United States General Accounting Office

GAO

Report to the Chairman, Select Committee on Indian Affairs, U.S. Senate

May 1991

INDIAN ISSUES

Compensation Claims Analyses Overstate Economic Losses

GAO/RCED-91-77

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-242425

May 21, 1991

The Honorable Daniel K. Inouye
Chairman, Select Committee on
Indian Affairs
United States Senate

Dear Mr. Chairman:

This report responds to your request that we assess the adequacy of the economic analyses supporting the Garrison Unit Joint Tribal Advisory Committee's (JTAC)[1] recommendation that Indian tribes at the Fort Berthold Reservation in North Dakota and Standing Rock Reservation in North and South Dakota receive additional financial compensation.[2] Congressional authorizations to acquire and to provide compensation for approximately 152,360 acres of land from Fort Berthold and 55,994 acres from Standing Rock were made in 1949 and 1958, respectively. The government required the lands for the construction of a water resources project authorized by the Flood Control Act of 1944 (P.L. 78-534).

In addressing the issue of additional financial compensation, JTAC relied on analyses performed by consultants of the respective tribes. On the basis of these analyses, JTAC concluded that compensation provided by the Congress was not sufficient to cover the economic losses sustained by the tribes (lost assets that had estimable value, such as land, buildings, and timber). As a result, JTAC recommended in 1986 that the tribes receive between $359.6 million and $754.7 million in additional financial compensation.

Your office requested that we (1) assess the adequacy of the economic analyses prepared by the tribes' consultants and (2) identify any alternative methods the Committee might consider in addressing the question of additional financial compensation to the tribes. This report provides the results of our work. As agreed, we did not address the question of whether additional compensation should be provided or evaluate the

[1] JTAC was established in 1985 by the Secretary of the Interior to examine the economic and developmental needs of the Fort Berthold and Standing Rock reservations, including the need for additional financial compensation for land acquired by the government for construction of a flood control project.

[2] Final Report of the Garrison Unit Joint Tribal Advisory Committee, May 23, 1986, United States Department of the Interior, Bureau of Indian Affairs, Billings, Montana.

adequacy of the original compensation amount appropriated by the Congress.

Results in Brief

Our review found that the analyses performed by the tribes' consultants overstate the economic losses sustained when their land was taken and, consequently, should not be relied on by the Congress. The consultants' estimates of economic loss are overstated because they were based on overly optimistic assumptions about the tribes' economic situation prior to the loss of the land. If the Congress should wish to consider providing additional compensation, an alternative approach might be used. In establishing a basis for determining additional compensation, the Congress might start with the difference between the amount of compensation the tribes believed was warranted at the time the land was taken and the compensation that was appropriated by the Congress. Appropriate adjustments could be made to reflect current values.

Background

The Flood Control Act of 1944 established a comprehensive plan for flood control and other purposes in the Missouri River Basin. As a result of implementing this act, approximately 152,360 acres of land were taken from the Fort Berthold Reservation in North Dakota and 55,994 acres from the Standing Rock Reservation in North and South Dakota. The Congress authorized compensation of $12,605,625 to the Three Affiliated Tribes (Mandan, Hidatsa, and Arikara) of Fort Berthold in October 1949 and $12,211,553 to the Sioux Tribe of Standing Rock in September 1958 for the loss of their respective lands.[3]

During its evaluation of the Fort Berthold and Standing Rock Reservations' additional compensation issue, JTAC requested that the tribes of Fort Berthold and Standing Rock estimate the economic losses they sustained as a result of losing their land to the federal government. Each reservation hired an economic consultant to determine the dollar value of these economic losses. The consultants used different analytical approaches for estimating these losses.

The consultant for Fort Berthold based the estimated loss on the amount of money that would equal income the tribes could have earned annually from the reservation bottomlands taken from them. The consultant for Fort Berthold calculated that the Three Affiliated Tribes sustained losses of between $170 million and $178.4 million and proposed that

[3]P.L. 81-437 and P.L. 85-915, respectively.

they receive additional compensation of between $170 million and $180 million. The consultant for Standing Rock based the estimate of loss on the amount of money that would equal the dollar value of the assets such as land and buildings lost, plus the value associated with the annual use of resources that were lost (for example, the annual harvest value of the reservation's timber resource). In addition, the consultant included the economic losses sustained by Indian consumers as a result of higher prices for resource products (such as fence posts) that were no longer available. The consultant calculated a loss of $342.9 million for the Sioux Tribe of Standing Rock and recommended that amount in additional compensation.

Because the different analytical approaches used by the consultants would produce substantially different estimates of loss and because JTAC did not favor one over the other, JTAC calculated an economic loss for each reservation, using the other consultant's approach. JTAC's calculation of the loss to Fort Berthold using the Standing Rock consultant's approach was $411.8 million, as compared to the $178.4 million estimate made by the Fort Berthold consultant. JTAC's calculation of the Standing Rock loss, using the Fort Berthold consultant's approach, was $181.2 million, as compared to the $342.9 million estimate made by the Standing Rock consultant. On the basis of the consultants' analyses and its own calculations, JTAC concluded that the tribes had not been adequately compensated by the federal government for the "unique circumstances and values" taken from them and recommended additional compensation of between $178.4 million and $411.8 million for Fort Berthold, and between $181.2 million and $342.9 million for Standing Rock.

In 1987 the U.S. Department of the Interior expressed opposition to the additional compensation recommended by JTAC.

How Congressional Compensation Was Determined

Typically, compensation for lands taken for public purposes (for example, lands to be used for construction of dams or highways) is based on a market value appraisal. Such an appraisal generally involves an examination of similar past transactions between willing sellers and buyers. Because no comparable sales transactions were available, the Congress determined compensation by assessing the various "losses" the tribes would incur.

The Congress established a market value for the various Indian assets on the reservations, such as agricultural land, improvements, standing timber, and other items (for example, mineral rights, in the case of Fort

Berthold). In addition, the estimated costs of relocating and reestablishing tribal members and relocating cemeteries, monuments, and shrines were considered in determining the compensation to be provided.

The Congress also recognized that the tribes would lose assets of unknown value. These assets, or intangible benefits, included spiritual ties to the lands (for example, cemeteries and tribal monuments), tribal claim to a homeland, and benefits derived from living along the Missouri River. Because it was very difficult to quantify the value of these assets (there were no comparable sales of similar assets on which to base an estimate), the Congress included a lump sum of money as compensation for "all other claims," including intangible assets.

As final compensation the Congress appropriated $12,605,625 to the Three Affiliated Tribes at Fort Berthold: $5,105,625 for lands and improvements, relocation of tribal members, and relocation of cemeteries and monuments, and $7,500,000 for other claims by the tribes. The Congress appropriated $12,211,553 to the Sioux tribe of Standing Rock: $1,952,040 for lands and improvements, $3,299,513 for all other claims by the tribe, and $6,960,000 for tribal rehabilitation intended to improve the economic and social status of the tribe. The compensation represented dollar values in the year the compensation was appropriated—1949 for Fort Berthold and 1958 for Standing Rock.

Consultants' Analyses Included Questionable Assumptions and Methods

The consultants based some assumptions used to approximate the tribes' economic condition before the tribes lost their land on data that we believe to be unrepresentative of the economic conditions on the reservations at the time the land was acquired. Problems identified with the analyses are briefly summarized below. More detailed discussions of our review of the consultants' analyses are contained in appendixes I and II.

The consultant for Fort Berthold used two different methods to estimate the annual income the Three Affiliated Tribes of Fort Berthold would have earned from the lands that were acquired by the federal government. The first method was to estimate the income the tribes earned from the land in 1950. The second method was to estimate the income the tribes would have earned in 1986 if they had retained ownership of the land between 1950 and 1986. As a result of the two methods, the consultant concluded that the Fort Berthold tribes should receive between $170 million and $180 million (in 1986 dollars) as additional

compensation. However, under the first method, the consultant assumed, among other things, a family income that was much higher than reported Indian family income during the late 1940s. Under the second method, the consultant used optimistic assumptions about the rate of agricultural development that might have occurred had the lands not been taken. In addition, the consultant assumed that the Indians would be unemployed once the lands were taken from them. As a result of these factors, we believe that the consultant overstated the tribes' economic losses.

The consultant for the Sioux Tribe of Standing Rock estimated the tribe's economic losses resulting from the loss of its lands at approximately $342.9 million (in 1986 dollars) and recommended that the tribe receive this amount in additional compensation. However, the consultant (1) double-counted the income that could have been earned from the lands; (2) assumed that the tribe would have continued to consume the same amount of each resource product, such as timber, regardless of its price; (3) assumed an annual timber harvest level in perpetuity that was almost three times that which could have been sustained; (4) assumed that there were no costs associated with the production of timber or the gathering and transporting of wild game and fruit; and (5) assumed a level of grazing greater than the level that reportedly could have been supported by the land. As a result of these factors, we believe that the Standing Rock consultant overstated the tribe's economic losses.

Finally, neither consultant reduced the estimate of additional compensation by the total amount the Congress had previously appropriated for lands acquired. If this compensation had been considered, the Fort Berthold consultant's estimate of additional compensation would have been approximately $58 million less; the Standing Rock consultant's estimate of additional compensation would have been approximately $40 million less.

Historical Information May Be Useful to the Congress in Addressing the Issue of Additional Compensation

Because there is limited information concerning the Indians' economic condition on which to base an estimate of their economic losses, an alternative approach for considering additional compensation might be to consider the difference between the dollar amounts the tribes believed were warranted when the lands were acquired by the federal government and the amounts the Congress provided as compensation.

Congressional documents indicate that the tribes had identified dollar amounts that they believed were warranted as compensation for their

lands.[4] These amounts were substantially greater than the amounts the Congress was willing to provide as compensation for the required lands.

Congressional documents suggest, however, that Fort Berthold tribes accepted the lower amount proposed by the Congress because they were concerned that continued resistance might have resulted in lower compensation. Another factor that may have induced the Fort Berthold tribes to settle for lower amounts was that construction on Garrison Dam (which would flood Fort Berthold lands) had already begun in the spring of 1946, long before final compensation was authorized by the Congress.

In 1949 the three Fort Berthold tribes stated that the land being acquired was worth $21,981,000, or $9,375,375 more than the $12,605,625 that the Congress had appropriated. In 1958 the Standing Rock Sioux Tribe stated that $26,370,663 would compensate for their lands, which was $14,159,110 more than the $12,211,553 that the Congress had appropriated.

For each reservation we calculated the 1990 dollar value of the difference between the amounts the tribes believed were warranted and the compensation that was appropriated. The 1990 value depends on the interest rate used to adjust the original dollar value in 1950 for Fort Berthold and 1959 for Standing Rock. To account for the several types of interest rates that could be used, we calculated a range of dollar values for each reservation.

To calculate the lower value of each range, we used the annual rate of inflation between the time the land was acquired and 1990. To calculate the upper value of each range, we used the annual average rate of interest earned on investments in corporate bonds for the same period. The upper value reflects a long-term rate of return on investments in the private sector. Our calculated dollar range of additional compensation for Fort Berthold is $51,803,940 to $149,243,557 and for Standing Rock, $64,460,876 to $170,031,297.[5]

[4]Hearings before the Subcommittee on Indian Affairs of the Committee on Public Lands, House of Representatives, Eighty-First Congress, First Session, on H.J. Res. 33 (Apr. 29, 30, May 2 and 3, 1949) and House Rep. No. 2498 (June 27, 1956).

[5]Values within each range represent investments at interest rates greater than the rate of inflation, but lower than the corporate bond rate. For example, if additional compensation were invested at the rate of interest earned on 3-year U.S. Treasury bonds, the 1990 dollar value of the difference would equal $109,841,845 in the case of Fort Berthold and $133,317,158 in the case of Standing Rock.

