result of the IJC recommended alternative. If the Souris Loop environmental impact statement is not due for three years, how are the State Department and the Bureau of Reclamation to know whether the IJC alternative is environmentally acceptable to the United States? Clearly, they will not know unless the Souris supplemental environmental impact statement is developed as soon as possible and before completion of the IJC study.

It should be noted that the Bureau of Reclamation is not without funds to accomplish this task. The sum of $1 million in additional funds was included in the fiscal year 1976 public works appropriations act specifically for acceleration of return flow and other environmental studies necessary to determine the impacts of Garrison on neighboring states and Canada.[56] A portion of funds have been spent on recent water quality studies.[57] In the Committee's view, the remainder of this appropriation could be combined with normal environmental assessments funds to complete supplemental impact statements.

Inadequate Wetland Impact Data

Another indication of the inadequacy of the Department of the Interior's Garrison environmental assessment effort is evidenced by recent information revealed during the subcommittee's hearings, which indicates much greater wetland losses than originally anticipated and the possible adverse impacts to eight national wildlife refuges in the Dakotas. During the November 19 hearing, the Assistant Secretary of the Interior for Fish and Wildlife and Parks, Nathaniel Reed, testified that recent Fish and Wildlife Service wetland inventories have determined that wetland losses in the Oakes-LaMoure and Lincoln Valley sections of the project will be 2½ times greater (from 4,400 acres to 12,334 acres) than envisioned in the final Garrison environmental impact statement.[58] While inventories have yet to be completed for the other 75 percent of the project, these new figures indicate that wetland losses will be much greater than estimated in the Final Environmental Statement (FES).[59] This calls into question not only the adequacy of the Garrison environmental impact statement—which apparently was based on sadly outdated wetland inventories—but the adequacy of the revised Garrison wildlife mitigation plan and the fate of certain Federal wildlife refuges as well. According to Assistant Secretary Reed, the revised wildlife mitigation plan will not be able to offset wetland losses resulting from Garrison construction.[60]

Another problem raised by Assistant Secretary Reed concerned the findings of a recent Bureau of Reclamation study of projected Souris River irrigation return flows resulting from Garrison.

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[56] Senate Report 94–504, to accompany H.R. 8122, "Public Works for Water and Power Development and Energy Research Appropriations Bill, 1976," December 4, 1975, p. 89. This report concurs with the House that $1 million be appropriated for fiscal year 1976 for the Garrison Diversion Unit "to accelerate the return flow studies of the unit. The purpose of these studies is to develop more definitive answers with respect to effects of the Garrison Diversion Unit on the quality and quantity of flows in the Souris, Red, and James Rivers as a sound basis for environmental decisions to construction of the unit."

[57] Bureau of Reclamation contract (No. 6–07–01–01320) with HARZA Engineering Company, June 26, 1975, was for $122,732.

[58] Hearings (Part 2), November 19, 1975, p. 68.

[59] February 24, 1976, letter from Assistant Secretary of the Interior Nathaniel Reed to Subcommittee Chairman Moorhead, Hearings (Part 2), November 19, 1975, p. 5.

[60] Id., p. 34.

The Bureau of Reclamation's FES of January 1974 states, "The Souris River will receive about 63,000 acre-feet of return flow annually from Garrison Diversion Unit irrigation in the Souris Loop Area." [61] A May 1974 report by the Bureau of Reclamation entitled, "Irrigation Return Flows to the Souris River and Canada," related not only the 63,000 acre-feet of return flow but also an additional 44,000 acre-feet from "canal seepage" and "operational wastes", or a total of 107,000 acre-feet.[62] Flows are also expected to be greater than anticipated in the James and Red rivers.

The Fish and Wildlife Service fears that increased return flows in the Souris, Red, Wild Rice, Sheyenne and James rivers could adversely impact as many as eight National Wildlife Refuges that lie in the path of the project. (See Chapter IX.)

Clearly, wetland and wildlife impact data is in a dynamic state at a point in time when proper assessment of such impacts should have already been accomplished. The Committee shares Assistant Secretary Reed's concern that National Wildlife Refuges could be flooded by return flows from Garrison, and as a result, the Conservation, Energy, and Natural Resources Subcommittee asked the Fish and Wildlife Service to prepare a report evaluating the impact of Garrison on the National Wildlife Refuges in North Dakota.[63] (The results of this report are discussed in Chapter IX.) Furthermore, the Committee believes the errors in the final Garrison environmental impact statement highlight the critical need for immediate assessment of the impacts of Garrison on waterfowl, wildlife, and wetlands. This can be done by accelerating the schedule for completion of supplemental environmental impact statements for the Souris, Central North Dakota, and Oakes-LaMoure sections of the project, assuming the Lincoln Valley impacts would be addressed in the Central North Dakota statement, and by developing a separate supplemental impact statement to discuss wildlife refuge impacts (see p. 79).

Possible Garrison-Coal Development Conflicts

North Dakota is underlain with 350 billion tons of lignite coal reserves.[64] Neither Interior's Final Garrison environmental impact statement nor its programmatic Coal Leasing Environmental Impact Statement [65] contain adequate discussions as to the possible conflicts that could result in North Dakota between Garrison-served irrigated agriculture and accelerated coal development that is expected in western North Dakota during the next decade. As a result, the Committee's investigation focused on four potential problems with accelerated coal development: (1) The extent of expected coal development in North Dakota; (2) the extent of possible pollution of lakes and streams from coal waste; (3) the adequacy of area water supply to service accelerated energy development, irrigated agriculture and other uses simul-

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[61] "Garrison Diversion Unit. Final Environmental Statement," p. III–16.

[62] Bureau of Reclamation, "Irrigation Return Flows to the Souris River and Canada," May 1974, p. 28. Recent Bureau of Reclamation water quality studies (June 1976) have estimated the return flows entering the Souris River will average around 82,000 acre-feet per year.

[63] U.S. Fish and Wildlife Service, "An Evaluation of the Impacts Caused By the Garrison Diversion Unit in North Dakota," (March 1976).

[64] Id., p. 34.

[65] Department of the Interior, "Final Environmental Impact Statement. Proposed Coal Leasing Program," 1975. The water quality impact of coal development discussed in the Coal Leasing impact statement deals mostly with groundwater hydrology. These discussions are quite general in nature and the impact on irrigated agriculture as it would pertain in the subject region is not specifically addressed.

taneously; and (4) the possibility that irrigable lands could be converted to coal development at some future date.

At the request of the subcommittee chairman, Assistant Secretary of the Interior Jack O. Horton devoted a portion of his November 19, 1975, testimony to the coal problem. Mr. Horton told the subcommittee that the Interior Department had determined that "there should be no major or insoluble problems from coal mining operations" in North Dakota.[66] He based this finding on two assumptions: one, that lignite reserves will be developed slowly because of needed improvements in coal gasification technology and two, most North Dakota coal deposits do not underlie areas to be serviced by the Garrison Diversion Unit. According to Mr. Horton:

> The major deterrent to mining of North Dakota lignite is the abundance of higher rank coals available in adjacent States. The North Dakota lignite minable by surface methods will become economically desirable when the cost of fuels produced by gasification or liquefaction is competitive with the cost of natural hydrocarbon fuels. The vast resources of lignite not amenable to surface mining will require a breakthrough in mining technology to be of economic value. * * * The effects of coal mining will not have a discernable impact on irrigation. The Garrison diversion unit will be separate from coal development opportunities which are almost entirely west of the Missouri River while irrigation will be primarily to the east.[67]

While coal deposits may not underlie areas to be irrigated, as Interior asserts, substantial deposits do lie within the Missouri and Souris drainage basins.[68] In the event coal gasification technology can be improved to the point that lignite mining can be profitable, the potential coal mine runoff problems could increase pollution in water diverted for irrigation. This could result in it being unusable for irrigation or other purposes.

Interior's contention that higher rank coals than lignite are available in adjacent states has apparently not been a deterrent either to industry or the Federal Government in pursuing coal development in North Dakota.

Large acreages of North Dakota lignite are already under lease by major gas companies who hope to build coal gasification plants in the area in the near future. One company, American Natural Gas (ANG) Coal Gasification Company, has applied to the Bureau of Reclamation for 17,000 acre-feet of water for a coal gasification plant south of Lake Sakakawea near Beulah, North Dakota.[69] Another company, Michigan-Wisconsin Pipeline Co., plans to build a gasification plant in the 1980's in western North Dakota. These two companies alone propose 8 coal mines and 6 gasification plants to be served by a combined coal reserve of 5.8 billion tons.[70]

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[66] Hearings (Part 2), November 19, 1975, pp. 41 and 53.
[67] Id., p. 53.
[68] Id., p. 34. The Interior Department reports that 2.881 billion tons of demonstrated coal reserves lie north of the Garrison Reservoir in the Missouri River Basin and 641 million tons lie in the Souris River drainage area.
[69] Remarks of Secretary of the Interior Thomas S. Kleppe before the 3rd Annual Water Conference. Fargo, N. Dak., February 18, 1976. Also, see Hearings (Part 2), November 19, 1975, p. 39.
[70] Hearings (Part 2), November 19, 1975, p. 39.

Meanwhile, the Federal Government has devoted much time and money to revising its coal leasing program, strengthening its mine reclamation policies and assessing the potential of coal development in North Dakota through the Northern Great Plains Resources Program.

Created in June of 1972, the Northern Great Plains resource assessment study was pursued cooperatively by the Departments of the Interior and Agriculture, the Environmental Protection Agency, and the States of Montana, Wyoming, Nebraska, North Dakota, and South Dakota.[71] During the three years of the study's existence, data on resource and environmental values in the five-state Northern Great Plains region were gathered and utilized to project the implications of various assumed rates of development for the coal resource. Their report was issued in August 1975 and reveals that at the most probable level of coal production, there would be mined slightly more than 362 million tons of coal per year in the Northern Great Plains in the year 2000.[72] This compares to 598 million tons mined in all 50 states during 1973.[73] The magnitude of coal development expected indicates that a very real possibility could exist for rapid coal development in North Dakota and the Northern Great Plains over the next 25 years, to be accompanied by many of the environmental and social problems that have traditionally been associated with this industry.

Both the Department of the Interior and the Environmental Protection Agency testified that they did not expect coal development in western North Dakota to cause major water pollution problems similar to those that have occurred in eastern states in the past. According to the Interior Department:

> The primary problem in West Virginia and Pennsylvania has been acid mine drainage because Eastern coals are typically of high sulfur content, the area receives relatively high rainfall and generally has high water tables, and the coal is usually mined in hilly country that accelerates runoff. Also, most of past mining in the East was by underground methods where the water was able to collect in old workings thereby promoting the oxidation of the pyrite.
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> Siltation of stream waters has occurred where soils are easily erodible, rainfall is high, sufficient precautions were not taken to control the runoff, and mining was not followed by adequate reclamation and revegetation.
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> * * * * *
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> Similar problems are not expected to occur in North Dakota. The sulfur content of North Dakota lignite is low, rainfall is about one-third that in the eastern U.S., the water table is generally deeper, and the terrain is much flatter. Also, under State and Federal regulations where backfilling, grading, and revegetation follow mining in a regular pattern, runoff from surface mining should be minimized. Meteoric runoff of the coal producing area of Pennsylvania and West Virginia is 15 to 120 times greater than that in the lignite

[71] "Report of the Northern Great Plains Resources Program," August 1975.
[72] Id., p. III–24.
[73] October 6, 1975, Department of the Interior press release highlighting major findings of U.S. Geological Survey report "Coal Resources of the United States," (Jan. 1, 1974).

area of North Dakota. Runoff in the eastern area amounts to 15–30 inches per year while that in North Dakota area amounts to ¼–1 inch per year.[74]

The Environmental Protection Agency told the subcommittee that under the existing Garrison plan "there is certainly a possibility that non-point sources from coal development could be transferred via the Garrison Diversion Unit to other drainage basins." [75] However, EPA said it did not consider this to be a significant problem because of the possibility of dilution of runoff in the giant 24 million acre-foot Lake Sakakawea prior to diversion and because EPA expects the effectiveness of its National Pollution Discharge Permit System to prevent coal mine waste from entering the system.[76]

The Committee has no reason to question that the analysis of the potential pollution from coal waste given by EPA and the Department of the Interior is other than correct. However, the Committee is concerned that there have been no studies linking simultaneous acceleration of Federal coal leasing and operation of the Garrison Diversion Unit as presently planned.[77] The Committee feels that the impacts of these two Federal actions are not being considered in concert with each other and that a realistic examination of the possible conflicts between coal development and agriculture in North Dakota should be undertaken.

The Committee therefore recommends:

> The Department of the Interior, in conjunction with the Environmental Protection Agency, undertake an assessment of the possible impacts of accelerated coal development on water quality and irrigated agriculture in the Missouri River and Souris River Basins, including possible impacts on Canada and neighboring states that could result from interbasin water transfers from Garrison. A substantive discussion of expected coal impacts should be included in each supplemental environmental impact statement proposed for the three major sections of the project.

The subcommittee's inquiry did not reveal any evidence that irrigation areas designated to receive Garrison water allocations could be subject to future coal development. Assistant Secretary of the Interior Jack Horton told the subcommittee that

> None of the 116,000 acres in the Souris River basin that are proposed for irrigation have minable lignite since they lie east of the Fort Union (coal) formation.[78]

The Committee concurs with the Interior that this will not be a major problem if the geological assessment is correct.

The Committee was concerned that development of coal could greatly increase water use in the Upper Missouri. However, the Committee has been assured by representatives of the Department of the Interior that water availability for competing uses in the Missouri River Basin should be adequate. The Committee learned that a number of stu-

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[74] Hearings (Part 2), November 19, 1975, p. 42.
[75] Id., pp. 115–116.
[76] Id., p. 116.
[77] Id., p. 40.
[78] Id., p. 52.

dies have been done on water availability in the Upper Missouri River Basin.[79] Interior Department officials told the subcommittee that one report, "Water for Energy in the Northern Great Plains," indicates that energy needs, including revegetation, could range between about 600,000 acre-feet and slightly over 1 million.[80] Assistant Secretary Horton said:

> We have determined that during the next 50 years, at least 1 million acre/feet annually are available from the Missouri River mainstream reservoir system to meet energy water requirements without infringing on other project water uses.[81]

In addition, the Interior Department announced on February 3, 1976, the commencement of a study to be done by the U.S. Geological Survey, which will determine availability of ground water in the Powder River Basin that can be used for future energy production in a five-state area including North Dakota. This study will focus on the Madison Limestone Aquifer, an untapped resource which underlies much of the region.

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[79] The following studies have been by Interior and other agencies covering various aspects of water allocation in the Upper Missouri River Basin: (1) Missouri River Basin Comprehensive Framework Study, December 1971; (2) Appraisal Report on Montana-Wyoming Aqueducts, Bureau of Reclamation, April 1972; (3) Water for Energy in the Northern Great Plains Area with Emphasis on the Yellowstone River Basin, Department of the Interior, January 1975; (4) Northern Great Plains Resource Program, April 1975; (5) Water Resources Council National Assessment, in process to be published early 1976 (Interior having made major input to this study). Hearings (Part 2), November 19, 1973, pp. 43–44.

[80] Id., p. 53.

[81] Id.

VI. CANADIAN, MINNESOTA, AND SOUTH DAKOTA CONCERNS

Findings

A. The Canadian government has objected to the continued construction of the Garrison Diversion Unit as presently planned on grounds that return flows from the project will be injurious to health and property in Canada in violation of the Boundary Waters Treaty of 1909. However, the Canadian Government has agreed to the International Joint Commission reference to determine the impacts of Garrison on Canada.

B. Confusion over differing Bureau of Reclamation analyses of return flow levels in the Souris River has prevented a determination as to whether Garrison would cause harm to health and property in Canada.

C. To determine whether the Boundary Waters Treaty of 1909 would be violated by the Garrison Project as presently planned, the Canadian and U.S. governments have referred the matter to the International Joint Commission for study.

D. Canadians are also concerned about possible flooding that could occur along the Souris and Red rivers in Canada as a result of increased streamflows.

E. The Minnesota Pollution Control Agency (MPCA) objects to the Garrison Project on grounds that it will cause further pollution of the Red River of the north, which serves as Minnesota's western boundary.

F. The South Dakota legislature is concerned that alternatives being considered by the International Joint Commission and the Bureau of Reclamation to reroute Garrison return flows into the Missouri and James rivers could increase pollution and flooding of South Dakota waters.

G. Citizens of northeastern South Dakota (Brown County) are concerned about possible pollution and flooding of the James River from the existing Garrison Diversion plan and object to a proposed 6,000-acre wildlife mitigation area planned in the Hecla, South Dakota, area.

Canada, the Minnesota Pollution Control Agency, and the South Dakota State Legislature voiced strong concern over adverse effects Garrison irrigation return flows could have on rivers and streams flowing across or along their borders. Perhaps the strongest opposition to the project has come from the Canadian government, which has asked the State Department to halt the project on grounds it would cause harm to health and property of Canadian citizens and as a result, violate the Boundary Waters Treaty of 1909.[82] Minnesota and South

[82] Article IV of the Boundary Waters Treaty of 1909 provides in part that "boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health and property of the other."

Dakota are similarly concerned about possible degradation of water quality in domestic rivers and streams from the completion of the existing plan. However, these states have expressed additional fears that alteations of the Garrison project plan resulting from accommodation of Canadian objections, could cause additional water quality, flooding, and wildlife impacts on this side of the border by increasing return flows in domestic streams. This chapter will summarize the major problems which Garrison holds for Canada, Minnesota, and South Dakota and what is being done at the Federal and State level to address these problems.

Canadian Impacts

According to State Department testimony given the subcommittee on November 19, 1975, the water quality dispute between Canada and the United States over Garrison began in early 1970.[83] The history of negotiations beginning at that time and proceeding to the present was outlined by Deputy Assistant Secretary of State Richard D. Vine:

> The transboundary effects of the Garrison Diversion Unit have been a matter of discussion between the United States and Canadian Governments since early 1970. At that time, the Government of Canada asked to be provided specific information about the project in view of its potential effects on the Souris River in the Province of Manitoba. This information was made available in mid-1970.
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> A little over a year later, in October 1971, the Government of Canada informed the Department that the anticipated changes in water quality in the Souris River were unacceptable, and proposed a meeting between officials of the two Governments to discuss measures which might appropriately be taken to ensure that the quality of the water of the Souris River passing into Canada did not fall below its present level. The U.S. Government agreed to a meeting, which was held in early 1973. During the meeting, the two Governments agreed to establish a technical working group to discuss the project's potential transboundary effects. The technical working group met only once. On that occasion, the Canadian Government took a new position, that the United States should make substantive guarantees that there would be no change in the river's water quality prior to technical discussions.
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> In October 1973, the Canadian Government first formally indicated its conclusion that the Garrison Diversion Unit would result in a violation of article IV of the Boundary Waters Treaty. The Canadian Government also expanded its concern to include the Red River, and urgently requested that the Government of the United States establish a moratorium on all further construction of the Garrison Diversion Unit until an understanding could be reached as to Canadian rights and interests.
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> In response to this indication of concern, the Department of State formally advised the Canadian Government in Feb-

[83] Canada dates the beginning of formal diplomatic exchanges on Garrison from 1969, Hearings (Part 2), November 19, 1975, p. 6.

ruary 1974 that the United States would abide by its obligations under the Boundary Waters Treaty and that no construction of project works potentially affecting Canada would be undertaken until it was clear that those obligations would be met. All concerned U.S. Government agencies concurred in this position.

Between February 1974 and January 1975 continuing technical exchanges took place between the two Governments in the form of studies by both United States and Canada officials on the project's likely transboundary effects, a meeting of United States and Canadian technical representatives, and a visit by Canadian technicians to the project site and to the Bureau of Reclamation's computer center.

These technical exchanges established the basis for a meeting of senior officials of both Governments in January 1975. The outcome of that meeting was an ad referendum decision to consider a reference to the International Joint Commission or a similar body to study the problem and to make recommendations which would help assure that a treaty violation would not occur. Negotiation of the text of a reference to the Commission was completed in August 1975. The text was promptly approved by all concerned U.S. Government agencies, and after approval by the Canadian Cabinet, the bilateral reference was submitted to the International Joint Commission on October 22, 1975. The reference is broadly based, encompasses all areas of present and potential dispute, and authorizes the Commission to look into any matter it deems relevant.[84]

The Embassy of Canada filed a statement with the Committee on November 19, reiterating its opposition to the Garrison project, and concluding that the "project as now envisaged would have adverse effects on the Canadian portions of the Souris, Assiniboine, and Red Rivers, and on Lake Winnipeg, which would cause injury to health and property in Canada in contravention of Article IV of the Boundary Waters Treaty of 1909." [85]

The formal Canadian objections point solely to adverse water quality impacts that could result from increased irrigation return flows in the Souris, Red, and Assiniboine rivers and Lake Winnipeg.[86] Canada's position is based on information contained in Bureau of Reclamation technical studies—including the final Garrison environmental impact statement and the Souris River return flow study—and Canadian technical studies.

The water quality situation is discussed in greater detail in Chapter 7 of this report. In essence, the recently completed water quality study done by the Harza Engineering Company (hereinafter referred to as "The Harza Water Quality Study") at the request of the Bureau of Reclamation indicates that return flows from Garrison entering the Souris River in a typical year (1967) would amount to an average of 95,300 acre-feet per year, or a 160 percent increase over average his-

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[84] Hearings (Part 2), November 19, 1975, pp. 3–4.
[85] This statement is reprinted in part 2 of the hearing record, November 19, 1975, p. 6.
[86] Canada has, however, expressed concern that increased streamflows could cause flooding along the Souris River in Canada though this has not become an item for negotiations. Statement of Deputy Assistant Secretary Richard D. Vine, Id., p. 7.

torical Souris River lows.[87] Furthermore, this study indicates that maximum concentrations of total dissolved salts (TDS) would be increased by the project, maximum concentrations of salts would increase in the spring and early summer and decrease during the winter, late summer and fall as a result of dilutions.[88] Total salt loading in the river, however, would be increased by an undetermined amount also. The report found that there would be little change in dissolved oxygen levels; phosphate levels would increase slightly; and nitrate concentrations would "increase greatly." [89]

While the report concludes that "With the Project return flows, maximum concentrations near the Canadian border will be lower than at present for all constituents except nitrate," [90] it points out that "average annual TDS concentration will be increased from 600 mg/l at present to around 800 mg/l." [91] (Mg/l-milligrams per liter of water.) In short periods of very high concentrations salt occurring in the river during low flow would be reduced, but, on the whole, salt content in the river will be increased by an average of 25 percent by Garrison.

Water quality impacts from Garrison on the Red River of the North are not expected to be as pronounced as in the Souris when measured in terms of maximum concentration of salts for an average year, but are, nevertheless, significant. Flows at the Canadian border are expected to increase by an average 45,960 acre-feet per year (or about 2 percent of present flows).[92] Maximum concentrations of TDS by 50 mg/l, and nitrates by .17 mg/l.[93] Also, in the case of the Souris, total amounts of salt and nitrates in the river will be increased by an undetermined amount.

The Canadian government argues that based on the data examined, water quality impacts will be pronounced and continuing.[94] The Bureau, on the other hand, contends that despite possible short-term degradation, water quality will eventually stabilize over time to the point that the quality of water crossing the boundary could actually be improved.[95] This analysis is disputed by EPA, CEQ, and the Canadian government.

Though officials of the two countries disagree on their interpretations of the data presented, there is no disagreement over the fact that short- and long-term water quality degradation will in fact occur in the Souris and Red rivers.[96] Therefore, the major points of contention

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[87] May 1976 Report prepared by the Harza Engineering Co. for the Bureau of Reclamation entitled "Garrison Diversion Unit, Effect of Return Flows on Receiving Waters," p. IV–2. In previous studies, the Bureau of Reclamation has estimated return flows entering the Souris at 65,000 acre-feet (1972 Souris River Return Flow Study) and 107,000 acre-feet (1974 Souris River Return Flow Study).

[88] Id., p. IV–3.

[89] Id., pp. IV–3 to IV–6.

[90] Id., p. IV–3.

[91] Id., p. IV–9.

[92] Bureau of Reclamation, "Summary Report of Water Quality Study, Garrison Diversion Unit, North Dakota," June 1976, p. III–18.

[93] Harza Water Quality Study, p. VIII–6.

[94] Canada has stated that increases in total dissolved solids (TDS) in the Souris and Red Rivers will have a detrimental effect on municipal and industrial water users along those rivers as well as producing an adverse impact on the flora and fauna of the river systems. They are also concerned about the total effect of the dissolved solids entering Lake Winnipeg. Canada has stated that potential increase in magnesium sulphate and calcium sulphate in return flows would result in increased water treatment cost on the Souris, Red, and Assiniboine Rivers. Canada has asserted that there will also be a resultant increase in nitrate nitrogen in the rivers and lake system which would result in additional algae growth, water treatment problems, restricted recreational opportunities and potential harm to fish. Canada has also expressed concern that pesticides and herbicides residues may be present in return flow waters and that there will be an increase in total hardness.

[95] Hearings (Part 1), September 15, 1975, p. 14.

[96] January 30, 1974, memorandum from Thomas R. Pickering, Executive Secretary, Department of State, to Maj. Gen. Brent Scowcroft, The White House.

have centered on the extent and scope of pollution and whether it would constitute injury to health and property in Canada contrary to the provisions of Article IV of the Treaty.

The failure of Canada and the United States to agree at the negotiating table as to whether health and property of Canadian citizens would be injured by construction and operation of Garrison as presently planned led to a decision in January of 1975 to refer the matter to the International Joint Commission for study.[97] By October 1975, the terms of reference were agreed to and the IJC was asked to examine the transboundary implications of the Garrison project and make recommendations as to such measures as might be taken to assist the Canadian and U.S. governments in ensuring that the provisions of Article IV are honored.[98] Deputy Assistant Secretary of State Vine told the subcommittee that the IJC study should be completed by October 31, 1976, and meanwhile, "the United States will continue its self-imposed moratorium on project works potentially affecting Canada."[99] He said one important byproduct of the IJC study would be the development of a mutually acceptable data base on which a decision by both countries could be based:

> * * * The need for such a common base is acute given the nature of the transboundary streams concerned which have widely fluctuating stream flow and water quality conditions. In addition, such a shared data base assumes great importance because of the substantial revisions of the predicted environmental effects of the Garrison Diversion Unit as expressed in the Bureau of Reclamation's report entitled, "Irrigation Return Flows to the Souris River and Canada" of May 1974. The impacts predicted in that report vary considerably from the impacts predicted in the Bureau's final environmental statement of January 10, 1974. * * * [100]

Mr. Vine implied that the confusion caused by the inconsistency of Bureau data has prevented a State Department determination as to "whether continuation of the project, as presently conceived, would result in injury to health and property in Canada." He conceded that "There may . . . be a continuing possibility that such injury will result, and this possibility is a source of concern to the Department."[101]

Any alternative to Garrison as presently planned that may be recommended by the IJC will not be binding on either party. However, as Mr. Vine pointed out in response to a question from Representative Gilbert Gude of Maryland, the procedures employed by the IJC in compiling and analyzing the data builds objectivity into the process, which will be helpful in securing agreement on the data base:

> Mr. GUDE. Is there a working relationship between the two Governments and the IJC to insure that when the Commission's report does materialize, there will be no questioning of the type of data used and the significance of the data? In other words, is there a mechanism for technical working agreements so that the work of the IJC will be productive?

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[97] Statement of Deputy Assistant Secretary of State Richard D. Vine, Hearings (Part 2), November 19, 1975. p. 4.
[98] Hearings (Part 2), November 19, 1975, Appendix 4, pp. 221–24.
[99] Hearings (Part 2), November 19, 1975, p. 4.
[100] Id.
[101] Id.

> Mr. VINE. One of the beauties of the IJC over the years is that in addition to providing its own neutral expertise, staff, and insights into the problem, it draws upon the technical expertise of the two Governments. The Commission's board, which is already formed, incorporates a large number of the key officials working on this matter in this Government, and on the Canadian side as well, incidentally, as people with technical expertise who are not in any way affiliated with the Governments. And we expect that this process, as it has in the past, will produce technically superior data which are agreed and which Governments will accept. I think that the track record of the IJC on this kind of thing has been very good indeed.[102]

Mr. Vine said while there is no assurance that the governments will abide by the IJC recommendations, "it is implicit that if governments give instructions to a neutral commission to come out with a report," the findings will be accepted unless there is evidence of undue influence by one country or the other.[103] Vine said the State Department expects to abide by the findings and would expect Canada to do likewise without surrendering the freedom to make judgments about the implications of the findings.

While an agreement over Garrison appears within reach with the IJC reference, it may be that the present Garrison plan will emerge from the proceeding in some altered form. Alternatives available to the IJC are numerous, each with a different set of problems and costs. It seems certain that if the Canadians persist in their opposition to Souris and Red river irrigation return flows, an alternative reducing or neutralizing return flows will be required. Since both countries reserve the right to refute the IJC's data base and ignore its recommendations, the Congress cannot be assured at this point that the IJC recommendations will be enough to satisfy the Canadians nor be acceptable to the United States.

Some Canadians fear other impacts from Garrison besides water quality degradation and the resulting economic impacts. The Manitoba Environmental Council, testifying before the subcommittee in Bismarck, N.D., outlined a number of other adverse impacts expected from Garrison. These are summarized in the following paragraph from the Manitoba Environmental Council's report on "The Impacts of the Garrison Diversion Unit on Canada":

> * * * Additions of water to the Souris and Red Rivers will increase the potential for flooding along those rivers. It will also provide additional water for beneficial uses in Canada such as municipal water supplies and generation of additional hydro-electric power. The loss of wetlands and increased incidence of botulism in waterfowl in North Dakota may reduce waterfowl populations in Canada. Exotic species of fish, plants, aquatic invertebrates, bacteria, and viruses which may enter the Red River drainage basin when the historically separated Red and Missouri River basins are joined may have detrimental impacts on fish and other aquatic organisms in the Red River basin.[104]

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[102] Id., p. 10.
[103] Id.
[104] Hearings (Part 1), September 15, 1975, p. 252.

Since the Canadian government has not formally objected to the Garrison project on the basis of adverse impacts other than water quality degradation, the Committee will not deal at length with those other problems. The Committee does believe, however, that the Bureau of Reclamation should give serious attention to all adverse impacts from Garrison which could result in Manitoba and Canada generally, even though they might not be the subject of formal Canadian objections. This could be accomplished through the NEPA process, which extends to impacts of major Federal actions on neighboring countries. The Committee therefore recommends:

> The Department of the Interior provide detailed analyses in supplemental environmental impact statements of the effects on Canada of the Garrison project on flooding, municipal water supplies, hydro-electric power generation, wetland loss, increased wildlife and waterfowl diseases, and introduction of exotic species into Canadian waters.

It should be noted that officials of the Bureau of Reclamation indicated during the course of the subcommittee's hearing in Bismarck that the Canadian opposition to the Garrison project was based more on emotionalism than fact. It is the Committee's opinion that this attitude is neither realistic nor accurate.

The significance being given resolution of the Garrison issue by Canadian and U.S. officials was strongly emphasized by Deputy Assistant Secretary of State Vine, who told the subcommittee,

> * * * The Garrison Diversion Unit has been a major concern of the Canadian Government over the past several years. Prime Minister Trudeau raised this matter with President Ford during their meeting last December. At that time, the President assured the Prime Minister that the United States would abide by its commitments to Canada. The issue was again raised during Secretary Kissinger's visit to Ottawa last month. The Government of Canada continues to view the potential impact of the project on Canadian waters with the most serious concern. It has made its views known to the Congress through the Department of State. A copy of the Canadian statement transmitted to Members of Congress as well as the most recent statement of Canada's position have been submitted for the record.
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> Failure of the two Governments to reach a mutually agreeable settlement could have an effect on overall environmental and other cooperation with Canada. * * * [105]

The Committee is convinced that Canadian objections to the Garrison project are serious and that a proper solution to the return flow problem is essential to the continuation of good diplomatic relations. Every effort should be made by the Administration to assure an equitable agreement is reached.

Minnesota's Concerns

The Red River of the North forms the boundary between a portion of eastern North Dakota and northwestern Minnesota and would be

[105] Hearings (Part 2), November 19, 1975, p. 5.

impacted by the Garrison Diversion Unit by irrigation return flows from the Sheyenne and Wild Rice rivers. The Sheyenne River would carry irrigation return flows originating in central North Dakota (Warwick-McVille and New Rockford areas) to the Red River. The Wild Rice River would drain return flows from the East Oakes section of the Project in southeastern North Dakota into the Red River.

Water quality standards for the Red River have been promulgated by the Minnesota Pollution Control Agency as required by State and Federal law. The specific water quality regulation applicable to the Red River is Minnesota Regulation WPC–15 (Criteria for the Classification of the Interstate Waters of the State and Establishment of Standards and Purity). This regulation contains levels for some 39 physical, chemical, bacteriological, and radiological parameters as well as several biological parameters.[106]

Minnesota is concerned that the Garrison Diversion Unit could cause violations of these standards.

The Garrison Final Environmental Statement does not include adequate consideration of Minnesota water quality standards. According to the Council of Environmental Quality's guidelines for preparation of environmental impact statements by various Federal agencies, "the relationship of the proposed action to land use plans, policies, and controls" is required to be considered. The regulations go on to explain that:

> * * * This requires a discussion of how the proposed action may conform or conflict with the objectives and specific terms of approved or proposed Federal, State and local land use plans, policies, and controls, if any, for the affected area including those developed in response to the Clean Air Act or Federal Water Pollution Control Act Amendments of 1972. Where a conflict or inconsistency exists, the agency has reconciled its proposed action with the plan, policy or control, and the reasons why the agency has decided to proceed notwithstanding the absence of full reconciliation.[107]

In the Committee's opinion, the Bureau has not satisfied the CEQ guideline requirements with regard to Minnesota's jurisdiction and concerns.

Inquiries to the Bureau of Reclamation by MPCA asking for a determination as to whether Minnesota standards for the Red River would or would not be violated by Garrison produced general and unsupported assurances.[108] (A return flow study for the River is in progress.)

The Committee therefore recommends that:

> The Bureau of Reclamation comply with its responsibilities to reconcile the Garrison Diversion Unit with plans, policies and controls of Minnesota pursuant to 40 CFR 1550.8(a)(3)(11) of the President's Council on Environmental Quality and in conformance with the requirements of the Federal Water Pollution Control Act, P.L. 92–500.

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[106] These standards are detailed in an October 18, 1974, letter from Minnesota Pollution Control Agency Director, Grant J. Merritt, to Robert L. McPhail, Regional Director, Bureau of Reclamation, reproduced in Hearings (Part 1), September 15, 1975, pp. 749–51.

[107] 40 CFR 1500.8(a)(3)(11).

[108] See Hearings (Part 1), September 15, 1975, Appendix 2, pp. 718–808, for correspondence between the Minnesota Pollution Control Agency and the Bureau of Reclamation concerning possible violation of Minnesota water quality standards.

Like Canada, the Minnesota Pollution Control Agency rejects claims made by the Bureau of Reclamation that the Red River water quality will be enhanced as a result of dilution of the river water with Garrison return flows.[109] MPCA is concerned that dilution is contrary to Minnesota law, which directs the Minnesota Pollution Control Agency to encourage waste treatment, including advanced waste treatment, instead of stream low-flow augmentation for dilution purposes to control and prevent pollution.[110] The Final Environmental Statement for the Garrison Diversion Unit and other documents of the Bureau specifically indicate that dilution will be used as a means for mitigating impacts associated with return flow accruals from the project.[111] The Committee believes this concept is contrary to the policies established in the Federal Water Pollution Control Act Amendments of 1972 (section 102(b)), which specifically provides that "storage and water releases shall not be provided as a substitute for adequate treatment or other methods of controlling waste at the source."

The Committee therefore recommends that:

> Methods for treatment of pollution from the Garrison Diversion Unit be in compliance with applicable Federal and State laws, including section 102(b) of the Federal Water Pollution Control Act Amendments of 1972.

The Committee further recommends that:

> Dilution of rivers and streams should not be used to achieve compliance with applicable Federal and State water quality standards.

MPCA has also expressed concern that the Bureau has not considered secondary impacts from the Garrison project (which include potential changes in municipal, industrial, agricultural, and recreational uses of the Red River) or the social and economic impacts that would occur on the Minnesota side of the river.[112] Minnesota has expressed concern that Garrison is being constructed without proper consideration of these impacts. The Committee's investigation confirms that these impacts have not been examined by the Bureau of Reclamation.

The Committee therefore recommends that:

> The Bureau of Reclamation examine the secondary, social, and economic impacts of the Garrison project on Minnesota and South Dakota and provide a detailed discussion of such impacts in the supplemental impact statements for Central North Dakota and Oakes-LaMoure sections of the project.

The Minnesota Pollution Control Agency has also informed the Committee that it has contemplated filing suit against the Bureau of Reclamation under the Freedom of Information Act[113] regarding the difficulty it has experienced in obtaining necessary technical

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[109] Hearings (Part 1), September 15, 1975, pp. 142–43. Also see the June 8, 1976, letter from Peter Gove, Director of MPCA, to the Minnesota congressional delegation, which contains an analysis of recent Bureau of Reclamation return flow studies and concludes that the studies show that 12 water quality constituents for the Red River near Moorhead would be degraded by Garrison return flows.

[110] Id.

[111] Final Environmental Statement, Garrison Diversion Unit, p. IV–31.

[112] Hearings (Part 1), September 15, 1975, Appendix 1, pp. 739–43.

[113] 5 U.S.C. 552, 1967 as amended, Public Law 93–502 (Nov. 21, 1974), title 43, Code of Federal Regulations, subtitle A, part 2 as amended, 40 Federal Register 7304 (1974).

and other data concerning the impacts of the Garrison project on Minnesota.

Mr. David Zentner of the Minnesota Pollution Control Agency summarized the Minnesota Pollution Control Agency's attitude toward the Garrison project in the following excerpt from his testimony before the subcommittee in Bismarck:

> In summary, Mr. Chairman, our position is not that Minnesota wants to interfere with the internal affairs of North Dakota. However, if there will be unnecessary harm to Minnesota's environment as a result of Garrison, then we feel we have a responsibility to protect our interests. We believe that the Federal Government simply does not know very much about what is going to happen to the environment when the Garrison project becomes functional and that the construction of Garrison is proceeding without the benefit of adequate environment studies. For obvious reasons, we believe strongly that the continued construction of Garrison, in effect, presupposes the outcome of environmental studies. It is our position that the construction of this project should not proceed until further study of the environmental impact is completed.[114]

South Dakota Concerns

South Dakota is directly affected by any upstream uses or alterations of the Missouri and James rivers, both of which flow from North Dakota into South Dakota.

The authorized Garrison Diversion Unit plan would utilize the James River as a canal to bring diverted Missouri River water into southeastern North Dakota for irrigation, municipal, and other purposes. The river would then be used to drain irrigation return flows across the border into South Dakota.

Concerns expressed by South Dakotans about the Garrison project can be summarized as follows: (1) possible flooding along the James River from increased streamflow from Garrison; (2) expected increase in salt content and other pollutants as a result of cumulative return flows from Garrison; (3) fear that the James and Missouri rivers will become the drain for even more return flow waters and pollutants if Canada and Minnesota continue their objections to the existing project plan; and (4) taking 6,000 acres of South Dakota land (Brown County) for wildlife mitigation of Garrison construction in North Dakota.

