



United States Department of the Interior

BUREAU OF RECLAMATION

Dakotas Area Office

P.O. Box 1017

Bismarck, North Dakota 58502



IN REPLY REFER TO:

DK-5000-12-01

ENV-6.00

APR 16 2013

Dear Interested Party:

The Bureau of Reclamation, Dakotas Area Office, has prepared a final environmental assessment (EA) for the issuance of long term (up to 40 years) Pick-Sloan Missouri Basin Program water and power contracts and reorganization of Lower Heart Irrigation Company and Individual irrigator contracting to become members of the Western Heart River Irrigation District, a new irrigation district, or other irrigation entity.

Reclamation has proposed to enter into long term irrigation water service contract renewal with the Company and the numerous individual water service contract holders and/or enter into a water service or repayment contract with the Western Heart River Irrigation District (District) or other entity and an electric power service contract with the District to increase the project use power "Contract Rate of Delivery" or CROD. No new acreage is being considered under the proposed action.

As the lead Federal agency, Reclamation is responsible for ensuring compliance with environmental and cultural resource laws. The EA evaluates the potential impacts to the human and natural environment associated with the proposed action, to issue long term Pick-Sloan Missouri Basin Project water and power contracts.

If no unaddressed significant environmental effects are identified during the review period, Reclamation will sign a Finding of No Significant Impact and proceed to issue a temporary water service contract and special use permit until long term contracts can be signed. However, if unaddressed significant environmental effects are identified during the review period, Reclamation will consider the preparation of a supplemental EA or the preparation of an environmental impact statement (EIS).

Reclamation defines significance in accordance with 40 CFR 1508.27 in reference to context and intensity.

We would appreciate your review and comments on the EA by May 15, 2013. Anyone interested in obtaining a copy of this document should write: Richard L. Long, Area Manager, Dakotas Area Office, Bureau of Reclamation, P.O. Box 1017, Bismarck, ND 58502 or contact - Kelly McPhillips at 701-221-1287 or via e-mail at kmcphillips@usbr.gov.

Sincerely

Richard L. Long
Area Manager

Enclosure

RECLAMATION

Managing Water in the West

DK-5000-12-01

Final Environmental Assessment

Irrigation Water Service and Power Contracts for Heart Butte Unit, Heart Division - Morton and Grant Counties, North Dakota

Heart Butte Unit-Pick-Sloan Missouri Basin Program



U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Dakotas Area Office

April 2013

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Mission Statements

Department of the Interior

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Irrigation Water Service and Power Contracts for Heart Butte Unit, Heart Division – Morton and Grant Counties, North Dakota

Lead Agency
United States Department of the Interior
Bureau of Reclamation
Great Plains Region
Dakotas Area Office
Bismarck, ND

NO. DK-5000-12-01

For further information regarding this Environmental Assessment, contact:

Kelly McPhillips
PO Box 1017
Bismarck ND 58502
701-221-1287
FAX - 701-250-4590

kmcpillips@usbr.gov

February 2013

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List of Acronyms and Definitions

Action Area - All areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action

Affected Area (also “area affected”) - Under NEPA analysis Grant and Morton Counties adjacent to the Heart River represent the affected area.

BMP’s - Best Management Practices as commonly accepted.

Corps - U.S. Army Corps of Engineers

Critical Habitat - A specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection.

Company - The Lower Heart Irrigation Company, a company that administers a water service contract with Reclamation for providing water service to irrigate Heart Butte Unit lands with water from Heart Butte Reservoir.

Connected Actions - Connected actions are those that are “closely related” to the proposal and alternatives. Connected actions automatically trigger other actions, they cannot or will not proceed unless other actions have been taken previously or simultaneously, or they are interdependent parts of a larger action and depend on the larger action for their justification (40 CFR Part 1508.25).

Contract or Contract Instrument - The term “contract instrument” or “contract” is used throughout this document to refer to the option of entering into a long-term water service contract, repayment contract, or amendment to Contract No. 049E620012.

District - The Western Heart River Irrigation District, a federally constructed irrigation district.

Division - The Heart Division of the Pick-Sloan Missouri Basin Program.

EA - Environmental Assessment

EIS - Environmental Impact Statement

Environmental Mitigation Commitments - These are commitments included as an inseparable component of this Proposed Action. They are designed to offset potential for significant environmental effects resulting from the Proposed Action. These commitments will be implemented to (1) prevent, minimize, or offset the occurrence of potential for adverse environmental effects and (2) ensure compliance with applicable Federal and State regulations designed to protect fish and wildlife resources, important habitats and sensitive areas, cultural and paleontological resources, human health and safety, and the public interest.