The amounts we have calculated are based on the amounts the tribes believed were warranted at the time of the takings, and yet are less than the amounts the tribes' consultants recommended for additional compensation.

Conclusions

We believe that the consultants' estimates of economic loss are overstated because they are based on information that does not reflect the economic condition of the tribes prior to the loss of their lands. Further, we believe that as a practical matter, any attempt to estimate the economic losses sustained by the tribes as a result of losing their land would necessarily involve some speculation.

Matters for Congressional Consideration

The question of whether additional compensation for the tribes is warranted can be resolved only by a policy decision. If the Congress decides that additional compensation is warranted, we believe that the Congress should not rely on JTAC's recommendation for additional financial compensation. An alternative approach to establish a basis for additional compensation might be for the Congress to start with the difference between the compensation the tribes believed was warranted at the time of the taking and the compensation that was appropriated by the Congress. Appropriate adjustments could be made to reflect current value.

Consultants' Comments

In commenting on a draft of this report, the consultants provided their rationales for the assumptions and methodologies they had used in their studies. One consultant indicated that our differing viewpoints on assumptions and methodologies were reasonable, in many cases. The other consultant questioned many of the problems and concerns we had raised. The consultants also raised several issues that they believed should be the subject of further independent study.

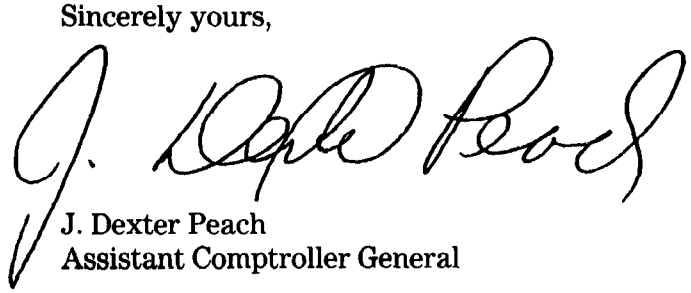
Overall, we believe the consultants' comments highlight the difficulties involved in attempting to measure, with a high degree of confidence, economic losses the tribes may have sustained as a result of losing their lands. After reviewing the consultants' comments, we continue to believe that the problems we found with the consultants' economic analyses are valid and result in estimates of tribal economic losses that are overstated and that should not be relied upon. Our responses to the consultants' specific comments are included in appendixes III and IV.

This report is based on our review of the consultants' economic analyses and other pertinent information regarding the economic condition of the tribes at the time the land was acquired, including Missouri River Basin Investigation staff reports prepared by the Bureau of Indian Affairs. We also held discussions with the tribes' consultants. Our work was performed between August and December 1990 in accordance with generally accepted auditing standards.

We are sending copies of this report to the Secretary of the Interior; the Director, Office of Management and Budget; and other appropriate congressional committees. We will also make copies available to others upon request.

This work was performed under the direction of James Duffus III, Director, Natural Resources Management Issues, who may be reached at (202) 275-7756. Other major contributors to this report are listed in appendix V.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Contents

Abbreviations

GAO	General Accounting Office
JTAC	Garrison Unit Joint Tribal Advisory Committee
mbf	thousand board feet
MRBI	Missouri River Basin Investigation
USDI	United States Department of the Interior

Critique of the Fort Berthold Consultant's Economic Analysis

The economic consultant for the Three Affiliated Tribes of Fort Berthold estimated the income the tribes would have earned from the use of the land that was acquired by the federal government. The consultant concluded that the tribes did not receive adequate compensation for the land they lost and that the economic losses sustained by the tribes were equal to between $170 million and $180 million in 1986 dollars.[1]

The Consultant's Analysis

The consultant used two analytical methods to estimate the annual income that the tribes would have earned from their reservation bottomlands. In the first method, the consultant assumed that family income on the reservation in 1950 was comparable to that of the U.S. median family income of approximately $3,319. On the basis of this assumption, and using a 3.5 percent capitalization rate, the consultant estimated that the 1950 dollar value of a series of annual income payments (equal to $3,319), in perpetuity, was $40 million.[2] The consultant adjusted the $40 million value to 1986 dollars using the rate of inflation between 1950 and 1986 and obtained a value of $178.4 million.

In the second method, the consultant estimated the annual income that the tribes would have earned in 1986 from the reservation bottomlands had the tribes retained ownership of the lands. To make this calculation, the consultant made some assumptions about how the tribes would have used their lands between 1950 and 1986. The consultant assumed, for example, that the amount of reservation acreage developed annually as irrigated cropland would have corresponded to the acreage developed on non-Indian agricultural lands in North Dakota. According to the consultant, acreage devoted to irrigation increased 5.4 percent annually between 1949 and 1982 in the North Dakota non-Indian agricultural sector. In addition, the consultant assumed that the net dollar return per acre based on its use (irrigated land, woodland, etc.) would reflect dollar returns earned from producing higher than average yields (yields under high quality management).

[1] 1See R. G. Cummings, Valuing the Resource Base Lost By the Three Affiliated Tribes as a Result of Lands Taken From Them for the Garrison Project, Resource Management Associates, Albuquerque, New Mexico (1986).

[2] Capitalization is a technique used to determine the current value of the expected future earnings of a particular asset (for example, the annual income earned from the land over a period of years). Earnings that are expected to occur in future years are discounted back to the present using a rate of discount. Discounting accounts for the fact that, in general, a dollar today is worth more than a dollar one year from now. "In perpetuity" refers to the fact that the asset will produce earnings every year "forever." It is, of course, unrealistic to presume that an asset will earn income "forever," but, as a result of discounting, the sum of earnings in later years is negligible.

Applying the second method, the consultant estimated that the tribes would have earned $15.3 million from the lands in 1986. Using a 9-percent discount rate, the consultant capitalized the $15.3 million to derive the total value of a series of expected future income payments. As a result of these calculations, the consultant's estimate of the tribes' economic losses was $170 million in 1986 dollars.

Our Review of the Consultant's Analyses

On reviewing the consultant's analysis, U.S. Department of the Interior (USDI) documents[3] detailing the social and economic conditions of the Fort Berthold tribes, and other pertinent documents, we believe that the consultant's estimates of economic loss are based on key variables and parameters that do not reflect reservation-specific conditions at the time the land was acquired. More specifically we make the following observations.

- In the first method, the consultant assumed that the tribes' median family income (their earnings from the land—cash plus noncash income) in the late 1940s was equal to the U.S. median family income in 1950 of approximately $3,319. We believe that the consultant's estimate of Indian median family income overstates the income earned by families on the reservation in 1950. On the basis of information reported in Missouri River Basin Investigation (MRBI) reports, we estimate that Indian family total income (cash plus noncash) in 1950 was approximately $1,840.[4] We believe that this is a reasonable estimate because it approximates the U.S. rural family median income in 1950 of $1,970.[5]
- In the first method, the consultant used a 3.5-percent discount rate to capitalize annual income foregone. In our view, the consultant did not

[3]Bureau of Indian Affairs, Missouri River Basin Investigation staff reports.

[4]Two MRBI reports indicate that median family income at Fort Berthold was $875 in 1947 and that an estimate of mean noncash income, or income earned from products the tribes harvested for themselves, was $700 in 1948. These reports are Social and Economic Report of the Fort Berthold Reservation Supplement No. 1, MRBI Rep. No. 94 (Aug. 31, 1949) and The Resources, People and Administration of Fort Berthold Reservation North Dakota, MRBI Rep. No. 60 (Aug. 24, 1948), USDI Bureau of Indian Affairs, Billings, Montana. We used the consumer price index to adjust the two income figures for inflation between 1947 and 1950 and added the 1950 values to derive an estimate of 1950 family total income. It should be noted that MRBI Rep. No. 94 indicated the estimate of mean noncash income, $700 per family, was conservative, in part, because it did not include noncash income earned from milk, cream, eggs, poultry products and garden produce. It is unlikely, however, that the noncash income earned from these items would equal the difference between our estimate of $1,840 and the consultant's estimate of $3,319.

[5]Statistical Abstract of the U.S., U.S. Department of Commerce (1956).

provide adequate support that the tribes would have used the 3.5-percent discount rate to value their assets. The discount rate used to determine the economic loss sustained by the tribes should reflect the rate the tribes would have used to value their assets (their rate of time preference).[6] We recognize the difficulty associated with determining the discount rate the tribes would have used to value their assets. In addition, we recognize that a lower rate would yield a higher land value, while a higher rate would yield a lower land value. There may be plausible arguments for a higher or lower rate. However, we believe that stronger justification is required to support the fact that the Indians would have used the 3.5-percent rate.

- In applying the second method, the consultant made assumptions about how the tribes would have developed their lands between 1950 and 1986 if they had retained ownership of the land. Information, however, on the social and economic events that might have occurred on the land between 1950 and 1986 was not available when the tribes' lands were appraised. We believe that this assumption is unrealistic because it did not recognize the more limited information that was available at the time the land was acquired. For example, it could not be anticipated at the time the land was acquired that federal agricultural support programs would be developed (between 1950 and 1986) that would change the value of the agricultural land.
- On a related note, the consultant assumed that the development of irrigable land on the reservation between 1950 and 1986 would have corresponded to the actual rate of development on non-Indian agricultural land in North Dakota between 1950 and 1986. Documents we reviewed indicate that the tribes were interested primarily in raising cattle, not growing crops.[7] In addition, cropping activities on the reservation were limited to dry cropping activities (as opposed to irrigated cropping activities). Evidence of the tribes' preference of cattle-raising over dry cropping is given in U.S. Department of the Interior documents, which indicate that the tribes rejected an initial compensation offer of certain

[6]In a fair-market transaction, the agreed selling price is a function, among other factors, of both the buyer's and the seller's discount rate.

[7]Social and Economic Report on the Future of Fort Berthold Reservation North Dakota, Missouri River Basin Investigations staff report, USDI Bureau of Indian Affairs, Billings, Montana (Jan. 15, 1948).

alternate lands to replace the lands being taken because a large component of the alternate lands was suited primarily for dry cropping.[8] Thus, we believe stronger justification is required to support the consultant's assumption.

- The consultant implicitly assumed that the opportunity cost of labor was zero. That is, the consultant assumed that there was no alternate employment available to the Indians on the reservation, and as a result, the cost of labor was not subtracted from income earned in agricultural activities. This assumption may be accurate in a closed economy where labor has no other opportunity for employment. MRBI Report No. 94 indicated, however, that some members of the tribes were working off the reservation. This information indicates that some of the Indians were employed elsewhere (for example, by non-Indian ranchers), in which case their wages earned should be subtracted from the estimated economic losses.
- The consultant did not subtract actual compensation appropriated to the tribes from the estimates of economic loss because, according to the consultant, the appropriated amount was not sufficient to provide the tribes with an annual income (as determined by the consultant's first method) between 1950 and 1986. We believe that an estimate of additional financial compensation should be offset by the actual compensation appropriated by the Congress at the time the land was acquired ($12,605,625). For comparison purposes, we used the consultant's price-adjustment method (rate of inflation) to calculate the estimated 1986 value of compensation appropriated to Fort Berthold. The 1986 value is $56,221,088. Consequently, the consultant's estimates of total economic loss would have been $56,221,088 less if compensation appropriated by the Congress had been accounted for in the analysis.