Mr. Vern Butler, Secretary of the South Dakota Department of Natural Resources, and a representative of the United Family Farmers, a South Dakota farmers organization, raised these issues during testimony before the subcommittee in Bismarck last September. Mr. Butler, who was testifying for the Governor of South Dakota, informed the subcommittee that South Dakota continues to support the Garrison project. He dismissed the possibility of flooding and pollution from drainage of return flows in the James River as being minor since it amounted to less than 5 percent of the average James River flow coming into South Dakota. Mr. Butler said that the water quality impacts

[114] Hearings (Part 1), September 15, 1975, p. 144.

would be manageable but admitted that some additional salts could be funneled into the river.[115]

According to the Garrison Final Environmental Statement, the quantity of water expected to cross the North Dakota-South Dakota boundary from the Garrison Diversion Unit as presently planned is approximately 3,600 acre-feet, 1,000 acre-feet of which will flow directly into the Souris River. The remainder will be routed into the Hecla Slough area (Brown County, South Dakota) and used for wildlife development purposes. According to the Bureau of Reclamation, "none of this water will reach the James River." [116]

However, new information recently provided the Congress in recent water quality studies demonstrates that Garrison return flows will not only reach the James River and South Dakota but will be of a much greater quantity and worse quality than originally anticipated in the 1974 return flow study. Using a typical year (1958) as a base, the Harza Engineering Company study shows that "return flows will increase annual runoff near the South Dakota border by about 13,300 acre feet." [117] The report goes on to say that salts (TDS), nitrates, and other pollutants will be significantly increased over present levels in the river at the South Dakota border during certain periods during the year:

> Near the South Dakota border, the concentrations of TDS and sulfate with full Project development will increase by about 30 percent during the winter, spring, and early summer. However, during the late summer and fall, the concentrations will be reduced by about 20 percent.
>
> During the initial years of Project operation * * * the concentrations of TDS and sulfate may increase by as much as 100 percent . . . The concentrations of manganese will be reduced substantially during late summer and fall and will be about at present levels during other seasons.
>
> Dissolved oxygen levels will be essentially unchanged along the entire study reach of the James River.
>
> The concentration of nitrate, near the South Dakota border, will increase greatly. The increase will be most pronounced during the cold winter period * * *.[118]

While this new water quality information is helpful, it is not enough. The Bureau of Reclamation's year-long delay in publishing the draft supplemental environmental impact statement for the Oakes-LaMoure section of the project has kept the public in the dark as to the detailed impacts of the Garrison project on the James River and South Dakota. It is essential that this document be made available to the public as soon as possible.

The Committee therefore recommends that:

> The Bureau of Reclamation promptly complete and publish the supplemental environmental impact statement for the Oakes-LaMoure section of the Garrison Diversion Unit.

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[115] Id., p. 173.
[116] Id., p. 29.
[117] Harza Water Quality Study, May 1976, p. VIII–2.
[118] Id., pp. VIII–7 and VIII–8.

In the event the Oakes-LaMoure supplemental statement does not include an analysis of the effects of increased irrigation return flows on the James River, the Committee further recommends that:

> Return flow data for the James River be included in the supplemental environmental impact statement for the Oakes-LaMoure section of the Garrison project prior to its being finalized, and the public be afforded an opportunity to examine and comment on the return flow data.

Other elements which may affect South Dakota are alternatives to the Garrison project which could be recommended by the Bureau of Reclamation and the International Joint Commission to accommodate Canadian objections to Souris River and Red River return flows. One alternative the Bureau indicates it has under consideration would route the irrigation return flows from the Souris Loop back to Lake Sakakawea or the Missouri River.[119]

The possibility of irrigation wastes being funneled down either the Missouri or James Rivers, which could be used to dispose of Central North Dakota return flows, led to the passage of a resolution by the South Dakota legislature strongly objecting to Garrison return flows.[120] Citing the refusal by Minnesota and Canada to accept Garrison return flows as cause for concern that South Dakota could be the recipient, the resolution says that "return flows will cause an admitted degradation of South Dakota waters and may cause violation of South Dakota water quality standards." The resolution also expresses fear that "the increased volume of water flowing into the James River may lead to flooding, possible channelization, and increased erosion without countervailing benefits being received." The resolution concludes that:

> * * * the Governor and Attorney General of South Dakota are urged to take whatever action they deem appropriate to safeguard the health and welfare of the people of this state from any possible adverse effects of the Garrison Project. Such actions may include the proposal of modifications to the Garrison Project or the bringing of a lawsuit on behalf of the State to assure that the return flows from the Garrison Diversion Unit will not violate South Dakota water quality standards nor have any adverse economic, social or environmental effects on South Dakota * * *.

The Committee has no reason to believe that Garrison return flows expected to drain into the James River will result in the violation of South Dakota's water quality standards. Nor is there any indication that a rerouting of Souris and Central North Dakota return flows is being seriously considered by either the Bureau of Reclamation or the International Joint Commission as being more desirable than other alternatives. However, the South Dakota concurrent resolution is evidence of the uncertainty of the present Garrison Diversion plan and the lack of solid environmental and economic information available to State and local communities being affected by the project. Until reliable data is available, and until the Canadian problem is resolved,

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[119] Hearings (Part 2). November 19, 1975. p. 76.
[120] House Concurrent Resolution No. 521, 51st session, South Dakota Legislative Assembly, February 20, 1976.

neither South Dakota nor Minnesota can be convinced that the existing or subsequent Garrison Diversion plan will not result in harm to their citizens. The Bureau of Reclamation, therefore, has an obligation to make every opportunity available to citizens of these two states to examine and comment on supplemental environmental statements prior to commencing construction on areas of the project which will drain into the Red or James Rivers.

The Committee received numerous letters and petitions from South Dakotans objecting to the proposed 6,000-acre wildlife mitigation area planned near Hecla, South Dakota, in northeastern Brown County. Dr. George Piper, who represented the United Family Farmers at the subcommittee's Bismarck hearing, testified that:

> There is virtually total opposition to the plan among the people of the area and the commissioners of Brown County. The citizens of Hecla and affected property owners have not had opportunity to participate in the planning of the Garrison project and have no representation on the Garrison Diversion Conservancy District which is involved in the planning process.
>
> We support their request that the Hecla Slough plan be abandoned and that a site for the wildlife area be selected in North Dakota where the replacement of wildlife will be required.[121]

As a result of the strong opposition to the Hecla wildlife refuge, the Committee asked the Assistant Secretary of the Interior for Fish and Wildlife and Parks Nathaniel Reed to comment on this problem in his testimony on November 19, 1975. Mr. Reed told the subcommittee that he is "not totally unreceptive to eliminating" the Hecla wildlife area from the mitigation plan if substitute acreage can be found in North Dakota:

> The original plan for irrigation contained lands in Brown and Marshall Counties, S. Dak. This necessitated the inclusion of a wildlife mitigation area in the vicinity to offset damages. Since this area is no longer considered for irrigation, a re-evaluation of that part of the wildlife plan is in order.
>
> The purchase of 6,090 acres in one block as originally proposed would no doubt have some impact, but should not significantly affect the agriculture and economic activity of the area. This is true to some extent for any portion of the project where land acquisition is involved. While the lands originally selected for the wildlife plan encompass a variety of land uses, including cropland, we believe that such acquisition is necessary in or near the project area to compensate for serious wildlife losses caused by project construction.
>
> It is our responsibility, as well as that of the construction agency, to insure that the full complement of 146,530 acres is acquired and managed for wildlife as intended by Congress when it authorized construction of Garrison.
>
> If objections persist, the Service is not totally unreceptive to eliminating the entire Hecla wildlife area provided that the

[121] Hearings (Part 1), September 15; 1975, p. 410.

6,090 acres which meet the wetland restoration criteria are selected in the 25-county Garrison Diversion Conservancy District in North Dakota and if concurrence for the change is received from the North Dakota Game and Fish Department and the South Dakota Department of Game, Fish, and Parks.[122]

In view of the Fish and Wildlife Service's concurrence that the Hecla portion of the wildlife mitigation plan should be eliminated, if possible, the Committee recommends that:

The Bureau of Reclamation and the U. S. Fish and Wildlife Service promptly initiate discussions with appropriate South Dakota and North Dakota officials with the intention of finding substitute acreage in North Dakota to replace the Hecla wildlife mitigation area.

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[122] Hearings (Part 2), November 19, 1975, p. 67.

VII. GARRISON IMPACTS ON WATER QUALITY OF RECEIVING STREAMS

Findings

A. While the water quality simulation model used by the Bureau of Reclamation to predict pollution impacts in rivers affected by the Garrison Diversion Unit has been found to be generally satisfactory from a technical standpoint, the model has major limitations which the Bureau failed to take into account in conducting its return flow studies. This same model was used in recent Bureau of Reclamation water quality studies.

B. Natural flows in all five rivers affected by the Project (the Souris, the Red River of the North, the James, the Wild Rice and the Sheyenne) vary considerably from very low flows, when salt and other constituent concentrations are extremely high, to periods of high flow or flooding, when salt concentrations are much lower.

C. The Bureau of Reclamation has determined in various water quality studies, including the recent study done in conjunction with the Harza Engineering Company, that return flows from the Garrison Diversion Unit will be beneficial by stabilizing streamflows and eliminating low flow periods. However, flood potential will be increased slightly in all five rivers.

D. The Bureau of Reclamation has determined that overall salinity concentrations in all of the affected rivers will be increased over historical levels, but during some parts of the year, salinity concentrations will be lowered by the additional return flow water.

E. The recent Bureau of Reclamation water quality studies represent water quality parameters in mean (simple average) and median values over a 63-year period, which tends to minimize the peak concentration levels of important water pollutants that are expected to result during the "peak soil leaching" periods of project development.

F. While return flows will dilute high chemical constituent concentrations in river water in periods of low flow, absolute increases (loadings) of salts, nutrients, and other chemical constituents will result. The cumulative effects of increased salt and nutrient loading in the Souris and Red Rivers could increase pollution problems in Lake Winnipeg, into which both streams eventually flow.

G. While the Bureau of Reclamation is relying heavily on proper irrigation practices to minimize water quality impacts, no irrigation management plan has yet been developed by the Bureau which includes controls that will assure minimal degradation of water quality.

H. An irrigation management plan is essential to reducing water quality impacts.

I. The Bureau's planned use of sprinkler irrigation methods should improve water quality; however, use of sprinkler systems is voluntary on the part of participating farmers.

One of the most controversial aspects of the Initial Stage of the Garrison Diversion Unit has been the effects of the Project's return flows on the water quality of the Souris, Red, Wild Rice, Sheyenne, and James Rivers. These five rivers, along with Devils Lake and the proposed Lonetree Reservoir, will all receive varying amounts and qualities of wastewaters from the project.

The term "return flows" is generally used to describe wastewaters from the project, and includes five components:[123]

1. *Irrigation return flows.*—These are the flows resulting from percolation of unconsumed precipitation and irrigation water through the soil profile of irrigated lands. These flows will enter the receiving rivers through man-made and natural drainage.
2. *Conveyance system seepage.*—This is the water lost by seepage from canals, laterals, and reservoirs.
3. *Operational wastes.*—These are canal flows which exceed waterflow irrigation requirements and necessitate waterflow through wasteways to the receiving streams.
4. *Fish and wildlife area return flows.*—These are return flows from the delivery of water to a number of habitat areas under the project plan. Some of the return flows from fish and wildlife areas will be surface flows to the river, but the majority will seep through the soil profile and will accrue to the receiving waters.
5. *Municipal and industrial return flows.*—These are return flows from water service in the Garrison Diversion Unit to communities located in drainage basins of the receiving streams in North Dakota. Although a portion of the diverted water is consumptively used, most of it enters the rivers through the communities' waste treatment facilities.

The Committee's hearing record is replete with speculation by various witnesses as to what effects the return flows will have on the water quality in these rivers, and whether the Bureau has accurately predicted the effects in their own studies. The following section of this report describes the various studies and methodologies which have been used by the Bureau to predict the extent of water quality degradation from the projects.

Return Flow Studies

The Bureau of Reclamation has completed three water quality studies since 1972, in an attempt to assess the effect of Garrison return flows on receiving streams. The first two studies were concerned primarily with the return flows entering the Souris River and Canada. The 1972 study was conducted to define the effects of Garrison return flows on the Souris River, and was limited to gathering basic data on the Souris River Basin, analyzing the data with a mathematical model, mixing the results with the natural flow of the Souris, and evaluating the results of the mixing.[124] The study pro-

[123] Bureau of Reclamation Summary Report, "Water Quality Study, Garrison Diversion Unit, North Dakota," June 1976, p. II–1 (hereinafter cited as "Bureau Summary Report").
[124] Id., p. I–3.

vided basic information on predicted concentrations of total dissolved solids (salts) and other constituents. A more detailed study of the Souris River Basin was conducted in 1974 [125] which refined the 1972 estimates of return flows from irrigation of the Souris area. This study provided new information on nutrients (nitrates and phosphates), temperature, trace elements (heavy metals) and turbidity in addition to total dissolved solids and individual ionic constituents.

More recently, the Bureau of Reclamation has completed a new water quality study which encompasses all five streams affected by the project. This new study contains information developed under contract by the Harza Engineering Company [126] (hereinafter referred to as "Harza Study") as well as additional analyses and information from the Bureau of Reclamation.[127] The Committee received copies of this study on June 1, 1976, and, in view of its significance, held up final consideration of its investigative report on the Garrison Project in order to have the report's results evaluated and analyzed by the staff.

It should be noted that this most recent study is extremely technical, and has not yet been formally reviewed by the International Joint Commission, the Environmental Protection Agency, the Council on Environmental Quality, or any other agency with appropriate expertise. Thus, the Committee's hearings record reflects the best information available at the time of the hearings. This report, however, is based on material which has become available since the hearings, including the June, 1976, study.

How Water Pollution Levels Have Been Predicted

Every irrigation project results in at least some degradation of water quality. This is because more water must be applied to the crops and soil than can actually be used by the plants in order to prevent the accumulation of salts in the soil profile. In other words, irrigated soils must be leached of excess chemicals with relatively fresh water in order to remain productive. The Garrison Diversion Unit is rather unique in that, for the entire 250,000-acre irrigated project area, a complex system of man-made tile drains will be installed to collect these excess irrigation waters after their travel through the soil profile, for ultimate discharge into one of the receiving streams or lakes. The Bureau of Reclamation has conducted a series of return flow studies in an effort to identify the water quality impacts of the project in response to the requirements of the National Environmental Policy Act of 1969 (NEPA), and concerns which have been expressed by the Canadian Government.

The Bureau has used a highly sophisticated computer modeling technique to predict increases in streamflows and pollutants that will result in various rivers from the introduction of return flows.

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[125] See: Bureau of Reclamation draft report "Irrigation Return Flows to the Souris River and Canada, Garrison Diversion Unit" (May 1974). (Hereinafter cited as 1974 Souris River Return Flow Study.)

[126] See: Report prepared by Harza Engineering Company for the Bureau of Reclamation entitled "Garrison Diversion Unit Effects of Return Flows on Receiving Waters" (May 1976) [hereinafter referred to as Harza Water Quality Study].

[127] See: Bureau of Reclamation report "Water Quality Study: Garrison Diversion Unit, North Dakota" (June 1976) [hereinafter referred to as 1976 Bureau Water Quality Study].

This model, which has been described as "generally satisfactory," represents the "application of the most current technological state of the art in this field." [128] Bureau of Reclamation Regional Director Robert McPhail provided the following description of how the model is applied in the prediction of water quality impacts from irrigation return flows:

> After a preliminary analysis to test the consistency and accuracy of the basic field data, it is analyzed with a computer model to predict return flow quality and quantity from the irrigated areas of the project. This model contains provisions for treating unsaturated and saturated hydraulics of the irrigation water in the soil and aquifer, providing a detailed balance of the chemical reactions and transformations, including solution, precipitation, ion exchange, ion pairing, and nitrogen transformation in the soil and ground water systems to give the quantity and quality of resulting return flow at the accrual points to drain from the irrigated area.
>
> The computer model also involves the use of an irrigation scheduling program to predict timing and amount of irrigations. The model gives results that include soil moisture contents, water levels, flow lines, the quality of soil water in the unsaturated zone (at the water table, and in the saturated zone), and the quality and quantity of the drainage effluent. These results are then routed into the receiving waters to show what effects the return flows have upon the river.
>
> The primary results from this type of study are separated into two categories, one showing the quantity of return flows that may be expected and the other showing the chemical quality of these same return flows.[129]

The process described by Regional Director McPhail predicts the expected levels of important water quality constituents from only the irrigation return flow component of the overall return flow "package." These figures, along with estimates for the remaining return flow components (seepage, operational wastes, municipal and industrial return flows, and fish and wildlife area return flows) are then used as input to a "routing model," which superimposes the predicted levels on existing water quality and streamflows in the rivers to determine the total impact of all the return flow components on the receiving waters.[130]

These computer-modelled predictions of the water quality impacts of the Garrison Project have, until recently, concentrated on the Souris River (a large percentage of the project's irrigated acreage will drain into the Souris River, and ultimately reach Canada). The modelling technique described above was used in the Bureau's 1972 and May, 1974, reports on the effects of Garrison return flows on the Souris River and Canada,[131] and was also used for the June, 1976, report, "Water Quality Study, Garrison Diversion Unit, North Dakota." [132] This latest study, which is accompanied by a report on

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[128] Hearings (Part 1), September 15, 1975, p. 16.
[129] Id., pp. 15–16.
[130] Id., p. 15.
[131] Id., p.
[132] Hearings (Part 2), November 19, 1975, p. 98.

the water quality impacts of the project by the Harza Engineering Company, considers the effects of the project's return flows on the Red, Wild Rice, Sheyenne, and James Rivers, as well as the Souris River.

Limitations of the Modeling Technique

It is very important to note that all the water quality studies for the Garrison project which have been released to date (including the Bureau's June, 1976 report) have predicted the water quality effects for most of the important pollutant constituents on the basis of the model described above. Thus while each study has been an improvement over previous attempts to quantify the expected water quality impacts of the project, the same basic tool—the computer model—has been used each time. In fact, this same model, with more refinements, is currently being used by committees of the International Garrison Diversion Study Board of the International Joint Commission in their investigation of the project's effects on Canada. The most recent (June, 1976) study of the project by the Bureau is significant primarily because the model was applied for the first time to the receiving waters in the project area beside the Souris.

May 1974 Study

Prior to the release of the June, 1976 reports, significant criticisms regarding the Bureau's failure to recognize the inherent limitations of the irrigation return flow model were made both at the Subcommittee hearings, and through correspondence to the Bureau of Reclamation. While there was agreement among the witnesses that the model reflected "state-of-the-art" technology, the Environmental Protection Agency, the Minnesota Pollution Control Agency, and the Canadian government questioned some of the major assumptions made by the Bureau in applying the model to return flows from the project which would affect the Souris River.[133] As an example, EPA felt that many of these assumptions, which may be critical to the model's ultimate predictions, were unrealistic, and may produce model results which do not adequately reflect the "worst" water quality conditions which would be expected in the river with full development of the Garrison project.[134] EPA outlined several important assumptions used by the Bureau in producing the 1974 report on the Souris River which require that the modelling results be viewed with caution.[135] Among these assumptions are:

1. That the 37,000 acre-feet of canal seepage and operational waste will filter through the soil eventually reaching the Souris River, without picking up additional salt content. The Bureau expects this water to dilute Souris River return flows, resulting in improvement of their quality. Yet, the EPA argues that there is no indication that this water will

[133] Statement of David Zenter, Minnesota Pollution Control Agency, Hearings (Part 1), September 15, 1975, p. 142; Report of the Manitoba Department of Mines Resources and Environmental Management, "Some effects of the Garrison Diversion Unit on the Souris River in Canada." November 1974, Id., p. 236; Statement of John R. Quarles, Deputy Administrator of the Environmental Protection Agency, Hearings (Part 2), November 19, 1975, p. 75.

[134] Hearings (Part 2), November 19, 1975, p. 112.

[135] Id., pp. 112–113.

be any cleaner than the return flows and certainly no indication that it will be as salt-free as the Bureau assumes. EPA has informed the Bureau that "a more reasonable assumption regarding seepage losses * * * is that they would be approximately the same quality as the return flows (1,800 ppm TDS rather than the 540 ppm assumed).[136]

2. That there will be no nitrogen pollution from fertilizers because it will all be utilized by crops. The EPA says that this assumption does not account for poor fertilizer application practices, which are inevitable and uncontrollable.

3. That farmers will employ effective irrigation management practices, including sprinkler irrigation systems, monitoring water application rates, and scheduling water applications. "In reality," says EPA, "the individual habits of every farmer using irrigation water in the project area will determine the degree to which irrigation management programs are effective." The Committee's investigation has confirmed that so far no uniform requirement has been imposed on water recipients that sprinklers be used nor has an effective irrigation management scheme been developed by the Conservancy District.

4. That soil master profiles accurately reflect soil conditions in the project area. Irrigation areas are not firm and cropping patterns will vary over time. However, the soil data used in the model may not accurately reflect natural soil variability of the irrigation areas, thus affecting the predicted range of water quality impacts.

In addition to the major assumptions noted above, EPA and others have stressed some inherent limitations of the modeling program, including:

1. The inability of the model to consider other important water quality parameters, such as phosphates, herbicides, pesticides, and heavy metals. Increased agricultural activity stimulated by Garrison will result in the more intensive use of fertilizers and pesticides, which may enter the rivers through the natural processes of erosion and runoff.[137]

2. The 1974 study did not include "sensitivity analyses" of the return flow model. If these were conducted, the model's sensitivity to variations in the input data (e.g., cropping patterns or the amount of saline soils which are irrigated) could better be judged.

3. The results of the modeling work were presented by the Bureau as one number, which was intended to represent the average value of pollutant concentrations in the Souris River. In actuality, this is a misleading approach, since the results of the modeling work are accurate only within about 20 percent. Presentation of a range of probable values for the water quality would have been more accurate and objective.

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[136] January 13, 1975, letter from Sheldon Meyers, Director, Office of Federal Activities, EPA, to Gilbert Stamm, Commissioner, Bureau of Reclamation, Id., p. 376.
[137] Hearings (Part 2), November 19, 1975, p. 9.

In summary, testimony received at the Committee's hearings regarding the predictive methodologies used by the Bureau for water quality studies generally supported the Bureau's use of the computer model as used in the 1974 study, but cautioned against strict interpretation of the results in view of the basic limitations of the technique, and the questionable assumptions which were used by the Bureau in the operating of the model.

June 1976 Study

On June 1, 1976, the Bureau provided the Committee with reports on more recent studies regarding the water quality impacts of the Garrison Project which were conducted during 1975 and the first half of 1976. These studies, which were commissioned at the request of Congress, were intended to supplement earlier water quality studies by employing computer modeling techniques on all five rivers in the United States which would be affected by the project, and to provide more accurate data on water quality conditions with the project which could be used in the Bureau's forthcoming supplemental environmental impact statement for the project. Three reports were made available:

1. "Garrison Diversion Unit Effects of Return Flows on Receiving Waters," prepared for the Bureau of Reclamation by the Harza Engineering Company, May 1976.
2. "Report on Water Quality Study, Garrison Diversion Unit, North Dakota," prepared by the Bureau of Reclamation June, 1976.
3. "Summary Report, Garrison Diversion Unit Water Quality Study," prepared by the Bureau of Reclamation, June, 1976.

The Summary Report was intended by the Bureau to combine and summarize the results of the two major studies.

According to the Bureau:

> Harza examined the historic river conditions and selected a typical year for each of the five rivers. The monthly streamflows in the typical year are representative of low, normal, and high flow (bankfull) conditions. The typical year conditions were projected for each river to the year 2025, both with and without the Garrison Diversion Unit. Study elements evaluated for each of the conditions were: (1) quality and quantity of the receiving waters; (2) chemical elements or compounds in return flows; (3) riverine ecosystems; and (4) uses of the receiving waters.
>
> Concurrently with the study by Harza, the Bureau of Reclamation accelerated its work to determine the quantity and quality of return flows and the effects these return flows will have on receiving streams. A computerized simulation model was used to estimate the volume and quality in receiving streams. This report is the product of work by the Bureau of Reclamation.[138]

The "computer simulation model" used by the Bureau in the preparation of their portion of the two-volume (plus summary) report

[138] 1976 Bureau Water Quality Study, pp. 6–7.

is the same basic model which was used in the development of previous reports on water quality. In addition, output from this model was used by Harza as input for some of their analyses, which utilized two other computer models.

Time was not available to the Committee for a detailed review of the methodologies, data, and assumptions which were used in the development of these most recent studies. However, some general observations can be made:

1. Most of the reported results were obtained by use of the computer modeling techniques discussed earlier. Thus, while the basic approaches used are sound ones, the results must be interpreted with care. Because of differences in the way in which data are presented in the reports, extreme care must be used in interpreting results which are expressed as numerical figures for the various water quality parameters. Statistical analyses played an important role in these investigations, and these analyses are reflected in the manner in which the data are presented. Confusion and misleading conclusions may be the result of a hasty evaluation of the results reported in the studies.

2. Because these reports relied heavily on the computer modeling techniques used in earlier studies, the same precautions noted earlier regarding the assumptions used in the modeling apply. Justifications for using many of the assumptions are provided in the reports; however, professional opinions regarding these explanations and the subjective judgments which have necessarily been made will differ, thus further lending credence to statements in the hearing record regarding the need for presenting a range of probable water quality data, rather than relying heavily on single probable numerical values.

3. The models used by the Harza Company, especially the "Water Quality for River and Reservoir Systems" model, have not yet been subjected to a rigorous review by agencies concerned with the impacts of the Garrison project. Additional care should thus be used in the interpretation of results, especially where empirical judgments have been made for the study. The Harza report does not adequately address this situation, and it is unclear to what extent the model has been subjected to sensitivity analyses or calibration. This is important because the use of more modeling techniques introduces more assumptions and judgments, the accuracy of which all reflect on the ultimate numerical results.

4. According to the Harza Report [139], Bureau of Reclamation personnel decided not to consider fertilizers in their computations of nitrate levels in the irrigation return flows. Levels of nitrate-nitrogen were thus estimated by Harza for presentation in the study. No further explanation was provided regarding this decision not to consider fertilizers in the computations. Fertilizers, however, were considered in the 1974 Souris River return flow study.

5. The current reports regarding water quality in the receiving streams place heavy emphasis on the concentrations of individual water quality constituents in the return flows and the streams. From the standpoint of overall environmental quality, however, the monthly and annual loadings of these pollutants to the receiving waters must

[139] Harza Water Quality Study, p. A–4. The Harza report said that "The USBR had decided not to include fertilizers in their computations and ammonia was not calculated."

be considered. This is especially important when considering the cumulative effects of the project on Lake Winnipeg in Canada. Earlier reports by the Bureau briefly discussed this situation, and it has been stated that salt loadings to the Souris River in Canada will be nearly double after the project is operational.[140] The cumulative effects of increased salt loading from introduction of return flows into the Souris River and Red River—both of which flow into Lake Winnipeg—has not been determined by the Bureau of Reclamation, and it seems unlikely that the segmented environmental assessment approach being used will show the cumulative effect of increased total dissolved solids from return flows on Lake Winnipeg.

The Committee therefore recommends that:

> The Bureau of Reclamation determine the cumulative effect of salt loading in the Souris and Red rivers on Lake Winnipeg and inform the International Joint Commission and the State Department of the results; and that the Bureau include a discussion of the cumulative impacts in either the Souris or Central North Dakota sections' supplemental environmental impact statement.

Regarding loadings of nutrients, Canada is concerned that an expected 50 percent increase in nutrients in the Souris River and relative increases in the Red will increase nutrient loads in Lake Winnipeg, thereby contributing to its water quality degradation.[141] The large Canadians lake already suffers from eutrophication and increased nutrient levels could cause further deterioration.[142]

In its formal comments on the earlier Bureau return flow studies, the Environmental Protection Agency argued that it is inconsistent to say that a 50 percent increase in nutrient loading annually will not affect the nutrient concentration in the river. EPA concluded that:

> * * * Such conclusions are misleading, and indicate that basic data to conduct needed environmental analyses are not available. Pending the results of appropriate studies, statements such as the one quoted above should be deleted.[143]

The Committee agrees with the EPA on this point and remains unconvinced that such a dramatic increase in nutrient loading will not have a significant affect on the river environment.

The Committee therefore recommends that:

> The Bureau of Reclamation provide proper justification data to support its conclusion that increased nutrient loading in the Souris River that will result from the operation of the Garrison Diversion Unit will not significantly affect the river's water quality. If this conclusion cannot be adequately supported, proper determination should be made of expected impacts from nutrient loading and the 1974 Souris River Re-

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[140] 1974 Souris River Return Flow Study, p. 29.

[141] Manitoba Department of Mines, Resources and Environmental Management, "Some Effects of the Garrison Diversion Unit on the Souris River in Canada," November, 1974; See: Hearings (Part 2), November 19, 1975, Appendix 5, pp. 250–252.

[142] Hearings (Part 2). November 19. 1975, p. 355.

[143] June 13, 1974, letter from Sheldon Meyers, Director, Office of Federal Activities, EPA, to Jack O. Horton, Assistant Secretary of the Interior, Hearings (Part 2), November 19, 1975, pp. 386–387.

turn Flow Study revised accordingly. This information should be made available to the State Department, International Joint Commission, and Canadian government as soon as possible and should be included in the supplemental environmental impact statement for the Souris section of the Garrison project.

The Committee further recommends that:

The Bureau of Reclamation determine the cumulative impacts of nutrient loading in the Souris and Red rivers on Lake Winnipeg and inform the IJC and the State Department of the results.

6. Conclusions reached in the June, 1976 Reports repeatedly imply that while the project will result in poorer overall water quality (higher concentrations of some pollutants), these effects will be offset by the project's increased flows, which will eliminate "frequently occurring low-flow and no-flow conditions".[144] The Committee notes that this result of the project may be in conflict with the goals of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92–500), which states that "storage and water releases shall not be provided as a substitute for adequate treatment or other methods of controlling waste at the source" [§ 102(b)]. Irrigation management (discussed later in this chapter) will still be the most effective method available for reducing the water quality impacts of the project.

7. Perhaps the most important observation to be made regarding the June, 1976 Reports is that the Summary Report[145] reports water quality data only in terms of average values for the 63-year period of study. Monthly values, if presented, would more clearly demonstrate the ranges of values expected in flows and qualities. To individuals, industries, municipalities, and ecological systems which will make use of these waters and return flows, the highest values expected during some months of the year while the project is operational could well be more important that "the overall effects"[146] of the project.

It is the Committee's opinion that the Bureau of Reclamation has an obligation to assure that the public is adequately informed of the worst possible impacts that could result from Garrison-related irrigation return flows entering the streams, rivers, and lakes in the region. The Committee therefore recommends that:

The Bureau of Reclamation develop a method of reporting the results of return flow studies which will demonstrate as accurately as possible the probable range of increased concentrations of pollution (rather than the average increase) that would result from construction and operation of the Garrison Diversion Unit.

The following descriptions of the effects of return flows on the five receiving streams in the project area were excerpted directly from the Bureau's Summary Report. The Committee recognizes that care must

[144] Bureau Summary Report, water quality studies, p. III–3.
[145] Id.
[146] Bureau Summary Report, water quality studies, p. III–3.

be taken in their interpretations because of the limitations of the analytical techniques which were described earlier. They are presented only as possible interpretation of available data. Differences in professional opinion among agencies concerned with the impacts of the project should be considered.

General Water Quality Impacts on Receiving Streams

Based on the recent water quality study done jointly by the Bureau of Reclamation and the Harza Engineering Company, the Bureau has arrived at the following general conclusions as to how Garrison return flows will affect quantities of water in the Souris, James, Wild Rice, Sheyenne and Red Rivers once the project becomes operational:

> * * * Periods of extremely low flow are common on all five of the rivers in the project area. The most positive benefit from Garrison Diversion Unit return flows will be the stabilization of streamflows. Low flows of the rivers will be augmented and no-flow conditions will be eliminated.
>
> The aesthetic character of rivers in the project area will be greatly improved with additional flows, particularly in late summer. * * *
>
> Water supply potential in the Souris, James (at the North Dakota-South Dakota border), Sheyenne, Wild Rice and Red Rivers will also be enhanced by the addition of project return flow. * * *
>
> * * * The presence of the additional water in the stream channels will cause a slight increase in flood potentials for the Souris, James, Wild Rice, Sheyenne, and Red Rivers. Peak return flows will reach the rivers during late summer and early fall and will not coincide with high runoff periods of the river. However, the capacity of the streams for conveyance of heavy runoff from intense thunderstorms would be reduced by the amount of return flow in the stream channels at the time of the flood. * * *
>
> The primary impact on flooding from this additional water (return flows) would be to extend the duration of floods by a short time of up to 3 to 5 percent * * *
>
> The James River will convey irrigation water during the irrigation season. The Upper James will be structurally stabilized to accommodate this increased flow and will be greatly benefited during historical low or nonexistent flow.[147]

The Bureau summarized the overall affects on water quality in the five affected streams as follows:

> * * * Overall median salinity levels of streamflow in all of these rivers will be increased over historical levels, but during the late summer, fall, and winter, salinity concentrations will be improved by the additional water. Maximum concentrations of salinity and all major chemical water quality parameters will be reduced.
>
> Average or median water quality constituent levels may not be a realiable indication of restrictions on water use that could

[147] Bureau Summary Report, water quality studies, pp. IV–1 to IV–2.

occur with the addition of return flows to streams of the project area. Return flow accruals to these streams will reduce constituent levels when they were historically at their highest and will increase these levels when they were historically at their lowest. The net effect of these additional flows will be an improvement in the usability of streamflow in the area.

The TDS (salt) standard for the Souris, James, Wild Rice, and Sheyenne Rivers is 1,000 mg/l, and for the Red River, is 500 mg/l. * * * Historically streamflows of the Red and Sheyenne Rivers have exceeded these levels only a few times during the period of record. This frequency of exceedance will not be significantly changed by the Garrison Diversion Unit return flows. TDS standards for the Souris, James, and Wild Rice Rivers are typically exceeded annually during the late fall and winter months. * * *

Other than TDS, the only water quality constituents that will be significantly affected by Garrison Diversion Unit return flows are sulfate and hardness * * * The primary effect of these sulfate and hardness increases will be on municipal users of the streamflows. Treatment costs may be increased at some locations by a small amount due to higher hardness levels. * * * [148]

Souris River Impacts

The Souris River—which originates in Saskatchewan, Canada, and flows south, making a large loop through the northern portion of North Dakota before flowing back again into Canada—will be the primary receiving stream for Garrison return flows from the Souris and Karlsruhe areas of the project. These two irrigation areas represent 116,000 of the 250,000 acres to be irrigated by the Garrison Project.

The Bureau of Reclamation's 1974 return flow study focuses primarily on the Garrison Diversion Unit's impact on the Souris River. The 1974 study was highly controversial and was extensively criticized by the Environmental Protection Agency, the Canadian government, and the Minnesota Pollution Control Agency as reflected in the hearing record. The more recent Harza Study provides a more detailed picture of the environmental impact of Garrison on the Souris River.

A problem in predicting and reporting the water quality effects of return flows on the Souris River results from the wide variation in streamflow and salinity conditions experienced throughout the year. The river is often either dry or flooded for weeks at a time. Salinity readings as high as 3,650 milligrams per liter during low flow periods to as low as 160 mg/l during flood periods have been recorded over the years.[149] With North Dakota and Manitoba water quality standards for total dissolved solids (salts) set at 1000 mg/l, it is easy to see that violations of the standards have occurred naturally from time to

[148] Id., pp. IV–2 to IV–4.

[149] Hearings (Part 1), September 15, 1975, p. 22. The Bureau testified that the total dissolved solids in the river exceeded 1000 mg/l for periods up to 6 months per year during an 18-year period.

time.[150] The river appears to be heavily enriched with nitrates and phosphates.

The Bureau's Summary of the recent Harza Study and the Bureau Water Quality Study conclude that Garrison return flows will have the following net effect on water quality in the Souris River:

> The net annual change in flow of the Souris River at Westhope from project return flows will be about 81,000 acre-feet from its mean historical flow of 173,760 acre-feet per year. Flow will be increased during all seasons, eliminating frequently occurring low-flow and no-flow conditions. * * *
>
> The addition of return flows will increase the estimated *mean annual* TDS concentration (sum of constituents, of Souris River streamflow from 577 mg/l to 725 mg/l. * * *
>
> The concentration of phosphorous as phosphate will increase greatly during May through December (as high as 5.1 mg/l) in some reaches of the river due to a projected phosphate concentration of 10 mg/l in the municipal and industrial return flow from the city of Minot. * * *
>
> Nitrate-nitrogen concentrations in the Souris River near Westhope could be as low as 016 mg/l (present level) or as high as 2 mg/l to 5 mg/l May through October, or 8 mg/l to 10 mg/l (other times of the year).
>
> Pesticide levels are not expected to increase significantly due to project return flows.[151]

Red River Impacts

The Red River of the North flows north along the North Dakota-Minnesota boundary, eventually draining into Lake Winnipeg, Canada. Like the Souris River, the quantity and quality of river water varies throughout the year with high salt concentrations being experienced in low flow periods and vice versa.[152] The Bureau of Reclamation told the subcommittee that salt content (TDS) in the Red River has varied from a low of 200 mg/l to a high of 580 mg/l at various points along the river, with mean average annual concentrations of 350 mg/l to 370 mg/l.[153] This indicates that the 500 mg/l Minnesota drinking water standard for TDS is breached naturally during low flow periods without Garrison return flows.

The Red River will receive Garrison return flows from the Warwick-McVille and East Oakes sections of the project via the Sheyenne and Wild Rice rivers, which flow into the Red.

The Bureau's Summary Report of the water quality studies concludes that Garrison return flows will have the following net effect on water quality in the Red River at Fargo, N.D.:

> Mean annual flow of the river will be increased from 486,240 acre-feet to 503,520 acre-feet. * * *
>
> The addition of East Oakes area return flows to the Wild Rice River will increase the estimated *mean annual* TDS

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[150] Id., p. 21.
[151] Bureau Summary Report, water quality studies, pp. III–3 to III–6.
[152] Hearings (Part 1), September 15, 1975, p. 23.
[153] Id.

concentration (sum of constituents) of Red River streamflow at Fargo from 402 mg/l to 442 mg/l. * * *

The concentrations of phosphate, dissolved oxygen nitrate-nitrogen, and other water quality constituents will essentially be unaffected by Garrison Diversion Unit return flows. Water temperatures will also be unchanged.[154]

Additional summary figures were given for the Red River at Grand Forks, N.D., where the greatest impact from return flows is expected to occur:

At Grand Forks, streamflow of the Red River will be augmented by return flows from all irrigated areas of the project that are drained by the Red River. Mean annual streamflow will be increased from 2,057,520 acre-feet to 2,103,480 acre feet.* * *

The *mean annual* TDS concentration (sum of constituents) at that point (Grand Forks) will be increased from 400 mg/l to 417 mg/l. * * *

In all cases, constituent concentrations and water temperature are relatively unchanged by the addition of Garrison Diversion Unit return flows to the Red River at Grand Forks.* * * [155]

Still further summaries of water quality data were given for the Red River at Emerson, Manitoba, just across the border:

The mean annual flow of the Red River into Canada, at Emerson, will be increased by 45,960 acre-feet. * * *

The mean annual TDS concentration (sum of constituents) of this flow will increase from the historical level of 441 mg/l to approximately 453 mg/l.