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ES - U.S. Fish and Wildlife Service, Ecological Services Office, Bismarck, ND

ESA - Endangered Species Act of 1973

FONSI - Finding of No Significant Impact, the decision document that concludes an EA

NDDH - North Dakota Department of Health

NEPA - National Environmental Policy Act of 1969 as amended

NHPA - National Historic Preservation Act of 1966 as amended

NRCS - U.S. Department of Agriculture, Natural Resources Conservation Service

OM&R - Operation, Maintenance & Replacement

Perfected surface water permit - Water permit No. 250B obtained by the Bureau of Reclamation from the North Dakota State Water Commission for the storage of water in Heart Butte Reservoir and putting the water to beneficial use.

Primary Constituent Elements - Primary constituent elements are those physical and biological features of a landscape that a species needs to survive and reproduce.

PSMBP power- Pick-Sloan Missouri Basin Program project use power reserved for authorized PSMBP projects.

Reclamation - U.S. Department of the Interior, Bureau of Reclamation

ROW - Right-of-Way

Service - U.S. Department of the Interior, Fish and Wildlife Service

Surcharge Storage - water storage capacity between the top of exclusive flood control (elevation 2094.5) and the Design Maximum Water Surface (elevation 2119.5).

SWC - North Dakota State Water Commission

Unit - The Heart Butte Unit of the Heart Division

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Chapter 1

Introduction

This environmental assessment (EA) will evaluate the potential effects to the human and natural environment for issuance of a long term water service contract or contracts to provide continued irrigation of lands currently within the Lower Heart Irrigation Company (Company) and lands provided water through individual water service contracts directly with the Bureau of Reclamation (Reclamation). The existing irrigated lands are along the Heart River and are provided water service from Heart Butte Reservoir.

Reclamation has proposed to enter into a long term irrigation water service contract renewal with the Company and numerous individual water service contract holders and/or enter into a water service or repayment contract with the Western Heart River Irrigation District (District) or other entity and an electric power service contract with the District to increase the project use power “Contract Rate of Delivery” or CROD.

In 1992 Reclamation completed an EA that examined the cumulative effects of irrigating varying magnitudes of acreage and signed a Finding of No Significant Impact (FONSI) for the irrigation of up to 10,000 acres (Reclamation 1992). The outcome of Reclamation’s 1992 EA did not change the Heart Butte Unit authorized acreage of 13,100 acres. This proposed action would a) reorganize the irrigation entities; b) not alter the total acres of currently irrigated lands; c) would not alter the 10,000 acre maximum identified in the cumulative effects analysis for the Heart Butte Unit; and d) make additional Pick Sloan Missouri Basin Program (PSMBP) “project use power” available for eligible irrigators.

Purpose and Need for the Action

The purpose of this Federal action is to provide for continued beneficial use of a federally developed water project and consolidate the wide array of irrigation organizations and contracts into a single irrigation district, to the extent possible, for the benefit of the irrigators and Reclamation’s administration of their contracts. Inclusion of the Company and individual contract lands into the District or a new irrigation district would provide the opportunity for those lands to receive Pick-Sloan Missouri Basin Program “project use power” for first lift pumping of irrigation water. The Reclamation Act of 1956 requires Reclamation to provide water users holding long term contracts (in excess of 10 year terms) a first right of renewal to a stated share of a project’s available water supply, as well as the right to convert from a water service contract to a repayment contract.

The need for the Federal action includes:

- Existing long-term water service contracts with the Company and individual contract irrigators expire at the end of 2013,

- A new contract or contracts with the Lower Heart Irrigation Company and individual water service contract holders would provide for continued delivery of Heart Butte Unit

project water for irrigation, and repayment of the unpaid balance of allocated costs associated with the construction of Heart Butte Dam and associated water conveyance facilities as they apply, and

Reorganization of the numerous irrigation contracts, organizations, and individuals to their benefit and the benefit of the federal government.

Specifically, this analysis examines the reissuance of the long-term contract with the Company and/or administrative changes relative to District and/or Company organization.

Decisions to be Made

- a) Should Reclamation enter into a long term water service contract renewal with the Company and include lands currently under individual water service contracts in the Company, with minor changes to the articles of the existing contracts?
- b) Should Reclamation amend the existing District water service contract to consolidate the individual contract holder acreage and/or all of the Company share holder's acreage?
- c) Should Reclamation include the remaining difference in acreage, between the 7,699.8 irrigated acres currently served and the 10,000 acres for which Reclamation signed a FONSI in 1992 or 2,300.2 acres, into the amended or new contract?