[8]The Congress attempted, in the case of Fort Berthold, to compensate by offering comparable lands for the lands being taken (i.e., lands comparable in size and quality; War Department Civil Appropriation Act, 1947, P.L. 79-374). The tribes rejected the offer, however, because it did not meet the "comparable lands" criteria outlined in P.L. 79-374. See Report and Recommendations to the Commissioner of Indian Affairs on the Offer of Lieu Lands to the Indians of Fort Berthold Reservation, North Dakota by the Honorable The Secretary of War, November 21, 1946, USDI Bureau of Indian Affairs, Billings, Montana (Dec. 10, 1946) and Meeting in the Secretary's Conference Room December 16, 1946, for the Purposes of Obtaining the Views of the Three Affiliated Tribes of the Fort Berthold Reservation on the Lieu Lands Offered by the Secretary of War, USDI (Dec. 16, 1946).

Critique of the Standing Rock Consultant's Economic Analysis

The economic consultant for the Sioux Tribe of Standing Rock Reservation estimated the value of economic losses sustained by the tribe as a result of losing the reservation's bottomlands.[1] The consultant estimated that the total economic loss was equal to $342,897,374 in 1986 dollars and concluded that the funds appropriated by the Congress at the time the land was acquired did not sufficiently compensate the tribe.

The Consultant's Analysis

According to the consultant, the Sioux Tribe of Standing Rock lost its homelands as a result of the lands being taken and, consequently, sustained direct and indirect losses. Direct losses were defined by the consultant as losses of land, water (sources of quality water for homes and ranches), riverbeds, roads, housing, and other items (including the loss of three rodeo arenas, two race tracks, three sawmills, and several monuments). The consultant's estimate of total direct losses in 1959 dollars was $7,448,520. Indirect losses were defined in terms of resources foregone— including timber, natural products (fruit), wildlife, agricultural products, and labor. The consultant assumed that the total annual economic loss of each resource would equal the dollar value of the annual use of each resource product (the value of the annual timber harvest or the annual deer harvest) plus the dollar value of the loss in consumer surplus.[2]

In estimating the economic value associated with the loss of timber, natural products, and wildlife, the consultant assumed that there were no costs associated with producing, transporting, and/or gathering these products. Agricultural losses (losses in acreage used for livestock grazing, cropland, and irrigation) were estimated in terms of the net dollar value of land (gross earnings per acre minus all production costs except labor) that could be earned from these various agricultural uses. The consultant capitalized the sum of indirect losses using a 2.5 percent rate of discount. As a result, the consultant derived an estimate of the 1958 value of a series of expected future earnings (representing the economic losses), in perpetuity, of $56,886,605.

Direct losses and indirect losses were then added together for a total of $64,335,125, which, according to the consultant, represented the total

[1]See Analysis of Economic Loss Resulting From Lands Taken From the Standing Rock Sioux Tribe for the Oahe Dam, The Robert McLaughlin Company, Solen, North Dakota (1986).

[2]Consumer surplus is a monetary measure of the benefit consumers derive from using a particular good. The consultant assumed that because of the decrease in resource supply, the price of the good produced from the resource increased. According to the consultant, the tribe sustained a monetary loss as a result of the increase in price.

economic loss. From this amount, the consultant subtracted the amount of compensation the Congress had appropriated for land, improvements, timber, and other claims ($5,251,553), resulting in a economic "shortfall" of $59,083,572. To determine the 1986 dollar value of the $59,083,572, the consultant used the annual rate of discount on 6-month U.S. Treasury securities to adjust the 1959 figure. As a result, the consultant estimated that compensation owed to the Standing Rock tribe was $342,897,374 in 1986 dollars.

Our Review of the Consultant's Analysis

On reviewing the consultant's analysis, U.S. Department of the Interior reports[3] detailing the social and economic conditions of the Standing Rock tribe at the time the lands were taken, and other pertinent documents, we believe that the consultant's estimate of total economic loss sustained by the Standing Rock tribe reflects (1) errors in the analysis (double-counting), (2) data that are not representative of conditions on the reservation at the time the land was acquired, and (3) a lack of evidence to support critical assumptions. More specifically we make the following observations.

- When considering direct losses, the consultant estimated the per acre dollar value of the 55,994 acres of land taken using average prices of North Dakota farmland. When assessing indirect losses, the consultant estimated the income earned, in perpetuity, by 54,302 acres of the lands taken in the production of timber, dryland crops, cattle, and as irrigated farmland. The dollar amounts derived were included in the estimate of total economic loss. However, the average prices used to estimate direct losses represent market valuation of the income earned, in perpetuity, from the lands in producing various farm products. Thus, the consultant's dollar value estimate of the lands included a double-counting of income that could have been earned. If, for example, the estimated direct loss associated with the 55,994 acres had not been included, the estimate of total economic loss in 1958 dollars would have been approximately $3,356,640 less.[4]
- The consultant used two numbers to derive his estimate ($60 per acre) of the 1958 price of Standing Rock river bottomland. The first was an

[3]Bureau of Indian Affairs, Missouri River Basin Investigation staff reports.

[4]Using the consultant's price-adjustment method, this 1958 dollar amount is equal to $19.4 million in 1986.

index number (61), which relates North Dakota farmland values in different years to one another.[5] The second was the per acre value of developed land across the Missouri River from the reservation ($82.60, the average payment made to landowners between 1961 and 1965). It is incorrect, however, to use an index number as a proxy for a dollar value because the index number is not measured in dollars.[6] We believe that stronger justification is needed to support the derivation of the value of Standing Rock river bottomland.

- The consultant's consumer surplus analysis was based on an assumption about the tribes' demand curve.[7] However, the consultant's report did not include evidence supporting the parameters of this demand curve. Without such an estimate or other evidence, the consultant's estimates of consumer surplus loss cannot be verified.
- Specifically, the consultant assumed that, as a result of loss of the land, prices for various resource products (timber, natural products, wildlife) used on the reservation increased between 50 and 300 percent. For example, the consultant assumed that 90 percent of the commercial timber at Standing Rock was lost because of inundation, and, as a result, per unit prices for timber products increased by 50 percent. The consultant, however, did not provide evidence to support these price increases.
- In addition, the consultant implicitly assumed that there were no substitutes for the resource products (such as timber) lost as a result of the lands being taken; tribal demand, therefore, was assumed to be perfectly price inelastic. In other words, the consultant assumed the tribe would have continued to consume the same amount of each resource product (for example, timber) after the lands were taken, regardless of the price of such products. As a result, the consultant's calculation of consumer surplus loss represents the maximum possible loss that could be expected, given the increase in price. In our view, this assumption is unrealistic because it fails to account for substitution effects (that is, as prices rose, the Indians would have switched to other products).

[5]See F.R. Taylor, C.S. VavRosky, and D.F. Scott, Statistics of North Dakota Agriculture, Dept. of Agric. Econ. Bull. No. 408 Rev., North Dakota State Univ., Fargo (June 1981).

[6]The dollar value of the land in 1958 would have equaled $61 per acre only when the dollar value of the land in the base year of the index, 1967, equaled $100.

[7]A demand curve is a schedule of prices and quantities of some good that indicates the level of use associated with a particular price. To calculate the loss in consumer surplus, it was necessary to estimate the tribes' demand curve.

- The consultant assumed that the net merchantable volume of timber per acre on the lands taken was 5.773 thousand board feet (mbf). This estimate was based, however, on data from the Garrison area (i.e., Fort Berthold).[8] The consultant did not address whether the Fort Berthold and Standing Rock lands were equal in terms of timber productivity. We noted that MRBI Report No. 138 indicated that Fort Berthold had a greater proportion of sawtimber (that is, trees large enough to produce sawlogs, which can be used in sawmills to produce lumber) than did Standing Rock.[9]
- In calculating the indirect loss of the timber resource, the consultant assumed that the annual harvest level in 1959, and every year in perpetuity, would equal approximately 3,547 mbf. However, MRBI Report No. 138 indicated that in 1954 the annual sustainable harvest level was only 1,280 mbf. As a result, the consultant's assumed harvest level in 1959 was 177 percent greater than the reported sustainable harvest level. The consultant did not offer evidence to support the rate of increase in timberland productivity between 1954 and 1959. Furthermore, to assume that this harvest level could be sustained indefinitely without significant investment in the forest resource (investment in forest development to maintain the resource's productivity at such a high level) is, in our view, unrealistic.
- The consultant assumed that the population of the tribe grew and that their utilization of wood products increased by 40 percent between 1951 and 1959. However, the consultant did not provide any empirical evidence for such a growth in tribal population or for the increase in investment in sawmill capacity that would have been necessary to support such increased wood utilization. MRBI Report No. 151 indicated that tribal population increased by only 25 percent between the period 1945 and 1955 and that 26 percent of the Indians on the reservation in 1955 were "in the more productive age group, 20 to 44 years...."[10] By contrast,

[8]This number was obtained by the consultant using information in J.A. Leitch and D.E. Anderson, Impact of Inundation and Changes in Garrison Diversion Project Plans on the North Dakota Economy, Agric. Econ. Rep. No. 127, Dept. of Agric. Econ., North Dakota State Univ., Fargo (1977). The original source for this information was a letter from the Deputy State Forester cited in J.E. Johnson and R.J. Goodman, Negative Impacts of Garrison and Oahe Reservoirs on the North Dakota Economy, Dept. of Agric. Econ., North Dakota State Univ., Fargo (1962).

[9]Comparison of Appraised Values of Indian Properties and of Estimated Costs of Re-establishing Displaced Families, Timber, Wildlife, and Wild Product Losses, and Potential and Intangible Damages to Indians at Fort Berthold, Cheyenne River, Standing Rock, Crow Creek, and Lower Brule Reservations from Garrison, Oahe, and Fort Randall Reservoir Takings North Dakota and South Dakota, USDI Bureau of Indian Affairs, MRBI Rep. No. 138 (1954). This report defined sawtimber as trees at least 11 inches diameter breast height with one or more 8-foot logs with top diameters of at least 8 inches.

[10]Cultural and Economic Status of the Sioux People, 1955 Standing Rock Reservation North and South Dakota, MRBI Rep. No. 151, USDI Bureau of Indian Affairs, Billings, Montana (Feb. 1957).

the percentage of North and South Dakota population in the 20-to-44 age group was 34. Given the lack of information regarding the basis for the consultant's assumption and the MRBI report findings, we question the assumption of a 40-percent increase in the use of wood products and sawmill capacity.[11]

- The consultant assumed that there were no costs associated with forest management and wood-product production (fixed costs such as cutting machinery and variable costs such as fuel, labor, and transportation). Similarly, the consultant implicitly assumed the costs of gathering and transporting fruit and hunting wildlife were zero. As a result of these assumptions, the consultant's estimate of indirect losses is higher than what would have been obtained if the costs of producing these goods had been subtracted from the benefits obtained from consuming the goods. Such costs should be accounted for when estimating the value of the production.
- The consultant assumed that the productivity of pastureland at Standing Rock was equal to one animal per 20 acres. This assumption is inconsistent with information reported in MRBI Report No. 151, which indicated that the productivity of Standing Rock rangeland varied between 25 and 40 acres per animal, and averaged 30 acres per animal. As a result of this assumption, the consultant estimated that Standing Rock pastureland supported more cattle and produced more revenue than was indicated by available information for that period.
- The consultant assumed that 16,000 acres of the lands taken were potentially irrigable. However, this number is approximately the amount of potentially irrigable cropland acreage that was inundated in all of North Dakota by the construction of the Oahe Reservoir (a unit of the flood control project) and not just at Standing Rock. According to MRBI Report No. 138, the total irrigable acreage at Standing Rock was 7,844, or only about half of the total North Dakota acreage taken. As a result of the consultant's assumption, and because irrigated land is more valuable than any other land use considered by the consultant, the dollar value of the lands taken was, in our view, overstated.
- The consultant used a 2.5-percent discount rate to capitalize resources foregone. According to the consultant, this discount rate was the average federal funds rate between 1955 and 1959. This rate, however, is likely more indicative of the discount rate (rate of time preference) of

[11]Alternatively, an increase in wood utilization could result from an increase in sawmill technology. A simple measure of this concept is given by the rate of change in the amount of lumber produced divided by the amount of logs harvested. An increase in this ratio would indicate that more lumber is being produced from the same amount of logs. However, a review of the data suggests that the U.S. hardwood industry's rate of wood utilization between 1951 and 1959 increased by less than 1 percent.

the buyer (the government in this case) and not the "seller" (the Indian tribe). The discount rate used to determine the economic loss sustained by the tribe should reflect the rate the tribe would have used to value its assets (their rate of time preference).[12] We recognize the difficulty associated with determining the discount rate the tribe would have used to value its assets. However, we believe that stronger justification is required to support the use of the 2.5-percent capitalization rate.