In all cases, constituent concentrations and water temperature are relatively unchanged by the addition of Garrison Diversion Unit return flows.* * * [156]

James River Impacts

The James River, which rises in the Lincoln Valley of North Dakota and flows south into South Dakota, will receive return flows from the proposed Oakes-LaMoure section of the Garrison Project. Historically, the James has experienced salt concentrations as low as 200 mg/l and as high as 1000 mg/l, with the mean annual concentration ranging from 350 to 500 at various points along the river.[157]

The Bureau's summary report of its water quality study and the Harza study draws the following conclusions concerning the impact of return flows on the James River:

Return flows to the James River will cause an average annual increase of about 3,600 acre-feet from its mean historical flow of 55,920 acre-feet per year. The addition of this flow to

[154] Bureau Summary Report, water quality studies, pp. III–13 to III–15.
[155] Id., pp. III–15 to III–17.
[156] Id., pp. III–18 to III–20.
[157] Hearings (Part 1), September 15, 1976, p. 23.

the river will generally increase streamflow during all seasons except the summer. * * *

Operation of the Oakes Pumping Plant will be coordinated with flood periods to reduce maximum flows into South Dakota. With this operation, the historical maximum monthly flow of the river, 101,000 acre-feet would be reduced to about 95,400 acre-feet. Other flood flows would also be significantly reduced. * * *

The addition of Garrison Diversion Unit return flows to natural flows of the James River will increase the mean annual TDS concentrations (sum of constituents) from 504 mg/l to about 690 mg/l.

Garrison Diversion Unit return flows will have little effect upon temperature levels, monthly dissolved oxygen concentrations, and pesticide levels of James River streamflow. Phosphate concentrations will be reduced to less than one-half of the present levels in the river during the entire year, and manganese concentrations will be reduced substantially during the late summer and fall and will remain essentially unchanged during the remainder of the year. * * *

Nitrate-nitrogen concentrations near the South Dakota border could increase from 0.3 mg/l to levels as high as 1.0 mg/l to 1.5 mg/l during April through October and 4 mg/l to 7 mg/l at other times of the year.[158]

Wild Rice River Impacts

When the Garrison Diversion Unit is fully operational, some 17,200 acre-feet of Project return flows will flow through the Wild Rice River into the Red River annually. Essentially, the Wild Rice River will serve as a drain for the East Oakes area of the project.

The Bureau's Summary Report concludes the following with respect to the water quality impacts on the Wild Rice River:

> The annual flow of the Wild Rice River will be increased by an average of 17,280 acre-feet from its historical mean flow of 53,160 acre-feet.
>
> When Garrison Diversion Unit return flows are combined with natural flows of the Wild Rice River, the estimated mean annual TDS concentration (sum of constituents) of resultant flows of the river will be increased from 680 mg/l to about 903 mg/l.* * *
>
> The volume of return flow water being added to existing streamflow will affect other physical and chemical water quality characteristics of the Wild Rice River. There will be no significant changes in water temperature in the river except in a limited region in the vicinity of drain outfalls, where in the summer the cooler water from the drains (as much as 10°–13° C cooler than the river) will mix with river flows. It will take approximately 15 miles for the combined flow to return to normal ambient levels. In spring and fall the return flows are not expected to be more than 2° to 3° below river temperature.

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[158] Bureau Summary Report, water quality studies, pp. III–21 to III–24.

Winter water temperatures of the receiving streams (0.5° C) will not be affected by the return flow. There will also be little change in monthly dissolved oxygen levels in the river. * * *

With Garrison Diversion Unit return flows, nitrate-nitrogen concentrations along the Wild Rice River could range from as low as 0.4 mg/1 (present levels) to as high as 2 mg/1 to 4 mg/1 during April through September * * * 7 mg/1 to 14 mg/1 at other times of the year.[159]

Sheyenne River Impacts

Return flows from the Warwick-McVille area of the Garrison project will drain through the Sheyenne River into the Red River of the north. According to the Bureau's Summary Report:

> The annual accrual of water to the Sheyenne River from return flows will be about 28,320 acre-feet, which when added to the mean historical flow of the river will yield a resultant mean annual flow of 121,680 acre-feet per year. * * *
>
> The addition of Garrison Diversion Unit return flows to natural flows of the Sheyenne River will increase the estimated mean annual TDS concentration (sum of constituents) from 543 mg/1 to about 622 mg/1. * * *
>
> Garrison Diversion Unit will have little or no effect upon temperature levels, monthly dissolved oxygen concentrations, and pesticide levels of Sheyenne River streamflow. * * *
>
> Garrison Diversion Unit return flows may not affect nitrate-nitrogen concentrations (present levels of 0.6 mg/1) in the Sheyenne River above Lake Ashtabula. They could cause an increase to around 2 mg/1 to 5 mg/1 during April through October and to about 8 mg/1 to 13 mg/1 at other times of the year. Nitrate-nitrogen levels in the lower Sheyenne River could remain as low as 0.6 mg/1 or may increase to 1 mg/1 to 3 mg/1 for all months.[160]

Irrigation Management as a Water Pollution Control Tool

The Bureau of Reclamation relies heavily on its proposed irrigation management program to reduce adverse impacts on water quality to the Souris, Red, and James rivers. This program will include a monitoring function described by the Bureau as follows:

> The Bureau will develop a program for monitoring water quality and quantity adequate to document existing conditions in the vicinity of proposed project areas two years prior to water delivery with the goal of providing optimum water quality and quantity benefits from the Garrison Diversion Unit within authorized project purposes. This program will include the monitoring of water in observation wells, streams, canals, reservoirs, point discharges and drains. Some of this monitoring will be done cooperatively with other agencies

[159] Id., pp. III–7 to III–9.
[160] Id., pp. III–10 to III–12.

> such as the State Health Department and the U.S. Geological Survey. Many of the required monitoring stations are already in operation and are providing baseline data prior to project development.[161]

According to the Bureau, an "irrigation management services" will be provided as part of project operations.

For the time being, the Bureau and the Conservancy District have hired one employee each to provide guidance to farmers in the 25-county district area.[162]

The importance of an effective irrigation management system to control water quality was emphasized by the Environmental Protection Agency, the Council on Environmental Quality, and the Minnesota Pollution Control Agency during the subcommittee's hearings.

John Quarles, Deputy Administrator of the Environmental Protection Agency, summarized the basic concerns voiced by these three agencies when he told the subcommittee:

> We believe, as does the Bureau of Reclamation, that irrigation management will play a major role in the final determination of the project's effects on water quality. However, the Bureau has not yet satisfactorily identified how an irrigation management program for the project area will be operated and how it will be enforced.
>
> Further, it should be noted that although Garrison is a federally sponsored project, its operation—and thus the control of water quality—will be the responsibility of the water users.[163]

It is one thing to claim that a management scheme will be developed to minimize water quality impacts, but it is quite another to produce a plan that will be enforceable and effective. For example, a June 22, 1976, GAO report on its review of the Bureau's policies, procedures and practices for promoting efficient on-farm management of irrigation water had the following conclusions about the Bureau's "irrigation management service" program:

> The success of the Irrigation Management Services program depends on the voluntary response and cooperation of farmers.
>
> Although first demonstrated in 1969, the program has not been widely accepted. The Bureau has not adequately demonstrated the benefits of the program. Since they have not been convinced of the program's economic or technical reliability, farmers are reluctant to use computer services (such as those used in the Bureau's irrigation management services program).[163a]

GAO made several recommendations to improve the Bureau's "irrigation management service" program. The Committee plans to closely monitor action taken by the Bureau to implement the GAO recommendations.

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[161] Hearings (Part 1), September 15, 1975, p. 60.
[162] Id.
[163] Hearings (Part 2), November 19, 1975, p. 74.
[163a] GAO report entitled "Better Federal Coordination Needd To Promote More Efficient Farm Irrigation" (RED–76–116, June 22, 1976), pp. ii and iii.

The Committee's investigation has confirmed that the Garrison Conservancy District has not developed a management plan that identifies exactly how farmers will be required to employ optimum water, fertilizer, and pesticide application practices to reduce pollution.

With respect to water application methods, the Bureau has stated that the project will be designed to accommodate sprinkler irrigation methods rather than the traditional ditch irrigation (gravity) method.[164] The full use of sprinkler irrigation would improve the quality of return flows.[165] However, the use of sprinkler systems is voluntary on the part of each individual farmer, which leaves the question open as to whether farmers will be willing to incur the necessary expense to install sprinkler equipment.[166] At present, however, the Committee must rely on Bureau assurances that all 250,000 acres will be irrigated with costly sprinkler systems. We are not convinced that the program, as outlined so far, will provide the water quality protection required to support Bureau predictions.

An irrigation management program is essential in helping reduce adverse water quality impacts from Garrison or any other reclamation project. Howeveer, th Committee notes that no effective program exists to assist local water districts in developing such plans. It appears that guidelines would be both usedful and necessary.

The Committee therefore recommends that:

> The Bureau of Reclamation, in cooperation with the Environmental Protection Agency, to assist the Garrison Conservancy District in developing an irrigation management program that insures proper application of water, fertilizers, and pesticides in accordance with goals, policies, and provisions of the Water Pollution Control Act and the Pesticide Control Act.

The Committee further recommends that:

> The Bureau of Reclamation promptly develop a management program for the Garrison Diversion Unit which contains adequate control mechanisms to assure proper application of water, pesticides and fertilizers. This program should require farmers receiving irrigation water to install and operate sprinkler irrigation systems in compliance with the stated policies of the Bureau and the Garrison Diversion Conservancy District.

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[164] Hearings (Part 1), September 15, 1975, p. 21. The Bureau told the subcommittee that "The entire project distribution system is being designed to accommodate sprinkler irrigation methods."

[165] All witnesses commenting on irrigation methodology supported the sprinkler system as being more advantageous than the ditch method.

[166] Hearings (Part 1), September 15, 1975, p. 21.

VIII. WILDLIFE MITIGATION PROBLEMS

Findings

A. The original Garrison Diversion Unit wildlife mitigation plan is being revised by the U.S. Fish and Willife Service (FWS) because the original plan proved to be inadequate to protect wetlands and waterfowl.

B. Even with the 146,000-acre revised wildlife mitigation plan (which would emphasize restoration of drained areas), the project will result in a net loss for wildlife and wetlands.

C. A recent Fish and Wildlife Service wetland inventory in the Oakes-LaMoure and Lincoln Valley sections of the project indicate that wetlands losses will be 2½ times greater than estimated in the Garrison Final Environmental Statement and total wetland losses are expected to be as high as 50,000 acres.

D. The 8,500 acres of mitigation areas already acquired by the Bureau are not being managed for wildlife purposes.

F. The wildlife mitigation plan will not offset adverse impacts to National Wildlife Refuges.

The marshes and prairie potholes of the Northern Great Plains are second only to the coastal estuaries in their biological productivity. Many wildlife creatures in North Dakota are dependent on the prairie wetlands for their existence.[167] The wildlife mitigation plan endeavors to replace or compensate for the estimated 67,000 acres of wetlands that would be taken out of production by Garrison.[168]

The Garrison fish and wildlife mitigation plan is an important part of the Garrison Diversion Unit as authorized in 1965.[169] The Department of the Interior, including the Fish and Wildlife Service, claimed it would mitigate substantial losses in wetlands that would occur as a result of construction of canal rights-of-way and reservoirs and would provide $2.5 million annually in claimed wildlife benefits to help offset project costs.[170] The original plan called for the U.S. Fish and Wildlife Service to develop 36 major fish and wildlife management areas and a number of smaller units, all of which would total 146,530 acres of land and water areas.[171] This plan was focused primarily on waterfowl and other game species and relied heavily on water level manipulation and intensive management. There was little emphasis on wetland restoration and preservation.[172]

A change in Fish and Wildlife Service philosophy toward wildlife mitigation and improved knowledge of the wetland ecosystem led the Service to conclude in the early 1970's that the original wildlife miti-

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[167] Hearings (Part 2), November 19, 1975, p. 66.
[168] Ibid.
[169] House Report No. 282, 89th Cong., 1st sess., Garrison Diversion Unit, Missouri River Basin Project, May 4, 1965, p. 6.
[170] Ibid.
[171] Hearings (Part 2), November 19, 1975, p. 64. Also see: Bureau of Reclamation, Definite Project Plan Report, Garrison Diversion Unit, Initial Stage, November 1962 (revised February 1965), summary sheet, p. 1.
[172] Id.

gation plan was unsatisfactory and in need of substantial revision. The Bureau of Reclamation agreed that the plan should be revised. In June 1974, the Fish and Wildlife Service published a report which spelled out the problems with the original plan. Assistant Secretary of the Interior for Fish, Wildlife and Parks, Nathaniel Reed, summarized the findings of the report as follows:

> * * * This report specifically emphasized the need for revisions in the plan and indicated that several major considerations were not fully evaluated in the original plan, including: (1) that the pothole ecosystem evolved over thousands of years of alternate dry and wet periods, (2) that a diversity of wetland types has more value to wildlife than monotypic deep marshes, (3) that maintaining artificially high water levels, and changing water quality is likely to result in significant losses of some ecosystems, and (4) that altering existing habitat in order to benefit one group of species often or typically results in loss of habitat for other species.[173]

Mr. Reed said the old mitigation plan—which relied on an assured water supply provided by artificial structures which would deepen and stabilize water levels in existing wetland basins—would have resuplted in a "net loss of wetlands." The revised plan, on the other hand, would attempt to compensate project-caused wetland loss "through the purchase and restoration of former natural wetland complexes that have been destroyed," including drained wetlands and those subject to drainage.[174]

Not only would this approach prevent unacceptable deterioration of shore and wading bird habitats, it would also prevent the government from acquiring large acreages of farmland (including buildings and improvements) as sites for the larger wildlife mitigation areas envisioned in the original plan. Mr. Reed told the subcommittee that the revised plan would "involve the purchase of smaller land and scattered blocks rather than large areas.[175]

Other benefits of the revised plan include: (1) Use of natural wetlands for storage areas which will help reduce flooding downstream; (2) greater recycling and tapping of nutrients, which will improve water quality; and (3) as a source of drinking water for cattle.[176]

Despite the restoration of wetlands and improved wildlife habitat that will result from the revised wildlife mitigation plan, the Fish and Wildlife Service has determined that the plan still cannot offset the adverse effects on wetlands that will result from construction and operation of the Garrison project. Assistant Secretary Reed made this point in response to a question from subcommittee Chairman Moorhead:

> Mr. MOORHEAD. * * * Mr. Secretary, after all the tradeoffs have been calculated, after all the balancing has been taken into account, I wonder what your judgment would be if you were somehow taken above it all, on a cloud, and looked down on the entire project area. Would the project be a net gain or a net loss for wildlife values?

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[173] Id., p. 65.
[174] Id., pp. 65–66.
[175] Id., p. 66.
[176] Id.

> Mr. REED. Considering that we were going to buy the 146,000 acres of choice lands—stipulating that we were going to complete that—she's still a net loser.
>
> Mr. MOORHEAD. It's still a net loser?
>
> Mr. REED. That's right.
>
> Obviously you have to take that into consideration that it may be a net gainer for the people of North Dakota. But from a wildlife standpoint even with the 146,000 acres, no question about it.[177]

Mr. Reed explained later that by using the term "net loser," he was referring to both acres of productive wetlands and numbers and varieties of wildlife species.[178] He testified that any adverse effects on Federal wildlife refuges from the project would be "in addition to" those losses for which the 146,000-acre mitigation plan was designed to offset.[179]

One reason why the revised wildlife mitigation plan will not be able to offset the adverse effects of the Garrison Diversion Unit is that the expected wetland loss from the project was originally underestimated by the Fish and Wildlife Service and the Bureau of Reclamation in preparing the Garrison Environmental Impact Statement. A more recent Fish and Wildlife Service reinventory of wetlands in the proposed Oakes-LaMoure and Lincoln Valley sections of the Garrison project determined that wetland losses would be approximately 8,000 acres greater than originally estimated.[180] The inventory showed that, whereas the original estimates in Oakes-LaMoure and Lincoln Valley were 4,400 and 110 acres, respectively, actual losses would be as high as 12,334 and 500 acres, respectively, in the two areas. Since these areas represent about one-fourth of areas to be served by the project, the total losses after all inventories are completed are expected to be much greater. The Fish and Wildlife Service told the subcommittee that wetland losses could exceed 50,000 acres:

> Final wetland reinventories to determine the total wetland acre loss on the remainder of the project will begin in 1976. Preliminary reviews of aerial photographs, soil surveys, quadrangle sheets and gross field inspections indicate total wetland losses due to direct project construction may exceed 50,000 acres. This compares to an original estimate of about 27,000 acres.[181]

At the present time, 48,000 acres of previously drained wetlands are available for restoration to mitigate losses, assuming they can be placed under management. This would not meet the requirements of full mitigation.

The Bureau of Reclamation disagrees with the Fish and Wildlife Service that the Garrison project will result in a net loss of wetland and wildlife. In doing so, the Bureau refuses to acknowledge the ex-

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[177] Id., p. 69.
[178] Id., p. 71.
[179] Id.
[180] Id., p. 106.
[181] Id.

istence of new information developed by the Fish and Wildlife Service. The Bureau of Reclamation told this committee that:

> The Fish and Wildlife Service has not completed its current reevaluation of the wildlife plan and has not informed us of the results of its evaluation of the revised mitigation plan. Until this is done, the Bureau must use data from the original plan. The Bureau intends to mitigate all adverse effects of the project on wildlife habitat. * * * [182]

It is difficult for the Committee to believe that the Bureau of Reclamation cannot obtain the completed portions of the revised wildlife mitigation plan from its sister agency in the Department of the Interior. Furthermore, the Committee is concerned that the Bureau of Reclamation has chosen to continue to pass judgments about the wetland impacts of the project on an outdated wildlife mitigation plan that will have more adverse wetland impacts than the revised plan and will never be implemented. The Bureau is apparently proceeding with blinders on in planning the wildlife mitigation portion of the Garrison project. While this "head-in-the-sand" approach may make life much simpler for Bureau planners, it certainly does not provide the public or the Congress with accurate information about Garrison.

The Committee therefore recommends that:

> The Fish and Wildlife Service complete the Garrison wildlife mitigation plan as soon as practical and meanwhile inform the Congress, the Bureau of Reclamation, and other affected agencies periodically of any new developments in the mitigation plan, including results of wetland reinventories in other areas.

The Fish and Wildlife Service testified that the Bureau of Reclamation has not developed a management system for the 8,500 acres of wildlife areas that have already been acquired for the project.[183] When the Committee asked the Bureau when a management system would be established, the agency replied that a system would be developed "when completion of the revised fish and wildlife plan and funding levels allow us to complete the acquisition of land for each individual management unit." [184]

The Committee believes the 8,500 acres of wildlife mitigation lands already acquired should be serving the purpose for which they were acquired at taxpayers' expense, namely, to serve as productive wildlife habitat. The Committee does not agree with the Bureau that development of a management system should await completion of the mitigation plan and therefore recommends that:

> The Fish and Wildlife Service, in cooperation with the Bureau of Reclamation, take necessary steps to develop and implement a management system for the 8,500 acres of wetlands acquired for wildlife mitigation.

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[182] Id., p. 95.
[183] Assistant Secretary Reed testified that while $87 million had been spent on the overall project, only $2.3 million has been spent on wildlife mitigation. Id., p. 68.
[184] Id., p. 96.

The Committee further recommends that:

> The Fish and Wildlife Service, in cooperation with the Bureau, develops procedures to assure that wildlife mitigation lands being acquired for various projects under its jurisdiction are brought under an effective management system immediately after acquisition.

The Fish and Wildlife Service also complained that wildlife mitigation has not kept pace with construction of the principal supply works.[185] In response, the Bureau of Reclamation blamed the lag in wildlife mitigation of lack of funding and the changing state of the wildlife mitigation plan.[186] The Committee rejects the argument that funding is not adequate for wildlife mitigation. If funding is not adequate for wildlife mitigation, it is because the Bureau of Reclamation has not budgeted or allocated funds for this purpose.

However, the Committee does see how revision of the wildlife mitigation plan at this point in land acquisition and construction could hamper acquisition of wildlife areas in some instances.

The Committee therefore recommends that:

> The Bureau of Reclamation and the Fish and Wildlife Service take necessary precautions to assure that acquisition and development of wildlife mitigation areas keep pace with project construction.

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[185] Id., p. 68.
[186] Id., p. 96.

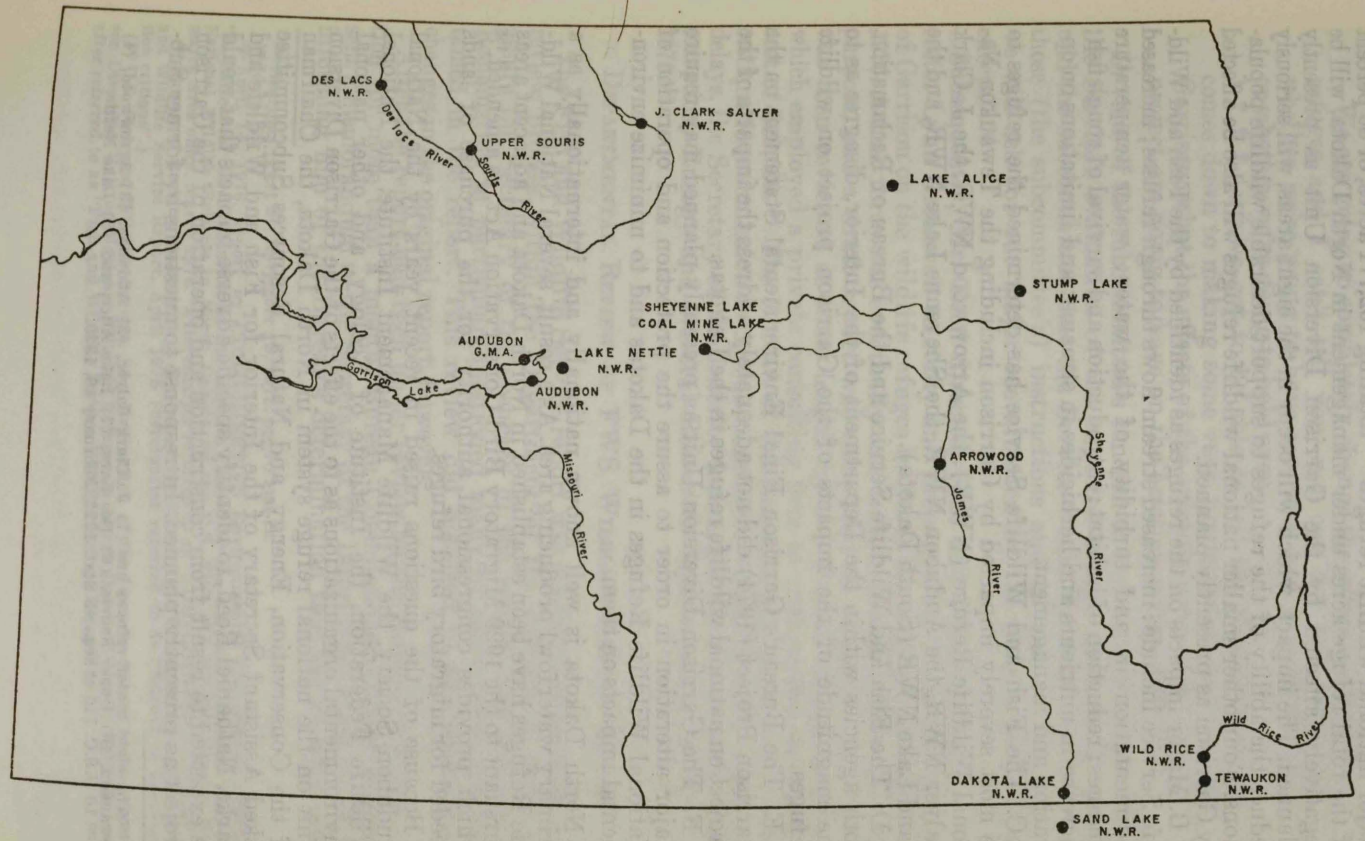

FIGURE 1.—Location of national wildlife refuges and major river systems affected by the Garrison diversion unit in North and South Dakota.

FINDINGS

A. The Fish and Wildlife Service (FWS) has determined that eight major national wildlife refuges [187] totaling 162,771 acres, or 80 percent of the total refuge acres under management in North Dakota, will be negatively affected by the Garrison Diversion Unit as presently planned. The impact, which will occur in the eight areas, will seriously reduce the ability of the refuges to support desirable wildlife populations. Four other smaller national wildlife refuges will also be affected by Garrison as presently planned.

B. Major impacts on the refuges as identified by the Fish and Wildlife Service include: increased stream flows through refuses; increased sedimentation in and turbidity of the water; water temperature changes; reduction of habitat; introduction and survival of rough fish; increase in nutrients and herbicides in streams; and limitations on operation and management.

C. The Fish and Wildlife Service has determined the refuges to be most severely impacted by Garrison including the Tewaukon National Wildlife Refuge (NWR), the Arrowwood NWR, the J. Clark Salyer NWR, the Audubon NWR, the Sheyenne Lake NWR, and the Sand Lake NWR (South Dakota).

D. The Fish and Wildlife Service and the Bureau of Reclamation, both agencies within the Department of the Interior, disagree as to the magnitude of the impacts of the Garrison project on wildlife refuges.

E. The Bureau's Garrison Final Environmental Statement on the Garrison Project (1974) did not adequately address the impacts of the project on national wildlife refuges in the Dakotas.

F. The Garrison Diversion Unit as presently planned may require major alteration in order to assure the protection and operation of National Wildlife Refuges in the Dakotas and to minimize environmental impacts on them.

North Dakota is well known nationally and internationally as a primary waterfowl producing area. As a result, several National Wildlife Refuges have been established in North Dakota and adjacent areas pursuant to the 1929 Migratory Bird Conservation Act, as amended,[188] which provides congressional authority for the purchase of lands needed for migratory bird refuges.

Because of the questions raised in recent years by the National Audubon Society, the Wildlife Management Institute, the National Wildlife Federation, the Institute of Ecology, and other national environmental organizations as to the effects of the Garrison Diversion Unit on the national refuge system in North Dakota, the Chairman of the Conservation, Energy, and Natural Resources Subcommittee asked Assistant Secretary of the Interior for Fish and Wildlife and Parks, Nathaniel Reed, to identify specific adverse impacts that would be expected to result from construction and operation of the Garrison project as presently planned. In response to questions by former Sub-

[187] The eight major refuges are (1) J. Clark Salyer, (2) Audubon, (3) Arrowwood, (4) Tewaukon, (5) Upper Souris, (6) Des Lacs, (7) Lake Alice, and (8) Lake Nettie.
[188] 16 U.S.C. 715 et seq., 45 Stat. 1222, February 18, 1929.

committee Chairman Moorhead and Representative Gilbert Gude during the November 19, 1975, hearing in Washington, Mr. Reed stated that:

> We are going to completely change the whole basis of those refuges and I can't tell you, nor can my best biologists, whether we're going to have a serious loss, a moderate loss, or whether we're going to hold even.
>
> * * * [w]e've got to be able to tell the Secretary, as he comes down to making some very fundamental decisions on Garrison, what the effects of the existing project or planned project are going to have on the existing refuge system.[189]

In view of the subcommittee's concern to know the Fish and Wildlife Service's evaluation of the expected refuge impacts, Mr. Reed told the subcommittee that the Service would "proceed rapidly with those (the subcommittee's) instructions and on a short time frame we will ask for our major reevaluation by the Service as to those effects." [190]

Subsequently, Mr. Reed directed Fish and Wildlife Service Director Lynn Greenwalt to study and prepare a report on the impacts of Garrison on the wildlife refuges in North Dakota by late February 1976. A task force was eventually convened in North Dakota for that purpose, and a draft report was completed on schedule. The report was then reviewed at some length by the Bureau of Reclamation, which employed a private consulting firm to critique the report at a cost of $10,000.[191] The Bureau of Reclamation also prepared its own critique for submission to the subcommittee.[192] Finally, after numerous delays, the Secretary of the Interior forwarded the report to the Conservation, Energy and Natural Resources Subcommittee on May 5, 1976.[193]

Departmental Review of FWS Wildlife Refuge Report

The Fish and Wildlife Service report was subjected to an intensive review process within the Department of the Interior in order to assure the Secretary of the accuracy of the report. The Bureau of Reclamation in particular questioned many of the conclusions contained in the report. This review did not lead to any substantive changes in the original report, however.

After the report had been under review by the Bureau of Reclamation for more than a month, Bureau Commissioner Gilbert Stamm sent a memorandum to the Secretary of the Interior on April 16, 1976, informing him of the Bureau's determination that the report's con-

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[189] Hearings (Part 2), November 19, 1975, pp. 70 and 72.

[190] Id., p. 72.

[191] April 14, 1976, report by CDM/LIMNETICS Environmental Consultants, entitled "A Critique of An Evaluation of the Impacts Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota by the U.S. Fish and Wildlife Service, Bismarck Area office, March 1976." (Hereinafter referred to as "CDM/LIMNETICS Critique".)

[192] Bureau of Reclamation report, A Review of the March 1976 Bismarck Area Office Fish and Wildlife Service Report, April 1976 (hereinafter referred to as "Bureau of Reclamation critique".)

[193] U.S. Fish and Wildlife Service, "An Evaluation of the Impacts Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota," March 1976 (hereinafter referred to as "Fish and Wildlife Service Wildlife Refuge Report").

clusions "are unsound and without technical confirmation".[194] Mr. Stamm continued, saying that "most of the remaining conclusions are overstated** (and) [t]he predicted effects are based on cursory evaluations and lack qualification and specific quantification." He recommended to the Secretary

> * * * that the report of Fish and Wildlife Service should not be released at this time. We urge that the report be returned to the Fish and Wildlife Service with a request that the issues be resolved and a new report suitable for transmittal to the House Subcommittee on Conservation, Energy and Natural Resources be prepared. Alternatively, if this is not deemed appropriate, we request that the review of the Fish and Wildlife Service report prepared by the Bureau of Reclamation and the critique prepared by CDM/LIMNETICS be attached to the report prior to its release to the Congress or to the public.[195]

The Fish and Wildlife Service subsequently prepared a detailed response to the Bureau of Reclamation critique, which addressed each major criticism.[196] Based on this response, the Director of the Fish and Wildlife Service informed the Secretary of the Interior in an April 28 memorandum that "The Bureau of Reclamation has presented no new data or analysis in its review that would cause us to modify our general conclusion that the Garrison Diversion Unit will degrade the National Wildlife Refuge System in the Dakotas."[197] The memorandum went on to reaffirm FWS support for the professionalism and accuracy of the report and urged that, should the Secretary continue to question the validity of the report, "we suggest that you request a review of this report by a competent peer group, such as a committee of the National Academy of Sciences, the Wildlife Management Institute or The Wildlife Society."[198] It is significant that the Secretary of the Interior required neither that the report be rewritten as requested nor that it be reviewed by a competent peer group.

The Secretary of the Interior forwarded the report to the subcommittee on May 5, along with copies of the various critiques and memoranda associated with the internal review of the report. In view of the extent of the internal departmental review, the Committee's opinion is that the information contained in the report represents an accurate statement of the Department of the Interior's evaluation of the expected impacts of the Garrison Diversion Unit on the National Wildlife Refuge System in North Dakota.

Wildlife Refuge Impacts

The Fish and Wildlife Service's report to the subcommittee concludes that eight major National Wildlife and other smaller refuge

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[194] April 16, 1976, memorandum from Commissioner Gilbert G. Stamm, Bureau of Reclamation, to the Secretary of the Interior, p. 1.

[195] Id., p. 3.

[196] U.S. Fish and Wildlife Service, "Critique of Bureau of Reclamation's Review of 'An Evaluation of the Impact Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota'," April 1976 (hereinafter referred to as "Fish and Wildlife Service Response to Bureau Critique").

[197] April 28, 1976, memorandum from Lynn Greenwalt, Director, Fish and Wildlife Service, to Secretary of the Interior, p. 1.

[198] Id., p. 5.

areas would be affected by construction and operation of the Garrison Diversion Unit. The eight major wildlife refuges (See Map) include the Tewaukon National Wildlife Refuge, the Arrowwood National Wildlife Refuge, the J. Clark Salyer National Wildlife Refuge, the Audubon National Wildlife Refuge, the Sand Lake National Wildlife Refuge (which is in South Dakota), the Des Lacs and Upper Souris National Wildlife Refuges, Lake Alice National Wildlife Refuge and Lake Nettie National Wildlife Refuge. Other national wildlife refuges affected by Garrison include the Dakota Lake NWR, the Sheyenne Lake-Coal Mine Lake NWR, Stump Lake NWR, and Wild Rice Lake NWR.

The major impacts that the Garrison Diversion Unit would have on the refuge system in North Dakota are summarized by the Fish and Wildlife Service as follows:

> Unseasonal volumes and timing of the Garrison Diversion Unit (GDU) project flows will become major factors in refuge operations. The FWS has substantiated loss of present and future management options, increased operation and maintenance costs, winter return flow impacts, and greater flood potential.
>
> The FWS report on GDU impacts on refuges established the basis for concerns over channelization, sedimentation and turbidity resulting from the project. Eighty-seven miles of stream channelization, annual cleaning of 72 miles of open project drains, increased stream velocities, threefold to fivefold volume increases in channelized streams, drain construction on 250,000 acres, and the loss of the sediment trapping function of 50,000 wetland acres are factors which will adversely impact Dakota refuges.
>
> Temperature alteration of river systems by project return flows will impact NWR's by extending open water periods beyond normal freezeup dates. Waterfowl concentrating on these areas will be exposed to severe environmental stresses and increase their susceptability to diseases. Changes in water temperature regimes by irrigation return flows may alter aquatic ecosystems on NWR's.
>
> Project operations will increase the cost of control of rough fish, sediment removal, and maintenance of control structures.
>
> Application of nitrogen and phosphorus fertilizers will increase twofold to fivefold on irrigable lands in the project area. Project drains and canals will transport return flows and runoff containing increased nutrients to the refuge pools. Higher nutrient levels in refuge pools will result in algal blooms, causing increased turbidity which reduces the production of water plants used by waterfowl and increase the potential for growth of toxic blue-green algae.
>
> Many of the herbicides used along project canals, drains and rights-of-way to control aquatic plants destroy waterfowl food plants, and have been demonstrated to be toxic to many invertebrates and some fish. An increased occurrence and greater potential for accidential spills or misuse of herbicides exists in maintenance of project features.

Three waterfowl production areas, three national wildlife refuges, and at least six game management areas will be negatively impacted by either drainage or partial or complete inundation by the project.

Project flows will enhance the survival and continual recruitment of undesirable fish populations, particularly carp, in four NWR's through increased flows, open water and increased oxygenation. Carp will be introduced into carp free waterfowl habitat on four additional NWR's through project features and establishment of suitable routes and habitat in the lower Souris River.

The prairie pothole region has climatic and geological characteristics which combine to create the most productive waterfowl habitat in North America. Because national wildlife refuges in North Dakota occupy strategic locations within this primary waterfowl producing region, they are highly vulnerable to construction projects of the magnitude of the GDU.[199]

Project Water Volumes and Timing

The Fish and Wildlife Service expects water management capabilities to be reduced in the Tewaukon, Arrowwood, J. Clark Salyer, and Sand Lake National Wildlife Refuges. Management capabilities will be eliminated in the Sheyenne NWR since that refuge will be inundated and replaced with portions of the Lonetree Reservoir feature of Garrison, presently under construction.[200]

Water management of the refuges will be affected, for the most part, by the increased water volumes flowing through the refuges as a result of the Garrison Diversion Unit. Increased water volumes will interfere with drawdown capabilities, which are an essential tool to maintaining water levels in the refuges for wildlife management purposes.[201] For example, the Fish and Wildlife Service reports that irrigation return flows, canal seepage, and operational wastes from the East Oakes Irrigation Area will increase the flows through the Tewaukon refuge 13,800 acre-feet annually.[202] Most of this flow will occur during July through February, which is normally a low flow period for the refuges. During this period, river flows will consist almost entirely of waste water and return flows from irrigated agriculture. According to the FWS:

> Increased flows in the Wild Rice River will reduce effective water management in refuge pools at Tewaukon. Management at the refuge presently includes the option of drawing down Lake Tewaukon to a depth of 3 to 4 feet and managing it as a waterfowl marsh. *Garrison Diversion Unit flows will severely reduce the management capability.* (Emphasis supplied.) Cutler's marsh (pool 2), Maka Pool (pool 3) and

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[199] Fish and Wildlife Service Response to Bureau Critique, pp. 1–2.

[200] Fish and Wildlife Service Refuge Impact Report, pp. 16, 17, 36, 55, 75, and 89.

[201] Fish and Wildlife Service Critique, p. 8. According to the FWS, "Drawdown is the primary management tool utilized to promote aquatic productivity. Actual drawdown means lowering pool elevation, either by way of structural capabilities or natural evaporation, to dry out bottom soils. Maximum response from drawdown can be accomplished if bottom soils are dried during July and August."

[202] Fish and Wildlife Service Wildlife Refuge Impact Report, p. 16.

> pool 4 will lose effective drawdown capabilities. Mann Lake, Sprague Lake and Horseshoe Slough (pools 13, 14 and 16, respectively), which are at lower elevations than the Wild Rice River and do not presently have control structures, will be continually flooded by the Wild Rice River. Future management of refuge pools will be impaired by greater flows in the river. Loss of drawdown capabilities on refuge pools will lessen their productivity for wildlife.[203]

The Wild Rice River will serve as the principal artery to carry Garrison return flows from the East Oakes Irrigation area into the Red River, which flows north into Canada.

In Arrowwood NWR, which is located on the James River, the Fish and Wildlife Service expects that "all impacts, either direct or indirect, are related to the large volumes of project waters." [204] Compared to historic river flows, Bureau of Reclamation return flow data indicates that flows through the refuge will be almost tripled annually by the Garrison project.[205] In the case of Tewaukon, the Fish and Wildlife Service expects that the heaviest flows from the project will be increased during periods of normal low flow when drawdown capabilities have normally been employed for management purposes:

> * * * A dramatic influence on the water regime and management of the pools is also evident when monthly irrigation flows are compared to monthly refuge inflow average. During June, a threefold increase in flows will occur. River flows will be correspondingly increased during July 22 times, August 129 times, September 431 times and October 68 times. These figures provide the basis for the conclusion that summer drawdown capabilities will be lost with Garrison Diversion Unit flows.[206]

According to the FWS, future management would "be dictated by project releases to the LaMoure-Oakes section of Garrison." [207] The J. Clark Salyer refuge, which will be influenced by 58,740 acre-feet of return flows from the Souris area annually, would be similarly affected.[208]

Another management limitation expected at the J. Clark Salyer NWR concerns the possibility that the refuge water management structures could be required for use more frequently than at present for flood control downstream. The Fish and Wildlife Service report explains during spring flooding conditions on the Souris River, the J. Clark Salyer Refuge cooperates with Canada to minimize flooding downstream from the refuge. However, return flows from the Garrison Diversion Unit could increase flooding which "may result in requests from Canadian authorities to hold more water on the refuge." [209] This would "result in water management to satisfy political entities rather than to optimize wildlife production." [210]

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[203] Id., pp. 16–17.
[204] Id., p. 45.
[205] Id.
[206] Id.
[207] Id., p. 39.
[208] Id., p. 64.
[209] Id., pp. 62–63.
[210] Id., p. 63.

Channelization Impacts

The Fish and Wildlife Service has determined that stream channelization associated with the Garrison project is expected to adversely impact three major wildlife refuges—the Tewaukon NWR, the Arrowwood NWR and the J. Clark Salyer NWR.[211] Eighty-seven miles of stream channelization are expected in conjunction with the Garrison project, resulting in increased sedimentation and turbidity in wildlife refuge pools.[212]

The description of the expected impacts of stream channelization on the Tewaukon NWR exemplifies the kinds of impacts expected in the refuges from channelization activity upstream:

> * * * Siltation reduces pool capacities (Brown 1974) and requires additional maintenance and silt removal (Matthews 1976, pers. comm.). Growth and vigor of submergent and emergent aquatic plants are decreased by siltation and increased turbidity (Jackson and Starrett 1959, McKee and Wolf 1963, and Committee on Water Quality Criteria 1972). Similar decreases in populations of aquatic invertebrates occur when siltation and turbidity increase (Benson and Cowell 1967). The loss of aquatic plants and invertebrates, which are primary foods for waterfowl and other aquatic wildlife, will decrease the productivity of the refuge pools. Return flows coupled with channelization will cause sand deposition as well as other forms of sedimentation in refuge pools. The deleterious effects of shifting sand on aquatic plant and animal communities are well documented (Eggleton 1939, Hansen 1971).[213]

In response to the Bureau of Reclamation claims that the impacts from stream channelization will be intermittent and short-term because they will be due mainly to construction of project drains,[214] the Fish and Wildlife Service points to the Bureau's own Final Environmental Statement (FES), which states that 72 miles of open, deep drains and small reaches of canals will be cleaned of stormflow sediments each year with resulting increases in turbidity of drain water. According to the FES, bank erosion and disturbance of aquatic plants will occur during and after these annual cleaning operations.[215]

Temperature Alteration, Open Water and Waterfowl Disease

The Fish and Wildlife Service believes that changes in normal river temperatures (warmer in the winter, cooler in the summer) and prolonged open water in refuges resulting from Garrison return flows will combine to create a situation that will increase the chances of disease in waterfowl. According to the Service—

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[211] FWS response to Bureau Critique, p. 11.
[212] Id. Also see: Fifth Report of the Committee on Government Operations, "Stream Channelization: What Federally Financed Draglines and Bulldozers Do to Our Nation's Streams". House Report 93–530, 93rd Cong. 1st Sess. September 27, 1973.
[213] Fish and Wildlife Service Wildlife Refuge Report, p. 18.
[214] Bureau of Reclamation Critique, p. 24.
[215] Fish and Wildlife Service Response to Bureau Critique, p. 11; Also see Final Environmental Statement, Garrison Diversion Unit, 1974.

> * * * Project return flows will change normal freezing patterns, maintain open water, and extend the length of time waterfowl will remain in North Dakota into the winter freeze-up period. This will expose waterfowl to freezing temperatures, food shortages, and concentration factors. * * * [216]

The Fish and Wildlife Service analysis shows that at least four wildlife refuges—Tewaukon, J. Clark Salyer, Dakota Lake and Sand Lake—will be affected by changes in ambient water temperatures since they are within 30 miles from proposed Garrison open project drains.[217] (The thirty-mile distance is the outward limit of the area within which the Bureau of Reclamation says water temperatures will change due to introduction of return flows.)[218] According to the Service—

> Each of these four refuges has large waterfowl concentrations which move south when freezeup occurs. Providing open water throughout the winter, or extending normal freezeup dates into this winter period, expose waterfowl populations to a variety of environmental stresses and disease potentials * * *
> Diseases are the same whether found in North Dakota, South Dakota, or Missouri. Stress factors involved which trigger the outbreak may be of different degrees. The environmental stress factors can be extremely severe during North Dakota winters, and holding waterfowl in the state longer than normal will increase their susceptibility to disease and starvation.[219]

Increased streamflows will also reduce upland habitat in some refuges, such as Audubon Lake NWR. The Fish and Wildlife Service reports that by raising the water level in Audubon NWR by 15 feet, islands in the lake will be decreased from 196 (1,173 acres) to 148 (430 acres).[220] The Fish and Wildlife Service contends that this will result in a net loss of wildlife in the refuge.

Introduction and Survival of Rough Fish Species

The Fish and Wildlife Service told the Conservation, Energy, and Natural Resources Subcommittee that it "is concerned about the increased survival and recruitment of carp and other rough fish in the aquatic habitat at Arrowwood, Tewaukon, Dakota Lake and Sand Lake NWR's" as a result of the Garrison Diversion Unit.[221] Also, carp are expected to be introduced into the J. Clark Salyer refuge by Garrison return flows.[222]

Presently, drawdown and winterkill are utilized by the Service to control rough fish populations in the refuges. After winterkill, most refuge pools remain fish-free until high water allows reestablishment of populations of rough fish.[223]

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[216] Fish and Wildlife Service Response to Bureau Critique, p. 15.
[217] Id.
[218] Bureau of Reclamation Critique, p. 27.
[219] Fish and Wildlife Service Response to Bureau Critique, p. 14.
[220] Fish and Wildlife Service Wildlife Refuge Report, p. 69.
[221] Fish and Wildlife Service Response to Bureau Critique, p. 22.
[222] Fish and Wildlife Service Wildlife Refuge Report, p. 56.
[223] Fish and Wildlife Service Response to Bureau Critique, p. 22.

The Service's response to the Bureau of Reclamation's critique of the report on the impact of Garrison on wildlife refuges in North Dakota explains why Garrison will increase the rough fish problem:

> Increased water volumes due to GDU irrigation flows or return flows will allow increased movement, survival and annual reestablishment of undesirable fish populations in refuge pools during spring and summer flows. Return flows during winter will increase survival and allow breeding populations of carp to become established. BR (1974b) reported that return flows to the Souris River at J. Clark Salyer NWR would "be beneficial to fish by providing a means of oxygenation during a portion of the winter season." It is reasonable that return flows will similarly increase survival of fish at Tewaukon, Dakota Lake and Sand Lake NWR's. BR states in the FES (1974a), the LaMoure/Oakes administrative DES (1975a), and in their comments to the evaluation, that problems controlling rough fish on refuges will be compounded.[224]

The Service is particularly worried about control of carp population because they are destructive to aquatic plants, cause increased turbidity in refuge pools, and decrease invertebrate populations.[225]

The introduction of carp as a result of the interbasin transfer of Garrison waters is expected to have "serious ecological effects" in the J. Clark Salyer NWR on the Souris River.[226] The Fish and Wildlife Service contends that the fish screens will not be adequate to prevent carp from entering the refuge through the Lonetree Reservoir and the Velva Canal:

> * * * Exclusion of carp from Lonetree Reservoir depends upon 100 percent efficiency of the proposed fish screens. No fish screen is known to be 100 percent effective. Carp established in Lonetree Reservoir will reach the refuge by way of the Velva Canal and associated wasteways which drain into the Souris River.[227]

The Fish and Wildlife Service also contends that Garrison return flows will increase the oxygen content in the Souris River during low flow periods, thereby improving the climate for introduction and survival of carp in the Souris River from the Assiniboine River in Canada. Heretofore, carp have been unable to enter the Souris from the Assiniboine because of low oxygen levels in the water.[228]

The matter of interbasin transfer of rough fish species is a matter presently before the International Joint Commission, which is studying the impact of the Garrison Diversion Unit on Canada.

The Fish and Wildlife Service and the Bureau of Reclamation agree that additional fish control measures will be required in some cases to control rough fish resulting from operation of Garrison.[229] It should

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[224] Id.
[225] Fish and Wildlife Service Wildlife Refuge Report, p. 19.
[226] Id., p. 56.
[227] Id., See also Fish and Wildlife Service Response to Bureau Critique, p. 23.
[228] Id., pp. 55–56.
[229] Bureau of Reclamation Critique of FWS Report, p. 29. The Bureau of Reclamation says that "It has been recognized in the environmental impact statement that such effects will occur and in some cases will require additional fish control measures."

be noted, however, that the Bureau of Reclamation feels strongly that its fish screen will be adequate to control rough fish introduction into the Souris River.[230]

Increase in Nutrients and Herbicides

Runoff from application of nutrients from increased crop fertilization and herbicides from elimination of nuisance weeds in and along open drains is expected to have an adverse impact on most of the major wildlife refuges in the path of the Garrison project.

As mentioned earlier in this report, the Bureau of Reclamation has not adequately determined the expected levels of nitrates in affected rivers and streams other than in the Souris River (See Chapter VII). Nor are the effects of increased nitrate concentrations in streams adequately understood by the Bureau at this point. Nevertheless, the Fish and Wildlife Service reports that preliminary Bureau of Reclamation data indicates that nitrate application in the Oakes-LaMoure irrigation area will increase by 500 percent once irrigation begins.[231] Based on this data and research reports which show heavy application of fertilizers in irrigated areas increase nitrates in streams, the Fish and Wildlife Service concludes that "It is reasonable to expect increased nitrates in return flows entering Dakota Lake, Tewaukon and J. Clark Salyer NWR's." [232]

Phosphate levels in national wildlife refuges are also expected to increase dramatically as a result of proliferation of feedlot operation which Garrison-irrigated crops are expected to support. Runoff from feedlots is high in nitrate and phosphate content.[233] Again quoting preliminary Bureau of Reclamation data for the Oakes-LaMoure area, the Fish and Wildlife Service stated that it expects a 400 percent increase in phosphate fertilizer application in the Oakes-LaMoure area.[234] Furthermore, many small private cattle feeding operations will be exempt from obtaining an EPA point source discharge permit required under section 402 of the Federal Water Pollution Control Act of 1972 (P.L. 92–500). This means that there will be no regulation of runoff from these operations and hence no control over the phosphates and nitrates pollutants that will result from them.

The Fish and Wildlife Service summarized the expected impacts on the refuges from nitrates and phosphates as follows:

> It is generally accepted that phosphorous and nitrogen limit primary productivity in most rivers and lakes. Hynes (1970, 1971) stated that nutrient salts (potassium, nitrate and phosphates) needed for plant growth were more important than the inert salts. Nitrogen and phosphate are the most important as they are often in short supply in natural waters and thus control the amount of plant growth. With increased sedimentation, turbidity, rough fish activity, and resultant loss of aquatic invertebrates and aquatic plants, the increase in primary productivity is expected to result in algal blooms of greater intensity and duration. This condition is not conducive

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[230] Id., p. 31.
[231] Fish and Wildlife Service Response to Bureau Critique, p. 18.
[232] Id.
[233] Id.
[234] Fish and Wildlife Service Wildlife Refuge Report, p. 22.

to waterfowl management, and as Olson (1964) pointed out, blue-green algal blooms can have toxic effects on waterfowl, shore birds, and other species of terrestrial and aquatic wildlife.[235]

The Bureau of Reclamation contends that the irrigation management service proposed for Garrison will help control influx of nitrates, phosphates, and other salts into the refuges.[236] However, as mentioned earlier in this report (Chapter VII), this proposed program is sketchy at present and provides no firm controls over fertilizer, pesticide, or water applications to assure minimization of runoff.

The Fish and Wildlife Service also is concerned that use of major herbicide compounds along ditchbanks will adversely affect the food chain and health of waterfowl and wildlife in refuges.

In response to the Fish and Wildlife Service's concern over impact on refuges from herbicides and pesticides, the Bureau of Reclamation relies heavily on the Environmental Protection Agency's (EPA) pesticide registration program as providing adequate protection against harmful effects of pesticide and herbicide compounds. According to the Bureau, "Registration of the pesticides requires evaluation of residues in crops, water and other parts of the environment by the EPA."[237] What the Bureau fails to mention, however, is that a recent General Accounting Office report has shown that, in many cases, pesticides have been registered without required tests being performed.[238] Test data was found to be missing or inadequate on many registered pesticides either because the pesticide was registered prior to the enactment of the Federal Environmental Pesticide Control Act of 1972[239] or because required tests simply were not performed by the manufacturer. The Environmental Protection Agency is presently reviewing over 35,000 registered pesticides to determine which may require either deregistration or reregistration according to their impact on the environment and human health.[240] The Conservation, Energy, and Natural Resources Subcommittee is currently investigating the EPA's pesticide registration program.

Adequacy of NEPA Statement in Addressing NWR Impacts

The Bureau of Reclamation Final Environmental Statement (FES) on the Garrison Diversion Unit devotes very little discussion to the impacts from the project on National Wildlife Refuges in North Dakota. The statement mentions that the level of Audubon Lake NWR would be raised by 15 feet; that Sheyenee Lake NWR would be inundated by the project; and the lower half of the J. Clark Salyer NWR could be affected by higher average levels of dissolved solids and increased flows as a result of irrigation.[241] Other impacts recently identified by the Fish and Wildlife Service are not discussed in the

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[235] Fish and Wildlife Service Response to Bureau of Reclamation Critique, pp. 18–19.
[236] Bureau of Reclamation Critique of Fish and Wildlife Service Report, p. 35.
[237] Id., p. 37.
[238] General Accounting Office Report to the Congress, "Federal Pesticide Registration Program: Is It Protecting the Public and the Environment Adequately from Pesticide Hazards?", December 4, 1975.
[239] 7 U.S.C. 136.
[240] See: Hearings before the Conservation, Energy, and Natural Resources Subcommittee, "EPA's Implementation of the Pesticide Control Act," 94th Cong., 2d sess., February 11 and March 5, 1976, p. 48.
[241] Final Environmental Statement, Garrison Division Unit, p. V–6.

FES. The Fish and Wildlife Service mentions some of the impacts identified in the draft supplemental environmental statement for the Oakes-LaMoure irrigation area, which was recently released in draft form for public comment.

The lack of attention given the impact of Garrison on the refuges demonstrates once again the inadequacy of the 1974 Final Environmental Statement in providing the Bureau of Reclamation and the public with necessary information to determine the cumulative environmental impacts of the project. Wildlife refuge impacts should have been determined during preparation of the Final Environmental Statement and certainly by now—with 20 percent of the project having been completed. The Committee feels strongly that the impacts on the refuges should be determined immediately in a supplemental environmental impact statement with appropriate public review and comment prior to further land acquisition and construction contracts.

The Committee therefore recommends that:

> The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, promptly prepare a supplemental environmental impact statement containing detailed analyses and discussions of the cumulative environmental impacts of the Garrison Diversion Unit on the National Wildlife Refuges in the Dakotas prior to initiation of further land acquisition or construction contracts. The supplemental statement should address issues raised in the Fish and Wildlife Service Report of March 1976.

The Committee is also concerned that appropriate committees of Congress having authorizing or appropriation jurisdiction over the National Wildlife Refuge System have not been adequately informed of the potential conflicts that exist between Garrison Diversion Unit construction and operation and the maintenance and operation of the National Wildlife Refuge System in North Dakota.

The Committee therefore recommends that:

> The Fish and Wildlife Service take necessary steps to adequately inform the appropriate committees of Congress having jurisdiction over the Wildlife Refuge System of the potential adverse impact expected from construction and operation of the Garrison Diversion Unit as presently planned.

Alternatives

The Fish and Wildlife Service recommended several alternatives to the Garrison project plan which would reduce the impacts of the project on the wildlife refuge system.[242] The Bureau indicates possible agreement with some and disagreement with others.[243] The Committee believes that it is important to identify various alternatives to the Garrison project that will assure protection of the refuges in question.

The Committee therefore recommends that:

> The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, identify alternatives to the Garrison

[242] Fish and Wildlife Service Wildlife Refuge Report, pp. 24, 44, and 63.
[243] Bureau of Reclamation Critique of Fish and Wildlife Service Report, pp. 41–43.

Division Unit project plan that will eliminate adverse impacts to the national wildlife refuge system. If such alternatives should increase the cost, reduce benefits, or require major alteration of the present project plan, the Bureau of Reclamation should so notify the appropriate committees of Congress and promptly return to Congress for reauthorization of the project.

X. PROJECT ALTERNATIVES, LONE TREE RESERVOIR, AND CONTINUED CONSTRUCTION

Findings

A. The State Department and the Bureau of Reclamation have assured the Canadian Government that a construction moratorium exists on portions of the Garrison Diversion Unit which potentially affect Canada until the water quality dispute is resolved.

B. Construction continues on Lonetree Reservoir, even though, under the presently authorized project plan, it potentially affects Canada. The Bureau claims that the Lonetree Reservoir will be needed regardless of possible alterations that could be required of the project.

C. The Bureau of Reclamation is considering at least nine alternatives to the Garrison Diversion Unit that could help resolve the water quality dispute with Canada. Alteration of the Garrison project could increase project costs by as much as $150 million.

D. The Bureau has given emphasis to the use of desalinization plants as a possible means to ameliorate the water quality dispute with Canada.

Canadian objections to continued construction of the Garrison project prompted the State Department and the Bureau of Reclamation to agree to a construction moratoruim on portions of the Garrison project that potentially affect Canadian interests.[244] Since the agreement was not committed to writing, it is difficult to determine which project features were determined by the parties as potentially affecting Canada and which do not.

The Bureau of Reclamation and the Department of State testified that the McClusky Canal and the Lonetree Reservoir are viewed by the Interior Department as not potentially affecting Canadian waters. Construction continues on these features at the present time. However, the 1965 law that authorized the Garrison Plan is quite specific in its intent. The authorized plan envisioned the McClusky Canal as the primary feeder canal to Lonetree, which would then feed water by gravity through the Velva Canal to the Souris Loop irrigation area.[245] Return flows from the Souris irrigation area would then drain into the Souris River and eventually into Canada. This plan is the one the Bureau has been authorized to construct and no major alterations of the project have been authorized by Congress. By treating the authorized project plan as a fluid plan that could be altered as problems arise, the Bureau assumes flexibility in making major alterations to the project, which, in the Committee's opinion, are not available under present law.

The Bureau of Reclamation agrees that the authorizing act does not provide for segmentation of the Lonetree Reservoir and McClusky

[244] May 28, 1975, letter from Robert J. McCloskey, Assistant Secretary of State for Congressional Relations, to subcommittee Chairman Moorhead, Id., Appendix 3, p. 216.
[245] Bureau of Reclamation's supplemental report on the Garrison Diversion Unit—Initial Stage (Nov. 1962, revised Feb. 1965), p. 10.

Canal from the rest of the project. Yet, as a basis for continued construction of these two features, the Bureau claims that "by themselves the McClusky Canal and Lonetree Reservoir do not affect Canada." The Bureau's argument follows:

> There are no provisions in the authorizing legislation to allow the McClusky Canal-Lonetree Reservoir portion of the unit as a separate entity.
>
> The McClusky Canal and Lonetree Reservoir are being constructed under the authorizing legislation.
>
> We do not claim that the Lonetree Reservoir has no relation to the Velva Canal and the Souris Loop area. We have simply stated that, by themselves, the McClusky Canal and Lonetree Reservoir would not affect Canada.
>
> The Lonetree Reservoir is required to furnish water to all service areas. Should other lands be submitted for The Souris Loop area or the plan modified to prevent return flows from accruing to streams crossing the border into Canada, the Lonetree Reservoir will be required as an integral part of those project facilities. The Lonetree Reservoir is a regulating reservoir planned for the purpose of reducing the size of the Snake Creek Pumping Plant and McClusky Canal.
>
> The canal to move the water supply to lands in the Souris Loop area will necessarily begin at the Lonetree Reservoir. Otherwise, the McClusky Canal and the Snake Creek Pumping Plant would have required larger sizes.
>
> The McClusky Canal and Lonetree Reservoir are part of the authorized plan. Return flows into Canada cannot occur from the reservoir unless facilities, such as the Velva Canal, are also constructed to convey water into other basins which drain into Canada.[246]

In short the Bureau of Reclamation recognizes that the overall project plan, including the McClusky Canal and the Lonetree Reservoir, does potentially affect Canada. However, as a matter of convenience to allow continued construction, it takes the position that the project will only affect Canada at that point where construction would begin on features falling within the Souris River basin, for example, the Velva Canal. This may be satisfactory to the Canadians; but from a planning standpoint, it is totally unacceptable since it represents an irreversible commitment to alternatives that include the existing design and capacity of the Lonetree Reservoir.

It must be remembered that the Lonetree Reservoir is being constructed for use on the initial and subsequent stages of the project. Depending on the outcome of the International Joint Commission study, it may be that subsequent stages of the project could be altered or precluded and/or the initial stage reduced in size. In that event, the Lonetree reservoir could be much larger than necessary to accommodate an altered project plan.

Of course, no one can say what alternative will be suggested by the IJC or whether the United States or Canada will accept its rec-

[246] Id., p. 88.

ommendations. Several alternatives have been developed by the Bureau of Reclamation, ranging from elimination of the Souris section of the project (116,000 acres) to rerouting return flows down domestic streams, to construction of desalinization plants (See Appendix 2). Assuming any one of these alternatives were recommended by the IJC, additional congressional authority would probably be required to implement the revised project plan. Meanwhile, construction continues on the Lonetree Reservoir under the questionable assumption that its capacity and location and the size of the initial stage (250,000 irrigation acres) will remain unchanged by any future alterations of the project. The Committee is unconvinced that this will in fact be the case.

The Committee does recognize, however, that the McClusky Canal is almost two-thirds complete and, as a practical matter, the Bureau is irretrievably committed to construction of the canal as presently planned. This is not, however, the case with the Lonetree Reservoir and associated dams. Construction began early this year and will continue for at least two more years. Construction could be deferred on this feature, at least until it is apparent that Canada and the United States will accept the recommendations of the IJC, which should be issued in November 1976.

The Committee therefore recommends that:

> Land acquisition and construction of the Lonetree Reservoir feature of the Garrison Diversion Unit be deferred until the Canadian and United States Governments have agreed upon an acceptable alternative to the present project plan.

According to recent testimony before the IJC in Grand Forks, North Dakota, the Bureau of Reclamation also claims that Reaches 1 and 2 of the New Rockford Canal, which lead eastward from Lonetree "will not affect nor contribute to return flows accruing to streams flowing into Canada." [247] This position implies that the only function of the New Rockford Canal (and the James River Feeder Canal) is to supply the Oakes and LaMoure areas of the project, which will drain into the James River. In fact, the canal is designed to serve the Oakes-LaMoure and Warwick-McVille areas, of which most of the return flows will drain into the Red River. This too represents an unacceptable irreversible commitment of resources that should not occur until an alternative has been developed that is acceptable to the Canadian and U.S. governments. Clearly the proposed irrigation areas in Warwick-McVille and Oakes-LaMoure could be affected by possible alternatives. Continued construction could result in an expensive canal being built to serve only a small irrigation area on the James River.

The Committee believes these features do potentially affect Canada and recommends that:

> Land acquisition and construction on the New Rockford Canal and portions of the project to be served by the canals should be deferred until the Canadian and United States Governments have agreed upon an acceptable alternative to the present project plan.

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[247] January 12, 1976, statement by the Bureau of Reclamation before the International Joint Comission in Grand Forks, N. Dak., p. 2.

The Bureau's testimony before the International Joint Commission study board relied heavily on the possible use of desalinization plants to cleanse the Garrison return flows of pollutants before allowing them to flow across the international boundary.[248] This would be one of the more expensive alternatives,[249] although admittedly one of the easiest ways to salvage most of the present project plan. However, the immense cost of building desalinization plants—as evidenced by present Federal efforts to desalinize Colorado River water prior to its entering Mexico—will undoubtedly have a negative effect on the Garrison project's economic feasibility. It is the Committee's judgment that desalinization plants would be unacceptable considering the present high cost of the Garrison project.

The Committee recommends, therefore, that:

> All alternatives short of construction of expensive desalinization plants be considered by the United States Government as a means of mitigating the current water quality dispute with Canada. If such alternatives should increase the cost, reduce benefits, or require major alteration of the present project plan, the Bureau of Reclamation should notify the appropriate committees of Congress and promptly return to Congress for reauthorization of the project.

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[248] Id., p. 6.
[249] Hearings (Part 2), November 19, 1975, p. 63.

XI. COST-BENEFIT PROBLEMS

Findings

A. The Bureau's budget justification documents for fiscal year 1977 for the Garrison Diversion Unit are based on erroneous inflation indexing procedures and report inaccurately the true estimated cost and authorized cost ceiling for the Garrison Diversion Unit.

B. The Bureau of Reclamation has not revised its budget justification documents for fiscal year 1977 to reflect changes in the estimated costs and authorized cost ceiling for the Garrison Diversion Unit recommended in the 14th report of the Committee on Government Operations (House Report 94–852, February 26, 1976) and agreed to by the Department of the Interior.

C. The Bureau of Reclamation has not informed the committees of Congress having authorizing and appropriations jurisdiction over Reclamation that the estimated cost of the Garrison Diversion Unit is approximately $40 million over its authorized cost ceiling as indexed for inflation.

D. The authorized cost ceiling and the estimated costs for the Garrison Project do not include an estimated $150 million in costs that could be required to settle the boundary waters dispute with Canada; however, costs of alternatives are too preliminary at this point for the Bureau to adjust properly the ceiling or the estimated costs of the project.

E. The proposed construction of desalinization plants on the Souris and Red rivers to settle the water quality dispute with Canada is among the more expensive alternatives under consideration by the Bureau of Reclamation and the International Joint Commission.

F. The irrigation farmers who will benefit from Garrison Diversion Unit water will repay only 5 percent of the cost of project construction while partial repayment from Federal power revenues from Garrison Dam will provide a subsidy to agriculture of $377 million (July 1975 prices).

G. Bureau of Reclamation and North Dakota officials expect that Garrison will produce benefits from irrigation, municipal and industrial water, fish and wildlife conservation, and flood control.

H. An artificially low discount rate of 3¼ percent, set by law, assigns an exaggerated value to benefits expected from the Garrison Diversion Unit and results in a misleading cost-benefit ratio. Cost-benefit ratios for new Reclamation projects authorized by Congress are required to use discount rates that are much higher.

I. The $2.7 million in claimed wildlife conservation benefits are not adequately justified in view of the determination by the Fish and Wildlife Service that Garrison will result in a net loss to wetlands and will be harmful to Federal wildlife refuges.

J. It is unclear as to whether flood control benefits claimed for Garrison will materialize or whether domestic flooding along the Souris, Red, and James rivers will result in increased flood control costs.

Reclamation economics is a complex operation which requires examination of many interrelated variables, some predicted, some known, some unknown, all of which lead to a conclusion that a project either is or is not economically feasible. During the course of the subcommittee's examination of the Garrison project, numerous allegations were heard that the project's cost-benefit ratio is not an adequate reflection of the economic feasibility of the project and that the cost-benefit ratio is really much lower than the 2.8 to 1 figure reported by the Bureau of Reclamation.

It is not the Committee's intention to undertake a complete review of the economic ramifications of the Garrison project. We believe that such an examination would be appropriate for the General Accounting Office, the auditing arm of Congress.

Nevertheless, the Committee's investigation has uncovered several problems with the cost-benefit analysis of Garrison which merit comment in this report. This chapter will consider each of these points individually and make recommendations as necessary.

Rising Project Costs

The initial authorization of a reclamation project is based on a determination by the Congress that the project is worth the expected expense. The Congress must rely heavily on a Bureau of Reclamation cost-benefit analysis to support enactment of the authorizing legislation. In the case of Garrison, the 1965 act was passed on the basis of a cost-benefit analysis that demonstrated a 2.5 to 1 ratio of benefits to costs.[250] (The present cost-benefit ratio is 2.9 to 1.) The estimated cost to complete the project in 1965 dollars was $207 million, a figure which was incorporated into the legislation as the congressionally-authorized cost ceiling.[251]

The statutorily-fixed authorized cost ceiling of a reclamation project is the basic authorization for appropriations and expenditures to build it. It also serves as a control mechanism whereby the Congress can monitor the increase in actual costs as planning and construction proceed over a number of years. The authorization for most projects, including Garrison, includes language to allow an increase in the cost ceiling to account for inflation. Since engineering cost indexes are used in this procedure, the process is called indexing. Indexing provides the Bureau with a reasonable degree of latitude to increase cost ceilings to account for inflation while retaining necessary congressional control over spending. In theory, the cost ceiling each year should remain in the same ratio to the dollar value as it was in the year the project was authorized.

As a result of the indexing of rising construction costs, the cost ceiling and estimated costs of the Garrison project have risen dramatically in recent years. According to the Bureau of Reclamation, the

[250] House Report 282, 89th Cong., 1st sess., "Garrison Diversion Unit, Missouri River Basin Project," May 4, 1965.
[251] Section 6, Public Law 89–108, August 5, 1965.

estimated cost of the project had risen to $496 million in January 1975,[252] an increase of approximately $289 million in a ten-year period.

The rising costs of the Garrison project prompted the Conservation Energy, and Natural Resources Subcommittee to request a review of some aspects of the Garrison Diversion Unit by the General Accounting Office. The GAO subsequently issued several reports to the subcommittee which demonstrated that the Garrison authorized cost ceiling had been considerably over-inflated and estimated costs understated.[253] The most recent report of GAO to the subcommittee focused specifically on the Bureau of Reclamation's inflation indexing procedures and found that the estimated costs of the Garrison project would be $40 million over its authorized cost ceiling if recommended GAO corrections were employed by the Bureau in its computations.[254]

The Committee subsequently held hearing on the issues raised in the November 17, 1975, GAO report and issued its report on February 26, 1976. The Committee's report took exception to the Bureau's current indexing procedures and made eighteen recommendations (some based on GAO recommendations) to correct the procedures and the reporting of the ceiling and project costs to Congress and the public.[255] The Bureau of Reclamation's response to the report has indicated that action is being taken to implement most of the Committee's recommendations, but the cost ceiling and estimated cost of the project will not be readjusted until submission to Congress of the fiscal year 1978 budget. Therefore, present budget justification documents, which are based on the erroneous procedures and which show the Garrison Diversion Unit to be within its authorized cost ceiling, are an inaccurate reflection of the true cost status of the project.

The Committee therefore recommends that:

> The Bureau of Reclamation update the budget justification documents for the Garrison Diversion Unit prior to completion of congressional consideration of the Project's FY 1977 budget request, making adjustments in the authorized cost ceiling and the estimated total Federal obligations as recommended in House Report 94–852.

The Committee recommends further that:

> The Secretary of the Interior advise the congressional oversight and appropriations committees promptly whenever total estimated costs for the Garrison Project cannot be reduced within its authorized cost ceiling without causing a substantial change in project benefits.

Identification of Costs of Alternatives

The $496 million estimated cost for the Garrison project does not include additional costs that could result from alterations to the project which could be required to accommodate the Canadian objections.

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[252] House Report 94–852, 14th report of the Committee on Government Operations, "Bureau of Reclamation's Indexing Procedures Conceal Information That Water Resource Projects Ar in Excess of Their Authorized Cost Ceilings," February 26, 1976 (hereinafter cited a "House Report 94–852, Feb. 26, 1976"), Appendix 1, p. 50.

[253] GAO reports, supra, footnote 2, p. 4.

[254] GAO report, November 17, 1975.

[255] House Report 94–852, February 26, 1976.

The General Accounting Office reported to the subcommittee in November of 1974 that the cost of alternatives could run as high as $35 million.[256] The General Accounting Office subsequently recommended in its November 17, 1975, report to the subcommittee that the Bureau of Reclamation footnote the estimated cost of alternatives in the budget documents (Project Data Sheets) for fiscal year 1977 and subsequent fiscal years.[257] The Bureau complied with this and reported to the Congress that alternatives to the Garrison project could cost an additional $150 million.[258]

The Committee agrees with Roland Robison, Deputy Assistant Secretary of the Interior for Land and Water, that the preliminary nature of cost estimates for possible alternatives to Garrison prevent an accurate adjustment of the ceiling since the choice of an appropriate alternative depends upon the outcome of the International Joint Commission proceedings presently in progress.[259] However, the Committee believes that cost increases of the magnitude expected to result from alterations of the project should be added to the estimated cost of the project as soon as possible after a suitable alternative has been agreed to by Canada and the United States.

The Committee therefore recommends that:

> The Bureau of Reclamation adjust the estimated total Federal obligations for the Garrison Diversion Unit as soon as possible after an alternative has been agreed upon by the United States and Canada to account for any necessary increases in costs required to settle the water quality dispute with Canada.

Federal Subsidies to Garrison

The National Water Commission, created by an act of Congress in 1968 to review national water resource problems, submitted its report and recommendations to the President and Congress on June 15, 1973.[260] This report concluded, among other things, that where subsidies are intended with respect to a water resource project, they should be identified and understood rather than "concealed in policies governing the terms of repayment." The appropriate section of the report argues that:

> The considered use of subsidies which result when direct beneficiaries are relieved of some of the costs of water projects may be a desirable means for the Federal Government to accomplish some public policy objective. When subsidies are granted, however, it is desirable that they should be open and straightforward, so that considered and informed reviews may be carried out from time to time as objectives and condi-

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[256] GAO report, November 25, 1974, p. 19.
[257] GAO report, November 17, 1975, p. 28.
[258] March 31, 1976 letter from Assistant Secretary of the Interior Jack O. Horton to Subcommittee Chairman Moorhead responding to recommendations in House Report 94-852, February 26, 1976.
[259] February 28, 1975, letter from Roland Robison to Subcommittee Chairman Moorhead in response to GAO report, November 25, 1974.
[260] See: Final Report of the National Water Commission, June 15, 1973, or "New Directions in U. S. Water Policy: Summary, Conclusions and Recommendations from the Final Report of the National Water Commission," June 28, 1973. The full report of the Commission is 500 pages and contains 232 recommendations covering all aspects of water resource problems.

> tions change. It is the Commission's position that the proportion of Federal financial assistance to non-Federal interests should be set forth in decisions on cost-sharing and not concealed in policies governing the terms of repayment. Present inconsistencies in this regard contribute to misallocations of the Nation's always limited investment capital resources.[261]

One method of subsidizing water resource projects is realized through the repayment of much or all of the costs of a project with Federal power revenues.

The subsidy to Garrison provided by the power revenue repayment scheme was documented in the 1965 House report on the Garrison authorizing legislation. The repayment summary included in the report shows that of the $212 million in costs (1965 dollars) required to be repaid to the Federal Government, $179.2 million would be borne by power revenues from the Garrison Dam, which, the reader will recall, was constructed pursuant to the Flood Control Act of 1944 (Pick-Sloan Missouri River Basin Project).

In an examination of Bureau of Reclamation claims that the Garrison project would pay for itself, Representative Moorhead questioned Assistant Secretary of the Interior Jack Horton about the magnitude of the power revenue subsidy during the November 19, 1975, hearing. Mr. Horton confirmed the fact that irrigators will pay only 5 percent of the irrigation costs of the project, which amounts to a Federal subsidy of approximately $377 million in 1975 dollars.[262] Irrigators, who will receive 80 percent of the benefits from the $500 million project would, in fact, repay only about $19.8 million.[263] The remainder of the costs would be borne by the taxpayers and by the fourteen municipal governments which are expected to benefit from the increased water supply. Clearly, therefore, the Garrison Diverson Unit will not "pay for itself" as the Bureau claims.

Further questioning of the Bureau of Reclamation demonstrated that conceivably all project costs could be paid for by Federal power revenues. Reclamation law provides that irrigators are not required to begin repayment until after the project water becomes available, which, for Garrison, would be around 1980. It will be 1990 before the project is actually completed and all farmers have begun repayment. Repayment then extends over a 50-year period on a pay-as-you-can basis. When asked whether power revenues could pay for the project before irrigators begin their repayment, the Bureau of Reclamation replied:

> Each reimbursable function of the P–S MBP [Pick-Sloan Missouri River Basin Project] has an assigned cost to repay within a definite repayment period. The fiscal year 1974 Power Repayment Study showed sufficient surplus power

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[261] "New Directions in U.S. Water Policy: Summary, Conclusions and Recommendations from the Final Report of the National Water Commission," June 28, 1973, p. 168.

[262] Hearings (Part 2), November 19, 1975, p. 59.

[263] $496 million estimated project costs

×80% irrigation costs

$396.8 million in irrigation costs
95% repaid by Federal power revenues

$377 million subsidy

revenues available to repay all Garrison Diversion Unit irrigation costs by the year 2054.[264]

The Committee does not believe that the Federal subsidy should be any greater than originally anticipated in the authorizing legislation regardless of whether "surplus power revenues" are available. The Committee would remind the Bureau that power revenues do not result from the Garrison Diversion Unit but rather from Garrison Dam and would be available to the Federal Government whether the project is built or not.

The Committee therefore recommends that:

> The Bureau of Reclamation take the necessary precautions to assure that irrigation beneficiaries from the Garrison Diversion Unit are required to repay the amount specified in the repayment contract within the time frame required by law.

The Committee believes that the failure of the Bureau of Reclamation to acknowledge that certain subsidies to agriculture are inherent in the repayment system has contributed to much of the confusion about the economic feasibility of the Garrison project that has developed in recent years. Since many members of the public do not have ready access to copies of Bureau of Reclamation or congressional documents, many are apt to be misled by Bureau claims that all costs of the project will be repaid to the Federal.

The Committee therefore recomends that:

> The Bureau of Reclamation adopt a policy of acknowledging the extent of Federal subsidies to agriculture that are built into the repayment system of reclamation projects, including Garrison.

Expected Project Benefits

The Bureau of Reclamation and State government officials in North Dakota anticipate the Garrison Diversion Unit will produce benefits from irrigation, municipal and industrial water, fish and wildlife conservation, recreation, and flood control.

The Bureau submitted to the Conservation, Energy, and Natural Resources Subcommittee the following breakdown of annual benefits:[265]

Benefits:	*Annual equivalent values January 1974 analysis*
Irrigation—total annual benefits	$43,882,000
Municipal and industrial water	1,108,000
Fish and wildlife	2,282,000
Recreation	1,554,000
Flood control	285,000
Total annual benefits	49,111,000

These $49,111,000 in total annual benefits are compared with $17,427,000 in estimated annual Federal costs, which results in a 2.9 to 1 benefit-cost ratio.

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[264] Hearings (Part 2), November 19, 1975, p. 93.
[265] Hearings (Part 1), September 15, 1975, p. 71.

Representative Mark Andrews of North Dakota in testimony before the subcommittee in Bismarck, N. Dak., elaborated on what the people of North Dakota expect Garrison will do for them:

> First, it will irrigate 250,000 acres with the potential to irrigate 1 million acres, resulting in triple the present production. These past weeks we have heard the cries from consumers to increase food production. We have even heard prominent people saying we should put a lid on our exports because we need more of it here at home. There is no way we can do that and maintain our posture of using food as a tool for peace in a troubled world. Garrison diversion plays a major part in our goal of increased food production.
>
> Second, it will provide a stable water supply for 14 cities and towns who are now facing serious water supply problems.
>
> Third, nine new water-oriented public use recreation areas which have been planned by the National Park Service but administered by county or local park boards will be created.
>
> Fourth, new sources of water from the Missouri River will be available in central and eastern North Dakota for lake restoration and stream flow improvement. Periods of no flow or low flow that are now experienced, resulting in fish kills and other environment degradation, will be substantially reduced or eliminated.
>
> Fifth, the development of fish and wildlife areas is a part of the project. An assured water supply for waterfowl production in 146,000 acres of water and marsh and adjacent dryland will also be a part of the project.
>
> Finally, Mr. Chairman, the project is expected to have a $46 million gross income effect on our State's farm economy. This also translates into an additional $107 million indirect effect on other areas of our State's economy.[266]

There is some question as to whether expected wildlife and flood control benefits will, in fact, materialize (as discussed later in this chapter). And the expected tripling of agricultural production in irrigated areas seems inordinately high when compared with historic increases in other areas, which is closer to 200 percent. Nevertheless, even with these reservations, it seems quite clear that the State of North Dakota stands to benefit economically from completion of the Garrison Diversion Unit. But the Garrison Diversion Unit is not a North Dakota project; it is a national project supported by Federal funds. Whether these benefits are worth the substantial Federal investment is, however, not clear at this time and will not be until the Bureau of Reclamation provides the Congress and the public with a realistic cost-benefit analysis for Garrison.