- The consultant did not subtract compensation appropriated by the Congress for tribal rehabilitation ($6,960,000) from its estimate of additional financial compensation. The legislative documents suggest that the tribe and the Congress believed compensation for rehabilitation was a component of the compensation-for-lands package. As a result, we believe that any additional financial compensation amount should recognize prior compensation appropriated. The amount appropriated by the Congress for rehabilitation was $6,960,000. For comparison purposes, we used the consultant's price-adjustment method (6-month treasury rate) to calculate the 1986 value of $6,960,000. The 1986 value is approximately $40,398,915. Consequently, the consultant's estimate of total economic loss would have been $40,398,915 less if it had accounted for all compensation appropriated by the Congress.

[12]In a fair-market transaction, the agreed selling price is a function, among other factors, of both the buyer's and the seller's discount rate.

Comments From the Fort Berthold Consultant

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

ar

The University of New Mexico

Department of Economics
1915 Roma NE/Economics Bldg.
Albuquerque, NM 87131
(505) 277-5304
FAX (505) 277-9445

February 25, 1991

Mr. James Duffus III, Director
Natural Resources Management Issues
Resources, Community, and Economic
Development Division
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Duffus:

Thank you for your letter of February 21, 1991, and for a copy of your draft report "Compensation Claims Analyses Overstate Economic Losses." I have read the report and find it to be a competent piece of work which is, in the main, objective. There are, however, a few issues which I feel you might wish to consider in putting together the final draft of your study. I submit these to you in the spirit of professional courtesy.

1. In several places, as on page 4 and in your "Matters for Congressional Consideration", you seem to focus on "...the compensation that the tribes believed was warranted at the time of the taking (emphasis added)..." as a basis for compensation. It is surely obvious that the tribes were ignorant as to what constitutionally mandated just compensation might mean in their case. Indeed, I argue in the report (and elsewhere[1]) that the Congress erred in its application of the "fair market value" criterion for this purpose. I suggest that the objectiveness of your approach would be enhanced by your focus not on what the tribes might have thought was "fair," but upon your best estimate for just compensation.

See comment 1.

2. Somewhat related to the above, on p. 8 you (correctly) mention a few of the reasons underlying the tribe's acceptance of the amount proposed by the Congress. This misses, however, the coercive flavor of the position in which the tribes found themselves. This position was succinctly stated by Representative Lemke: "I am sure that they (the tribes) will accept this settlement because it is the only thing that they can do." (80th Congress, Congressional Record-House, October 19, 1949 at p. 15051)

See comment 2.

3. While I would be prepared to debate my justification for using U.S. median income as a measure for relevant median incomes of tribal families, your

[1]See Cummings, R.G., "Legal and Administrative Uses of Economic Paradigms," Natural Resources Journal, forthcoming April, 1991.

concern with this use is certainly reasonable. Without entering this debate, I agree that the issue is the difference between your admittedly conservative estimate of $1,840 and my estimate of $3,319. Resolution of this issue would require careful examination of the manner in which non-cash income was estimated in the MRBI report, and an appropriate adjustment. If you have this information, I would be interested in reviewing it.

See comment 3.

4. In terms of the discount rate used to capitalize incomes, I totally agree that the appropriate rate is one which reflects the rate of time preference of the tribes. Your concern for a stronger justification for using a 3.5% rate is curious, however, particularly in view of your conclusion that my value estimates are overestimated. Two observations are relevant here. First, as noted in my footnote 21, the 3.5% rate approximates average yields on triple-A corporate and preferred stocks in 1950. These are nominal rates. An appropriately "real" rate would then likely be lower than 3.5%, thereby increasing the compensation estimate. Secondly, there is compelling (in my view) evidence that Indian tribes have substantively lower time preference rates than those established in markets, particularly when resource endowments are at issue. For example, tribes on the Wind River and Flathead reservations use tribal funds to re-acquire tribal lands at prices which imply zero or negative rates of return. Also relevant in this regard is the literature on the ethical foundations of benefit-cost analyses in general, and discounting in particular. The bottom line here is my feeling that, if you wish to take issue with the 3.5% rate used in my analysis, you may wish to make clear the direction of the implied bias: it underestimates (I assert) the estimate for compensation.

See comment 4.

5. We can reasonably differ in terms of the structure of my second method for estimating compensation. I confess that I do not understand your argument that the "perfect knowledge" assumption is unrealistic because it does not recognize the more limited information available in 1950. In this regard, however, I feel that your assertions concerning the tribes primary interest in raising cattle rather than crops (p. 17) are too strong. Senate Report No. 605 (July 1, 1949) notes the "...steadily expanding agricultural program..." on the reservation.

See comment 5.

6. Regarding the zero opportunity cost of labor (p. 18), the relevance of this point turns on what "some" means as it relates to tribal members working off the reservation, and the implications of such off-reservation employment for estimates of land-based family incomes. I do not have, nor seemingly do you, information which would suggest that this assumption results in any substantive overestimate of value.

See comment 6.

7. I was unwilling to take a position on whether or not monies paid to the tribes should be subtracted from any proper calculation of just compensation for their taken lands; I briefly mention arguments for and against this position. You apparently wish to take a position on this issue which involves equity, not economics, and argue that it should be subtracted. This is fine, I suppose, but I wonder if you should not at least acknowledge the equity considerations at

See comment 7.

issue here. If, as a result of being substantially undercompensated for your property (in the sense that it is insufficient to allow you to maintain your pre-taking income level), you must "eat" into your capital, isn't your depreciated position at the time (some 40 years later) that "just" compensation is being considered relevant? I would hope that, at a minimum, the rebuttable issues associated with your assertion that prior compensation should be deducted from any contemporary settlement be acknowledged in your report.

Thank you again for your courtesy in sharing this draft with me. Notwithstanding the observations offered above, your staff is to be congratulated for their efforts.

Sincerely yours,

Ronald G. Cummings,
Professor and Chairman

RGC:dp

The following are our comments on the Fort Berthold consultant's letter dated February 25, 1991.

GAO Comments

1. We recognize that in some cases of "forced sales" (such as condemnations), market value may not be sufficient to leave a person's welfare unchanged.[1] Herfindahl and Kneese[2] present this argument and suggest that the fact that most homes are not for sale at the market price indicates that a "forced sale" at the market price may not be adequate to fully compensate the "seller" (that is, to leave their welfare unchanged). However, the Fort Berthold tribes presented their estimate of what they believed to be adequate compensation during congressional hearings on the land acquisition. We believe that the tribes presented their estimate with the intent of convincing the Congress that the amount of compensation the Congress was considering was too low. In our view, the tribes' estimate is the best information available regarding the amount of compensation they would have accepted.

2. We agree with the consultant that the Fort Berthold tribes may not have been willing sellers of their land at the amount of compensation authorized by the Congress.

3. Our estimate of Fort Berthold family income is an approximation of total family income earned on the reservation in 1950. We believe that it is a reasonable estimate because it approximates median income earned by rural families in the U.S. in 1950.

4. Our comment regarding the consultant's choice of capitalization rate was that the 3.5-percent rate was representative of the buyer and not the seller and that stronger justification was needed to support the fact that the Indians would have used this rate at the time their land was acquired. The consultant stated in his report that the 3.5-percent discount rate was the congressionally mandated rate for land/water projects during the period the land was acquired. Moreover, the consultant indicated in a conversation with GAO that he assumed the 3.5-percent rate was a real rate. This assumption was necessary for technical accuracy (that is, in the capitalization equation real income should be divided by a real discount rate).

[1]Welfare refers to a person's well-being. For example, a forced sale may leave a person worse off, economically and socially, than the person was before the sale.

[2]Orris C. Herfindahl and Allen V. Kneese, Economic Theory of Natural Resources, Charles E. Merrill Publishing Company (1974).

As for the consultant's second point concerning the use of a zero or negative rate of discount by tribes on the Wind River and Flathead reservations, we note that, in deriving an estimate of the value of their land, the Fort Berthold tribes used a 4-percent capitalization rate.[3] Thus, the possibility that the tribes would have used a capitalization rate of zero or less is questionable. In general, we recognize that 3.5 percent may be reasonable as there are plausible arguments for which the true rate would be higher or lower.

5. The consultant's second approach for estimating the tribes' economic losses was based on economic data from 1950 to 1986. Implicit in this approach is the assumption that the tribes should be compensated an amount based on information that was not available to them at the time of the taking. In a market transaction, neither the seller nor the buyer has the benefit of knowing how the future will unfold. As a result, their valuations of the assets in question are based on expectations about the future. In theory, the consultant's second approach for estimating the tribes' economic losses could yield a value higher or lower than a valuation made in a typical market transaction, which is based on available information at the time of the transaction.

We acknowledge the possibility that the tribes, had their land not been acquired, may have developed a more irrigation-oriented farming economy between 1950 and 1986. However, without empirical evidence from the time the land was acquired to support such a transition, we do not favor the consultant's assumption.

6. We do not know the precise number of Fort Berthold Indians that were employed off the reservation at the time their land was acquired. However, the fact that some Indians were working off the reservation indicates that the opportunity existed, which implies that the consultant's assumption of a zero opportunity cost of labor is questionable.

7. The consultant commented that whether compensation paid to the tribes should be subtracted from additional compensation involved an equity issue and that the tribe's current condition should be considered in addressing additional compensation. We believe that it would be very difficult to establish causation between the tribes' current condition and the loss of their land.

[3]Hearings before the Subcommittee on Indian Affairs of the Committee on Public Lands, House of Representatives, Eighty-First Congress, First Session, on H.J. Res. 33 (Apr. 29, 30, May 2 and 3, 1949), p. 47.

Comments From the Standing Rock Consultant

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

Robert McLaughlin Company
POST OFFICE BOX 68
SOLEN, NORTH DAKOTA 58570
(701) 544-3427

March 6, 1991

Mr. James Duffus III
Director, Natural Resources
Management Issues
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Duffus:

Thank you for providing the Robert McLaughlin Company with the opportunity to review and comment on your report titled: Indian Issues: Compensation Claims Analyses Overstate Economic Losses, (GAO/RCED-91-77). I have reviewed the report and offer the following response to your study conclusions.

In March of 1986, the Robert McLaughlin Company, RMC, was retained by the Tribe to provide a brief analysis on the economic loss incurred by the Tribe by reason of the impoundment of the Oahe Reservoir. On April 30, 1986, RMC completed its preliminary report entitled: "Analysis of Economic Loss Resulting from Lands Taken from the Standing Rock Sioux Tribe for the Oahe Dam," (this report will be henceforth referred to as the "ELR" report).

GAO reviewed the merits of the RMC report and its conclusion that the United States seriously underpaid the Tribe for the economic loss of its homelands adjacent the Missouri River.