Discount Rate

One reason why the cost-benefit ratio is questionable is because the Bureau of Reclamation employs an artificially low discount rate in computing the dollar value of claimed benefits. The discount rate,

[266] Id., pp. 3–4.

simply stated, is the public's expression of consumption now rather than later. Through the use of a discount rate, the future costs and benefits are reduced to present value, for purposes of determining the worth of expected benefits in current dollars. The higher the discount rate, the lower the present value of benefits. An artificially low discount rate, therefore, would assign an exaggerated value to expected benefits now. The Committee's investigation has determined that this is what has happened in the case of the Garrison project.

During the subcommittee's Bismarck hearing, Dr. Thomas M. Powers, an economics professor from the University of Montana, testified that the low discount rate employed by the Bureau in computing the Garrison cost-benefit ratio provides a misleading indication of the economic worth of the project:

> There is near consensus among university, business, and Government economists that the real opportunity cost of tying up valuable resources in a project over a period of time is at least 10 percent. That is, the discount rate to be used in evaluating public investments should be at least 10 percent. The Water Resources Council in 1971 admitted that and legally mandated that at least 7 percent be used. The Bureau of Reclamation, citing Public Law 89–108, authorizing the Garrison diversion unit, has used a rate of 2⅞ percent to 3¼ percent, that is, a rate only one-third to one-fourth of what would have to be used to accurately evaluate the economic logic of the project.
>
> Now, I do not question Congress' right to authorize a project regardless of its economic rationality. There are many factors that could overrule the economic analysis and make such a decision rational. What I am pointing out is that when the Bureau of Reclamation refuses to calculate net benefits using the 10 percent discount rate professional economists agree is appropriate, they hide from the public and the Congress the actual size of the Federal subsidy or payment involved. Congress is left not knowing what it has actually authorized.[267]

The Institute of Ecology's critique of the Garrison Final Environmental Statement presents an example of how use of the low discount rate overstates the value of Garrison benefits:

> The choice of a 2.875 percent discount rate grossly exaggerates the present value of benefits to be derived from the Garrison Diversion project. For example, a project yielding benefits of $10,000 a year for 50 years promises a total income stream of $500,000. But the present value of that stream discounted at 8 percent is only $122,311. Discounted at 2.75 percent, it is $267,516. That is, choosing an unacceptably low discount rate more than doubles the calculated value of that stream of benefits.[267a]

In explanation for the lower discount rate formula, the Bureau of Reclamation told the subcommittee that

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[267] Hearings (Part 1). September 15, 1975, p. 110.

[267a] Environmental Assessment Project, Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," p. 14.

> The Bureau has adhered to a discount rate of 3¼ percent for figuring costs and benefits in accordance with policies for planning water developments. The Garrison Diversion Unit was planned under the policies of Senate Document 97 which fixed the discount rate at the time of authorization at 3¼ percent for the unit. Since the unit was authorized in 1965, prior to the establishment of policies by the Water Resources Council, the Counsel's procedures for determining discount rates do not apply.[268]

The Water Resources Council's procedures referred to by the Bureau are the so-called "principles and standards" for water resource planning. These standards established a detailed procedure to be used by Federal agencies in computing the discount rate for water resource projects and established a minimum rate of 6¾ percent.[269] They have the force of law; however, the Congress subsequently passed the Water Resource Development Act of 1974 (Public Law 93–251), which provided in section 80 that economic feasibility analyses of previously authorized projects would utilize interest rate formulas established in Senate Document 97, as amended in 1968. (This document was the forerunner of the Water Resources Council's principles and standards.) Senate Document 97 provides that any project authorized befor January 3, 1969, will utilize the discount rate formula in force prior to December 1968, which in the case of Garrison was 3¼ percent. Hence, the artificially low discount rate for Garrison is legal.

The Committee nevertheless believes that any reauthorization of the Garrison Diversion Unit which might be required to settle the Canadian dispute should be removed from Senate Document 97 constraints since the Congress would, in fact, be considering a new and different diversion plan with different costs and benefits than the present, or original, plan. In this eventuality, a new cost-benefit analysis should be required and this analysis should be based on a more realistic discount rate than the one presently being used.

The Committee therefore recommends that:

> In the event the Garrison Project should require reauthorization as a result of alterations in the present project plan which might be necessary to accommodate Canadian concerns, the Bureau of Reclamation should develop a new economic feasibility study of the revised project plan utilizing a current discount rate which complies with the Principles and Standards of the Water Resources Council.

Unsubstantiated Wildlife Benefits

The Bureau of Reclamation claims $2.7 million in annual benefits to wildlife will result from completion of the Garrison Diversion Unit.[270] Yet, as discussed in Chapter VIII, the Fish and Wildlife Service has determined that the project's wildlife mitigation plan cannot replace the wetlands lost to construction and flooding and will

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[268] Hearings (Part 2), November 19, 1975, p. 45.
[269] Water Resources Council, "Establishment of Principles and Standards for Planning," p. 86. See: Federal Register Vol. 38, No. 174, September 10, 1973, p. 24778.
[270] Hearings (Part 2), November 19, 1975, p. 95.

therefore result in a net loss to wetlands and wildlife. Furthermore, as discussed in Chapter IX, the Fish and Wildlife Service has determined that at least eight National Wildlife refuges in the Dakotas will be adversely affected by increased streamflows resulting from Garrison return flows. These losses were not expected by the Bureau of Reclamation, will not be offset by the Garrison wildlife mitigation plan and have not been included in the cost-benefit analysis.

The Bureau of Reclamation told the subcommittee that "when an accurate assessment of the impacts on wildlife areas is completed, the Fish and Wildlife Service will provide the necessary information to make changes, if any, in the benefits and costs of the project." [271] The agency claims, however, that since the wildlife benefits constitute less than 5 percent of the total project benefits, a reduction of the benefits "would have a minimal effect on the unit's economic feasibility."

The Committee's investigation shows that the Bureau has been informed of the impacts on wildlife that will result in the Oakes-LaMoure area. Also, a recent Fish and Wildlife Service study on wildlife refuge impacts is available. Other studies will be completed as wetland reinventorying proceeds.

The Committee would agree with the Bureau's statement that loss of wildlife benefits will not destroy Garrison's economic feasibility. We are concerned, however, that the Bureau accurately report the cost-benefit ratio for the project, both to Congress and the public. Since considerable evidence has been presented to indicate the very real possibility that no benefits, but rather considerable harm, will result to wetlands and wildlife as a result of the project, the Committee does not agree that these benefits should continue to be claimed by the Bureau of Reclamation. Because of unsupported benefits, the cost-benefit ratio for the project continues to be both misleading and inaccurate.

The Committee also cannot agree with the Bureau that $2.7 million in claimed annual wildlife benefits is not significant. From a reporting standpoint, it is very significant. The Congress authorized the Garrison project in 1965 on the assurance that the wetland losses from project construction would be mitigated and that wildlife and waterfowl would benefit. The 2.5 to 1 cost-benefit ratio presented by the Bureau of Reclamation for the project at that time included both the costs for acquiring the 146,500 acres of wildlife mitigation land and water areas and the claimed wildlife benefits. If these costs and benefits are no longer applicable, as it appears they might not be, then the appropriate committees of Congress should be immediately informed and the cost-benefit ratio should be adjusted accordingly.

The Committee therefore recommends that:

> The Fish and Wildlife Service should promptly complete its assessment of the impact of Garrison on wildlife and wetlands and inform the Bureau of Reclamation of any adjustments required in the Garrison cost-benefit ratio that are required to properly account for gains or losses to wetlands and wildlife from the Garrison Diversion Unit.

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[271] Id.

The Committee further recommends that:

> The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, promptly adjust the cost-benefit ratio of the Garrison Diversion Unit to account for wildlife and wetland losses that are expected from the project, including expected Federal costs necessary to prevent damage to Federal wildlife refuges.

Unsubstantiated Flood Control Benefits

The Bureau of Reclamation claims $336,000 annually in flood control benefits.[272] According to the Bureau, these benefits, which were estimated by the Corps of Engineers, "are based on estimated reductions in losses to land and other property, and on increases in net income from more intensive or changed use of property due to the reduction in flood water damages" as a result of Garrison.[273]

Evidence available to this committee, however, suggests that flooding could result from the project as well as from flood control. The flows from the Souris River will be nearly doubled by return flows from the Garrison project, and, according to the Bureau's recent water quality studies, flooding potential will be increased on all five rivers affected by Garrison (see Chapter VII). Assistant Secretary of the Interior Reed told the subcommittee that he feared that these increased flows could inundate the J. Clark Salyer National Wildlife Refuge, causing considerable harm. Furthermore, the Fish and Wildlife Service's report to the subcommittee on the effects of Garrison on the wildlife refuge system shows that flows are expected to be significantly increased in several of the refuges.

The Minnesota Pollution Control Agency also fears flooding will result in the Red River from the 50,000 acre-feet of return flows that will enter that river annually. (However, the Bureau claims the flooding impacts on the Red River will be insignificant and unquantifiable.)

Finally, the Bureau told the subcommittee about a potential flooding problem in Canada that has not been resolved. Regional Bureau Director Robert McPhail testified that earlier dredging of the Souris River on the United States side of the border had precipitated an unexpected situation where the channel on the Canadian side will be too small to accommodate the increased steamflow:

> In the United States the channel capacity is in the range of 1,200 to 1,500 ft^3/s.[273a] Canadian governmental sources have stated that the channel capacity for a portion of the Souris River in Manitoba immediately north of the international boundary is approximately 150 ft^3/s, more or less as a result of a dredging program conducted on the Souris River in the early 1900's. It appears that the impacts of the dredging program and subsequent maintenance of the dredge berms require further evaluation before this inconsistency can be resolved.[274]

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[272] Id., p. 95.
[273] Hearings (Part 1), September 15, 1975, p. 69.
[273a] Ft^3/s=cubic feet per second.
[274] Id., p. 28.

Whereas flooding in Manitoba may not necessarily reduce flood control benefits claimed by the Bureau for the United States, resolving the problem with Manitoba could be costly. Clearly, any costs expected to be increased by the United States to prevent flooding in Manitoba should be added to the "costs" side of the cost-benefit ratio.

The Committee therefore recommends that:

> The Bureau of Reclamation estimate the costs to the Federal Government that will be required to resolve the potential flooding in Manitoba from Garrison return flows. The cost-benefit ratio should be revised appropriately.

While it is unclear as to whether flood control benefits claimed for Garrison will actually materialize, it is also unclear as to whether domestic flooding along the Souris, Red, and James rivers will result in increased flood control costs to State and local governments. The Bureau should address this problem in its planned supplemental environmental statements.

The Committee therefore recommends that:

> The Bureau of Reclamation evaluate flood control benefits and potential flooding costs in the supplemental environmental impact statements for the Garrison Project.

The Committee is convinced, however, by the Fish and Wildlife report on wildlife refuge impacts that potential flooding of Federal wildlife refuges is a cost that should be promptly determined.

The Committee therefore recommends that:

> The Fish and Wildlife Service determine the cost to the Federal Government that could result from flooding of Federal wildlife refuges. The Bureau of Reclamation should revise its cost-benefit ratio accordingly.

XII. BUREAU LAND ACQUISITION AND RELOCATION POLICIES

Findings

A. Local criticism of the Bureau of Reclamation's land acquisition methods in North Dakota has developed into a major issue, which has contributed to the increased opposition to the project.

B. Procedures for land acquisition and relocation established in the Uniform Relocation and Real Property Acquisition Policies Act of 1970 have not been consistently followed by the Bureau of Reclamation in acquiring property for the Garrison Diversion Unit.

C. The Bureau of Reclamation and the Garrison Diversion Conservancy District have increased their efforts to improve relations with landowners.

D. Landowners who have been affected by Garrison Diversion Unit construction have not always been adequately informed of their rights and obligations under the Uniform Relocation and Real Property Acquisition Act of 1970.

E. The Bureau of Reclamation's policy of withholding property appraisal reports from landowners and encouraging exchanges of appraisal data between the landowner and the Government during condemnation litigation is inconsistent with the policy established by the Uniform Relocation and Real Property Acquisition Act of 1970, which requires that Federal agencies make every effort to negotiate a settlement prior to initiation of condemnation proceedings.

F. Costs necessary for landowners to defend themselves in condemnation litigation often prevent landowners from receiving the full benefit of the just compensation awarded by the court for the condemnation of his property.

G. The inability of the Bureau of Reclamation and the landowner to find suitable replacement property on which to relocate has, in some cases, subjected compensation payments to capital gains taxes, resulting in a loss of a portion of the compensation payment for property lost as a result of eminent domain proceedings.

H. While the Bureau of Reclamation is required by law to help farmers find replacement property on which to relocate, many property owners have complained that they received little or no relocation assistance from the Bureau.

During the course of the Committee's Garrison investigation, the Conservation, Energy, and Natural Resources Subcommittee received numerous letters, affidavits, and statements from North Dakota landowners complaining of unfair treatment by the Bureau of Reclamation in the acquisition or condemnation of their land for the Garrison project.

Every reclamation project, of course, requires the acquisition of some private property. And a certain amount of resentment and criticism is expected from those who must relinquish their property and their homes for a higher public need. In the case of Garrison, however, criticism of the Bureau of Reclamation's land acquisition methods has been so widespread and so pronounced that it has developed into a major issue which has contributed to the increased opposition to the project. In testimony before the subcommittee, Mr. Stanley Moore, President of the North Dakota Farmers Union, told the subcommittee:

> The protracted negotiations required by many of these landowners to gain even the most basic consideration of their situation by the Bureau of Reclamation created a significant loss of support for the project even though progress has been made toward the resolution of some of the problems we identified in earlier documents.
>
> The impositions, inconveniences, anger, bitterness, and frustration resulting from the difficulties in resolving individual landowner problems through the governmental bureaucracy in many cases simply cannot be erased through subsequent corrective action. These cases have become personal tragedies for which there can never be adequate compensation.[275]

Land acquisition and landowner relocation policies of all Federal agencies are to be guided by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (hereinafter "Relocation Assistance Act").[276] Having as its purpose "to establish a uniform policy for fair and equitable treatment of persons displaced as a result of Federal and Federally-assisted programs",[277] the Act sets out specific policies to be followed by Federal agencies in the identification, appraisal, acquisition, and condemnation of private property and the relocation and compensation of landowners.

For example, the Act requires, among other things, that the Bureau of Reclamation make every effort to acquire property by negotiation (sec. 301(1)). The property must be appraised before negotiations are initiated with the landowner, and the landowner must be allowed to accompany the appraiser when he makes his appraisal. The Bureau must then offer the landowner a fair price for his land. The offer must be promptly made and the landowner provided with a summary of the basis of the amount offered. The landowner is under no obligation to accept the Bureau appraised price and has the right to negotiate for a higher price. Only when negotiation with the landowner fails should condemnation proceedings be initiated to acquire the property—in other words, condemnation should be a last resort. The Act clearly states that the landowner cannot be compelled to surrender his property until payment is made.

While the subcommittee cannot verify the accuracy of criticisms made by various landowners concerning possible violations of the Act, the frequency with which certain violations have been reported

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[275] Id., pp. 185–186.
[276] Public Law 91–646 (Jan. 2, 1971), 84 Stat. 1894.
[277] Id., sec. 102.

indicates that the procedures laid down in Public Law 91–646 have not been consistently followed by the Bureau of Reclamation in acquiring property in the path of the Garrison project.

The principal problems addressed by the North Dakota Farmers Union, the Committee to Save North Dakota, and various landowners in the hearing record are summarized below:

(1) The failure of the Bureau of Reclamation to allow the landowners to accompany the appraiser during the appraisal of the landowner's property. For example, Mr. and Mrs. Albert Wall of Mercer, North Dakota, told the subcommittee that the Bureau appraiser never talked to them and the Bureau attempted to get Mrs. Wall to sell part of their farm in Mr. Wall's absence. These people said they did not know how much of their farm was to be taken until they asked to see the official survey maps after condemnation papers had been served.[278]

(2) Failure of the Bureau of Reclamation to adequately advise property owners of their rights under law. Property owners have several clearly delineated rights and privileges guaranteed by the Relocation and Real Property Acquisition Act, including the right to accompany the appraiser during appraisal of the property; right of refusal of the Federal Government's price; right to negotiate a fair price and to prompt payment; and the right to 90-day notice prior to eviction from the property. Evidence included in the hearing record and in affidavits submitted to the subcommittee demonstrates that in some cases property owners were either not adequately informed of their rights or did not properly understand their rights. For example, as mentioned earlier, some property owners told the subcommittee that they were not asked to accompany the appraiser.[279] Others claimed that they were coerced by Bureau negotiators into accepting the Bureau's initial offer for their property [280] or that the Bureau refused to

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[278] Hearings (Part 1), September 15, 1975, pp. 707–708. The pertinent portion of Mr. and Mrs. Wall's letter to the subcommittee follows:

I first learned about the Garrison Diversion Project in June or July of 1968. When a survey crew was surveying the section lines, I asked one of the men, what they were surveying for? And he told me a canal, but not to get alarmed about it, because this was a possible route they were planning to take. That possible route became a reality in Sept. of 1972.

There never was an appraiser at my place to talk to me or the family. But a negotiator came in Dec. or Jan. and talked to the wife, he wanted her to sign some papers, she wouldn't do it. (I wasn't home at the time.) Two days later he came back again, and wanted her to sign. She told him, that her husband wasn't home and she wasn't signing anything.

He never called to make an appointment so the family could be together to discuss this matter with him.

On February 14, 1972, the U.S. Marshall came out and served condemnation papers. We then drove to Bismarck and asked the Bureau of Reclamation for the maps so we could see where this canal was to be built thru our farm. They told us they couldn't find the maps of our place. Our son had to use very strong language, and when they saw that he meant every word he said, in matter of minutes they brought us the maps. Then we could understand why they never sent them along with the U.S. Marshall, because there wasn't anything left of our farm.

We owned 880 acres in one block, the Bureau of Reclamation condemned 371 acres of it. Cutting thru it diagonally. Leaving the buildings, one well and 110 acres, including the yard on the North side of the canal. On the other side, 305 acres pasture, 94 acres cropland, to get the remaining land which consists of only corners, we have to travel 12 miles because there aren't any crossings designed in our area. Also see: Undated letter from Herbert Nathan of Coleharbor, N.D., to former subcommittee chairman Moorhead, Id., pp. 641–642.

[279] Id., p. 707. Also see: Sworn affidavit of Ben Schatz taken September 22, 1972, Towner County, North Dakota, and submitted to the Conservation, Energy, and Natural Resources Subcommittee. (Mr. Schatz states that "The appraiser who originally set the government valuation for my land did not contact me nor give me an opportunity to familiarize him with my farm . . .") See also: Sworn affidavit of Albert and Rearle Wall of McLean County, N. Dak., dated September 22, 1972. (Both affidavits are in the subcommittee's file.)

[280] Undated letter of Mrs. Charles C. Hawley to subcommittee chairman Moorhead, Hearings (Part 1), September 15, 1975, p. 542.

negotiate a fair settlement.[281] Others demonstrated that they did not understand that they could negotiate for a fair price for their property.[282]

Still others claimed that they were evicted without being given the required 90-day notice [283] or did not receive prompt payment.[284]

(3) The failure of the Bureau of Reclamation to provide adequate compensation in some cases for property being acquired. This was perhaps the most common complaint from landowners affected by Garrison. The experience of Mr. Kenneth Grabinger of Turtle Lake, North Dakota, is indicative of the complaints that have resulted. In a letter to former subcommittee chairman Moorhead, Mr. Grabinger said that he was originally offered $23,500 for his property in 1971, which he felt was worth $58,000. After lengthy condemnation proceedings, the court awarded him $58,250 in May 1974.[285]

(4) The failure of the Bureau of Reclamation to provide adequate assistance in relocating displaced property owners on comparable replacement property. The Relocation Assistance Act is based on the principle that a displaced homeowner should not be left worse off economically than he was before being forced to move and that he should be able to relocate in a comparable dwelling that is decent, safe, and sanitary. The Bureau of Reclamation is required by law to provide relocation assistance to the landowner to help him locate a comparable dwelling and provide payments to compensate for any differences in the value of property acquired by the government and

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[281] September 13, 1975, letter from Ben Schatz to former subcommittee chairman Moor- claims that the Bureau of Reclamation negotiator told him thatpayment would be forth- Mr. and Mrs. Albert Wall to former subcommittee chairman Moorhead, Id., pp. 707–709.

[282] September 9, 1975, letter from Adolph E. Shirley to former subcommittee chairman Moorhead, Id., p. 700.

[283] September 22, 1972, sworn affidavit of Leo J. Reiser of McLean County, N. Dak. (in subcommittee files).

[284] Undated letter from Mr. Herbert Nathan of Coleharbor, N. Dak., to former subcommittee chairman Moorhead, Hearings (Part 1), September 15, 1975, p. 642. Mr. Nathan claims that the Bureau of Reclamation negotiator told him that payment would be forthcoming within 60 days but did not put it in writing. Payment was not made until almost six months after the contract was signed. Also see: September 22, 1972, affidavit of K. E. Peck of McLean County, N. Dak., which is also in the subcommittee's file.

[285] Hearings (Part 1), September 15, 1975, Appendix 1, p. 534. The pertinent part of Mr. Grabinger's letter follows:

* * * This brings me to the point of relating the story of the Bureau acquiring our property for this project. The first we knew definitely how much land we were to lose to the project was, I believe, December of 1970. That's when they sent out the appraiser to appraise our unit. He told us we were to lose 189.19 acres of our 800 acre farm unit.

Sometime in 1971 the Bureau's negotiator came out with their offer which was $23,500. This figure was far less than land was selling for in the area, let alone the fact that losing this acreage made the unit uneconomical by its taking away the choice grazing lands and farm land that maintained a substantial livestock enterprise on this diversified farm.

Our counter-offer was $300 an acre or $58,000. This figure wasn't just grabbed from the air, but as was proven later, was a well researched figure.

Negotiations—as they call them—continued until February of 1972 when the Bureau finally condemned the property. Their negotiations merely involved an occasional visit from one of the raft of personnel and the price increased to a verbal offer of $25,000.

In May of 1974, we were called into court to settle the case. The jury came back with a verdict of $58,280. This was immediately appealed by the Bureau and later turned down by the judge. An interesting thing about our court case was that the Bureau had two appraisals of our property. One appraiser testified to a $32,000 figure, the other Bureau appraiser testified to a figure of $37,000. Why then were we offered only $23,500 or even the later figure, $25,000, when their own men had opinions of much greater value.

When the Bureau was asked about this, they stated something about blaming the difference to a lapse in time and the latter figure was up-dated. This cannot be, as up-dating is to be done only to the condemnation date which was February of 1972, and anything after that cannot be accepted in court. By the time all this was settled and we got what we originally asked for, it cost me nearly $15,000 of the $58,000 for my attorney and appraiser. What this amounts to is that I spent a good share of my just compensation just to get my just compensation.

the replacement property as well as compensation for closing costs incidental to purchase of the comparable dwelling or property.

Several landowners informed the committee that they received little or no relocation assistance from the Bureau of Reclamation despite Relocation Act requirements that such assistance be provided wherever possible.[286]

(5) Relocation properties are often too expensive to adequately replace original property sold to the Federal Government. Generally, a landowner is entitled to be compensated any time the Federal Government takes some part of the real or personal property he owned. Interference by the Federal Government with any interest in property must be compensated. Yet, as Mr. Leland Vassler described in his letter for former subcommittee chairman Moorhead, the high cost of acquiring replacement property can often prevent a farmer from obtaining complete compensation for property lost as a result of the project:

> * * * We lost 352 acres of our own land plus 48 rented acres. We were able to replace 190 acres, 160 we already had been farming, this mostly to save on taxes. We haven't been able to replace the remaining 162 acres, therefore our machines cannot be used to the fullest extent that was planned on. The 190 acres we bought cost $35,200. We were awarded $53,560 for the total taking of 352 acres of land. Lawyer and appraisers fees were $8,416.78, this leaves me $45,143.22 take away $35,200 spent for the 190 acres I have $9,943.22 left to replace 162 acres, this simply cannot be done.
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> I understand condemnation laws of the United States read that when the government takes property one shall be as well off after as before. The 162 acres yet to be replaced will cost $40,000 if it could be bought. Should I be forced to subsidize Garrison Diversion to the tune of $30,000. Our time has expired on replacing the 162 acres so had to pay capital gains tax on the $9,943,22 both State & Federal. I would say Garrison Diversion is madness on the part of its promoters I understand the project will take 220 thousand acres of land out of production to irrigate 250 thousand. Our Turtle Lake-Mercer School district is losing 22,000 acres. Now divide this into 800 acre farms and you have lost 27 farms just in this area. The promoters of the project claim it would create more farms. I think someone should tell us where.[287]

Some landowners claimed that their (or the Bureau's) failure to locate comparable relocation properties or overdue compensation payments have prevented realization of complete compensation for prop-

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[286] An example of the types of complaints that have been leveled at the Bureau concerning the relocation assistance is contained in the September 15, 1975, letter from Mr. and Mrs. Albert Wall to former subcommittee chairman Moorhead, Hearings (Part 1), September 15, 1975, p. 708, which states: "The Bureau of Reclamation has ignored our pleas in assisting us in finding replacement land. They said 'It's not our duty to find land for you.'"

[287] Id., pp. 706–707. Also see September 14, 1975, letter from Mrs. Albert Faul, Jr., to former subcommittee chairman Moorhead, Id., p. 524.

erty loss by requiring payment of capital gains taxes.[288] Furthermore, any farmer who does not choose to buy replacement property must nevertheless relinquish a substantial portion of his compensation payment to the Federal Government in taxes.[289]

Anyone who chooses to have his case adjudicated in court runs a further risk of loss because of the high cost of attorneys' fees, as in the case of the Kenneth Grabinger family. By the end of their court settlement, they owed $15,000 of the $58,000 awarded them by the court for their attorney appraisal fees. As Mr. Grabinger phrased it "I spent a good share of my just compensation just to get my just compensation." [290]

In all fairness to the Bureau of Reclamation, land acquisition for the Garrison project, particularly with respect to the McClusky Canal, has occurred during a period of turbulent upward land price fluctuation due to a variety of factors. Also, the Bureau of Reclamation was in the process of negotiating the sale of several farms when the Relocation Assistance Act passed the Congress in January 1971. It took several months for the Bureau of Reclamation to comply with the procedures of the Act and to implement them at the local level.

The Bureau told the Conservation, Energy, and Natural Resources Subcommittee that it is taking steps to improve its relationship with property owners in the Project area. During testimony before the subcommittee in Bismarck, Regional Director Robert McPhail outlined several improvements in the land acquisition program designed to improve treatment of landowners:

1. Maintaining current appraisals by updating any appraisal more than 6 months old at the time negotiations begin and having the appraisal subsequently updated on 3-month intervals once negotiations are begun.
2. Intensifying and formalizing relocating services in order to obtain and disseminate information pertaining to farm lands available on the market for replacement purposes.
3. Conducting informal meetings with landowners in areas of planned acquisition. These are question and answer sessions with landowners and land acquisition personnel which are intended to provide as much advance information about procedures, methods, sequence, rights, and program timing as possible.
4. Establishment of an informational or complaint procedure "one point contact" for landowners or other individuals affected by the acquisition or construction program. Indi-

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[288] October 8, 1975, letter from Mr. and Mrs. Leland Vassler to former subcommittee chairman Moorhead, id., pp. 706–707. The appropriate part of the Vasslers' letter follows:
I understand condemnation laws of the United States read that when the government takes property one shall be as well off after as before. The 162 acres yet to be replaced will cost $40,000 if it could be bought. Should I be forced to subsidize Garrison Diversion to the tune of $30,000. Our time has expired on replacing the 162 acres so had to pay capital gains tax on the $9,943.22 both State & Federal. I would say Garrison Diversion is madness on the part of its promoters I understand the project will take 220 thousand acres of land out of production to irrigate 250 thousand. Our Turtle Lake Mercer school district is losing 22,000 acres. Now divide this into 800 acre farms and you have lost 27 farms just in this area. The promoters of the project claim it would create more farms. I think someone should tell us where.

[289] September 8, 1975, letter from Mr. and Mrs. Ernest J. Miller to former subcommittee chairman Moorhead, id., p. 635.

[290] Id., p. 534.

viduals are encouraged to contact the right-of-way office in Bismarck so that appropriate answers can be returned in a timely fashion.

5. Development of a procedure to advance relocation moneys to prevent or minimize the financial hardship of a relocation effort.

6. Implementation of special training in communication skills for our field personnel in addition to the regular employee training programs. During the last winter season, 50 of our key field personnel had received 40 hours of this special training.

7. Recent filling of a position in our Project Office Right-of-Way Division with an individual with broad experience in land acquisition and management of acquisition programs in other agencies as well as in the Bureau of Reclamation.

8. Attempting to provide funding for land acquisition at least one year in advance of need and insofar as possible two years in advance of need. This is an attempt to strike a middle ground on the timing issue in order to provide adequate time for a complete and compassionate negotiation.[291]

The Garrison Diversion Conservancy District has also recognized the need for improved land acquisition and relocation policies and has established a Land Acquisition Review Committee whose purpose is to review, advise, and provide constructive criticism relative to the Bureau's acquisition methods. The Conservancy has also hired a Land Acquisition Coordinator to work with the landowners and to help ease their problems.

The Committee is concerned about the treatment of landowners in the project area and is of the opinion further improvements in acquisition and relocation policy can and should be made by the Bureau to assure fair and equitable treatment of displaced persons.

First, it is abundantly clear from the record that many landowners are not properly informed of their rights and obligations under the law.

The Committee therefore recommends that:

> The Bureau of Reclamation develop a "landowner's bill of rights" to be presented to and discussed with the affected landowner prior to the initial survey of his property for acquisition purposes. This document should provide pertinent information about the public works project and how it will affect the landowner's property and should state clearly the affected landowner's rights pursuant to the provisions of the Uniform Relocation and Real Property Acquisition Act of 1970, including the right (1) to accompany the appraiser during the appraisal of his property and to the details of the appraisal; (2) to refuse to accept any and all offers made by the Federal agency for his property and to be free from coercion to sell; (3) to negotiate with the government for a better price for his property or for damages to his property and

[291] Id., pp. 65–66.

that the government is obliged to settle by negotiation rather than condemnation if at all possible; (4) to relocation assistance from the Federal agency, including relocation payments and/or comparable dwelling and property; (5) to retain property until payment is made for property; (6) to 90-day notice from the Federal Government before Federal possession of land acquired; and (7) to sell any uneconomic remnant of property resulting from eminent domain to the Federal Government at fair market value.

The Committee further recommends that:

The Bureau provide a receipt, to be signed by each landowner prior to the survey of his property, which will indicate that he has been informed of his rights and obligations pursuant to the Uniform Relocation Assistance and Real Property Acquisition Act of 1970.

Second, the record indicates that some surveys were performed by the Bureau without notifying the landowner and that appraisals were conducted without the landowner being invited to accompany the appraiser. The Committee believes the landowner should be kept informed at all times concerning government plans affecting his property. This should not only be done in compliance with the law but as a common courtesy on the part of the government to the affected property owner.

The Committee therefore recommends that:

The Bureau of Reclamation establish procedures to assure that prior to surveying or appraising, reasonable notice be given to and permission be acquired from the affected property owner. In the case of appraisals, the Bureau should assure that every landowner be invited and encouraged to accompany the appraiser in accordance with the law.

It is the present policy of the Bureau of Reclamation to give the property owner a summary of the appraisal rather than a detailed breakdown of the value of land and buildings to be acquired. Those landowners who have requested in the past that the Bureau supply them with a copy of the appraisal have been denied.

According to the Interior Department's Solicitor—

The Freedom of Information Act does not require the disclosure of appraisal reports during the negotiation process for the acquisition of real property, which process continues until such time a negotiated purchase is reached or condemnation is completed. * * * [292]

The Solicitor argues that two exemptions apply in this case—the first being that appraisals are classified as "interagency memoranda" and the second being the specific statutory langauge appearing in section 301 of the Uniform Relocation and Real Property Acquisition Act, which provides that the landowner be provided with a "summary of the basis for" the amount of the appraisal.

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[292] May 29, 1974, decision letter by Solicitor Kent Frizzell, Department of the Interior, denying appeal of a request for appraisal reports.

The Committee sees no compelling logic in denying a landowner, whose land is subject to the eminent domain power of the Federal Government, the complete details as to the value being assigned his property in an appraisal report. Without benefit of this information, the landowner is faced with two undesirable alternatives prior to the negotiations process: he can accept the word of the Bureau of Reclamation that he is getting a fair and equitable price for his property or he can, at his own expense, hire an appraiser to conduct an independent appraisal. Oftentimes, because of the added cost of an independent appraisal, the landowner is forced to take the former course, which reduces his ability to negotiate for a fair price.

The Committee wonders why the law would require the Bureau of Reclamation and other Federal agencies to invite the landowner to accompany the appraiser during the appraisal of his property if it were not intended that the landowner would be given a complete evaluation as to the appraiser's opinion of the worth of his property? Clearly, there was no intention that the landowner be denied this information. The National Park Service, another agency within the Department of the Interior, apparently agrees since that agency does provide affected landowners with a copy of their appraisal reports.

The Bureau's rationale for denying landowners' access to appraisal reports concerning their property is contained in an August 8, 1975, memorandum from the Associate Solicitor, Energy and Resources, Department of the Interior, to the Field Solicitor, Amarillo, Tex., which argues that the denial of appraisal information could encourage an exchange of government data for landowner data in the courts. The pertinent paragraph follows:

> Hopefully, *during the course of condemnation litigation*, there would be an exchange of government appraisal data for data of the same character from the defendant-landowners. We believe that the Bureau of Reclamation can withhold appraisal reports under the Freedom of Information Act to encourage such exchange. * * * [Italic added.]

The Assistant Solicitor goes on to admit, however, that there is "nothing in the Act which dictates such withholding, and disclosure of appraisal reports could be made, as the Park Service has apparently decided to do."

The Committee believes that the Bureau of Reclamation's policy of withholding appraisal reports is indefensible and in violation of the policies stated in section 301 of the Uniform Relocation and Real Property Acquisition Act. Section 301 clearly enunciates a policy of the Federal Government to—

> Encourage and expedite the acquisition of real property by agreements with owners, to avoid litigation and relieve congestion in the courts, to assure consistent treatment for owners in the many Federal programs, and to promote public confidence in Federal land acquisition practice. * * *

The Act goes on to state in subsection (1) that "The head of a Federal agency shall make every reasonable effort to acquire expeditiously real property by negotiations."

The Bureau's policy of denying landowners access to appraisal reports is adverse to all of these stated policies. In fact, the Bureau's stated policy of encouraging appraisal data exchanges during the course of condemnation litigation leads one to believe the Bureau is encouraging condemnation suits rather than attempting settlement by negotiation as required in subsection (1) of section 301 of the Act. This flies in the face of the legislative guidance provided in House Report 91–1656 of December 2, 1970, accompanying the Relocation Assistance Act, which states that "No Federal agency head shall intentionally make it necessary for an owner to institute legal proceedings to prove the fact of the taking of his real property."

And where is the uniform treatment of landowners when the Park Service and the Bureau of Reclamation are pursuing entirely different policies with respect to information as basic as the appraised value of the property to be acquired?

In view of the above, the Committee recommends that:

> The Bureau of Reclamation promptly abandon its policy of refusing landowners access to appraisal reports and adopt a policy of full disclosure of appraisal information similar to that employed by the National Park Service.

The Committee further recommends that:

> The Secretary of the Interior review the Department's land acquisition and relocation policies to determine if they are consistent with the policies established in subsection (1) of section 301 of the Uniform Relocation and Real Property Acquisition Act of 1970.

The hearing record also indicates possible deficiencies in the Uniform Relocation and Real Property Acquisition Act and Internal Revenue Code which require further in-depth examination by appropriate congressional committees. The first concerns the lack of authority for Federal agencies to provide compensation to the landowner for attorney fees which are necessary as a result of condemnation proceedings. The Committee realizes this is a sensitive and complicated issue which requires considerable study before enactment. Nevertheless, there is evidence that in some cases the substantial financial risk to the landowner in entering into condemnation proceedings serves as a incentive to the landowner to accept a price for his property that is neither fair nor equitable.

The second deficiency involves the application of capital gains taxes to compensation paid a landowner for condemned property. As discussed earlier, comparable replacement property is not always readily available, which sometimes results in the displaced person having to pay capital gains taxes on the sale of the property to the Government. Furthermore, the tax requirement that the money from the sale of property be reinvested within a year prevents landowners from utilizing other options that may be more suitable for their particular situations. For example, a landowner who might wish to keep the money from the sale of his property for other uses can do so only if he pays capital gains taxes on it. Because of the circumstances by which the landowner is required to sell in the interest of a higher

public need, it seems only fair that the landowner be exempted from the application of capital gains taxes to allow use of his "just compensation" to the best possible advantage of him and his family. This issue, too, requires close examination prior to enactment.

The Committee therefore recommends that:

> The Congress consider amending the Uniform Relocation and Real Property Acquisition Act of 1970 to provide property owners with reasonable and adequate compensation for attorney fees or other costs incurred as a result of Federal condemnation litigation.

The Committee further recommends that:

> The Congress consider amending the Internal Revenue Code to exempt from the application of the capital gains taxes income resulting from the sale of property to the Federal Government as a result of Federal condemnation proceedings.

Individual cases revealed in the Committee's hearing record indicate that the Bureau of Reclamation's relocation assistance program for the Garrison Diversion Unit is inadequate and in need of revitalization. The Bureau should make every effort to relocate landowners on comparable property and greater emphasis should be placed on replacement of condemned property to assure that the landowner does not suffer unnecessary losses as a result of his displacement. Evidence in the hearing record indicates that in many cases this is not being done, and a review of the 3-page Garrison relocation plan reveals the lack of a coordinated effort by the Bureau to assist individual landowners in relocation on comparable properties.

The Committee therefore recommends that:

> The Bureau of Reclamation review and revise its relocation plan for the Garrison Diversion Unit to assure complete relocation assistance to every displaced landowner in an effort to secure his prompt relocation on comparable replacement property without financial loss to him or his family.

XIII. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Committee finds that:

1. The Initial State of the Garrison Project is now 19 percent complete.

2. Though only the initial stage of the Garrison Project is authorized (250,000 acres), the Bureau of Reclamation has acquired right-of-way for the McClusky Canal to accommodate not only the initial stage but additional stages of the project development as well.

3. The 30,000-acre Lonetree Reservoir is designed and is being constructed for use on both the authorized initial stage (250,000 acres of irrigation) and the ultimate stages of project development, if approved by Congress (1,007,000 acres of irrigation). The size of Lonetree Reservoir could be reduced if the project design is altered to accommodate Canadian objections, unless offsetting irrigable acres can be found that do not involve return flows to Canada.

4. The Bureau of Reclamation has determined that an environmental impact statement in compliance with the National Environmental Policy Act of 1969 (NEPA) is necessary for the Garrison Diversion Unit even though the project was authorized prior to the enactment of NEPA.