Between 1950 and 1959, the Tribe had vigorously opposed the taking of tribal homelands for Oahe project purposes. But even during the long and difficult opposition on the part of the Tribe to preserve its most valuable Missouri River bottomlands, the United States initiated construction of the project without having first obtained any legal right to do so. Furthermore, the United States valued tribal homelands far from adequately and refused to consider any further discussion on just compensation payment thereby forcing the Tribe into a corner on the issue of settlement. This has been clearly understood by almost all analysts since the taking, but perhaps most persuasively argued by Michael L. Lawson in his account of the Indian takings: Dammed Indians, The Pick-Sloan Plan and the Missouri River Sioux, 1944-1980.

Most recently, The Economist, in the American Survey section of the October 13, 1990 issue, commented, in reference to the Indian takings along the Missouri,: "Indian land was the chief victim of the dams - the Fort Berthold reservation north of Bismarck has never recovered. Compensation was derisory" (See: page 29).

Soon after the RMC report was issued, a special joint tribal advisory, JTAC, committee established by the U.S. Department of the Interior, reviewed and approved the RMC finding that the Tribe had indeed incurred a serious economic loss as a result of the taking which was never justly compensated for and forwarded that finding to the Secretary of the Interior.

To further review the RMC report, the Tribe asked Joseph P. Kalt, Professor of Political Economy and Assistant Director for Natural Resources at the Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University to provide an analysis of the RMC report findings. Professor Kalt and Harry Nelson, Project Director at the Center, reviewed the RMC report and on February 8, 1988 forwarded their analysis to the Tribe. RMC was not contacted by the School before or during their review.

The Policy Center's review found several items it questioned in the RMC report. Briefly, these were as follows:

1. Differing Discount Rates.- The analysis found that RMC used two different discount rates in its analysis. RMC used a 2.5 percent capitalization rate to establish the economic loss incurred by the Tribe as of 1959. RMC used this rate as it was the same rate the government utilized in its Missouri River Basin Investigation team Report Number 138 which sought to establish direct and indirect costs the Tribe would incur as a result of the dam's construction. The second rate utilized by RMC was the rate that the government paid for six-month treasury securities over a period of time. RMC utilized the historical rate to calculate what the value of the loss would be in today's terms. The average of this federal funds rate between 1959 and 1986 was 6.52 percent.

Professor Kalt and Mr. Nelson argued that the above two rates were not consistent and therefore open to question. RMC accepts their position on consistency and has adopted the federal funds rate of 3.83 percent in 1959 to capitalize the economic loss as of 1959. We then utilize the average federal funds rate - as before - during the 1959 through 1990 period of 6.52 percent to bring the economic loss forward as in our original analysis. This, of course, lowers the amount of the value of the economic loss in today's terms (See: Table 2, attached to this letter).

2. They also found one instance of double counting in the RMC report. RMC again agrees with the Center's evaluation. The double counting took place when RMC listed Damages to Land (See: p. 34 in original Economic Loss Report) as a

direct damage. The School pointed out that this was a double counting of the damage costs and should be eliminated from the final total of direct damages. In the present response to the GAO report, RMC reduced the Damages to Land in the analysis to zero. This again reduces the final economic loss figure shown in the original RMC report (See: Table 2).

3. Finally, Professor Kalt and Mr. Nelson commented that the RMC use of consumer surplus was an estimated value and subject to question. RMC agrees that the use of consumer surplus was preliminary but does not agree with the School that it may be too arbitrary to be brought forward. RMC recommends that an in-depth research project be undertaken, acceptable to the Tribe and the government, to determine consumer surplus losses incurred by the Tribe. Such an analysis was obviously beyond the scope or intent of the original RMC preliminary report completed in 1986. However, the traditional goods utilized by the Standing Rock Sioux had significant value and, based on preliminary review, RMC is convinced that consumer surplus losses to the Tribe are and will remain very significant.

THE GAO REPORT

This brings us to the GAO report and its findings. The Robert McLaughlin Company questions the GAO's report assumptions in several areas. Each questionable GAO assumption is reviewed below.

The GAO review of RMC's ELR was thorough. The brief summary of the consultant's original analysis of the Tribe's economic loss found on pages 19-20 is generally accurate. RMC, however, sees the GAO's presumption that it correctly reads RMC's assumptions in 1986 as misleading. GAO assumes that there was no significant difference between Sioux Indian traditional economic pursuits in 1958 and those of the surrounding non-Indian economy. The assumption that Indian production inputs and non-Indian inputs can be valued the same is wrong. In fact, in the natural resource utilization categories, the processing of Indian wildlife, timber and food products for utilization and consumption retained much traditional Indian economic character. Contributed Sioux labor inputs, among other inputs such as the utilization of natural products in the processing of final product (tanning, skins processing, etc.), was still part of a traditional Indian production system in 1958 on Standing Rock. Such factor inputs must be accounted for adequately in any analysis of real economic losses incurred by tribal members in 1958.

In the non-Indian economy of that time, such factor inputs would have been priced as costs associated with producing, transporting and gathering such products and, if they were paid, netted out of the product's ultimate value. In a tradition production system, factors which make up a final product would have been paid to the individual(s) who produced them; i.e., the killing of deer, the processing and drying of meat, the tanning of the hide and the final consumable or product rendered - for example - goes to the Indian producer. Such production and value of production was lost when the bottomlands were destroyed by the dam. And, since Indian labor opportunity costs at that time were clearly not zero, they must be paid along with other like losses (it should be noted that the cost of the bullet and the original cost of for a .22 rifle, typically, depreciated over generations) may be considered input costs which do not have to be paid but, at the same time, are relatively insignificant to value of final traditional product.

The government can't have it both ways on value calculations. In the original analysis prepared for the government by the Missouri River Basin Investigation, MRBI, team analysts, the government's approach to valuing Indian damages for natural resource product in the areas of timber, natural products and wildlife was to utilize net values. RMC followed the MRBI and valued these resources the same way. To now have GAO, thirty years later, argue to have these resources valued utilizing a different methodology is inconsistent as well as incorrect.

Economists such as Amartya Sen and Stephen Marglin have long pointed out that valuation in traditional economies may be significantly different than valuations for modern or modernizing economies. Such is the case at Standing Rock in 1958. Pricing inputs for traditional economies requires a different methodology than the pricing of inputs in modern economies. The GAO report analysis fails to recognize this when they made their assumptions about Indian values at Standing Rock in 1958.

See comment 1.

The following are comments on each of the GAO's negative findings on RMC's ELR. Detail for the GAO analysis is found in Appendix II, pages 21 - 28 of their draft report.

1. Double Counting of Land Damages.- GAO points out that RMC doubled counted the direct cost: "Damages to Land" in the ELR. The aforementioned Harvard University analysis of the ELR first reported the error in 1988 and RMC disclosed this to GAO in a letter of September 13, 1990. We have deleted the "double count" from the calculation of 1959 loss estimates by reducing the direct damage figure found in the original ELR by $3,356,640 as illustrated in Table 2. The question of value of Standing Rock River bottomland is no longer at issue (at least in the ELR) as those costs have been eliminated by the "damages to land" deletion.

See comment 2.

2. Consumer Surplus.- The GAO report states that RMC utilized the concept of consumer surplus in the ELR. Correctly so. Because the concept of consumer surplus, RMC believes, is very important to correctly resolving the economic loss question for the Tribe, RMC placed an estimated value on consumer surplus losses. Even though the ELR estimates are premised on very preliminary data, this does not take away from a need to determine consumer surplus values. RMC informed GAO that the original ELR report was a "preliminary" report and this was clearly stated on page 25 of the original ELR document. This was so because of funding and time constraints placed on the Tribe by the JTAC review process in 1986. Such restraints did not permit an in-depth research analysis to be made on economic loss at that time.

See comment 3.

To not address the consumer surplus question would mean that such losses will remain an open-ended question. Such unresolved loss issues may result in additional downstream claims on the part of tribal members for economic loss resulting from the Oahe project.

See comment 4.

On the question of substitution effects, the GAO report assumes that traditional economy goods are easily substituted by modern economic goods. Accumulating evidence in the area of natural sciences, especially in the area of natural products, may indicate otherwise. Here again, there remains the need to have the question of substitution of modern goods for traditional goods addressed by an independent research study. If, in the case of Indian natural product utilization such as medicines and herbs, for example, that we find the product is not available in the modern economy and cannot be substituted for, then the economic loss is whole and damages significant. GAO cannot assume away that because a detailed analysis has not been made to determine the value of such losses that therefore such losses did not occur. The best evidence is that they did occur and GAO should not dismiss the consideration of such values because they have not as yet been finally determined.

See comment 5.

3. Timber Resources.- GAO questions RMC's use of data on timber resources. Here, RMC utilized the best alternative data available where there was no accessible data for Standing Rock's timber resources. This is not to say that a BIA archives document search (beyond the scope of the ELR) would not yield such information. RMC assumes that its production figures are the correct ones until otherwise explicitly proven different.

GAO places heavy emphasis on Standing Rock's sawlog production. RMC estimated that sawlog annual production would have only amounted to 643.80 million board feet, Mbf. The more traditional uses of timber resources at Standing Rock were for posts for fencing, poles and cordwood. The uses for these products were estimated to be 2,903.96 Mbf. Sawlog production would then have only amounted 18 percent of the total timber product utilized

annually. The sustainable level of timber resources utilized for posts, poles and cordwood, especially for cottonwood products, is on a much higher level than for sawlog production. (Note: It should be noted that for the past twenty years a viable small industry has existed along the Oahe bottomlands in cutting dead cottonwood trees for use as cordwood. This ongoing harvest of dead trees has continued unabated with little visible improvement in the reduction of dead trees that remain strewn along the impoundments bank's. All of this without any "sustainable" new growth whatsoever - the living trees were all killed by the impoundment.

See comment 6.

GAO questions RMC's estimation that a 40 percent growth in utilization would have taken place between the period 1951 and 1959. They do so by indicating that RMC did not provide any empirical evidence for its assumed growth in tribal population. It is difficult to provide empirical evidence where none exists. RMC estimated population growth based on several indicators. It is well known that Indian populations have been historically hard to count. The U.S. Census Bureau has been aware of the special problems associated with the Indian count for many years and have in the last two censuses taken special care to improve their Indian counts. What is known, at least on Standing Rock, is that the Indian population has been growing as a result of very high Indian birth rates and that the reservation non-Indian population has declined to one-half of its 1960 population.

Indian Public Health records show Standing Rock birth rates to be very high, in the 4 percent range. A 4 percent birth rate will generally result in a population increase, allowing for high mortality rates, of 3%, compounded, over 10 years. The population doubles every 28 years. For example, if the Indian population was 3,000 at any given year, adjusting for high mortality rates, a population would grow to 4,032. This would represent a 32 percent increase in population over a decade period while still allowing for high mortality rates. In fact, the Standing Rock Indian population between 1970 and 1980 grew at a much faster rate according to Census figures. Given every indication, short of "empirical evidence", that Indian population grew substantially during the period in question, RMC will hold with its original estimates of increased timber product utilization by tribal members during that period.

See comment 7.

4. Wildlife and Natural Products.- On the value of wildlife and natural products, the consultant did not assume that there was no costs associated with the processing of these products in the traditional tribal economy. There was the value of labor inputs by the Indian producers. And because the opportunity cost for labor is not zero, it remains that foregone labor has a value as an opportunity cost to build the Oahe project. Of course, this cost has not yet been paid by the government.

See comment 8.

5. Pastureland Productivity.- On pastureland productivity. The consultant is very familiar with pastureland productivity on Standing Rock as his practice as a livestock financial analyst requires a day to day valuation of stocking rates for reservation range cattle. GAO assumes that the MRBI report is accurate in this instance. This is not so. Actual stocking rates on Standing Rock grazing lands run between 18 to 22 acres per cow-calf unit. On a six month basis, which most of the grass is run on, they become even higher. This is certainly true for privately held grazing lands on or near the reservation as well. Of course, foregone losses should be based on real rates and not rates artificially set or otherwise determined (See: Shive's Rangeland and Environmental Consulting, Grazing Rate Study, Standing Rock Indian Reservation, Pagosa Springs, Colorado, August 1983).