5. The Bureau of Reclamation published a Final Environmental Impact Statement in January of 1974 for the overall project and announced plans to issued detailed supplemental environmental statements for the project's three major irrigation areas.

6. The adequacy of the Garrison Final Environmental Impact Statement has not been judicially determined.

7. Both the Environmental Protection Agency and the Council on Environmental Quality have found the Final Environmental Statement to be inadequate.

8. In the absence of further environmental information either in the form of supplemental environmental statements or return flow studies, it is not possible to determine adequately the full scope of environmental impacts of the project.

9. The Bureau's schedule for preparation of supplemental environmental impact statements for segments of the project does not provide for an adequate or timely assessment of the project's environmental impacts or alternatives.

10. The supplemental environmental impact statement for the Souris Loop section is not scheduled for publication by the Bureau until 1978. The Bureau of Reclamation has responsibility to publish the Souris supplemental statement promptly to assist the International Joint Commission in determining the impact of Garrison on Canada and to assist the State Department in determining whether IJC recommended alternatives will be environmentally and economically acceptable to the United States.

11. Supplemental environmental statements for the Central North Dakota and Oakes-LaMoure sections are needed to assess the environ-

mental impacts of the project on South Dakota, Minnesota, and affected Federal wildlife refuges.

12. The Canadian government has objected to the continued con- of the Garrison Diversion Unit as presently planned on grounds that struction of the Garrison Diversion Unit as presently planned on grounds that return flows from the project will be injurious to health and property in Canada in violation of the Boundary Waters Treaty of 1909. However, the Canadian Government has agreed to the International Joint Commission reference to determine the impacts of Garrison on Canada.

14. To determine whether the Boundary Waters Treaty of 1909 would be violated by the Garrison Project as presently planned, the Canadian and U.S. governments have referred the matter to the International Joint Commission for study.

15. Canadians are also concerned about possible flooding that could occur along the Souris and Red rivers in Canada as a result of increased streamflows.

16. The Minnesota Pollution Control Agency (MPCA) objects to the Garrison Project on grounds that it will cause further pollution of the Red River of the north, which serves as Minnesota's western boundary.

17. The South Dakota legislature is concerned that alternatives being considered by the International Joint Commission and the Bureau of Reclamation to reroute Garrison return flows into the Missouri and James rivers could increase pollution and flooding of South Dakota waters.

18. Citizens of northeastern South Dakota (Brown County) are concerned about possible pollution and flooding of the James River from the existing Garrison Diversion plan and object to a proposed 6,000-acre wildlife mitigation area planned in the Hecla, South Dakota, area.

19. While the water quality simulation model used by the Bureau of Reclamation to predict pollution impacts in rivers affected by the Garrison Diversion Unit has been found to be generally satisfactory from a technical standpoint, the model has major limitations which the Bureau failed to take into account in conducting its return flow studies. This same model was used in recent Bureau of Reclamation water quality studies.

20. Natural flows in all five rivers affected by the Project (the Souris, the Red River of the North, the James, the Wild Rice, and the Sheyenne) vary considerably from very low flows, when salt and other constituent concentrations are extremely high, to periods of high flow or flooding, when salt concentrations are much lower.

21. The Bureau of Reclamation has determined in various water quality studies, including the recent study done in conjunction with the Harza Engineering Company, that return flows from the Garrison Diversion Unit will be beneficial by stabilizing streamflows and eliminating low flow periods. However, flood potential will be increased slightly in all five rivers.

22. The Bureau of Reclamation has determined that overall salinity concentrations in all of the affected rivers will be increased over historical levels, but during some parts of the year, salinity concentrations will be lowered by the additional return flow water.

23. The recent Bureau of Reclamation water quality studies represent water quality parameters in mean (simple average) and median values over a 63-year period, which tends to minimize the peak concentration levels of important water pollutants that are expected to result during the "peak soil leaching" periods of project development.

24. While returns flows will dilute high chemical constituent concentrations in river water in periods of low flow, absolute increases (loadings) of salts, nutrients, and other chemical constituents will result. The cumulative effects of increased salt and nutrient loading in the Souris and Red rivers could increase pollution problems in Lake Winnipeg, into which both streams eventully flow.

25. While the Bureau of Reclamation is relying heavily on proper irrigation practices to minimize water quality impacts, no irrigation management plan has yet been developed by the Bureau which includes controls that will assure minimal degradation of water quality.

26. An irrigation management plan is essential to reducing water quality impacts.

27. The Bureau's planned use of sprinkler irrigation methods should improve water quality; however, use of sprinkler systems is voluntary on the part of participating farmers.

27. The original Garrison Diversion Unit wildlife mitigation plan is being revised by the U.S. Fish and Wildlife Service (FWS) because the original plan proved to be inadequate to protect wetlands and waterfowl.

28. Even with the 146,000-acre revised wildlife mitigation plan (which would emphasize restoration of drained areas), the project will result in a net loss for wildlife and wetlands.

29. A recent Fish and Wildlife Service wetland inventory in the Oakes-LaMoure and Lincoln Valley sections of the project indicate that wetlands losses will be 2½ times greater than estimated in the Garrison Final Environmental Statement, and total wetland losses are expected to be as high as 50,000 acres.

30. The 8,500 acres of mitigation areas already acquired by the Bureau are not being managed for wildlife purposes.

31. The wildlife mitigation plan will not offset adverse impacts to National Wildlife Refuges.

32. The Fish and Wildlife Service (FWS) has determined that eight major national wildlife refuges totalling 162,771 acres, or 80 percent of the total refuge acres under management in North Dakota, will be negatively affected by the Garrison Diversion Unit as presently planned. The impact, which will occur in the eight areas, will seriously reduce the ability of the refuges to support desirable wildlife populations. Four other smaller national wildlife refuges will also be affected by Garrison as presently planned.

33. Major impacts on the refuges as identified by the Fish and Wildlife Service include: increased streamflows through refuges; increased sedimentation in and turbidity of the water; water temperature changes; reduction of habitat; introduction and survival of rough fish; increase in nutrients and herbicides in streams; and limitations on operation and management.

34. The Fish and Wildlife Service has determined the refuges to be most severely impacted by Garrison including the Tewaukon National Wildlife Refuge (NWR), the Arrowwood NWR, the J. Clark

Salyer NWR, the Audubon NWR, the Sheyenne Lake NWR, and the Sand Lake NWR (South Dakota).

35. The Fish and Wildlife Service and the Bureau of Reclamation, both agencies within the Department of the Interior, disagree as to the magnitude of the impacts of the Garrison project on wildlife refuges.

36. The Bureau's Garrison Final Environmental Statement on the Garrison Project (1974) did not adequately address the impacts of the project on national wildlife refuges in the Dakotas.

37. The Garrison Diversion Unit as presently planned may require major alteration in order to assure the protection and operations of National Wildlife Refuges in the Dakotas and to minimize environmental impacts on them.

38. The State Department and the Bureau of Reclamation have assured the Canadian Government that a construction moratorium exists on portions of the Garrison Diversion Unit which potentially affect Canada until the water quality dispute is resolved.

39. Construction continues on Lonetree Reservoir, even though, under the presently authorized project plan, it potentially affects Canada. The Bureau claims that the Lonetree Reservoir will be needed regardless of possible alterations that could be required of the project.

40. The Bureau of Reclamation is considering at least nine alternatives to the Garrison Diversion Unit that could help resolve the water quality dispute with Canada. Alteration of the Garrison project could increase project costs by as much as $150 million.

41. The Bureau has given emphasis to the use of desalinization plants as a possible means to ameliorate the water quality dispute with Canada.

42. The Bureau's budget justification documents for fiscal year 1977 for the Garrison Diversion Unit are based on erroneous inflation indexing procedures and report inaccurately the true estimated cost and authorized cost ceiling for the Garrison Diversion Unit.

43. The Bureau of Reclamation has not revised its budget justification documents for fiscal year 1977 to reflect changes in the estimated costs and authorized cost ceiling for the Garrison Diversion Unit recommended in the 14th report of the Committee on Government Operations (House Report 94–852, February 26, 1976) and agreed to by the Department of the Interior.

44. The Bureau of Reclamation has not informed the committees of Congress having authorizing and appropriations jurisdiction over Reclamation that the estimated cost of the Garrison Diversion Unit is approximately $40 million over its authorized cost ceiling as indexed for inflation.

45. The authorized cost ceiling and the estimated costs for the Garrison Project do not include an estimated $150 million in costs that could be required to settle the boundary waters dispute with Canada; however, costs of alternatives are too preliminary at this point for the Bureau to adjust properly the ceiling or the estimated costs of the project.

46. The proposed construction of desalinization plants on the Souris and Red rivers to settle the water quality dispute with Canada is among the more expensive alternatives under consideration by the Bureau of Reclamation and the International Joint Commission.

47. The irrigation farmers who will benefit from Garrison Diversion Unit water will repay only 5 percent of the cost of project con-

struction while partial repayment from Federal power revenues from Garrison Dam will provide a subsidy to agriculture of $377 million (July 1975 prices).

48. Bureau of Reclamation and North Dakota officials expect that Garrison will produce benefits from irrigation, municipal and industrial water, fish and wildlife conservation, and flood control.

49. An artificially low discount rate of 3¼ percent, set by law, assigns an exaggerated value to benefits expected from the Garrison Diversion Unit and results in a misleading cost-benefit ratio. Cost-benefit ratios for new Reclamation projects authorized by Congress are required to use discount rates that are much higher.

50. The $2.7 million in claimed wildlife conservation benefits are not adequately justified in view of the determination by the Fish and Wildlife Service that Garrison will result in a net loss to wetlands and will be harmful to Federal wildlife refuges.

51. It is unclear as to whether flood control benefits claimed for Garrison will materialize or whether domestic flooding along the Souris, Red, and James rivers will result in increased flood control costs.

52. Local criticism of the Bureau of Reclamation's land acquisition methods in North Dakota has developed into a major issue, which has contributed to the increased opposition to the project.

53. Procedures for land acquisition and relocation established in the Uniform Relocation and Real Property Acquisition Policies Act of 1970 have not been consistently followed by the Bureau of Reclamation in acquiring property for the Garrison Diversion Unit.

54. The Bureau of Reclamation and the Garrison Diversion Conservancy District have increased their efforts to improve relations with landowners.

55. Landowners who have been affected by Garrison Diversion Unit construction have not always been adequately informed of their rights and obligations under the Uniform Relocation and Real Property Acquisition Act of 1970.

56. The Bureau of Reclamation's policy of withholding property appraisal reports from landowners and encouraging exchanges of appraisal data between the landowner and the Government during condemnation litigation is inconsistent with the policy established by the Uniform Relocation and Real Property Acquisition Act of 1970, which requires that Federal agencies make every effort to negotiate a settlement prior to initiation of condemnation proceedings.

57. Costs necessary for landowners to defend themselves in condemnation litigation often prevent landowners from receiving the full benefit of the just compensation awarded by the court for the condemnation of his property.

58. The inability of the Bureau of Reclamation and the landowner to find suitable replacement property on which to relocate has, in some cases, subjected compensation payments to capital gains taxes, resulting in a loss of a portion of the compensation payment for property lost as a result of eminent domain proceedings.

59. While the Bureau of Reclamation is required by law to help farmers find replacement property on which to relocate, many property owners have complained that they received little or no relocation assistance from the Bureau.

The Committee recommends that:

1. Land acquisition and construction on the Oakes-LaMoure, Central North Dakota, and Souris (and associated sections of the Garrison Diversion Unit canals and reservoirs) not proceed until supplemental environmental impact statements have been completed and published for all three areas. (See page 22.)

2. The Department of the Interior, in conjunction with the Environmental Protection Agency, undertake an assessment of the possible impacts of accelerated coal development on water quality and irrigated agriculture in the Missouri River and Souris River Basins, including possible impacts on Canada and neighboring states that could result from interbasin water transfers from Garrison. A substantive discussion of expected coal impacts should be included in each supplemental environmental impact statement proposed for the three major sections of the project. (See page 28.)

3. The Department of the Interior provide detailed analyses in supplemental environmental impact statements of the effects on Canada of the Garrison project on flooding, municipal water supplies, hydro-electric power generation, wetland loss, increased wildlife and waterfowl diseases, and introduction of exotic species into Canadian waters. (See page 36.)

4. The Bureau of Reclamation comply with its responsibilities to reconcile the Garrison Diversion Unit with plans, policies and controls of Minnesota pursuant to 40 CFR 1550.8(a)(3)(11) of the President's Council on Environmental Quality and in conformance with the requirements of the Federal Water Pollution Control Act, Public Law 92–500. (See page 37.)

5. Methods for treatment of pollution from the Garrison Diversion Unit be in compliance with applicable Federal and State laws, including section 102(b) of the Federal Water Pollution Control Act Amendments of 1972. (See page 38.)

6. Dilution of rivers and streams should not be used to achieve compliance with applicable Federal and State water quality standards. (See page 38.)

7. The Bureau of Reclamation examine the secondary, social, and economic impacts of the Garrison project on Minnesota and South Dakota and provide a detailed discussion of such impacts in the supplemental impact statements for Central North Dakota and Oakes-LaMoure sections of the project. (See page 38.)

8. The Bureau of Reclamation promptly complete and publish the supplemental environmental impact statement for the Oakes-LaMoure section of the Garrison Diversion Unit. (See page 40.)

9. Return flow data for the James River be included in the supplemental environmental impact statement for the Oakes-LaMoure section of the Garrison project prior to its being finalized, and the public be afforded an opportunity to examine and comment on the return flow data. (See page 41.)

10. The Bureau of Reclamation and the U.S. Fish and Wildlife Service promptly initiate discussions with appropriate South Dakota and North Dakota officials with the intention of finding substitute acreage in North Dakota to replace the Hecla wildlife mitigation area. (See page 43.)

11. The Bureau of Reclamation determine the cumulative effect of salt loading in the Souris and Red rivers on Lake Winnipeg and inform the International Joint Commission and the State Department of the results; and that the Bureau include a discussion of the cumulative impacts in either the Souris or Central North Dakota sections' supplemental environmental impact statement. (See page 52.)

12. The Bureau of Reclamation provide proper justification data to support its conclusion that increased nutrient loading in the Souris River that will result from the operation of the Garrison Diversion Unit will not significantly affect the river's water quality. If this conclusion cannot be adequately supported, proper determination should be made of expected impacts from nutrient loading and the 1974 Souris River Return Flow Study revised accordingly. This information should be made available to the State Department, International Joint Commission, and Canadian government as soon as possible and should be included in the supplemental environmental impact statement for the Souris section of the Garrison project. (See page 52.)

13. The Bureau of Reclamation determine the cumulative impacts of nutrient loading in the Souris and Red rivers on Lake Winnipeg and inform the IJC and the State Department of the results. (See page 53.)

14. The Bureau of Reclamation develop a method of reporting the results of return flow studies which will demonstrate as accurately as possible the probable range of increased concentrations of pollution (rather than the average increase) that would result from construction and operation of the Garrison Diversion Unit. (See page 53.)

15. The Bureau of Reclamation, in cooperation with the Environmental Protection Agency, assist the Garrison Conservancy District in developing an irrigation management plan that insures proper application of water, fertilizers, and pesticides in accordance with goals, policies, and provisions of the Water Pollution Control Act and the Pesticide Control Act. (See page 61.)

16. The Bureau of Reclamation promptly develop a management program for the Garrison Diversion Unit which contains adequate control mechanisms to assure proper application of water, pesticides and fertilizers. This program should require farmers receiving irrigation water to install and operate sprinkler irrigation systems in compliance with the stated policies of the Bureau and the Garrison Diversion Conservancy District. (See page 61.)

17. The Fish and Wildlife Service complete the Garrison wildlife mitigation plan as soon as practical and meanwhile inform the Congress, the Bureau of Reclamation, and other affected agencies periodically of any new developments in the mitigation plan, including results of wetland reinventories in other areas. (See page 65.)

18. Fish and Wildlife Service, in cooperation with the Bureau of Reclamation, take necessary steps to develop and implement a management system for the 8,500 acres of wetlands acquired for wildlife mitigation. (See page 65.)

19. The Fish and Wildlife Service, in cooperation with the Bureau develop procedures to assure that wildlife mitigation lands being acquired for various projects under its jurisdiction are brought under an effective management system immediately after acquisition. (See page 66.)

20. The Bureau of Reclamation and the Fish and Wildlife Service take necessary precautions to assure that acquisition and development of wildlife mitigation areas keep pace with project construction. (See page 66.)

21. The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, promptly prepare a supplemental environmental impact statement containing detailed analyses and discussions of the cumulative environmental impacts of the Garrison Diversion Unit on the National Wildlife Refuges in the Dakotas prior to initiation of further land acquisition or construction contracts. The supplemental statement should address issues raised in the Fish and Wildlife Service Report of March 1976. (See page 79.)

22. The Fish and Wildlife Service take necessary steps to adequately inform the appropriate committees of Congress having jurisdiction over the Wildlife Refuge System of the potential adverse impact expected from construction and operation of the Garrison Diversion Unit as presently planned. (See page 79.)

23. The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, identify alternatives to the Garrison Diversion Unit project plan that will eliminate adverse impacts to the national wildlife refuge system. If such alternatives should increase the cost, reduce benefits, or require major alteration of the present project plan, the Bureau of Reclamation should so notify the appropriate committees of Congress and promptly return to Congress for reauthorization of the project. (See page 79.)

24. Land acquisition and construction of the Lonetree Reservoir feature of the Garrison Diversion Unit be deferred until the Canadian and United States Governments have agreed upon an acceptable alternative to the present project plan. (See page 83.)

25. Land acquisition and construction on the New Rockford Canal and portions of the project to be served by the canals should be deferred until it is clear that the Canadian and United States Governments have agreed upon an acceptable alternative to the present project plan. (See page 83.)

26. All alternatives short of construction of expensive desalinization plants be considered by the United States Government as a means of mitigating the current water quality dispute with Canada. If such alternatives should increase the cost, reduce benefits, or require major alteration of the present project plan, the Bureau of Reclamation should notify the appropriate committees of Congress and promptly return to Congress for reauthorization of the project. (See page 84.)

27. The Bureau of Reclamation update the budget justification documents for the Garrison Diversion Unit prior to completion of congressional consideration of the Project's FY 1977 budget request, making adjustments in the authorized cost ceiling and the estimated total Federal obligations as recommended in House Report 94–852. (See page 87.)

28. The Secretary of the Interior advise the congressional oversight and appropriations committees promptly whenever total estimated

costs for the Garrison Project cannot be reduced within its authorized cost ceiling without causing a substantial change in project benefits. (See page 87.)

29. The Bureau of Reclamation adjust the estimated total Federal obligations for the Garrison Diversion Unit as soon as possible after an alternative has been agreed upon by the United States and Canada to account for any necessary increases in costs required to settle the water quality dispute with Canada. (See page 88.)

30. The Bureau of Reclamation take the necessary precautions to assure that irrigation beneficiaries from the Garrison Diversion Unit are required to repay the amount specified in the repayment contract within the time frame required by law. (See page 90.)

31. The Bureau of Reclamation adopt a policy of acknowledging the extent of Federal subsidies to agriculture that are built into the repayment system of reclamation projects, including Garrison. (See page 90.)

32. In the event the Garrison Project should require reauthorization as a result of alterations in the present project plan which might be necessary to accommodate Canadian concerns, the Bureau of Reclamation should develop a new economic feasibility study of the revised project plan utilizing a current discount rate which complies with the Principles and Standards of the Water Resources Council. (See page 93.)

33. The Fish and Wildlife Service should promptly complete its assessment of the impact of Garrison on wildlife and wetlands and inform the Bureau of Reclamation of any adjustments required in the Garrison cost-benefit ratio that are required to properly account for gains or losses to wetlands and wildlife from the Garrison Diversion Unit. (See page 94.)

34. The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, promptly adjust the cost-benefit ratio of the Garrison Diversion Unit to account for wildlife and wetland losses that are expected from the project, including expected Federal costs necessary to prevent damage to Federal wildlife refuges. (See page 95.)

35. The Bureau of Reclamation estimate the costs to the Federal Government that will be required to resolve the potential flooding in Manitoba from Garrison return flows. The cost-benefit ratio should be revised appropriately. (See page 96.)

36. The Bureau of Reclamation evaluate flood control benefits and potential flooding costs in the supplemental environmental impact statements for the Garrison Project. (See page 96.)

37. The Fish and Wildlife Service determine the costs to the Federal Government that could result from flooding of Federal wildlife refuges. The Bureau of Reclamation should revise its cost-benefit ratio accordingly. (See page 96.)

38. The Bureau of Reclamation develop a "landowner's bill of rights" to be presented to and discussed with the affected landowner prior to the initial survey of his property for acquisition purposes. This document should provide pertinent information about the public works project and how it will affect the landowner's property and

should state clearly the affected landowner's rights pursuant to the provisions of the Uniform Relocation and Real Property Acquisition Act of 1970, including the right (1) to accompany the appraiser during the appraisal of his property and to the details of the appraisal; (2) to refuse to accept any and all offers made by the Federal agency for his property and to be free from coercion to sell; (3) to negotiate with the government for a better price for his property or for damages to his property and that the government is obliged to settle by negotiation rather than condemnation if at all possible; (4) to relocation assistance from the Federal agency, including relocation payments and/or comparable dwelling and property; (5) to retain property until payment is made for property; (6) to 90-day notice from the Federal Government before Federal possession of land acquired; and (7) to sell any uneconomic remnant of property resulting from eminent domain to the Federal Government at fair market value. (See page 103.)

39. The Bureau provide a receipt, to be signed by each landowner prior to the survey of his property, which will indicate that he has been informed of his rights and obligations pursuant to the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. (See page 104.)

40. The Bureau of Reclamation establish procedures to assure that prior to surveying or appraising, reasonable notice be given to and permission be acquired from the affected property owner. In the case of appraisals, the Bureau should assure that every landowner be invited and encouraged to accompany the appraiser in accordance with the law. (See page 104.)

41. The Bureau of Reclamation promptly abandon its policy of refusing landowners access to appraisal reports and adopt a policy of full disclosure of appraisal information similar to that employed by the National Park Service. (See page 106.)

42. The Secretary of the Interior review the Department's land acquisition and relocation policies to determine if they are consistent with the policies established in subsection (1) of section 301 of the Uniform Relocation and Real Property Acquisition Act of 1970. (See page 106.)

43. The Congress consider amending the Uniform Relocation and Real Property Acquisition Act of 1970 to provide property owners with reasonable and adequate compensation for attorney fees or other costs incurred as a result of Federal condemnation litigation. (See page 107.)

44. The Congress consider amending the Internal Revenue Code to exempt from the application of the capital gains taxes income resulting from the sale of property to the Federal Government as a result of Federal condemnation proceedings. (See page 107.)

45. The Bureau of Reclamation review and revise its relocation plan for the Garrison Diversion Unit to assure complete relocation assistance to every displaced landowner in an effort to secure his prompt relocation on comparable replacement property without financial loss to him or his family. (See page 107.)

APPENDIXES

Appendix 1.—IJC Referral

Department of State,
Washington, D.C., October 22, 1975.

Mr. William A. Bullard,
Secretary, U.S. Section, International Joint Commission, Washington, D.C.

Dear Mr. Bullard: I have the honor to inform you that the Governments of Canada and the United States of America recognize that the proposed Garrison Diversion Unit of the Pick-Sloan Missouri Basin Program in the State of North Dakota has a potential for causing pollution of waters flowing across the international boundary into Canada.

The Government of Canada has concluded, on the basis of studies conducted by the United States and Canada, including certain studies conducted by the United States in response to questions raised by Canadian officials, that the Garrison Diversion Unit, as currently envisaged, would have adverse effects on the Canadian portions of the Souris, Assiniboine and Red Rivers, and on Lake Winnipeg, which would cause injury to health and property in Canada in contravention of Article IV of the Boundary Waters Treaty of 1909.

The Government of the United States has reached no final conclusion as to whether the Garrison Diversion Unit, as presently envisaged, would be consistent with the rights of the United States and of Canada to the equitable use of waters crossing the boundary and with Article IV of the Boundary Waters Treaty. The Government of the United States notes that, at present, waters crossing the boundary have wide natural fluctuations in quality and quantity, and that the Garrison Diversion Unit, as presently envisaged, could have both beneficial and adverse impacts of the quality and quantity of these waters. The Government of the United States has assured the Government of Canada that in any development of features of the Garrison Diversion Unit that will affect Canada, specifically works in the Red River Basin and the Souris Loop, the United States will comply with its obligation to Canada not to pollute water crossing the boundary to the injury of health or property within Canada. The Government of the United States has similarly assured the Government of Canada that no construction potentially affecting waters flowing into Canada will be undertaken unless it is clear that this obligation will be met.

In light of the views of Governments as expressed above, the Governments of Canada and the United States of America have agreed, pursuant to Article IX of the Boundary Waters Treaty in 1909, to request the International Joint Commission to examine into and to report upon the transboundary implications of the proposed completion and operation of the Garrison Diversion Unit in the State of North Dakota; and to make recommendations as to such measures, including modifications, alterations or adjustments to the Garrison

Diversion Unit, as might be taken to assist governments in ensuring that the provisions of Article IV of the Boundary Waters Treaty are honored.

In doing so, the Commission should examine into and report upon the following and such other matters as the International Joint Commission may deem relevant:

(a) the present state of water quality in the Souris and Red Rivers, their tributaries and other downstream waters, with particular reference to the Canadian portions thereof, which may be affected by the proposed completion and operation of the Garrison Diversion Unit. The examination should include the following: (1) Total dissolved solids; (2) sulfate, sodium, chloride, magnesium, calcium, and compounds thereof; (3) bicarbonates; (4) nutrients, including nitrogen, phosphorus, and their compounds; (5) pesticides and herbicides; (6) dissolved oxygen, temperature, sediment, and other related parameters affecting aquatic life; and (7) trace elements including baron, selenium, lead, and other heavy metals.

(b) the present uses of these waters and those uses which may reasonably be anticipated in the future;

(c) the effects of present water quality on these uses;

(d) the nature, extent and location of impacts on the quality and quantity of these waters to be anticipated as a result of the proposed completion and operation of the Garrison Diversion Unit;

(e) the nature, extent and economic cost of such impacts to be anticipated from the proposed completion and operation of the Garrison Diversion Unit on the present and anticipated future uses of these waters; and

(f) the nature and extent of the impact on commercial and recreational fisheries in Manitoba, particularly Lake Winnipeg, of the possible introduction from the Missouri River system through the Garrison Diversion Unit of foreign species of fish, fish diseases, and fish parasites.

Should the Commission make any recommendation concerning measures which could be taken to avoid or relieve adverse effects on uses in Canada, what would be the approximate cost of such measures?

In the conduct of its investigation and in the preparation of its report, the Commission should make use of information and technical data heretofore available, or which may become available during the course of the investigation. In addition, the Commission should seek the assistance, as required, of specially qualified personnel from both countries.

Both the United States and Canada ascribe particular importance to the views of the Commission on this matter. Accordingly, the Commission is requested to complete its investigation and submit its report in the minimum possible time, consistent with a thorough examination of the subject, but in any case, not later than October 31, 1976.

The Governments shall make available, or as necessary, seek the appropriation of, the funds required to provide the Commission promptly with the resources needed to discharge its obligations fully within the period specified.

Sincerely,

RICHARD D. VINE,
Deputy Assistant Secretary
for Canadian Affairs.

Appendix 2.—Alternatives Associated With the Development of the Souris Loop Area of the Garrison Diversion Unit

[The following discussion of possible alternatives to the Garrison Diversion Unit has been taken from Bureau of Reclamation testimony before the Conservation, Energy, and Natural Resources Subcommittee. Hearings, Sept. 19, 1975, pp. 75–76.]

The Commissioner of Reclamation, in his letter of June 16, 1975, to the Regional Director, Upper Missouri Region, requested that informal studies be initiated on those alternatives associated with handling Souris Loop return flows. This office is in the process of initiating such studies which will be performed at the subfeasibility grade level.

Several alternatives or combination of these alternatives associated with stage development of the Souris Loop Area will be analyzed to determine their relative impact on the Souris River. Stage development of irrigable lands in the Souris Section will take place over a period of approximately 10 years. This type of development will allow for a close monitoring of return flows from initial irrigated lands in the Souris Section. The monitoring of return flows will be done for the purpose of checking model predictions and making TDS adjustments accordingly. At a certain level of development, based on the impacts the existing return flows are having on the Souris River ecosystem, alternatives can be implemented.

One or a combination of the following courses of action can be implemented to allow for full development in the Souris Section. A basic alternative which will be considered is (1) dilution of the Souris River flows with water releases from the Velva Canal. This method of mixing waters for the purpose of reducing the TDS level in the Souris River would be advantageous when the volume of return flows is small. Small amounts of return flows will cause only a slight impact on the operation of the Velva Canal. The impact will consist of conveying a small amount of water from the Velva Canal to the Souris River for the purpose of dilution. With the above method of dilution it would be possible to alleviate periodic water quality (TDS) problems caused by return flows accruing in the Souris River.

Another alternative to be considered would involve one or possibly both of the following concepts: (2) A reuse of all or a portion of the return flows could be accomplished in the Souris Section through a careful selection of irrigated lands, the collection of the return flows from these lands, and the conveyance of these flows back to the Velva Canal. Water quality predictions would be used to indicate if the removal of a portion or all of the return flows in the canal would be required to alleviate the buildup of the TDS level in the canal. The removal of these return flows could be accomplished by transferring the flows to a body of water where impacts would be minimal. Conveyance of the return flows to (3) Lonetree Reservoir would eliminate

TDS concerns in the Souris River resulting from the irrigation of lands in the Souris Section. The reuse of these return flows at Lonetree Reservoir will have little or no adverse impact to other lands in the Garrison Diversion Unit. Return flows could also be conveyed to (4) the Missouri River or Lake Sakakawea with little or no adverse impact to the existing water quality in the river or lake. Other alternative uses of irrigation return flows could be (5) disposal by evaporation or (6) deepwell injection and (7) sale to industry.

A plan for treatment of Garrison Diversion Unit return flows could be accomplished by construction of a (8) desalinization plant. Such a plant would reduce the salinity level of all accruals from the irrigated lands in the Souris Section to the level existing in the Souris River prior to irrigation. As a result of this water treatment, no adverse impact from irrigated lands would exist upon the Souris River except for an increase in water quantity.

There is the possibility of (9) excluding the lands in the Souris Section and obtaining replacement lands in other basins of the Garrison Diversion Unit. The implementation of this alternative would require restudy of the Garrison Diversion Unit and should only be considered when none of the above-mentioned alternatives are deemed acceptable. More than one million acres of land were determined to be irrigable based on semi-detailed classification studies done for the ultimate stage of the Garrison Diversion Unit.

APPENDIX 3.—Congressman Mark Andrews' Critique of Draft of Garrison's Report and Subcommittee Staff Response

Congress of the United States,
House of Representatives,
Washington, D.C., June 8, 1976.

Hon. Leo J. Ryan,
Chairman, Subcommittee on Conservation, Energy and Natural Resources, Government Operations Committee, Washington, D.C.

Dear Leo: We appreciate very much the opportunity to review and comment on the initial draft report prepared by your Subcommittee.

Some time ago when questions were raised about Garrison viability, we asked Elmer Staats, head of the GAO, to provide us with information on how the Garrison Project compares on key parameters vis-a-vis representative sampling of other reclamation projects. Several projects compared are successful California projects about which you are familiar.

In a group of 19 reclamation projects, the Garrison cost/benefit ratio—by this, Leo, we mean the upgraded 1976 cost/benefit ratio is ranked second best. Similarly, the quality of the Garrison return flows ranked fifth best among 22 western reclamation projects.

Since the report from Mr. Staats ranks Garrison among the best irrigation projects we certainly hope your Subcommittee will consider this and alter the position taken in the draft report. We can assure you from extensive knowledge of the area that this project will assure that critical environmental needs are met for future generations. It will also greatly benefit our efforts to produce food and fiber to feed a hungry world.

You will recall that we supported the amendment providing $1 million for a detailed water quality study. This study was to be completed as rapidly as possible with the commitment that it be ready before consideration of the Appropriation Bill for continuation of Garrison construction. We, as well as the Congress, would looke quite silly if a Committee of the Congress were to issue a report based on out-dated and incomplete information when the most detailed study of any reclamation project ever made was just completed and presented to Congress. This is why we think it was wise of you to send the draft back to the staff to consider this new information. We thank you for this. We just hope your capable staff can do justice to this comprehensive water quality study in the week available to rework the report.

Certainly the draft report has many good points. We do need to assure compliance with water quality laws of neighboring states. But, again the Harza and Bureau report shows that Minnesota and South Dakota will not be harmed by these return flows. The Bureau of Reclamation is conducting meetings with appropriate state agencies

to show that their requirements have been met. Similarly, we do agree that the Canadian issue needs to be resolved and our treaty commitments honored. However, Leo, the IJC study results whose impact on future construction will be made public in August—about two months before any of the money in the Appropriation Bill will be available for spending. The Bureau, in any event, has scheduled construction on Lonetree Dam to begin well after the IJC report is scheduled for completion. We have been assured that the State Department and the Department of the Interior will not allow facilities to be constructed which will potentially dishonor our treaty with Canada.

With the way the studies are progressing we do not expect any Canadian objections to Red River water quality and quantity. If the Souris River issue, being a more complex issue, requires a longer period of time for resolution, then that portion of the project can be postponed, if necessary. In the meantime, Lonetree Dam at its present location and size should be constructed since it is needed for any envisioned alternative. Even in the extreme case where part, or all of, the Souris Area could not be irrigated the acreage can be transferred to other locations but still served by the Lonetree Reservoir. The authorization, Leo, as you know is for 250,000 acres but there are available one million acres that can be served out of the Lonetree Reservoir so acreage substitution is totally feasible.

As you know, because the original draft of the Government Operations study has been released to the press both of us have been considerably embarrassed since we assured our constituents of the Subcommittee's desire to study all material before taking any action. We are enclosing a copy of the newspaper story from last Sunday's Minneapolis Tribune so you will have it for your information. We are also enclosing detailed comments on your Subcommittee staff's draft report and the GAO report.

Again, Leo, because of the favorable report by both Harza Engineering and GAO, as well as the timing safeguards mentioned we would hope that the Subcommittee will formulate recommendations which honor the action taken by the House Appropriations Committee. In making this money available for use, we prevent the loss of a year's construction time, and decrease the impact of inflation on total project costs. Also, we prevent the loss of one year's annual benefits estimated to be $59.5 million dollars—more than twice the FY 77 appropriations. There are numerous cities and farms in North Dakota critically short of an adequate stream flow that are awaiting the quality water supply which Garrison Diversion provides. Indeed, jobs, food and area growth are all at stake.

As you and Members of the Subcommittee know, those of us who live, love and know the area best agree that the Garrison Diversion Project most needed for a sound and environmentally safe future. We appreciate very much the cooperation of your Subcommittee which will allow us to reach our goal.

Best personal regards.

Sincerely,

MARK ANDREWS,
Congressman for North Dakota.

BOB BERGLAND,
Congressman for Minnesota.

A CRITIQUE OF THE COMMITTEE ON GOVERNMENT OPERATIONS' DRAFT REPORT ON THE GARRISON DIVERSION PROJECT

The following are detailed comments submitted by Representative Mark Andrews and Representative Bob Bergland in regard to the draft report entitled "A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota" prepared by the Committee on Government Operations.

1. page 8, paragraph 2

The alterations in the original plan were not the reason for returning to Congress. All projects not already under construction were deauthorized in 1964. This was contained within a bill for raising power rates on the Missouri River Basin Plan.

2. pages 12–15

The tone of these pages is such as gives the impression of great opposition to the project. There are complaints and differences on some aspects of the project; however, there is overwhelming approval of this project by both state and local officials. It is significant that Governor Kneip of South Dakota, Governor Anderson of Minnesota, Governor Link of North Dakota, the North Dakota Congressional Delegation, the North Dakota State Water Commission and mayors of towns and cities who will benefit from abundant quality water all favor the project. The Farm Bureau and Farmers Union have both passed resolutions favoring the project at their last state conventions. All major North Dakota power companies and the Minnesota Association of Electrical Cooperatives support early completion of the project. Opposition stems from problems with land acquisition. We fully agree that improvements are needed in this area whenever government acquires private land.

3. page 16, finding B

The Bureau has purchased acreage sufficient only to construct and operate the first stage. If the canal were enlarged on its present alignment, there would be considerable savings in cost but additional canal right-of-way acreage would be required.

4. page 16, finding C

The Lonetree Reservoir is sized and located for the initial stage only. The size is determined by the topography, geology and the size of the McClusky canal. The combination of these considerations determined the size and location. If more acreage were to be irrigated, more water would need to be regulated by Lonetree. Expanding the project would substantially change the size of the McClusky canal and the operation of Lonetree Reservoir.

5. page 18, paragraph 2

Land acquisition has not begun on the service areas.

6. page 19, paragraph 2

Right-of-way requirements along the McClusky canal are determined by the needs for construction, operation and maintenance of the canal as currently sized and not for the ultimate stage development.

7. page 20, paragraph 1

The Lonetree Reservoir is not sized to accommodate the ultimate stage. As stated earlier, it could handle the additional acreage if certain other changes were made such as a substantial increase in the size of the canal into the Reservoir. A fundamental understanding of hydraulics would indicate that Lonetree Reservoir could be smaller only if you disregard the topography, geology and the size of the McClusky canal and the Snake Creek Pumping Plant.

8. page 20, paragraph 3

Construction of Lonetree is currently scheduled to begin late in fiscal year 1977 (November). This is after the International Joint Commission (IJC) will make its report to the two governments.

9. page 21, paragraph 2

There are no pumps associated with the New Rockford canal. The New Rockford canal is unrelated to service in the Lincoln Valley area. The question about whether or not construction and operation of features to serve West Oakes, LaMoure and Lincoln Valley areas would affect boundary waters was thoroughly discussed in public meetings with the IJC. A change in the size of the main distribution system (New Rockford canal, Oakes Pumping Plant and Oakes canal) would be justified only if irrigation and service to the areas within the Red River Basin (East Oakes-New Rockford and 60 percent of the Warwick-McVille area) were eliminated or precluded. Such elimination seems highly unlikely.

10. page 23, paragraph 2

The Bureau has supported the new plan in concept, but awaits more details and appropriate coordination with the state officials and interested parties.

11. pages 22 & 23

Somewhere in this part of the report it should be pointed out that Canadian objections to the Red River impacts have been without study and are expressed as concerns. Currently there are no conclusions of adverse effects or treaty violations from the project's effects on the Red River.

12. page 24, paragraph 1

In addition to 8,000 acres which are dedicated to wildlife. about 9,000 acres of right-of-way acquired along the McClusky canal have been dedicated to management for wildlife. Native grasses and shrubs have been or are being planted in this protected area. Wildlife are abundant in this area.

Funding for completion of the wildlife areas along the canal is contained in the fiscal year 77 request. The Fish and Wildlife Service will assume operations of these areas as soon as they are completed.

Mitigation is occurring concurrently with construction of the Unit in accordance with the terms of the repayment contract. It should also be noted that no benefits to irrigation or water service areas have occurred, but the canal right-of-way does serve the wildlife benefit anyway.

13. page 25, finding E

The schedule for supplemental EIS is in accordance with federal regulations and provides for assessment of the environmental impacts in the service areas will precede construction in the service area. The environmental impacts of the plan were reported in the January 1974 statement and details for the principal supply works currently under construction.

14. page 25, finding G

The environmental impact statements are not necessary for the IJC to complete their study. The International Garrison Diversion Study Board has advised the International Joint Commission that the Bureau has been very cooperative in supplying information needed for their work. They have not requested environmental impact statements.

15. page 26, finding H

Information to assess the impacts on water quality in South Dakota and Minnesota is contained in a three volume Bureau of Reclamation and Harza Engineering study dated May and June 1976. Detailed environmental impacts for the affected areas will be processed before plans are implemented. Major impacts have been known since 1974. South Dakota and Minnesota communities along the Red River have been and continue to be involved in the planning process.

The effects on national wildlife refuges were recognized during project development. Mitigation plans took these impacts into consideration. A full and defendable study of impacts need not await the evnironmental impact statements.

16. page 27, paragraph 3

The Bureau has acknowledged on several occasions that the adequacy on the merits was not determined by the Courts. What was determined by the Courts was procedural compliance with NEPA. This included a recognition of the detailed statements to follow.

j17. page 30, quotation 1

The projected qualities and quantities in the Souris River area were much higher than subsequent studies indicate. The values on the Red River were substantiated in great detail by the subsequent studies.

18. page 29, quotation 2

The effect on national wildlife refuges were recognized in the final environmental impact statement (FES) and the experts disagree on the adequacy of the mitigation plan. Allegations of inadequacy have not been substantiated.

19 page 30, quotation 3

The effects on power generation were fully considered in the development of the Missouri River Basin. Garrison is only one relatively small part of this plan. Garrison will use only 800,000 of 19,000,000 acre feet which flow down the Missouri annually.

20. page 30, quotation 4

The project will increase productivity by two to three times over existing dryland areas. In addition, it will shift the cultural practice

of summerfallow on about 25 percent the acreage to continuous cropping. The lands to be irrigated are less productive than the average dryland acreage.

21, page 30, quotation 5

The Bureau has recognized effects on ground water aquifers and continues to work with the State Water Commission to provide further study as indicated.

22. page 30, quotation 6

The farmers in North Dakota are shifting to sprinkler voluntarily where adequate water supply can be found. The experience has been environmentally, socially and economically positive. Further study is unwarranted.

23. page 30, paragraph 1

Possible alternatives are speculative only. If alterations are found necessary, they will receive due process of consideration by Congress and the environmental review process.

24. page 32

A full study of the return effects has been completed on the rivers and streams of North Dakota and is available. The work of the IJC is related to the 1909 treaty and will be completed before initial construction of the Lonetree Dam and the Lonetree Reservoir although unrelated. The effects on the national wildlife refuge system has been known and the adequacy of the mitigation plan is considered to be excellent within the authorized 146,500 acre limitation.

The recommendation that all the supplemental statements be in before beginning construction in any service area is unnecessary and not supported in regulation or logic. It would create tremendously costly delays in design and construction, thus depriving the people of efficiency in management of the tax dollar and deferring benefits for several years.

25. page 34 & 35

The agreement that the environmental impact statement (EIS) would have precluded the international consideration of the 1909 treaty is not valid. A careful reading of the testimony sited for Mr. Busterud supports this conclusion.

The speculation on alternatives makes false assumptions on the procedure that would follow if an alteration were warranted. The listing of alterations were not proposed to solve the issue—they were for study at a subfeasibility level. A study of economic and environmental feasibility could be designed for the best plans if certain things happened: (1) the IJC determined it was necessary and their recommendation to the two governments was agreeable, and (2) the level of acceptance under the 1909 treaty was known. Until an acceptable quality and quantity are known it is impossible to give more complete consideration of the feasibility of alterations under study.

In any event, if alterations were determined to be necessary by the two governments and those alterations were substantial, a due process of consideration under NEPA and by the Congress would be required.

26. page 35, last paragraph

The $1 million was not provided for EIS or alteration studies, but for water quality studies. The assertion that only $172,000 has been spent is incorrect. The estimated cost is over $1,000,000 on the water quality study which was to expedite ongoing work.

27. pages 37 & 38

The report fails to recognize two important facts:

(*a*) While it is true that the FES estimate of wetlands affected in the Oakes-LaMoure area has been found to be in error (according to Fish and Wildlife Service), the original mitigation plan was based on a higher figure. Nearly 40,000 acres of wetlands were to be affected and the plan was based on that estimate, not the lower figure contained in the FES. The figure in the FES was determined in cooperation with the Fish and Wildlife Service when the irrigation plan shifted from gravity to sprinkler.

(*b*) The proposed alteration of the original mitigation plan will greatly increase its effectiveness and benefit to wildlife. The concept of restoring wetlands and providing uplands for management along with the wetlands can cause production to increase significantly.

A conclusion that the plan will need to be modified to protect the refuges is unwarranted.

28. pages 38–40

The whole argument is based on possible improvements in coal gasification technology and speculation that even that will create an interface with Garrison. The argument further ignores the chronology of authorized development. Garrison was reauthorized in 1965 and the coal development is still tentative pending permits and environmental assessments.

29. page 46, finding A

It is true that Canada objected to construction of the plan as authorized; however, the current position in the negotiation is one of acceptance of the reference to IJC and the U.S. commitment to not construct facilities potentially affecting the boundary waters.

30. page 46, finding E

Minnesota's objection is based on concerns. It should not be implied that it will cause further pollution on the Red River.

31. page 46, finding F

It should also be stated that South Dakota officials, including the Governor, are not concerned about the impacts from the authorized plan. If alterations affecting South Dakota are pursued, their concerns will be given full consideration in due process. South Dakota understands and accepts this commitment.

32. page 59, first recommendation

This recommendation that dilution not be used to achieve compliance is in direct conflict with the recommendations of the EPA in their October 1975 report which states for the Red River and others

(including the Souris and James) that "Some form of flow augmentation would be needed to supplement low flow periods."

33. page 60, last paragraph

The June 1976 report in fact demonstrates that flooding effects can be reduced from those experienced historically.

34. page 61, last paragraph

Change the river from "Souris" to "James."

35. page 62, paragraph 1

The June 1976 study confirms the 3600 acre feet will flow to South Dakota and that the effects are minor. The EIS is not required to accurately determine water quality effects in South Dakota. Nonetheless, the draft EIS is to be filed shortly.

36. page 66

A study of alternatives to the Hecla Slough has been initiated through discussion with South Dakota officials. The draft of that study is scheduled for completion in July 1976.

37. page 67, finding B

To the contrary, the assumptions reviewed and incorporated in the June 1976 report indicated that the estimates were based on conservative assumptions and the impacts projected earlier were higher than justified. EPA testimony before the Committee (November 1975) states that the Bureau is "right on target" in overcoming EPA concerns.

38. page 67, finding D

Nothing shown in testimony or data analysis justifies the suggestion that salinity increases will be as high as 973.5 mg/1. The June study indicates that the average increase will be 138 mg/1 and that maximum historic levels will be *reduced* by 1453 mg/1.

39. page 68, finding I

It is true that cumulative effects on Lake Winnipeg have not been studied by the Bureau. The Manitoba Environmental Council published a report in January 1975 which concluded that the cumulative effects of nitrogen on Lake Winnipeg would be undetectable. Canadian participants in the IJC will address this point.

40. page 68, finding J

The design of the distribution system is for sprinkler. Farmers attempting to use gravity irrigation would face considerable additional expense and the high risk of water shortage during critical periods. Virtually all the private irrigation, about 90,000 acres in North Dakota during the last five years has been sprinkler type.

41. page 72

The discussion of concern for increased quantities of fertilizer and pesticides from the irrigation operation through erosion and runoff ignores the efficiency that is achieved under irrigation. The management of fertilizers and pesticides under the Conservancy District's control will be better than normally found under dryland conditions.

Under normal dryland operations the fertilizers are applied once in the spring of the year. A spring rain storm can and often does flush substantial amounts of nitrogen sediments and pesticides to the river. Under the irrigation management plan scheduled for the Garrison Diversion Unit, fertilizer applications would be spread out to meet the demand schedule of the plants, thus resulting in better efficiency of use.

Additionally, under irrigation the practice of summerfallowing as much as 50 percent of the acreage would be discontinued thus reducing runoff and erosion of sediments, fertilizers and pesticides.

The analysis of nitrates and pesticides was performed by Harza Engineering. The assumptions used in the study recognized the management potential, but also displayed values for no management. The latter assumption is unrealistic and in all cases the improvement from elimination of summerfallow was not recognized.

42. page 37, first recommendation

The Bureau analysis reported in June 1976 includes the recommendation of the Committee on the assumptions used in the return flow model study.

43. page 74, paragraph 2

The June 1976 analysis indicates that the quantity of return flows added to the Souris River will actually be about 82,000 acre feet annually rather than 107,000 acre feet as projected in the draft report of 1974.

44. page 78, recommendation

The IJC is charged with the responsibility of determining their effects in Canada and the Bureau is cooperating with that study.

45. pages 80 & 81

The irrigation specialist is the central coordinator. Other specialists will be employed (one is already on board in the Oakes area) to carry on the field work. EPA itself, through administration of federal law, is charged with control of pesticides. Studies of irrigation return flows have indicated no significant contributions can be expected. A NDSU study further confirms this conclusion.

46. page 82

The studies are complete and indicate that the volume of return flow into the Red River projected earlier was high by a small amount. The average annual return flow to the Red River will be about 46,000 acre feet.

47. page 83, last paragraph

The June 1976 study indicates that the increase in salinity in the Red River at Fargo will be 79 mg/1 and at Emerson (Canadian Border) it will be 9 mg/1. These are not significant differences from the historic levels.

48. page 89, finding A

No proof of inadequacy of the original plan has been provided.

49. page 89, findings B

The details of the new plan on the reanalysis of wetland losses are not complete. It is therefore impossible to conclude that the project

was a net loser to wildlife. There is serious disagreement with this statement. All that is known is that the point is not yet resolved.

50. page 89, finding C

This fails to recognize that the original plan was based on an estimated wetland loss of nearly 40,000 acres. The estimate of 50,000 acres is unsupported but certainly is not 2½ times in error from the original.

51. page 89, finding D

The right-of-way for the McClusky canal and the acres acquired for wildlife are not in use for purposes other than wildlife. They are protected. The right-of-way has been seeded to native grasses and shrubs have been planted for wildlife. Numerous sightings of abundant wildlife can be made along the canal right-of-way.

52. page 94, paragraph 1

The Committee's judgment and that of Secretary Reed that 48,000 acres of restorable wetland is not adequate for full mitigation fails to recognize the upland habitat and additional water supply available. With management of these areas compared to the affected wetlands currently in farmed areas, the productivity could be enhanced according to research studies conducted by the Fish and Wildlife Service.

53. page 95, paragraph 1

The responsibility for a management system for fish and wildlife lands rests with the Fish and Wildlife Service. The author appears to take without question the judgments of the Fish and Wildlife Service and disregard the argument of the Bureau and independent consultant. In other areas, the author readily accepts judgments from outside the agency with responsibility.

One example of the errors recognized in the report is the conclusion that the temperature of the return flows at 44–49° F will adversely affect the refuges and cause diseases. The response indicates that actual temperature change in the refuge will be 1° F.

Another example has to do with the fish screen not being 100 percent effective. Nature itself is not 100 percent effective. Flora and fauna have transferred from one basin to another during periods of high flow.

The number of unanswered differences among the professionals are too numerous to mention, but certainly serve to point out the need for completion of fully coordinated studies on all aspects of the plan including the benefits of the massive mitigation and enhancement plan.

54. page 97, finding D

Desalinization plants are not being relied upon "heavily" by the Bureau of Reclamation. The testimony given to the Committee by Commissioner Stamm merely included desalinization along with other alternatives under study. During testimony, the Commissioner emphasized management of the construction and operation as the prime alternative.

55. page 99, last paragraph

Again the author concludes that the ultimate stage is under construction. This is incorrect. Lonetree Reservoir is needed in the current configuration for a 250,000 acre irrigation plan.

56. page 101, paragraph 1

Again the author presumes that the alternations, if any, will preclude irrigation of 250,000 acres. This is unrealistic. It further fails to recognize the schedule for construction of Lonetree Dam will not be initiated until after the IJC work is completed.

It is not true that most of the return flow from "Oakes–LaMoure and Warwick–McVille areas" will drain into the Red River. Over one half of the acres referenced do not drain into the Red River.

57. page 103, finding C

There is disagreement on a national level on methods for computing cost overruns. This analysis should be addressed in a separate paper.

58. page 103, finding D

This is the highest possible estimate and not a representative figure.

59. page 104, finding I

This finding appears premature; the matter of fish and wildlife benefits is as yet unresolved.

60. page 104, finding J

The June 1976 report indicates that the effects of the return flows on historic flooding will be insignificant and that there will in fact be additional flood control benefits on the James River through operation of the Oakes Pumping Plant.

61. page 105, paragraph 1

This present benefit-cost ratio reported to Congress is 2.9 to 1 rather than 2.8 to 1.

62. page 121, recommendation

The recommendation that the Bureau adjust the benefit-cost ratio to account for wildlife effects is based on incomplete findings and judgements by the Fish and Wildlife Service. (See earlier comments on the status of their studies and Secretary Reed's testimony.)

63. page 33, page 68—finding H, page 78—recommendation

The June 1976 report on water quality uses the concentration of water as its unit of measurement. This terminology is common in water quality analysis and is a standard used by North Dakota, South Dakota, Minnesota and Manitoba. From the averages present in the report, loadings can be readily determined by a simple arithmetic calculation.

Since the report is directed to the analysis of at least intermittently flowing rivers, it is of primary importance to analyze rates and concentrations. To analyze effects in a large reservoir or lake such as Lake Winnipeg loadings need to be taken into account. The effects on Lake Winnipeg are being analyzed by the IJC. Preliminary judgments of the cumulative effects of loading in Lake Winnipeg are that it will be insignificant. Dr. Brunskill of Winnipeg reported that the amount of constituents added to Lake Winnipeg will be negligible.

GENERAL COMMENTS

1. An oral expression of concerns for more detail in the design and layout of the system and acreage on 250,000 acres is also addressed.

As you know, the procedure followed for authorization and implementation of the Garrison Diversion Unit is the same one used on large multipurpose public works programs through the west. The authorization is based on investigations in sufficient detail to determine economic environmental and engineering feasibility. Initial funding after authorization is normally used, as in the case of Garrison, for preconstruction design on the prime contracts and further negotiation of the contracts within each irrigation or service area.

Garrison is unique in that the feasibility of irrigation on the 250,000 acres was preceded by a study of over 1,000,000 acres. The flexibility to provide irrigation in alternate areas is assured.

The studies of alternatives for the Souris area will emphasize solutions to reduce impacts within the Souris area through management and handling of the return flows. Interior has indicated the cost of these alternatives will range all the way from negligible to $150 million for the most expensive plan.

2. Findings and recommendation in back of the report need to be updated to take into account recent water quality studies and comments above.

3. The ideas contained in the chapter on land acquisition are generally constructive and should provide a basis for improved legislation which affects all governmental agencies who purchase private land.

[NOTE. Page numbers refer to original draft of report.]

HOUSE OF REPRESENTATIVES,
Washington, D.C., June 23, 1976.

Hon. PAUL N. MCCLOSKEY, Jr.,
Cannon House Office Building,
Washington, D.C.

DEAR PETE: The attached document contains the written response to Congressman Mark Andrews' 63-point critique of the draft Garrison report, which you asked the staff of the Subcommittee to respond to prior to consideration of the report by the Government Operations Committee on June 24.

I think you will agree with me after reading the response that while there are certainly differences of opinion that still exist, the report has been soundly researched, is firmly based on an extensive hearing record and recent information about the project, and is in proper form for consideration of the full Committee.

With best regards,
Sincerely,

LEO J. RYAN, *Chairman.*

Attachment.

STAFF RESPONSE TO A CRITIQUE OF THE CONSERVATION, ENERGY, AND NATURAL RESOURCES DRAFT REPORT ON THE GARRISON DIVERSION PROJECT

1. On page 8, paragraph 2, the report deescribes the problems associated with finding irrigable land in western North Dakota which required the original 1944 Missouri-Souris diversion plan to be revised and eventually reauthorized in 1965 as the Garrison Diversion Unit.

Critique.—"The alterations in the original plan were not the reason for returning to Congress. All projects not already under construction were deauthorized in 1964. This was contained within a bill for raising power revenues on the Missouri River Basin Plan."

Response.—The Bureau of Reclamation began revising the original plan in 1957 and developed three feasibility studies of various alternatives before the present plan was decided upon in 1965. Neither the Garrison Project nor any other reclamation project was deauthorized in 1964 as claimed in the critique. The legislative action referred to in the critqiue was actually a statement in an appropriations bill which disallowed further funding for units of the Pick-Sloan Missouri Basin Program (including Garrison) until the projects had been reauthorized by Congress.

2. On pages 12 to 15 of the draft report the major problems with the Garrison Diversion Unit raised in the subcommittee's hearings are summarized.

Critique.—"The tone of these pages is such as gives the impression of great opposition to the project. There are complaints and differences on some aspects of the project; however, there is overwhelming approval of this project by both state and local officials. It is significant that Governor Kneip of South Dakota, Governor Anderson of Minnesota, Governor Link of North Dakota, the North Dakota congressional delegation, the North Dakota State Water Commission and mayors of towns and cities . . . all favor the project. The Farm Bureau and Farmer's Union have both passed resolutions favoring the project at their last state conventions. . . . Opposition stems from problems with land acquisition. We fully agree that improvements are needed in this area whenever government acquires private land."

Response.—This is a matter of style rather than fact. When the subcommittee announced its field hearings in North Dakota, the point was made clear to everyone concerned that we were going to North Dakota to discuss the issues, not to take a head count on who is for or against the project. The section under criticism here is merely intended to serve as a summary of the various problems raised in the hearings, which are to be discussed in the report. Nevertheless, the section clearly states on page 14 that:

"Despite the growing concern among various environmental groups, farm organization, state governments, and Federal agencies, there appears to be continued broad-based support for the project among North Dakotans. During hearings in Bismarck, North Dakota, on September 15, 1975, the Conservation, Energy, and Natural Resources Subcommittee heard supporting testimony from Governor Arthur Link, U. S. Representative Andrews, the Director of the North Dakota State Health Department, the Garrison Diversion Conservancy District, and the mayors of Fargo, Harvey, and Minot, North Dakota. Supporting testimony was also received for the record from the State Attorney General, Majority Leader of the North Dakota Senate, the Director of the North Dakota Game and Fish Department, and other political leaders."

No attempt was made in this section to list all political leaders and organizations that support or oppose Garrison Diversion. As for the positions of the Governors of Minnesota and South Dakota, they were

invited to present testimony to the subcommittee and chose instead to send designated representatives.

Governor Anderson of Minnesota sent a representative of the Minnesota Pollution Control Agency while Governor Kneip of South Dakota sent a representative of the S. D. Natural Resources Agency. No formal statements of support for Garrison were filed by either State Governor with this subcommittee. As for support of cities and towns, the subcommittee made no attempt to poll mayors of all cities. We do not question that most or all mayors in North Dakota support the project; however, the only mayors invited to testify at the hearings were the ones mentioned in the report.

The critique statement that the N. D. Farmer's Union has registered support for the project is an oversimplification of their position. Their position is that they support the objectives of Garrison Diversion but have urged that "serious questions relating to landowner treatment, groundwater studies, Canadian opposition, and pipeline feasibility studies be resolved." Furthermore, the N. D. Farmer's Union urged that no more land be acquired for the Project until the landowner controversy is resolved. (1976 Program of Policy and Action, N.D.F.U.)

3. On page 16, the report finds that "Though only the initial stage of the Garrison Project is authorized (250,000), the Bureau of Reclamation has acquired sufficient right-of-way for McClusky Canal to accommodate not only the initial stage but also full project development (1,007,000) as well."

Critique.—"The Bureau has purchased acreage sufficient only to construct and operate the first stage. If the canal were enlarged on its present alignment, there would be considerable savings in cost but additional canal right-of-way acreage would be required."

Response.—The 1974 Garrison Final Environmental Statement (p. I–6), prepared by the Bureau of Reclamation, contradicts this point. It states that "Sufficient right-of-way along McClusky Canal, which is the logical route for a larger supply canal, has been acquired to provide opportunity for later enlargement of the canal, if approved."

4. On page 16, finding C states that "The 30,000-acre Lonetree Reservoir is designed and is being constructed to accommodate full development even though only the initial stage has been authorized. The design capacity of Lonetree could be substantially reduced to accommodate the authorized initial stage. It could be further reduced if the project design is altered to accommodate Canadian objections."

Critique.—The Lonetree Reservoir is sized and located for the initial stage only. The size is determined by the topography, geology and size of the McClusky Canal. The combination of these considerations determined the size and location. If more acreage were to be irrigated, more water would need to be regulated by Lonetree. Expanding the project would substantially change the size of the McClusky Canal and the operation of Lonetree Reservoir.

Response.—First, the 1974 Final Environmental Statement for the Project confirms the finding of the report. The FES states that "Some feature locations would provide sites for larger facilities. Other locations, such as Lonetree Reservoir, are *utilized to the maximum capacity of the site and facilities could not be enlarged.*" (emphasis added)

Bureau of Reclamation officials have confirmed that Lonetree Reservoir is sized to accommodate full stage development (1,007,000) if additional stages are approved by Congress.

Second, in informal discussion with the subcommittee staff, Bureau of Reclamation officials urged that Lonetree Reservoir was sized to accommodate both the 250,000-acre stage I of the project and the ultimate stage of 1,000,000 acres, if approved by Congress. At the same time, they contend that the size of Lonetree Reservoir is dependent upon the size of McClusky Canal and that if Lonetree were built to a capacity smaller, then it would be necessary to enlarge McClusky Canal to handle peak irrigation demand. Yet, they contend further that construction and operations of the ultimate stage of the project would require that McClusky Canal be enlarged without a corresponding increase in the size of Lonetree Reservoir. This seems to be in direct conflict with the statement in the critique that the size of Lonetree is dependent upon the size of the McClusky Canal.

Finally, the Bureau of Reclamation assumes that, regardless of the outcome of the International Joint Commission study, the project will still serve 250,000 acres of irrigation and that there are sufficient irrigable replacement acreage available: The staff does not agree with this assumption for two reasons: (1) No one can say at this time whether the IJC will find the project in violation of the Boundary Waters Treaty of 1909 and therefore require redesign of the project and (2) no one knows what alternative project plan will be proposed by the IJC, whether this plan will be acceptable to Canada, or whether it will require that the size of the project be reduced. In reviewing Garrison alternatives produced by the Bureau so far (one of which would eliminate 116,000 acres of irrigation in the Souris Loop), it seems logical to assume that a recommendation to reduce the size of the 250,000-acre irrigation is possible. If this were to occur, then Bureau officials have conceded that the capacity of Lonetree could be in excess of the maximum size necessary to serve the irrigation needs. This tends to refute the statement made in the critique that the size of Lonetree Reservoir is determined by topography, geology and size of the McClusky Canal. If it were, Lonetree Reservoir would have been enlarged to accommodate the enlargement of the McClusky Canal.

5. On page 18, paragraph 2, the report states that preconstruction planning and land acquisition are being conducted in the three major irrigation areas of the project.

Critique.—"Land acquisition has not begun on the service areas."

Response.—The critique is correct on this point. Preconstruction planning has begun in the areas, but land acquisition has not. The report has been changed accordingly.

6. On page 19, paragraph 2, the report mentions that rights-of-way sufficient to enlarge the McClusky Canal to accommodate up to 1,000,000 acres of irrigation are being acquired.

Critique.—"Right-of-way requirements along the McClusky Canal are determined by the needs for construction, operation and maintenance of the canal as currently sized and not for the ultimate stage development."

Response.—The critique is incorrect on this point for the same reason as explained earlier in item No. 3.

7. On page 20, paragraph 1, the report states that Lonetree Reservoir is designed to accommodate 1,000,000 acres of irrigation.

Critique.—"The Lonetree Reservoir is not sized to accommodate the ultimate stage. As stated earlier, it could handle the additional acreage if certain other changes were made such as a substantial increase in the size of the canal into the Reservoir. A fundamental understanding of hydraulics would indicate the topography, geology and the size of the McClusky Canal and the Snake Creek Pumping Plant."

Response.—The critique is in error. The Lonetree Reservoir is sized to accommodate the ultimate stage or 1,000,000 acres of irrigation as explained earlier in item No. 4. The size of the reservoir will remain the same regardless of whether the McClusky Canal and Snake Creek pumping plant are enlarged.

8. On page 20, paragraph 3, the report mentions that the Lonetree Reservoir will be completed in 1977 and will begin filling in autumn of 1978.

Critique.—"Construction of Lonetree is currently scheduled to begin late in fiscal year 1977 (November). This is after the International Joint Commission (IJC) will make its report to the two governments." (U.S. and Canada)

Response.—According to the budget justification documents submitted to the Congress for FY 1977 (See: Public Works Appropriations Committee hearings, Feb. 26, 1976, page 383) construction "will be continued on the Lonetree Dam and associated dams (Wintering Dam, James River Dike) throughout FY 1976, and the transition quarter." On June 15, 1976, $12,160,000 was requested and approved by the House to continue construction on these features for FY 1977. The dams are necessary to contain the water in the reservoir. According to the Garrison project manager, however, the construction contract for Lonetree dam will not be awarded until winter 1977 and construction, until then, will be limited to Wintering Dam. The project manager says the reservoir will be completed in early 1979.

9(a) On page 21, paragraph 2 of the report states that "the Bureau claims that the New Rockford canal and associated pumps will be necessary to erve the Lincoln Valley and Oakes-LaMoure irrigation areas regardless of the fate of the Warwick-McVille and New Rockford areas" as a result of IJC recommendations.

Critique.—"There are no pumps associated with the New Rockford canal. The New Rockford canal is unrelated to service in the Lincoln Valley area."

Response.—The critique is correct and the report is in error on this point. Appropriate changes will be made in the draft report.

9(b) On page 21, paragraph 2 mentions that certain reaches of the proposed New Rockford canal serving the Oakes-LaMoure and the Warwick-McVille areas of the project do potentially affect Canada since the return flows from these areas will drain into the Red River. The Bureau plans to begin construction on Reaches 1 and 2 of the New Rockford canal in the spring of 1978.

Critique.—"The question about whether or not construction and operation of features to serve West Oakes, LaMoure and Lincoln Valley areas would affect boundary waters was thoroughly discussed in

public meetings of the IJC. A change in the size of the main distribution system (New Rockford canal, Oakes Pumping Plant and Oakes canal) would be justified only if irrigation and service to the areas within the Red River Basin (East Oakes-New Rockford and 60 percent of the Warwick-McVille area) were eliminated or precluded. Such elimination seems highly unlikely."

Response.—Whether one believes irrigation and service areas in the Red River basin will be altered to mitigate Canadian concerns is not the point. The point is that these areas do potentially affect Canada and the State Department has assured the Canadian government that a moratorium exists on portions of the project potentially affecting Canada until the water quality dispute is resolved. Of course, we will not know just how the project features in the Red River basin will be affected until the International Joint Commission has competed its study and has made its recommendations.

10. On page 23, paragraph 2, the report states that the Bureau of Reclamation supports the Fish and Wildlife Service's revised wildlife mitigation plan.

Critique.—"The Bureau has supported the new plan in concept, but awaits more details and appropriate coordination with the state officials and interested parties."

Response.—The suggested qualifying language will be added to the report to clarify the Bureau's position.

11. Pages 22 and 23 are part of a section of the report that discusses status of construction and planning.

Critique.—"Somewhere in this part of the report it should be pointed out that Canadian objections to the Red River impacts have been without study and are expressed as concerns. Currently there are no conclusions of adverse effects or treaty violations from the project's effects on the Red River."

Response.—The diplomatic correspondence included in the subcommittee's hearing record does not show that Canada is any less concerned about the effects of Garrison on the Red River than the Souris. A position paper submitted to the subcommittee by the Canadian Embassy on November 3, 1975, states: "On the basis of studies conducted in the United States and Canada, the Government of Canada has concluded that this project as now envisaged would have adverse effects on the Canadian portions of the Souris, Assiniboine, and Red Rivers, and on Lake Winnipeg, which would cause injury to health and property in Canada in contravention of Article IV of the Boundary Waters Treaty of 1909."

Canada has relied on the 1974 Bureau of Reclamation Souris River return flow study, the Garrison Final Environmental Statement, and on a November 1974 study by the Manitoba Department of Mines Resources & Environmental Management (see November 19, 1975, hearing record, Appendix 5, p. 227).

12. On page 24, paragraph 1, the draft report states that 8,501 acres have been acquired so far along the rights-of-way of the principal supply works.

Critique.—"In addition to 8,000 acres which dedicated to wildlife, about 9,000 acres of right-of-way acquired along the McClusky Canal have been dedicated to management for wildlife. Native grasses and

shrubs have been or are being planted in this protected area. Wildlife are abundant in this area.

Funding for completion of the wildlife areas along the canal is contained in the fiscal year 77 request. The Fish and Wildlife Service will assume operations of these areas as soon as they are complete. Mitigation is occurring concurrently with construction of the Unit in accordance with the terms of the repayment contract . . ."

Response.—Again, this chapter is meant to serve as a status report on the project. In fact, most of the language provided in this section is word-for-word from a Bureau of Reclamation status report prepared three months ago at the request of the staff. That report states "Land acquisition to date for wildlife mitigation totals 8,501 acres along the principal supply works. . . ."

Subsequent discussions with Bureau of Reclamation officials have revealed that the additional 9,000 acres, mentioned in the critique, are additional right-of-way acres that serve as scenic easements but will probably eventually be used for enlarging the project at some point in the future. The staff agrees with Assistant Secretary Reed that these acreages are not part of the 146,000-acre wildlife mitigation plan and should not be considered so (see page 68 of the Nov. 19, 1975, hearing record). Mr. Reed told the subcommittee that he opposed efforts by the Garrison Diversion Conservancy District to claim right-of-way acres as credit toward the 146,000-acre wildlife plan: "We only kid ourselves if we believe right-of-way acres will adequately offset losses caused by project construction. I am delighted to report that Bureau of Reclamation concurs in this position and has given us complete support."

Furthermore, according to testimony from Mr. Reed, wildlife mitigation is not proceeding concurrently with project construction, as alleged in the critique, but is in fact lagging far behind. "I am concerned," Reed told the subcommittee, "over progress being made in the fish and wildlife aspects of the plan which have lagged behind overall project development . . ."

13. On page 25, finding E states that "In the absence of further environmental information either in the form of supplemental environmental statements or return flow studies, it is not possible to determine adequately the full scope of environmental impacts of the project."

Critique.—"The schedule for supplemental EIS is in accordance with federal regulations and provides for assessment of the environmental impacts in the service areas will precede construction in the service areas. The environmental impacts of the plan were reported in the January 1974 statement and details for the principal supply works currently under construction."

Response.—Federal regulations do not address the question of the scheduling of supplemental environmental statements. The Bureau's proposal to issue three supplemental environmental impact statements for the three major irrigation areas is, in itself, an indication that construction is proceeding on the project without knowledge of the detailed environmental impacts of the project. The timeliness of the supplemental statements is predicated not so much on whether they precede construction but rather on whether the information contained therein is integrated into the decisionmaking process. The present Bu-

reau schedule provides for issuance of impact statements in sequence over a 2½-year period, and, as each is finalized, construction will begin in that area. This procedure prevents detailed information from being available to decisionmakers so that the cumulative impacts of the project can be properly weighed and necessary adjustments made in the project plan.

The staff is aware, and so states in the draft report, that the 1974 Final Environmental Statement was meant to serve as a detailed statement for the principal supply works and an overall statement for the rest of the project. We have not questioned the environmental assessment for the principal supply works. It is clear, however, that sufficient knowledge of environmental impacts in the major irrigation areas is lacking. The new water quality data provided in the recent Harza water quality study is an example of the absence of water quality data in the irrigation areas. With more than 20 percent of the project completed, the Harza study has provided the public for the first time with specific data on the effect of return flows on four of the five affected rivers. This material has not been considered in the context of an environmental impact statement for public comment.

In should be remembered that the National Environmental Policy Act (NEPA) required environmental impact statements for major Federal actions so that decisionmakers and the public could be informed of environmental consequences prior to construction.

14. On page 25, finding G states that "The supplemental environmental impact statement for the Souris Loop irrigation area is not available to provide the International Joint Commission with information that would help determine the impact of Garrison on Canada."

Critique.—"The environmental impact statements are not necessary for the IJC to complete their study. The International Garrison Diversion Study Board has advised the International Joint Commission that the Bureau has been very cooperative in supplying information needed for their work. They have not requested environmental impact statements."

Response.—There is no question that specific water quality and other environmental impacts on Canada from Garrison, not previously discussed in detail in the 1974 Final Environmental Statement, require examination prior to a diplomatic settlement between the two countries. The subcommittee's draft report indicates, quite rightly, had the intent of NEPA been followed by the Bureau of Reclamation in the first place, an intensive examination of the environmental impacts on Canada would have been included in the 1974 statement and therefore would have been available to the Canadian and United States governments during negotiations and certainly to the International Joint Commission during its study.

However, the Bureau of Reclamation has scheduled issuance of the Souris supplemental impact statement in November 1978, almost two years after the IJC is to complete its study. In other words, the information contained in the supplemental statement will be produced by the Bureau many months after critical decisions will have already been made concerning the project. Under questioning from former subcommittee chairman Moorhead during the November 19 hearing, Mr. Busterud, a member of the President's Council on Environ-

mental Quality, indicated that the IJC reference might have been avoided had the Bureau properly addressed the environmental impacts of the project in a timely fashion (Hearings (Part 2), page 33).

15. On page 26, finding H states that "Supplemental environmental statements for the Central North Dakota and Oakes-LaMoure sections are needed to assess the environmental impacts of the project on South Dakota, Minnesota, and affected Federal wildlife refuges."

Critique.—"Information to assess the impacts on water quality in South Dakota and Minnesota is contained in a three-volume Bureau of Reclamation and Harza Engineering study dated May and June 1976. Detailed environmental impacts for the affected areas will be processed before plans are implemented. Major impacts have been known since 1974. South Dakota and Minnesota communities along the Red River have been and continue to be involved in the planning process.

The effects on national wildlife refuges were recognized during project development. Mitigation plans took these impacts into consideration. A full and defendable study of impacts need not await the environment impact statement."

Response.—The Bureau water quality study deals with only two aspects of the impact on the environment from Garrison: water quality and flooding. There are, of course, many other considerations, such as social and economic impacts and project alternatives, that await consideration in supplemental impact statements. The water quality studies were not intended to take the place of environmental impact statements. If indeed, as the critique contends, the major environmental impacts have been known since 1974, then the question should be asked as to why the 1974 Final Environmental Statement did not discuss these impacts and why hasn't this information been made available in supplemental statements for review by Congress and the public?

The point made in the critique about the effects of the project on the National Wildlife Refuge System is in direct conflict with the testimony in the hearing record and with the recent report (March 1976) done for the subcommittee on the impacts of Garrison on the National Wildlife Refuge System. Assistant Secretary of the Interior Nathaniel Reed indicated during his November 19, 1975, testimony before the subcommittee that:

"We are going to experience a quantity of water (flowing through the refuges) that was not anticipated in the EIS, vastly increased over that, a quantity of water that we've never seen for an extended period of time.

"We are going to completely change the whole basis for those refuges and I can't tell you, nor can my best biologists, whether we're going to have a serious loss, a moderate loss, or whether we're going to hold even. It would appear that we really don't know." (Hearings, part 2, page 70.)

Mr. Reed subsequently agreed to prepare a report for the subcommittee which would address in some detail the effects of Garrison on the refuge system. The results of this report are included in chapter VII of the draft report.

The 146,000-acre Garrison wildlife mitigation plan does not offset wildlife and wetland losses to the national wildlife refuge system.

Wildlife refuge losses are in addition to losses originally expected to result from Garrison. (See hearings, part 2, page 71.)

16. On page 27, paragraph 2, the report states that the 1974 Garris-

16. On page 27, paragraph 2, the report states that the 1974 Garri-

son environmental impact statement has not been tested in the courts for its sufficiency.

Critique.—"The Bureau has acknowledged on several occasions that the adequacy on the merits was not determined by the Courts. What was determined by the courts was procedural compliance with NEPA. This included a recognition of the detailed (supplemental) statements to follow."

Response.—The statement in the report is a factual one. No attempt is made to characterize whether the Bureau has or has not acknowledged that the adequacy of the Final Environmental Statement has not been determined by the courts. The report does, however, state that "Proponents of Garrison have argued on numerous occasions in the past that the adequacy of the Garrison environmental impact statement has been upheld in the courts." This statement was included in the report in an effort to clear up some confusion that apparently exists on the extent of the court review of the EIS. For example, during the hearings, several witnesses, including Congressman Andrews, indicated that the court had ruled on the adequacy of the statement. Congressman Andrews told the subcommittee on September 15 that "Garrison has already withstood charges that it violated NEPA, as witnessed by a favorable U.S. District Court and Eighth Circuit Court of Appeals decision when attacked as being in violation of NEPA." (Hearings, part 1, page 4) As a matter of fact, the question before the courts was whether an EIS was required for Garrison under NEPA.

17–22. On pages 29 and 30, the draft report quotes Mr. Busterud, a member of the President's Council on Environmental Quality (CEQ), who outlined to the subcommittee the six major reasons why the CEQ had determined that the Garrison Final Environmental Impact Statement was inadequate.

Critique.—The critique takes issue with all of the points made in Mr. Busterud's testimony before the subcommittee.

Response.—The adequacy of an environmental impact statement is a matter of judgment. The President's Council on Environmental Quality is the agency of the Federal Government charged with reviewing environmental impact statements and making judgments as to their adequacy. In the case of the Garrison Project, the CEQ judged the statement to be inadequate for a variety of reasons, which are summarized in Mr. Busterud's quotation in question here. Mr. Busterud's summary of CEQ's objections to the statement appears to be an accurate reflection of points made by the CEQ at the time of its review in 1974. We see no reason to question its accuracy, and, of course, we cannot revise the quotation.

23. On page 30, paragraph 1, Mr. Busterud is paraphrased as saying that information on Garrison environmental problems and possible alternatives to mitigate them should be made available to Federal decisionmakers in advance of construction to prevent irreversible commitments of time and money to an undesirable alternative.

Critique.—"Possible alternatives are speculative only. If alternatives are found necessary, they will receive due process of consideration by the Congress and the environmental review process."

Response.—We agree that alternatives are speculative and that alterations will receive due consideration by the Congress. This does not diminish the fact that alternatives have been proposed by the Bureau of Reclamation and have been discussed in the Garrison EIS, the 1974 Souris River return flow study and the Bureau of Reclamation testimony before this subcommittee and the International Joint Commission. What is not available at this time are some details as to the pros and cons of costs in terms of dollars and environmental tradeoffs that would result from each of the alternatives under active consideration by the Bureau. This is what Mr. Busterud was referring to in his testimony.

24. On page 32, the report discusses the general inadequacies of the Garrison Final Environmental Impact Statement.

Critique.—"A full study of the return (flow) effects has been completed on the rivers and streams of North Dakota and is available. The work of the IJC is related to the 1909 treaty and will be completed before initial construction of the Lonetree Dam and the Lonetree Reservoir although unrelated.

The effects on the national wildlife refuge system have been known and the adequacy of the mitigation plan is considered to be excellent within the authorized 146,500-acre limitation.