See comment 9.

6. Irrigation Lands Taken.- There is good reason to argue that the MRBI estimation of potential irrigable acres lost by the Tribe in the taken area, data the GAO report assumes is correct, is in fact not reliable. Work done by Morrison-Maierle Inc., of Helena, Montana is indicative that early MRBI estimates significantly underestimated the amount of irrigation actually lands lost by the Tribe in the taken area.

See comment 10.

7. Subtracted Rehabilitation Funds.- Finally on page 27 of their draft report, GAO states the consultant did not subtract compensation paid the Tribe for rehabilitation purposes. Of course not. These funds were not and are not compensation payments. Congress never meant such funds to be viewed as part of any compensation package. In fact, several other tribes were provided such funds (the Navajo Tribe, the Mountain Utes and the Southern Ute Tribe) who incurred no dam project condemnations. The "rehabilitation" funds for Standing Rock of that period, are correctly viewed as simple transfer payment to a people who were socially disadvantaged.

The authorization bills for Indian rehabilitation programs of that era were thought of more in terms of incentives for the termination policy than anything else. The concept was: if the United States rehabilitated the Indian people, it would be easier to terminate the federal trust relationship with them.

The architect of this policy was Senator Arthur V. Watkins. And it was his aide, John Jex, at a hearing on the Standing Rock impoundment bill in 1954 who stated flatly to Peter Lookinghorse from the reservation: "So that what we are distributing here, if this bill is authorized, is not funds which you are entitled to as a result of an unlawful (sic) taking of land, but it is the authorization of funds to rehabilitate the members of the tribe who have not at this time been able to establish themselves" (U.S. Congress, Transcripts of Hearings, Proceedings of the Joint Sub-Committee on Interior and Insular Affairs, House of

See comment 11.

Representatives and United States Senate, "Acquisition of Lands for the Reservoir to be Created by the Construction of the Oahe Dam, and Rehabilitation of Indians," Thursday and Friday, July 15 and 16, 1954, Washington, D.C. p. 74).

This completes the RMC review of GAO report findings. The following section is the revised RMC calculation for economic loss which resulted from adjustments made following the Harvard University critique of February 8, 1988.

See comment 12.

The following calculation focuses on direct taking damages for reservation lands and infrastructure as well as on resources foregone due to permanent loss of reservation product and consumer surplus. These estimates differ from those established by the Missouri River Basin Investigations team and are based on the best information available to RMC from sources in early 1986.

RMC used January 1, 1959, as a base price year for determining reservation economic losses. Direct damages are based on 1958 prices, the year that the United States offered a settlement as compensation for the losses suffered by the taking of the tribal homelands. Prices used in this analysis have been adjusted, both forward or backward, to base year prices utilizing the appropriate consumer or producer price index published in the Economic Report of the President for 1985.

Calculations of indirect damages or resources foregone establish an annual loss value. This value is then capitalized to determine the total present value of the loss circa January 1959.

Capitalization is a process which calculates the net present value of a stream of future benefits at a particular interest rate or discount rate. The capitalized value, for example, of an annual income of $1,000 at a rate of 10 percent is $10,000 ($1,000 divided by .10). This method of valuation is utilized because of the permanent loss of reservation product and surplus as a result of the Oahe flooding and is a technique sometimes utilized by appraisers, including the Missouri River Basin Investigations team.

RMC finds that the capitalized value of resources foregone in addition to the direct damages to land and infrastructure approximates just compensation at the time of the taking in 1958. This was the format developed by MRBI economists in 1954 and the one utilized to determine the United States' offer as provided in P.L. 85-915. Allowance is then made for the compensatory payment actually received by the Tribe.

The remaining amount of shortfall in compensation is then brought forward to the present. This is done by utilizing the actual yearly fluctuation in the interest rate for six month treasury

securities since 1959, resulting in a contemporary value compounded annually.

The process of capitalization normally focuses on annual net returns in order to arrive at a capital value. If a real estate investment is being valued, the expected net return (gross revenues minus all expenses) is the amount capitalized. In calculating certain resources foregone, however, one must consider the opportunity cost of the labor input that is foregone. This means that in the areas of timber, natural products, and wild life, the reservation net product loss is the total product value of those resources. This is consistent with the approach taken by MRBI in determining a use value for timber, natural products and wild life. This is the net return to Standing Rock from these resources.

On the other hand, net product plus labor is utilized in determining values for crop and livestock production and irrigation potential. Unlike natural products directly used by residents of Standing Rock, other inputs are required in producing agricultural product besides labor. Costs of production for seed, fertilizer, machinery, interest, feed, medicines, and depreciation must be taken into account before considering the net value of reservation product foregone. These inputs represent, for the most part, external inputs and are not considered in determining economic loss at Standing Rock.

Direct damages estimate a contemporaneous base year value for reservation land and infrastructure.

RESOURCES FOREGONE

Timber Losses.- The river bottom lands along the Missouri that were inundated by the flooding of the Oahe reservoir contained 75% of the timber lands and 90% of the commercial timber at Standing Rock. The timber was directly utilized by residents of Standing Rock in several ways. Logs for construction were processed by several local sawmills and by hand. Poles and posts for building fences and corrals were obtained from the timbered lands and cordwood provided fuel for cooking and heating. The timberlands provided shelter for families and their livestock from the extremes of Dakota winters and summers and provided a habitat for wild game and produce that made up a large part of the residents' diet (See: The U.S. Department of the Interior, BIA, MRBI Report No. 138, Damages to Indians of Five Reservations from Three Missouri River Reservoirs in North and South Dakota, April 1954, Table 7, p. 35).

A study completed by the North Dakota Agricultural Economics Department in April of 1962 estimated the per acre net merchant

volume of timber in the taking area to be 5.773 mbf per acre (See: Jay A. Leitch and Donald E. Anderson, Agricultural Economics Report No. 127, Department of Agricultural Economics, North Dakota State University, Impact of Inundation and Changes in Garrison Diversion Project Plans on the North Dakota Economy, March 1978, Fargo, North dakota, p. 13. 508 million board feet of estimated net merchant volume of timber divided by 88,001 acres of woodland at the time of the taking equals 5,773 board feet per acre). In a timber cruise completed in August 1951, the Missouri River Basin Investigators determined the total number of woodland acres at Standing Rock to be 14,199 (See: MRBI, Report No. 138, op. cit, Table 7, p.35). This means that the total net commercial volume of timber at Standing Rock at the time of the taking was 81,966 mbf. This figure differs significantly from MRBI estimates of 44,900 mbf, indicating that they were too conservative in their estimates in the total timber resource that was available at Standing Rock and the annual harvest sustainable from it (See: MRBI Report No. 138, Table 21, p. 73).

This stand of timber was being harvested by local residents for fuel, fencing and construction needs. Several local sawmills were operating at that time and a potential for additional commercial production of sawed timber existed. Annual harvest from timberlands at Standing Rock averaged 2,500 mbf in a 10 year period form 1942 to 1951. By product, this breaks down into 429 mbf of sawed timber, 299.64 mbf of fence posts, 51.8 mbf of fence poles, and 1981.31 mbf of cordwood (See: MRBI Report No. 138. Table 22, p. 74). RMC estimated an overall increase of 40% in utilization of timber resources by 1959, due to increased population and growth in the commercial timber industry at Standing Rock during the eight year period following the MRBI study. This would bring total utilization to 643.80 mbf of sawed timber, 449.46 mbf of fence posts, 76.92 mbf of fence poles, and 2377.58 mbf of cordwood (See: Robert McLaughlin Company, Analysis of Economic Loss Resulting from Lands Taken from the Standing Rock Sioux Tribe for the Oahe Dam, Solen, North Dakota, April 1986, Table III - 1, p. 37).

In comparing MRBI 1954 prices with advertisements in the local Sioux County Pioneer Arrow, we saw that MRBI unit price estimates were a fair reflection of the use value of timber products (See: Sioux County Pioneer Arrow, Fort Yates, North Dakota, July 1, 1955, p. 3, corner posts for $3.00). Adjusted to 1959, these values result in saw timber at $72.36 per mbf, fence posts at $86.40 per mbf, fence poles at $108.00 per mbf, and cordwood at $48.60 per mbf (See: Council of Economic Advisors, Economic Report of the President, February 1985, p. 291, shows the increase in the consumer price index from 1954 to 1959 was 0.08%. MRBI Report 138, Table 23. p. 76, note 1, the use value of timber resources to the residents at Standing Rock estimated by MRBI was $67/mbf for sawed timber, $100/mbf for poles and $80/mbf for posts). This gives a total annual harvest value of

commercial timber products of $93,726 and a total annual harvest value for cordwood of $115,550. This equals $209,276 annually for all timber products harvested.

With a 90% loss of the commercial timber at Standing Rock, the benefit from this renewable resource is forever lost and today there is no commercial forestry enterprise at Standing Rock. We estimate that elimination of consumer surplus would have caused the price of commercial timber products to rise on a per-unit basis by approximately 50% in 1959. An average increased price of $120 per mbf represents the consumer surplus loss for this good's being permanently removed from Standing Rock. The surplus lost to local consumers amounted to $46,863 for this commodity. The estimated increased cost of cordwood represents not only the direct loss of a source of available fuel for heating and cooking but also the lost surplus of shelter provided by the timber lands. We estimate the elimination of consumer surplus would result in a price increase of 100% for cordwood. The surplus lost to local consumers amounted to $115,550. The total consumer surplus loss for all timber products harvested is $162,413.

The capitalization rate used by MRBI was 4% (See: MRBI Report 138, op. cit., p. 13). In assessments of property values, income capitalization is frequently used, among others, to assess the value of properties. The valuations are usually valuations of real estate purchases for various uses. In the case of farm real estate, for instance, farm valuation for tax purposes in North Dakota is based on a combination of a gross farm rental rate, a market capitalization rate, and the rate at which the Federal Land Bank is loaning funds (See: Glenn Pederson and Jerome Johnson, Department of Agricultural Economics, North Dakota State University, Staff Paper series AE 85002, "What is Agricultural Land Value?," March 1985, Fargo North Dakota, pp. 1-10).

Important in determining a capitalization rate is the intended use of the property, the stream of benefits over the life of the investment, and various factors of risk. Typically an analyst will start with a base "safe" rate, the rate of return on long-term, low-risk government bonds, and add points for various measures of risk, such as location, management, market, and intended use (See: Raleigh Barlowe, Land Resource Economics, Englewood Cliffs: Prentice-Hall, 1958, pp 187-201).

In the case of the taken lands, the government did not plan to run a commercial timber enterprise or go into farming. The lands were being condemned for use in a public flood control, power generation, downstream navigation, irrigation, and recreational project. The stream of economic and financial benefits from this project would be considerably greater and would last much longer than the normal real estate investment for agricultural or rental purposes. The accompanying risks would be close to zero. If the

Tribe were willingly selling the Missouri River bottom lands to buyers intending various commercial enterprises, higher capitalization rates would be justified, given the various risk factors involved. However, the land was not being sold willingly and, in fact, was being taken under threat of condemnation. Therefore, we chose as a capitalization rate the average Federal Funds rate for the five year period 1955 to 1959, which was 2.5%, a rate which fairly represents the investment risk to the government of this particular investment (See: Council of Economic Advisors, Economic Report of the President, op. cit., p. 310). However, based on the Harvard review and our agreement on the issue of consistency, this rate has been moved to 3.83 percent.

The annual fair market value for timber product lost is $209,276 and the annual consumer surplus loss is $162,413, for a total annual timber product loss of $371,690 (See: Table 1 for the capitalized loss).

Natural Products.- The timber lost to the inundation created corresponding losses of natural products that were dependent on the woodland environment. To the residents of Standing Rock, these natural products were an irreplaceable source of nutritional, cultural, recreational, and spiritual value. Wild fruits such as plums, june berries, grapes, and buffalo berries are in scarce supply today. Many species of natural vegetable and medicinal products can no longer be found locally because of the loss of the physical environment they were dependent upon.

The Standing Rock settlement bill, H. R. 5608, set the value of the annual harvest of these products at $20,000. At an average price per bushel of $3.50 in 1955, the average quantity harvested would be 5,714 bushels of natural products. Processed primarily by drying and some home canning, this would represent 140 pounds of dried fruit per year per family for the 408 families at Standing Rock who were utilizing these resources (See: MRBI Report 138, op. cit., p. 79, One bushel equals 50 pounds of fresh fruit and equals 10 lbs of dried fruit).

With the loss of 75% of the woodland area at Standing Rock, this valuable commodity was almost completely eliminated. Today the wild fruit that does exist is not available at all in some years. This is a result of exposure to weather extremes on the upland prairie areas that can completely destroy all the fruit available in that season. We estimate that the value of this commodity locally has risen on a per unit basis by approximately 300% as a result of this loss. An average increased price of $15.12 per bushel represents the consumer surplus loss for the decreased availability of this good as a result of the flooding. The fair market value of the product lost to the reservation was $20,000 and the surplus lost to local consumers amounted to $64,800, for a total yearly economic loss for this commodity of

$84,800 adjusted to 1959 prices (See: Council of Economic Advisors, Economic Report of the President, op. cit., p. 291. Consumer price index increase from 1955 to 1959 of 8%). See Table 1 for the capitalized rate for this product loss.

Wildlife Loss.- As a result of the loss of timberlands and natural products the big game, upland game, and fur game resources of the reservation were also decimated. A U.S. Fish and Wildlife Service survey estimated the value of wild life in the taken area of Standing Rock to be $60,300, based on 1936 to 1944 prices (See: MRBI Report 138, op. cit., Table 24, p. 78). The value of the annual harvest of these products was estimated in 1950 by the Standing Rock game conservationist of the Bureau of Indian Affairs to be $86,160 (See: MRBI Report 138, op. cit., p. 29). These estimates were based on loose knit information available to agency personnel or by surveys taken in areas adjacent to the reservation. We estimate the actual harvest of game taken to be much higher, as it was a primary source of protein for most resident families at Standing Rock. At an average annual use of 500 pounds of meat per family, this would amount to 208,000 pounds of meat per year by an estimated 60% of the families at Standing Rock that made use of the taken area wood lands. RMC believes this estimate is probably conservative, as the Missouri River bottom lands were a prime habitat area for all species of game. At an average 1959 value of $.54 per pound for all types of meat (dressed weight), the annual average harvest could be valued at $112,320. With an additional $8,748 estimated by the Fish and Game service as the value of the fur bearing game in the taken area, the total annual harvest value of wild game from the taken area can be estimated at $121,068 (See: MRBI, Report 138, op. cit., Table 24, p. 78).

The inundation, however, radically altered game habitat and removed game and its accessibility from inhabited areas. The resulting decrease in game populations locally and their accessibility resulted in an estimated increased cost to residents at Standing Rock of 100%. An average increased price of $1.08 per pound of meat and $26.24 per fur animal represents the consumer surplus loss for the decreased availability of this good. The fair market value of the product lost to the reservation was $121,068 and the surplus lost to local consumers amounted to $116,694, for a total yearly economic loss for this commodity of $237,762 adjusted to 1959 prices.

Agricultural Losses.- The bottom lands flooded by Oahe represented the most productive agricultural lands on the reservation in 1959. According to North Dakota agricultural statistics published by the NDSU Department of Agricultural Economics, net returns per acre in 1959 averaged $5.08 (See: Fred R. Taylor, Carol S. VavRosky, and Donald F. Scott; North Dakota

State University, Department of Agricultural Economics, north Dakota Agricultural Experiment Station, "Statistics of North Dakota Agriculture," June 1981, Fargo, North Dakota, pp. 3 and 64. $3,759 net income divided by 740 acres per farm.

Of the 55,944 acres of reservation land taken by the project, 54,302 acres were classified as agricultural lands. Subtracting 14,199 acres of timbered lands and 1,379 acres of crop land, 38,724 acres of land were available for livestock use, primarily in cow/calf operations (See: MRBI, Report 138, op. cit., Table 7, p. 35, Table 8, p. 37). At an average of one cow/calf unit per 20 acres, 1,936 cow/calf units could be supported by the lands taken. Cow/calf operations typically average an 84% calf birth rate and 68% of calves born are shipped to market (See: Wayne E. Stephens, the Bureau of Indian Affairs, Planning Support Group, Report Number 200, The Standing Rock Reservation Livestock Production Alternatives, Table 1, p. 6). At an average 1959 price of $27.60 per cwt and an average weight of 400 pounds, this represents a total annual income of calf production from taken lands of $122,085. Added income from marketings of cull cows at an average of 16% of the cow herd numbers would yield an additional $65,049, based on an average weight of 1,000 pounds and a 1959 price of $21.00 per cwt (See: "Statistics of North Dakota Agriculture," op. cit., p. 32). This amounts to an annual gross income from livestock lands of $4.83 per acre. At an average production cost of $2.08 per acre, the net return to the local rancher is $2.75 per acre (See: Stephens, op. cit., Table 4, p. 11. Total production costs of $100.32 per cow unit for average management less $17.60 hay costs and $30.00 grazing fees). This represents an annual economic loss to Standing Rock of $106,491 in 1959. In addition to this production loss, however, is the added loss of consumer surplus as a result of the lost sheltered pasture land and associated increased costs of dealing with a harsher climate on the upland benches. We estimate the added production cost in maintaining cattle weights to increase by 30% representing a consumer surplus loss of $31,947, for a total economic loss of $138,438.

1,379 acres of actual crop land were lost to the impoundment. In their 1978 study on the impact of the Garrison project on North Dakota's economy, Leitch and Anderson calculate a return over cost of $31.76 per acre for dryland crops in the taken area. Not included in this net revenue figure are the costs for hired labor of $6.59 per acre (See: Leitch, op. cit., p. 48). Since hired labor at Standing Rock would be family members, we estimate that the net product of dryland crops to be $38.35 per acre in 1977 dollars. Adjusted to 1959 dollars, this amounts to $19.37 per acre. This represents an annual economic loss to Standing Rock of $26,711.

MRBI reported an estimated 7,844 acres of potential irrigation

land in the taken area (See: MRBI Report 138, op. cit., Table 26, p. 83). The Leitch and Anderson study, however, indicates a much larger potential for irrigation in the taken lands. RMC estimates the potential for irrigation of taken lands at Standing Rock to be approximately 16,000 acres, or 28.6% of the total fertile bottom lands. Leitch and Anderson estimate a net return of $60.38 for irrigated lands in the taken area. This return includes a $12.85 cost per acre for hired labor. Again assuming that hired labor represents an opportunity cost we estimate the net product of irrigated land to be $73.23 per acre between irrigated and dryland crops on inundated lands of $34.88. This represents a 1959 dollar value of $17.61 per acre, or an annual economic loss to Standing Rock of $24,284 for the irrigation potential on the dryland cropping acres.

The remaining 14,621 acres of irrigation potential are livestock lands. In 1977 dollars the net product of irrigation lands including the opportunity cost of labor was shown above to be $73.23 per acre. Adjusting to 1959 dollars gives an irrigation net product value of $36.98 per acre. The difference in net returns between land utilized for livestock production at $2.75 per acre and irrigation at $36.98 per acre is $34.23. This amounts to an annual economic loss of $500,477 (See: Leitch, op. cit., pp. 48 - 49).

The total agricultural product loss as a result of impounded lands in 1959 dollars was $689,911 (See: Table 1).

Other Labor.- In the calculations of economic loss, the opportunity cost of labor has been included in the product or net product value. This does not account for, however, the opportunity cost of labor utilized in housing and other construction. Families from across the reservation made use of the local timber resources for construction of log homes. RMC estimates that 15 total homes would be built, replaced or substantially repaired during the year. Additionally, labor foregone from building corrals and other timber related construction is included in this category. We estimate the yearly economic loss for other labor for related construction activity to be $38,000.

DIRECT DAMAGES

Damages to Water.- Supplies of potable water and accessible livestock watering sites were lost in the impoundment. Springs, streams and wells that supplied reliable high quality water were lost forever. These supplies had to be replaced by water of inferior quality at a high cost to local consumers. Currently wells cost approximately $12.00 per foot to drill and must be

drilled to an average depth of 200 feet to obtain water that many times has a high mineral content and must be softened or filtered to provide fresh, clear water at a quality close to that which was lost (Note: Information obtained from interview with local real estate businessman on water quality and costs; Solen, ND, April 1986). Current costs for water run approximately $200 per year per household (Note: Current Standing Rock Water and Sewer Rates, April 25, 1986 in telephone interview with Lonna Gipp, Finance Office, Standing Rock Housing Authority, Fort Yates, North Dakota. $19.00 per home per month including sewer). This represents a cost in 1959 dollars of $55 per household affected. MRBI reported 190 families affected by the inundation (See: MRBI, Report 138, op. cit., Table 16, p. 59). The loss of fresh water to families at Standing Rock can be conservatively estimated at $10,450 per year. In addition to household use, ranchers were required to build dams to collect water for stock. MRBI estimated a one time cost of providing stock watering sites at $1,100 (See: Ibid., p. 59). Since stock dams, however, have a tendency to wash out periodically, this cost continues into the future. For the 50 ranches moved this cost could reasonably be expected to average $110 per year for each ranch, at total cost of $5,500 per year in 1959 prices. Total water supply losses of $15,950 per year capitalized at 2.5% would equal a $638,000 economic loss for this resource.

Damages to Land.- The original damages to land component has been deleted from these report findings as it was found to be a double counting error. $3,356,640 has been deducted from Table 2 of the original report.

Loss of the River Bed.- 22,000 acres of river bed was lost in addition to the 55,955 acres of bottom land. In 1958 the Tribe suggested the value of the river bed was $133,380, or $6.06 per acre. This figure was not included in the settlement offered by the United States. RMC believes the value of the riverbed to exceed $6.06 per acre in 1959 prices. We suggest the Tribe research the value of the bed to determine a new opportunity cost for the bed. The present study utilizes the $133,380 figure in lieu of any other available data to determine cost (See: Michael L. Lawson, Dammed Indians, the Pick-Sloan Plan and the Missouri Sioux, 1944 - 1980, Norman: University of Oklahoma Press, 1982, p. 121).

Damages to Roads.- Ninety-five miles of bottom land road from Cannonball to Mobridge and approximately twenty-four miles of private access roads were lost to the impoundment. According to Aaron Dalke, a North Dakota State Highway Department Engineering Technician, class 3 gravel roads typically used by counties for farm to market roads cost an estimated $75,000 per mile to

construct in today's dollars (From: Telephone conversation on April 30, 1986 with Aaron Dalke, Engineering Technician, North Dakota State Highway Department, Program and Development Division, Bismarck, North Dakota). Adjusted by the producer price index for construction, this represents a 1958 value of $23,000 per mile. The total value of the main river bottom road is therefore estimated at $2,185,000. In addition to the main road, RMC estimated approximately 23.75 miles of private access roads were lost to the 190 families who were affected by the inundation. The total value for these private roads was calculated on a basis of 1/8 of a mile of road per family at a cost of $10,000 per mile. This equals an additional $760,000 for damages to private access roads.