The recommendation that all the supplemental statements be in before beginning construction in any service area is unnecessary and not supported in regulation or logic. It would create tremendously costly delays in design and construction, thus depriving the people of efficiency in management of the tax dollar and deferring benefits for several years."

Response.—The recently completed Bureau of Reclamation water quality studies have been taken into consideration and the draft report has been revised accordingly.

The question of Lonetree Reservoir has been adequately discussed under item No. 4.

With regard to National Wildlife Refugees, the critique again implies that the wildlife mitigation plan will offset wildlife and wetland losses on national wildlife refuges. As mentioned earlier in item No. 18, this is not the case.

The wildlife mitigation plan, even as revised and improved by the U.S. Fish and Wildlife Service, is still regarded by the Fish and Wildlife Service as a "net loser" from a wildlife standpoint.

We cannot agree that the report's recommendation that all supplemental environmental statement be filed prior to commencing construction in the three major irrigation areas is "unnecessary and unsupported by logic or regulation. It is in fact the only way to assure that the information contained in the supplemental impact statements will be available to decisionmakers in a timely fashion as provided in the National Environmental Policy Act.

It is doubtful that any serious delays in design or construction would result from Bureau compliance with the recommendation. If it did, the delay would not be because the Committee recommended the en-

vironmental impacts be assessed prior to construction but rather because the Bureau of Reclamation's environmental assessment effort has been so slip-shod in the past.

On the point that the recommendation would cause management inefficiency and deferral of project benefits, it should be remembered that NEPA was passed so that the environmental consequences of major Federal actions could be properly identified early and factored into decisionmaking. Environmental assessment conducted properly, timely, and accurately will often prevent inefficiency and deferral of benefits that could come as a result of legal challenges after construction is well underway. It also helps identify potential problems in advance to allow time for proper planning and design to mitigate them. Finally, it helps identify the environmental tradeoffs that are required in order for project benefits to be realized as well as an opportunity for the public to make comments as to whether the tradeoffs are acceptable. Efficiency and benefits are important, but so is the environmental assessment process.

25(a). On page 34, Mr. Busterud of the CEQ is quoted saying that the need for an IJC reference might have been reduced if the Final Environmental Impact Statement had been prepared properly.

Critique.—"The agreement that the Final environmental statement (FES) would have precluded the international consideration of the 1909 treaty is not valid. A careful reading of the testimony cited for Mr. Busterud supports this conclusion."

Response.—We disagree. A careful reading indicates that CEQ believes that an adequate environmental impact statement would have reduced the need for an IJC reference.

25(b). On pages 34 and 35, there is a discussion of the alternatives to the Garrison Diversion Unit as proposed by the Bureau of Reclamation and the impact of these alternatives on the Souris Loop section of the project, which affects Canada most directly.

Critique.—"The speculation on alternatives makes false assumptions on the procedure that would follow if an alteration were not warranted. The listing of alterations were not proposed to solve the issue—they were for study at a subfeasibility level. A study of economic and environmental feasibility could be designed for the best plans if certain things happened: (1) the IJC determined it was necessary and their recommendations to the two governments were agreeable and (2) the level of acceptance under the 1909 treaty was known. Until an acceptable quality and quantity are known, it is impossible to give more complete consideration of the feasibility of alterations under study.

"In any event, if alterations were determined to be necessary by the two governments and those alternatives were substantial, a due process of consideration under NEPA and by the Congress would be required."

Response.—Since the critique does not elaborate as to which assumptions concerning alternatives are considered to be false, it is difficult to respond.

The discussion does not indicate that the nine alternatives proposed by the Bureau are meant to solve the issue, as the critique contends, but indicates instead that the IJC could very well adopt its own alternative.

Whether the alternatives were meant for discussion at the "sub-feasibility level" is irrelevant to the discussion in these pages. It is the opinion of the report that feasibility studies on the best possible alternatives should be in order to provide the IJC and the State Department with some guidance as to which alternatives might be more acceptable to the United States from an economic standpoint.

26. On page 35, the last paragraph states that "As of March 1, 1976, only $172,732 of this amount has been allocated for such studies. In the Committee's view, the remainder of this appropriation could be combined with normal environmental assessment funds to complete supplemental impact statements."

Critique.—"The $1 million was not provided for EIS or alternation studies, but for water quality studies. The assertion that only $172,000 has been spent is incorrect. The estimated cost is over $1,000,000 on the water quality study that was to expedite ongoing work."

Response.—The Bureau contract with the Harza Engineering Company was for $172,732. If the Bureau spent additional funds on these studies, the fact was not made known to the subcommittee prior to the completion of the draft report. The subcommittee has asked for a breakdown of the amount spent for the water quality studies. If, indeed, $1,000,000 was spent, the draft report will be revised accordingly.

27. On pages 37 and 38, the report discusses the Final Environmental Impact Statement's inadequacies with regard to wetland impact data.

Critique.—The critique alleges that the report fails to recognize two important facts: (1) that the number of acres of wetlands affected by the original wildlife mitigation plan is lower than that mentioned in the Final Environmental Statement and (2) that the proposed alteration of the original mitigation plan will greatly increase its effectiveness and benefit to wildlife. The critique also says that the conclusion that the plan will need to be modified to protect the refuges is unwarranted.

Response.—The information in the Final Environmental Statement (FES) regarding wetland losses is certainly more up to date than that on which the original wildlife mitigation plan was based back in 1965. We see no reason why the report should rely on out-of-date wetland loss estimates when more current figures are available.

We do not take issue with the statement that proposed alteration of the wildlife mitigation plan will "greatly increase *its* effectiveness and benefit to wildlife." The original plan was rejected by the Fish and Wildlife Service as inadequate. We must assume that the revised plan will be improved. We must note, however, that the Fish and Wildlife Service contends that even with the revisions in the plan, it will still result in a net loss to wetlands and wildlife.

(The staff will revise this section of the report to reflect more recent water quality figures provided in the Harza and Bureau of Reclamation water quality studies.)

28. On pages 38 to 40, the report discusses the possiblity of increased coal production in North Dakota during the next few years.

Critique.—"The whole argument is based on possible improvements in coal gasification technology and speculation that even that will create an interface with Garrison. The argument further ignores the chronology of authorized development. Garrison was reauthorized

in 1965 and the coal development is still tentative pending permits and environmental assessments."

Response.—The discussion on the acceleration of coal development in North Dakota is based on the facts. They are: (1) North Dakota has large reserves of mineable coal; (2) by the Interior Department's own estimates, coal development will dramatically increase in North Dakota btween now and the end of the century; (3) North Dakota lignite coal requires gasification to be economically mass-produced (although several million tons are presently being mined each year); (4) large acreages of lignite coal in North Dakota are presently held under lease by major gas companies in anticipation of building coal gasification plants; (5) the Department of the Interior is presently pursuing a policy of rapid acceleration of coal development in the western states, including North Dakota; and (6) rapid expansion of coal development is expected in western North Dakota (around Garrison Reservoir) concurrently with the development of the Garrison Diversion unit.

This section does not ignore the chronology of authorized development, as the critique alleges. The report recognizes that the Garrison Project was authorized in 1965 and accelerated coal development is more recent. This does not mean that the possible problems that could result from the interface of these two major developments in North Dakota should be ignored.

29. On page 46, finding A, the report finds that "the Canadian Government objects to the continued construction of the Garrison Diversion Unit as presently planned on grounds that return flows from the project will be injurious to health and property in Canada in violation of the Boundary Waters Treaty of 1909."

Critique.—"It is true that Canada objected to construction of the plan as authorized; however, the current position in the negotiation is one of acceptance of the reference of the IJC and the U.S. commitment to not construct facilities potentially affecting the Boundary waters."

Response.—The finding should read "The Canadian Government has objected etc.", and will be so changed. The staff also agrees that this finding should be clarified to state that Canada has agreed to the IJC reference and the U.S. commitment not to construct portions of the project potentially affecting Canada.

30. On page 46, finding E, the report finds "The Minnesota Pollution Control Agency (MPCA) objects to the Garrison Project on grounds that it will cause further pollution of the Red River of the north, which serves as Minnesota's western boundary."

Critique.—"Minnesota's objection is based on concerns. It should not be implied that it will cause further pollution on the Red River."

Response.—The finding will be changed to indicate that MPCA is concerned that Garrison will cause further pollution of the Red River. It should be noted that the MPCA's analysis of the recent Harza and Bureau of Reclamation water quality studies did not alleviate MPCA's concerns. In a letter to the members of the Minnesota delegation dated June 8, 1976, the MPCA reported that the Harza study shows at least 12 of its water quality standards for the Red River will be violated as a result of the Garrison Project's construction and operation.

31. On page 46, finding F States that "The South Dakota legislature is concerned that alternatives being considered by the International Joint Commission and the Bureau of Reclamation to reroute Garrison return flows into the Missouri and James rivers will increase pollution and flooding in South Dakota."

Critique.—"It should also be stated that South Dakota officials, including the Governor, are not concerned about the impacts from the authorized plan. If alterations affecting South Dakota are pursued, their concerns will be given full consideration in due process. South Dakota understands and accepts this commitment."

Response.—The finding in the draft report is a statement of fact. As for the views of the Governor of South Dakota, the text of the report states his position as presented by his personal representative to the subcommittee's hearings in Bismarck. However, a statement to the effect that the Governor of South Dakota disagrees with the resolution of the State legislature can be added to this finding.

32. On page 59, the report recommends that dilution of water in rivers not be used to achieve compliance with applicable Federal and State water quality standards.

Critique.—"This recommendation that dilution not be used to achieve compliance is in direct conflict with the recommendations of the EPA in their October 1975 report which states for the Red River and others (including the Souris and James) that 'Some form of flow augmentation would be needed to supplement low flow periods.' "

Response.—The recommendation is based on section 102(b) of the Water Pollution Control Act Amendments of 1972, which specifically provides that "storage and water releases shall not be provided as a substitute for adequate treatment or other methods of controlling waste at the source." We are not familiar with the October 1975 report cited by the critique.

33. On page 60, the report states that the Final Environmental Statement shows that the quantity of additional return flow water expected to cross the South Dakota boundary (James River) as a result of Garrison will amount to 3,600 acre-feet, 1,000 of which will flow directly into the James River.

Critique.—"The June 1976 report in fact demonstrates that flooding effects can be reduced from those experienced historically."

Response.—This section of the report has been rewritten at the direction of the subcommittee to take into consideration the recent Bureau of Reclamation water quality studies. Nevertheless, the critique's interpretation of these studies as indicating that flooding can be reduced from those experienced historically is inaccurate. The Bureau's Summary report, page IV–1, concludes that "The presence of the additional water in the stream channels will cause a slight increase in flood potentials for the Souris, James, Wild Rice, Sheyenne, and Red Rivers."

It should be remembered that these are mean (average) figures computed over a 63-year period. At certain periods in the year, flood potential will be increased more dramatically.

34. On page 61, last paragraph, the draft report erroneously mentions the Souris River in discussion of impacts on South Dakota.

Critique.—Change the river from "Souris" to "James".

Response.—This is a necessary editorial change.

35. On page 62, paragraph 1, the report states the Final Environmental Impact Statement shows that 3,600 acre-feet of return flows will enter the James River annually.

Critique.—"The June 1976 study confirms the 3600 acre feet will flow to South Dakota and that the effects are minor. The EIS is not required to accurately determine water quality effects in South Dakota. Nonetheless, the draft EIS is to be filed shortly."

Response.—The critique is correct. The Bureau's Summary Report of its water quality studies shows that "return flows to the James River will cause an average annual increase of about 3,600 acre-feet from its mean historical flow of 55,929 acre-feet per year." However, the companion Harza Engineering Study, done under Bureau contract, shows a more dramatic increase in return flows entering the River. This report shows that "return flows will increase annual runoff near the South Dakota border by about 13,300 acre-feet." Apparently, the Bureau has chosen the lowest estimate out of several presentations of data to include in their Summary Report.

36. On page 66, the report discusses a 6,000-acre wildlife mitigation area that is objectionable to many citizens of Brown County, South Dakota.

Critique.—"A study of alternatives to the Hecla Slough has been initiated through discussion with South Dakota officials. The draft of that study is scheduled for completion in July 1976."

Response.—The subcommittee has received no communication from the Bureau of Reclamation or the U.S. Fish and Wildlife Service which indicates alternatives to the Hecla Slough are being considered. The staff would recommend that the discussion and recommendations with respect to the Hecla Slough remain unchanged.

37. On page 67, finding B of the original draft water quality chapter (now revised at the subcommittee's direction to include new water quality studies) stated that "While the water quality simulation model used by the Bureau of Reclamation to predict pollution impacts in rivers affected by the Garrison Diversion Unit has been found to be generally satisfactory from a technical standpoint, the model has major limitations which the Bureau failed to take into account in conducting its return flow studies." This finding was incorporated unchanged into the revised water quality chapter.

Critique.—"To the contrary, the assumptions reviewed and incorporated in the June 1976 report indicated that the estimates were based on conservative assumptions and the impacts projected earlier were higher than justified. EPA testimony before the Committee (November 1975) states that the Bureau is 'right on target' in overcoming EPA concerns."

Response.—The staff disagrees with the critique that the assumptions in the model are conservative, as stated in the revised water quality chapter. One example of a modeling limitation which led to lower water quality estimates than will actually exist in the project area concerns the application of fertilizers, a major source of nitrates and phosphates. The Bureau assumed in the 1976 water quality studies that fertilizer would have no effect on water quality. The Harza Study, on the other hand, indicates that if fertilizer had been taken into consideration, the already high nitrate and phosphate levels would have been much higher.

As to the EPA's comments on the water quality model, the Assistant Administrator of the EPA, Mr. John Quarles, told the subcommittee over and over again during the November 19, 1975, hearing that the EPA's concerns about the model had not been met and that the EPA continued to believe that the modeling had been predicated on ideal rather than realistic conditions. (See hearings, part 2, pages 73 to 91.)

38. Page 67, finding D. This finding in the original draft water quality chapter stated some salinity level estimates from the Bureau of Reclamation's 1974 Souris River Return flow study. This finding was dropped and replaced during the rewrite of the water quality chapter to reflect new water quality information.

Critique.—"Nothing shown in testimony or data analysis justifies the suggestion that salinity increases will be as high as 973.5 mg/l. The June study indicates that the average increase will be 138 mg/l and that maximum historic levels will be reduced by 1453 mg/l."

Response.—The water quality chapter has been rewritten at the request of Congressmen Andrews and Bergland and at the direction of the subcommittee. The chapter now reflects water quality estimates contained in the Bureau of Reclamation and Harza Engineering Company return flow studies received by the subcommittee on June 1, 1976.

39. On page 68, finding I of the original draft water quality chapter, stated in part, that "The cumulative effects of increased salt and nutrient loading in the Souris and Red Rivers could increase pollution problems in Lake Winnipeg, into which both streams eventually flow." This finding is also contained in the revised water quality chapter.

Critique.—"It is true that cumulative effects on Lake Wnnnipeg have not been studied by the Bureau. The Manitoba Environmental Council published a report in January 1975 which concluded that the cumulative effects of nitrogen on Lake Winnipeg would be undetectable. Canadian participants in the IJC will address this point."

Response.—We have not relied heavily on the Manitoba Environmental Council's report but rather have used Bureau of Reclamation and Environmental Protection Agency documents as primary sources. These documents indicate that cumulative effects of nutrients entering the Red and Souris rivers could have adverse effects on Lake Winnipeg, which already suffers from eutrification. The Canadian concerns over Lake Winnipeg are genuine and have been expressed in diplomatic communications to the State Department.

40. On page 68, finding J of the original draft water quality chapter states that "The Bureau's planned use of sprinkler irrigation methods should improve water quality; however, use of sprinkler systems is voluntary on the part of participating farmers."

Critique.—"The design of the distribution system is for sprinkler. Farmers attempting to use gravity irrigation would face considerable additional expense and the high risk of water shortage during critical periods. Virtually all the private irrigation, about 90,000 acres in North Dakota during the last five years has been sprinkler type."

Response.—We do not question the points made in the critique concerning sprinkler irrigation costs. This, however, is not the point. If the Bureau of Reclamation is going to point to universal use of

sprinkler systems by farmers as a means of reducing adverse water quality impacts, then the use of sprinklers should be mandatory rather than voluntary.

41. Page 72 of the original draft water quality chapter discussed the need for development of an effective irrigation management plan to help reduce fertilizer and pesticide runoff into streams as a result of Garrison-related irrigation. This discussion was retained in the rewrite of the water quality chapter.

Critique.—"The discussion of concern for increased quantities of fertilizer and pesticides from the irrigation operation through erosion and runoff ignores the efficiency that is achieved under irrigation. The management of fertilizers and pesticides under the Conservancy District's control will be better than normally found under dryland conditions. Under normal dryland operations the fertilizers are applied once in the spring of the year. A spring rain storm can and often does flush substantial amounts of nitrogen sediments and pesticides to the river. Under the irrigation management plan scheduled for the Garrison Diversion Unit, fertilizer applications would be spread out to meet the demand schedule of the plants, thus resulting in better efficiency of use.

Additionally, under irrigation the practice of summerfallowing as much as 50 percent of the acreage would be discontinued thus reducing runoff and erosion of sediments, fertilizers and pesticides.

The analysis of nitrates and pesticides was performed by Harza Engineering. The assumptions used in the study recognized the management potential, but also displayed values for no management. The latter assumption is unrealistic and in all cases the improvement from elimination of summerfallow was not recognized.

Response.—There are differences of opinion as to the efficiency that can be achieved under irrigation. EPA and CEQ are skeptical of this "built-in" efficiency, especially when it is held up as a water quality control tool. The point made in the draft report, which the staff continues to believe is a valid one, is that the Bureau of Reclamation should assure that any irrigation management scheme employed by the Garrison Diversion Conservancy District is enforceable and effective. The Committee's investigation has confirmed that the Bureau has not developed an irrigation management plan (although they say they intend to) nor has it identified how water, fertilizer and pesticide applications will be controlled to reduce pollution. We think this should be done.

42. On page 73, the original draft recommended that the Bureau of Reclamation revise certain assumptions employed in its water quality model in order to reflect realistic, rather than ideal, conditions in the project area.

Critique.—"The Bureau analysis reported in June 1976 includes the recommendation of the Committee on the assumptions used in the return flow model study."

Response.—This recommendation was eliminated when the water quality chapter was rewritten to include information in the Bureau's new water quality studies. Nevertheless, it should be pointed out

that the critique is not correct in its statement that the "June 1976 (report) includes the recommendation of the Committee on the assumptions used in the return flow model study." Considerable discussion in the revised water quality chapter is devoted to criticism of the assumptions employed in the modeling of both the 1974 Souris River Return Flow study and the June 1976 study. The assumptions used continue to reflect ideal, rather than realistic, conditions, as we so state.

43. On page 74, paragraph 2 of the original draft water quality chapter noted that return flows would increase by 107,000 acre-feet the quantity of additional water entering the Souris River annually as a result of Garrison return flows (1974 Bureau of Reclamation Souris River Return Flow study).

Critique.—"The June 1976 analysis indicates that the quantity of return flows added to the Souris River will actually be about 82,000 acre feet annually rather than 107,000 acre feet as projected in the draft report of 1974."

Response.—When the water quality chapter was revised at the direction of the subcommittee, the 82,000 acre-feet figure was substituted for the 107,000 acre-feet figure. It should be remembered, however, that this is a mean (average) annual increase over a 63-year period and does not reflect years when return flows will be much greater than 82,000 acre-feet.

44. Page 78 of the original draft quality chapter included a recommendation that "The Bureau of Reclamation determine the cumulative effect of salt loading in the Souris and Red rivers on Lake Winnipeg and inform the International Joint Commission and the State Department of the results and that the Bureau of Reclamation include a discussion of the cumulative impacts in either the Souris or Central North Dakota sections supplemental environmental impact statements." This recommendation was retained in the revised water quality chapter.

Critique.—"The IJC is charged with the responsibility of determining their effects in Canada and the Bureau is cooperating with that study."

Response.—We do not question the fact that the IJC is charged with determining the effects of salt and nutrient loadings in the Souris River nor do we indicate that the Bureau of Reclamation is not cooperating with that study. The IJC study, however, does not relieve the Bureau of Reclamation of its responsibilities under NEPA to adequately assess the environmental impacts of the Garrison Project, including its international environmental implications. We believe the recommendation is important and should be addressed by the Bureau of Reclamation.

45. Pages 80 and 81 of the original draft of the water quality chapter mentioned Garrison Diversion Conservancy District plans to hire an irrigation consultant to educate farmers on proper irrigation procedures. It also discussed the possibility of increased pollution from pesticides and herbicides applied to irrigated crops.

Critique.—"The irrigation specialist is the central coordinator. Other specialists will be employed (one is already on board in the

Oakes area) to carry on the field work. EPA itself, through administration of federal law, is charged with control of pesticides. Studies of irrigation return flows have indicated no significant contributions can be expected. A NDSU study further confirms this conclusion."

Response.—The information concerning the irrigation specialist to be hired came from the 1974 Souris River return flow study, pages 39–40, and Bureau of Reclamation testimony before the subcommittee (hearings, part 1, page 60).

The discussion and recommendation related to pollution problems from pesticides and herbicides was omitted from the revised water quality chapter. The staff would agree, assuming diligent enforcement of the Pesticide Control Act by the EPA (as the Bureau has assumed in its recent water quality studies), that pesticides and herbicides do not appear to be a problem except in possible impacts on national wildlife refuges. The Bureau's Summary Report accompanying the water quality studies is quoted to this effect in the revised chapter.

46–47. Pages 82 and 83 of the original draft water quality chapter stated that "Much less is known about the water quality impacts in the Red and James rivers since return flow studies have not been completed on those two rivers as yet." Available Bureau estimates for these rivers were then summarized. This discussion has been omitted from the revised draft chapter.

Critique.—"The studies are complete and indicate that the volume of return flow into the Red River projected earlier was high by a small amount. The average annual return flow to the Red River will be about 46,000 acre feet.

"The June 1976 study indicates that the increase in salinity in the it will be 9 mg/1. These are not significant differences from the historical levels."

Response.—As noted above, this section has been revised to reflect information in recent water quality studies.

48. On page 89, finding A states that "The original Garrison Diversion Unit wildlife mitigation plan is being revised by the U.S. Fish and Wildlife Service because the original plan proved to be inadequate to protect wetlands and waterfowl."

Critique.—"No proof of inadequacy of the original plan has been provided."

Response.—The report, like many congressional reports, is based on hearing records (testimony) and available agency reports and documents. The Assistant Secretary of the Interior for Fish and Wildlife and Parks, Nathaniel Reed, testified unequivocally that the old mitigation plan was inadequate to protect wildlife. The draft report discusses his testimony as follows: "Mr. Reed said the old mitigation plan—which relied on an assured water supply provided by artificial structures which would deepen and stabilize water levels in existing wetland basins—would have resulted in a 'net loss of wetlands.' "

The Bureau of Reclamation has agreed that the mitigation plan should be revised. This seems proof enough that the previous mitigation plan was inadequate.

49. On page 89, finding B states that "Even with the 146,000-acre revised wildlife mitigation plan . . . the project will result in a net loss for wildlife and wetlands."

Critique.—"The details of the new plan on the reanalysis of wetland losses are not complete. It is therefore impossible to conclude that the project was a net loser to wildlife. There is serious disagreement with this statement. All that is known is that the point is not yet resolved."

Response.—This finding is based on testimony provided by Assistant Secretary Reed in the November 19, 1975, hearing before the subcommittee. His conclusion that the project would be a "net loser" for wildlife stems from recent Fish and Wildlife Service inventories of wetlands which indicate that wetland losses resulting from construction of the Garrison Project will be 2½ times greater than originally anticipated. Hence, the 146,000-acre mitigation plan, aimed at mitigating smaller losses than now appear to be the case, will not be able to offset all losses from construction of the Garrison Project. We believe the Fish and Wildlife Service's analysis is sound.

50. On page 89, finding C states that "A recent Fish and Wildlife Service wetland inventory in the Oakes-LaMoure section of the project indicates that wetlands losses will be 2½ times greater than estimated in the Final Garrison Environmental Statement. Total wetland losses are expected to be as high as 50,000 acres."

Critique.—"This fails to recognize that the original plan was based on an estimated wetland loss of nearly 40,000 acres. The estimate of 50,000 acres is unsupported but certainly is not 2½ times in error from the original."

Response.—As indicated in the finding quoted above, the 50,000-acre wetland figure is compared with the more recent data in the Garrison Final Environmental Statement, not the original 1965 project plan. We must assume that the Final Environmental Statement, although admittedly inadequate in its discussion of some environmental impacts, is at least accurate. Furthermore, the Fish and Wildlife Service's 50,000-acre estimate is supported by recent wetland inventories which reflect that project construction will destroy 2½ times the acreage of wetlands estimated in the FES.

51. On page 89, finding D states that "The 8,500 acres of mitigation areas already acquired by the Bureau are not being managed for wildlife purposes."

Critique.—"The right-of-way for the McClusky canal and the acres acquired for wildlife are not in use for purposes other than wildlife. They are protected. The right-of-way has been seeded to native grasses and shrubs have been planted for wildlife. Numerous sightings of abundant wildlife can be made along the canal right-of-way."

Response.—The critique misses the point. The point is that areas being acquired by the Federal Government for the specific purpose of mitigating wetland losses as a result of construction of the Garrison Project should be brought under an effective wildlife management system that utilizes the acreages to their maximum benefit. This is not being done.

Furthermore, as mentioned earlier in item No. 12, the canal right-of-way acreages cannot and should not be counted as wildlife mitigation lands. Assistant Secretary Reed was emphatic on this point during testimony before the subcommittee.

52. On page 94, paragraph 1 states that "At the present time, 48,000 acres of previously drained wetlands are available for restoration to mitigate losses, assuming they can be placed under management. This would not meet the requirement of full mitigation."

Critique.—"The Committee's judgment and that of Secretary Reed that 48,000 acres of restorable wetland is not adequate for full mitigation fails to recognize the upland habitat and additional water supply available. With management of these areas compared to the affected wetlands currently in farmed areas, the productivity could be enhanced according to research studies conducted by the Fish and Wildlife Service."

Response.—We are unable to comment on this point since we do not know which research studies the critique is referring to. The 48,000-acre figure was taken from Assistant Secretary Reed's testimony before the subcommittee.

53. On page 95, paragraph 1, the report says "The Bureau is apparently proceeding with blinders on in planning the wildlife mitigation portion of the Garrison Project. While this 'head-in-the-sand' approach may make life much simpler for Bureau planners, it certainly does not provide the public or the Congress with accurate information about Garrison."

Critique.—"The responsibility for a management system for fish and wildlife land rests with the Fish and Wildlife Service. The author appears to take without question the judgments of the Fish and Wildlife Service and disregard the argument of the Bureau and independent consultant. In other areas, the author readily accepts judgments from outside the agency with responsibility.

"One example of the errors recognized in the report is the conclusion that the temperature of the return flows at 44–49° F will adversely affect the refuges and cause diseases. The response indicates that actual temperature change in the refuge will be 1° F.

"Another example has to do with the fish screen not being 100 percent effective. Nature itself is not 100 percent effective. Flora and fauna have transferred from one basin to another during periods of high flow.

"The number of unanswered differences among the professionals are too numerous to mention, but certainly serve to point out the need for completion of fully coordinated studies on all aspects of the plan including the benefits of the massive mitigation and enhancement plans."

Response.—It is true that the ultimate responsibility for a management system for fish and wildlife lands rests with the Fish and Wildlife Service. However, the Bureau of Reclamation is responsible for acquiring the mitigation lands. So far, acquisition of mitigation lands has lagged behind project construction and many of the mitigation acreages cannot be combined into management units. Rather than acquiring land that will allow the various parcels to be brought together

into a unified management area, the Bureau of Reclamation has developed a procedure which allows mitigation lands to be leased back to the previous landowner for up to five years. This buys time for the Bureau but does not allow the acreages to be turned over to the Fish and Wildlife Service for management.

The U.S. Fish and Wildlife Service has on wildlife matters a great deal of expertise and is capable of ascertaining whether the wildlife mitigation plan will be adequate or not to offset construction losses. The Bureau of Reclamation is not doing the reinventorying of wetlands, it is not revising the wildlife mitigation plan, and it is not charged with the protection and management of the National Wildlife Refuge System. The Fish and Wildlife Service is. For these reasons, we would logically give more weight to the Fish and Wildlife Service testimony on these matters.

54. On page 97, finding D states that "The Bureau of Reclamation is relying heavily on desalinization plants as a possible means to ameliorate Canadian objections."

Critique.—"Desalinization plants are not being relied upon 'heavily' by the Bureau of Reclamation. The testimony given to the Committee by Commissioner Stamm merely included desalinization along with other alternatives under study. During testimony, the Commissioner emphasized management of the construction and operation as the prime alternative."

Response.—Bureau of Reclamation testimony before the International Joint Commission on January 12, 1976, did give greater emphasis to the use of desalinization plants than did Commissioner Stamm in his November 19, 1975, testimony before the subcommittee. The January statement provided three alternatives for use of desalinization plants as quoted below: "The first alternative is the construction of a small diversion dam and desalting plant near the mouth of the Deep River. A portion of the river flows would be treated and released back into the river to provide a blended mixture of an acceptable total dissolved solids level. The other two alternatives under this category would be to install either desalting or softening plants at the communities of Sours, Wawanesa and Portage La Prairie in Canada."

This testimony was the basis for the finding and recommendation in the report concerning desalinization plants as footnotes in the report indicate.

55. On page 99, last paragraph, the report states that "It must be remembered that the Lonetree Reservoir is being constructed to accommodate the initial and subsequent stages of the project, even though the congressional authority has been given to construct only the initial stage (250,000 acres)."

Critique.—"Again the author concludes that the ultimate stage is under construction. This is incorrect. Lonetree Reservoir is needed in the current configuration for a 250,000 acre irrigation plan."

Response.—The response to this point is the same as the response to item No. 4.

56. On page 101, the report discusses why construction should be deferred on certain features of the project until the IJC has completed its study and recommendations.

Critique.—"Again the author presumes that the alterations, if any, will preclude irrigation of 250,000 acres. This is unrealistic. It further fails to recognize the schedule for construction of Lonetree Dam will not be initiated until after the IJC work is completed."

Response.—The response to this point is the same as the response to item No. 4. We disagree that it is unrealistic to recognize the probability that the IJC study could result in the 250,000-acre project being substantially reduced in size. After all, this is one of the Bureau of Reclamation's proposed alternatives (elimination of the Souris Loop). It seems unrealistic to continue to spend money on construction on portions of a project that could be substantially altered as a result of Canadian-U.S. acceptance of the IJC recommendation.

56(b). On page 101, the report indicates that return flows from the Oakes-LaMoure and Warwick-McVille areas will drain into the Red River.

Critique.—"It is not true that most of the return flow from 'Oakes-LaMoure and Warwick-McVille areas' will drain into the Red River. Over half of the acres referenced do not drain into the Red River."

Response.—The report is in error on this point. The report should be clarified to read that return flows from the East Oakes area and a portion of the flows from the Warwick-McVille areas will drain into the Red River via the Sheyenne and Wild Rice rivers.

57. On page 103, finding C states "The Bureau of Reclamation has not informed the committees of Congress having authorizing and appropriations jurisdiction over Reclamation that the estimated cost of the Garrison Diversion Unit is approximately $40 million over its authorized cost ceiling as indexed for inflation."

Critique.—"There is disagreement on a national level on methods for computing cost overruns. This analysis should be addressed in a separate paper."

Response.—This matter has been addressed in separate reports by the Government Operations Committee (House Report 94–852, Feb. 26, 1976) and the General Accounting Office (Report No. RED–76–49, Nov. 17, 1975), both of which contained similar conclusions and recommendations. Both of these documents discuss the inadequacies of the Bureau of Reclamation's cost ceiling inflation indexing procedures in great detail using the Garrison Diversion Unit as an example. Both reports conclude that the estimated cost of the Garrison Project is approximately $40 million over its authorized cost ceiling as indexed for inflation.

There seems to be very little disagreement over GAO's and the House Government Operations Committee's recommended cost indexing procedures contained in the two reports. In a letter to former subcommittee chairman Moorhead, dated March 31, the Bureau of Reclamation agreed to revise its costs indexing procedures in accordance with the recommendations contained in the report.

58. On page 103, finding D states that "The authorized cost ceiling and the estimated costs for the Garrison Project do not include an estimated $150 million in costs that could be required to settle the boundary waters dispute with Canada; however, costs of alternatives

are too preliminary at this point for the Bureau to adjust properly the ceiling or the estimated costs of the project."

Critique.—"This is the highest possible estimate and not a representative figure."

Response.—We understand that it is probably a high estimate and the report makes no attempt to characterize it otherwise. We are merely reporting the most recent Bureau of Reclamation estimate of the costs of alternatives as reported to the Congress on FY 1977 budget justification documents.

59. On page 104, finding I states that "The $2.7 million in claimed wildlife conservation benefits are not adequately justified in view of the determination by the Fish and Wildlife Service that Garrison will result in a net loss to wetlands and will be harmful to Federal wildlife refuges."

Critique.—"This finding appears premature; the matter of fish and wildlife benefits is as yet unresolved."

Response.—The finding is a statement of fact. Fish and wildlife benefits are not only unresolved, they remain totally unsubstantiated by the Bureau at this point. If the Bureau is going to claim $2.7 million in annual benefits to wildlife from Garrison, the claim should be adequately justified.

60. On page 104, finding J of the report states that "It is unclear as to whether flood control benefits claimed for Garrison will materialize or whether domestic flooding along the Souris, Red, and James rivers will result in increased flood control costs."

Critique.—"The June 1976 report indicates that the effects of the return flows on historic flooding will be insignificant and that there will in fact be additional flood control benefits on the James River through operation of the Oakes Pumping Plant."

Response.—The Bureau Summary Report accompanying the June 1976 water quality studies concludes that flooding potential in all five affected rivers will be increased slightly, which will "extend the duration of floods by a short time of 3 to 5 percent." These are average (or mean) annual estimates computed over a 63-year period, so there will be periods when flooding will be significantly increased. If, as a result of Garrison, there will be a slight increase in flooding in all five rivers, it is difficult to understand how flood control benefits can be claimed. We believe the finding is correct as written.

61. On page 105, the report says the cost-benefit ratio is 2.8 to 1.

Critique.—"This present benefit-cost ratio reported to Congress is 2.9 to 1 rather than 2.8 to 1."

Response.—The critique is correct on this point. The 2.8 to 1 figure was the fiscal year 1976 cost-benefit ratio. The report will be changed to reflect the fiscal year 1977 figure.

62. On page 121, the report recommends that "The Bureau of Reclamation, in cooperation with the Fish and Wildlife Service, promptly adjust the cost-benefit ratio of the Garrison Diversion Unit to account for wildlife and wetland losses that are expected from the project, including expected Federal costs necessary to prevent damage to Federal wildlife refuges."

Critique.—"The recommendation that the Bureau adjust the benefit-cost ratio to account for wildlife benefits is based on incomplete findings and judgments by the Fish and Wildlife Service."

Response.—The information provided this subcommittee by the Fish and Wildlife Service with regard to the Garrison wildlife mitigation plan and the impact of Garrison on National Wildlife Refuges is substantial and well-documented (See response to items 49 and 50). We believe that the FWS testimony and reports indicate that wildlife benefits from Garrison may not materialize. The Bureau of Reclamation has an obligation to inform the Congress when projects' expected benefits will not materialize. One method of providing this information is through the annual updating of the cost-benefit ratio. We believe the recommendation is sound and necessary.

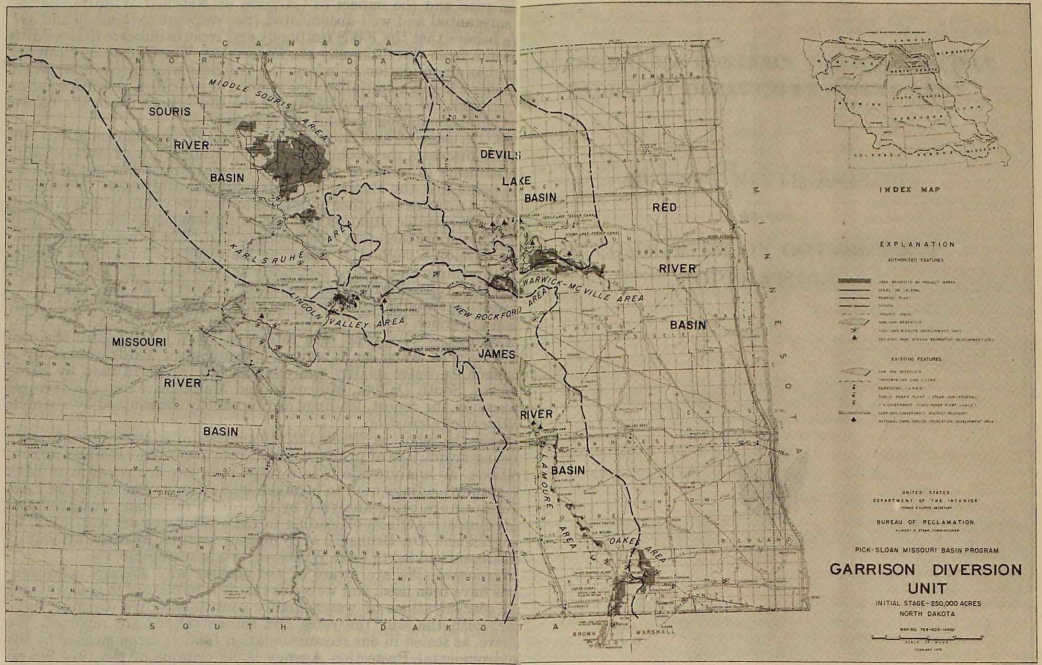
63. On page 68 and finding H and page 77 (recommendation), the report discusses the problems with reporting levels of water quality constituents in terms of an average concentration. The report makes the point that the Bureau of Reclamation should report increases in salinity, nitrates and other pollutants so that the public will be aware of the worst possible situation that can be expected as a result of the project. The report therefore recommended that "The Bureau of Reclamation develop a method of reporting the results of return flow studies which will demonstrate as accurately as possible the probable range of increased concentrations of pollution (rather than the average increase) that would result from construction and operation of the Garrison Diversion Unit."

Critique.—"The June 1976 report on water quality uses the concentration of water as its unit of measurement. This terminology is common in water quality analysis and is a standard used by North Dakota, South Dakota, Minnesota and Manitoba. From the averages present in the report, loadings can be readily determined by a simple arithmetic calculation.

Since the report is directed to the analysis of at least intermittently flowing rivers, it is of primary importance to analyze rates and concentrations. To analyze effects in a large reservoir or lake such as Lake Winnipeg loadings need to be taken into account. The effects on Lake Winnipeg are being analyzed by the IJC. Preliminary judgments of the cumulative effects of loading in Lake Winnipeg are that it will be insignificant. Dr. Brunskill of Winnipeg reported that the amount of constituents added to Lake Winnipeg will be negligible."

Response.—We are aware of the reasons why average concentrations have been used, and we agree that it is important to analyze rates and concentrations of water quality constituents. We disagree, however, with the way the rates and concentrations are reported. We believe, as stated in our recommendation (and as recommended by the Environmental Protection Agency in its critique of the 1974 Souris River return flow study—see hearings, part 2, appendix 7), that reporting concentrations in intermittently flowing rivers in terms of ranges would provide the public with better information on water quality impacts.

[NOTE: Page numbers refer to original draft of report.]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