Damages to Housing.- In addition to the direct damages to the land, water, and road system, the replacement housing that was provide proved to be totally inadequate. The "650" houses, so called because they cost $650 dollars to build, lasted only a few years and had to be replaced. In our calculations above for direct damages to land, we did not calculate for improvements. MRBI and other appraisers did not place much value on the existing housing stock along the bottom lands. The log cabins and frame houses along the river bottom were sheltered and protected by the woodlands and adequate replacement housing on the treeless prairie would have required a much larger investment per house. Most had garden plots and summer shade structures. The river bottom environment was cool in the summer and protected in the winter and within easy reach of important fuel supplies. It is this direct value for the log cabin and associated environment which RMC values here. The value of housing lost in terms of 1959 values is estimated to be $4,000 per unit. This results in $760,000 for housing stock lost to the impoundment.

Other Damages.- Other direct damages to the reservation were ultimately overlooked by the MRBI, Corps of Engineers and Congress. Three rodeo arenas located in Cannonball, Fort Yates and Kenel were lost to the impoundment. These are valued at $25,000 each, for a total loss of $75,000. Two race tracks located in Cannonball and Fort Yates were lost, each valued at $15,000, for a total of $30,000. Three sawmills located in Cannonball, Fort Yates and Kenel, which provided both commercial product and employment, were lost. Each sawmill is valued at $10,000, for a total of $30,000. Finally several monuments were flooded with an estimated value of $3,000.

Total direct damages at Standing Rock as a result of the Oahe impoundment are valued at $4,091,880.

TABLE - 1

STANDING ROCK ECONOMIC LOSS

ITEM	UNIT	ANNUAL USE	PRODUCT VALUE	SHADOW FACTOR	SHADOW PRICE	PRODUCT/NET PRODUCT	CONSUMER SURPLUS	ECONOMIC LOSS	CAPITAL VALUE
FOREGONE RESERVATION NET PRODUCT (INDIRECT DAMAGES) S								RATE: 3.83%	
TIMBER PRODUCTS									
LOGS	Mbf	643.80	72.36	0.50	108.54	46,585	23,293	69,878	
POSTS	Mbf	449.46	86.40	0.50	129.60	38,833	19,417	58,250	
POLES	Mbf	76.92	108.00	0.50	162.00	8,307	4,154	12,461	
CORDWOOD	Mbf	2377.58	48.60	1.00	97.20	115,550	115,550	231,100	
TOTAL TIMBER		3547.76				209,276	162,413	371,690	
WILD FRUITS & VEGETABLES		5714.29	3.78	3.00	15.12	20,000	64,800	84,800	
WILD LIFE, GAME, FUR									
BIG GAME	lbs	194000.00	0.54	1.00	1.08	104,760	104,760	209,520	
FUR ANIMALS	no.	500.00	17.50	0.50	26.25	8,750	4,375	13,125	
UPLAND GAME	lbs	14000.00	0.54	1.00	1.08	7,560	7,560	15,120	
TOTAL WILD LIFE						121,070	116,695	237,765	
CROP/LIVESTOCK PRODUCTION									
CROPS	acres	1379.00	19.37	0	19.37	26,711	0	26,711	
IRRIGATION	acres	1379.00	17.61	0	17.61	24,284	0	24,284	
LIVESTOCK	acres	38724.00	2.75	0.30	3.58	106,491	31,947	138,438	
IRRIGATION	acres	14621.00	34.23	0	34.23	500,477	0	500,477	
TOTAL CROP/LIVESTOCK						657,963	31,947	689,911	
OTHER LABOR	no.	19.00	2000.00			38,000		38,000	
TOTAL FOREGONE RESERVATION NET PRODUCT (INDIRECT DAMAGES)						1,046,310	375,856	1,422,165	
								1,422,165/0.0383 = 37,132,245	

TABLE - 2

STANDING ROCK ECONOMIC LOSS - DIRECT DAMAGES

ITEM	UNIT	QUANITY	VALUE	TOTAL VALUE
DIRECT DAMAGES TO WATER, LAND AND INFRASTRUCTURE				
DOMESTIC WATER	families	190	55	418,000
RANCH WATER	ranches	50	110	220,000
LAND	(deleted in 1991 revision)			-0-
RIVERBED LOSS	acres	22,000	6	133,380
MAIN RIVER ROAD	miles	95	23,000	2,185,000
PRIVATE ROADS	miles	24	10,000	237,500
HOUSING	families	190	4,000	760,000
RODEO ARENAS	no.	3	25,000	75,000
RACE TRACKS	no.	2	15,000	30,000
SAWMILLS	no.	3	10,000	30,000
MONUMENTS	total			3,000
TOTAL DIRECT DAMAGES				4,091,880
TOTAL INDIRECT DAMAGES (From Table 1)				37,132,245
TOTAL ECONOMIC LOSS				41,224,125
1959 SETTLEMENT (LAND, DIRECT & INDIRECT)				(5,251,553)
ADDITIONAL COMPENSATION AS OF 1959				35,972,572
1990 VALUE @ 6.52% AVE. FED RATE				271,502,000

ECONOMIC LOSS AND ADDITIONAL COMPENSATION

The total economic loss of net reservation product as a result of the inundation of reservation lands by the Oahe project amounts to $37,132,245 in 1959 dollars. This represents a net reservation product loss of $1,046,310 and a total consumer surplus loss of $375,856, for a total annual economic loss of $1,422,156. Capitalized at 3.83% (the revised rate after the JFK Harvard evaluation), this equals a total net reservation product loss of $37,132,245.

Total direct damages add another $4,091,880, for a total economic loss of $41,224,125. The settlement received by the Standing Rock Sioux Tribe in 1959 for direct and indirect damages amounted to $5,251,553 (See: Marvin J. Sonosky, Memorandum No. 4, to Standing Rock Sioux Tribal Council, September 3, 1958). This represents only 12.7% of the RMC estimated real economic loss incurred by the Tribe as a result of the impoundment. After deducting the direct and indirect payment for losses made by the United States in the amount of $5,251,553, the additional compensation which should have been paid the Tribe in 1958 comes to: $35,972,572.

In 1990 dollars, the shortfall in compensation - based on actual six-month treasury security interest rates between 1958 and 1990 would have been $271,502,000 (See: Council of Economic Advisors, Economic Report of the President, op. cit., p. 310). This amount represents the additional compensation that was due the Tribe at the time of the 1991 revisions of the Economic Loss Report analysis.

Sincerely,

Robert W. McLaughlin

The following are our comments on the Standing Rock consultant's letter dated March 6, 1991.

GAO Comments

1. MRBI documents indicate that in many ways the reservation and surrounding non-Indian economies were similar. For example, Standing Rock Indians leased reservation grazing land to non-Indians, were employed off the reservation, shopped off the reservation, and sent their children to schools off the reservation. Thus, the Indians and non-Indians had some agreement as to the rental price of the land, wages earned in employment, and prices paid for goods.

We believe that the Indians had other opportunities for employment, both on and off the reservation. That is, we believe that the opportunity cost of Indian labor was not zero. In addition, we believe the Indians incurred production costs in producing timber and other natural products. Indeed, MRBI Report No. 138 stated that cash outlays for timber harvesting were probably considerable for some Indians. Thus, we believe that the consultant should have accounted for the costs (that is, labor, equipment, and production costs) the Indians incurred in harvesting and transporting timber and producing wood products and in harvesting natural products and wildlife.

2. The consultant acknowledged the double-counting error in his original analysis.

3. The consultant acknowledges that his economic loss estimate is based on very preliminary data. We believe that there is not sufficient evidence from the time the land was acquired to support the consultant's analysis.

4. The consultant assumed that prices for timber and other natural products increased by 50 to 300 percent as a result of inundation by Oahe Reservoir. For example, the consultant stated that the price of wild fruit increased by 300 percent as the result of the loss of 75 percent of the reservation's woodland. The consultant did not provide evidence that prices increased at this rate. Furthermore, we believe that, even if prices would have increased to this level, it is unlikely that Indians would have continued to consume the same amount of these products at such higher prices. Rather, we believe that the Indians would have switched to other similar products.

5. The consultant used information based on the Garrison area (that is, Fort Berthold) to estimate timber productivity at Standing Rock Reservation. MRBI Report No. 138 (which the consultant cites), indicates that the commercial timber volume per acre in the Standing Rock taking area was less than the consultant's estimate.[1] We believe that it is inappropriate to use information from the Garrison area when information from the Standing Rock area is available.

6. Our main criticism was that the consultant assumed an annual harvest level (based on wood-product utilization) in 1959 and beyond that was nearly three times the estimated sustainable harvest level reported by MRBI (see MRBI Rep. No. 138, page 73). This assumption is inappropriate because it does not take into account the limited production capability of Standing Rock forestland.

7. The consultant assumed that wood utilization (that is, consumption of wood products) increased by 40 percent between 1951 and 1959 because of increases in tribal population and additions to the commercial timber industry at Standing Rock. As noted in our comment 6, this assumption does not take into account the limited production capability of the Standing Rock forestland. In addition, the consultant provided no evidence that would validate either a significant increase in population or an increase in investment required to increase the commercial timber industry at Standing Rock. We note that MRBI Report No. 151 indicates tribal population increased only by 25 percent over the 10-year period between 1945 and 1955.

8. We agree that the opportunity cost of labor was not zero. This means that the cost of labor should be subtracted from the value of products produced on the reservation. The consultant did not account for these costs in its economic analysis.

9. The MRBI report we referred to provided evidence of rangeland productivity at the time the land was acquired. The statements presented by the consultant, while providing more recent information on productivity, would not necessarily be indicative of the situation at the time the lands were taken.

[1]MRBI Rep. No. 138 indicates that commercial timber volume per acre was approximately 3.2 mbf in the area that was acquired at Standing Rock Reservation. This estimate is lower than the consultant's estimate of 5.773 mbf of net merchantable volume per acre at Standing Rock.

10. Our main criticism was that the consultant's estimate of irrigable acres at Standing Rock was based on the number of irrigable acres inundated by Oahe Reservoir in all of North Dakota. The amount of Standing Rock land used for the Oahe Reservoir was about half the total land inundated by the reservoir in North Dakota.

11. The legislative history contained in House Report No. 2498 of June 27, 1956,[2] (page 9) discusses funds provided for tribal rehabilitation. It states that "The complete tribal rehabilitation item is plainly connected with and directly related to the main purposes and objectives of the bill (H.R. 5608, which would provide for acquisition of Standing Rock lands for the Oahe project), necessitated by the taking of the control of the Missouri River and all of its adjacent bottom, timber, and benchlands away from the tribe as a whole and thereby depriving them of their most valuable natural resources and requiring them to adopt new and different methods of maintaining themselves in ordinary standards of life and health, and to provide for their future development, improvement, and progress to complete and permanent independence of Government guardianship and maintenance."

12. Since our work was focused on the studies supporting the JTAC recommendations, we did not review the consultant's latest analysis. The consultant did not indicate the extent to which it addressed all the problems we had noted.

[2]Providing for the Acquisition of Lands by the United States Required for the Reservoir Created by the Construction of Oahe Dam on the Missouri River and for Rehabilitation of the Indians at Standing Rock Sioux Reservation in South Dakota and North Dakota, House Rep. No. 2498, to accompany H.R. 5608 (June 27, 1956).

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.

Charles S. Cotton, Assistant Director-in-Charge
Charles W. Bausell, Jr., Assistant Director for Economic Analysis
Paul O. Grace, Assistant Director
Ralph J. Domenick, Evaluator-In-Charge
Timothy J. Guinane, Principal Economist

Ordering Information

The first five copies of each GAO report are free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877

Orders may also be placed by calling (202) 275-6241.

United States
General Accounting Office
Washington, D.C. 20548

Official Business
Penalty for Private Use $300

First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100