Background and History

Heart Butte Dam, located on the Heart River about 15 miles south of Glen Ullin, North Dakota, and the Heart Butte Unit (Unit) were authorized in Section 9 of the Flood Control Act of 1944 (S. Doc. No. 247, 78th Cong., 2nd sess) created in the Pick-Sloan Missouri Basin Program (PSMBP) formerly called the Missouri River Basin Project. The dam, completed in December 1949, was constructed to provide: flood control benefits to the entire Heart River Valley, an irrigation water supply to serve 13,100 acres in the Heart Butte Unit with water service from Heart Butte Reservoir, sedimentation control, fish and wildlife conservation, and recreation benefits.

Heart Butte Reservoir (Lake Tschida), impounded by the dam, has a total storage capacity of 435,970 acre-feet: 221,801 acre-feet is flood surcharge storage (51%), 147,027 acre-feet is exclusive flood control storage (34%), 61,915 acre-feet is controlled "active conservation storage" for project purposes (14%), and 5,227 acre-feet is for dead storage (1%). Active conservation storage is available for project purposes including downstream irrigation. The first water storage in Heart Butte Reservoir was in October 1949. In addition to irrigation, the Unit has since provided flood protection, particularly to the city of Mandan, even as recently as 2009 and 2010. The dam and reservoir are operated and maintained by Reclamation.

Water Rights. The North Dakota State Water Commission issued Reclamation a perfected surface water permit (permit number 250B) for up to 75,785.0 acre-feet of water storage annually in Heart Butte Reservoir for multiple purposes, including irrigation of up to 13,100.0 acres. The priority date of this water permit is March 13,

1946. The proposed contract instrument will utilize this water permit. The maximum amount of water delivered to project irrigators is based on beneficial use as defined by the State of North Dakota water law. Fish and Wildlife and recreation benefits, although popular, are lesser value benefits and therefore not permitted uses under water permit number 250B. Further, North Dakota Century Code Section 61-04-15.1 prohibits changing the use under a water permit from irrigation to recreation or fish and wildlife benefits according to then Chief Engineer, David Sprynczynatyk (Reclamation 1992).

The Heart Butte Unit was initially divided into the Eastern, Central, and Western Portions. Development was to include river pumping plants, relift plants, and a system of canals and laterals along the Heart River from Heart Butte Dam to the confluence with the Missouri River. Lands to be irrigated were originally developed by the individual irrigators to enable flood/gravity irrigation of the lands. Many of the irrigators have now converted to overhead sprinkler systems. Project-use power for pumping was to be supplied by Reclamation under the PSMBP.

Potential irrigators abandoned the original Heart River Irrigation District by vote. The Western Heart River Irrigation District did not contract with Reclamation until 1954 and recently renewed their long term contract for 2,593 acres in 2005. The Lower Heart Irrigation Company formed and in 1974 entered into a long-term contract with Reclamation to consolidate numerous temporary individual contracts with water users who needed a long-term water commitment to facilitate financial arrangements to develop lands for irrigation. Following an irrigation development period, the Company's service contract was set at 3,103 acres for the remainder of the 40-year contract.

Additional operators came forward that desired to irrigate lands in excess of the 3,103 acres available through shares in the Company. Neither the Company nor the District could absorb the additional irrigators. Therefore, Reclamation again entered into individual water service contracts with individual landowners requesting water until the Company or other organization could absorb the additional irrigators. The trend continued until now when there are 17 individuals and 2003.8 acres downstream of Heart Butte Reservoir who have contracted individually with Reclamation for irrigation water from Heart Butte Reservoir.

The Heart Butte Unit currently serves 7,779.8 irrigated acres of which 7,699.8 acres are downstream of Heart Butte Reservoir and 80 acres are along the Heart River upstream of the Reservoir, leaving a difference of 2,220.2 acres remaining that can be developed under the 10,000 acre development limit according to Reclamation's 1992 EA and FONSI. The Company's 27 shareholders irrigate 3,103.0 acres and their water service contract expires on December 31, 2013.

The 80 acres of lands upstream of Heart Butte Reservoir will not be considered part of this action.

Project Use Power – General Discussion

“Project use power” is reduced rate, electrical energy required to operate Reclamation project facilities in conformance with the Reclamation project authorization.

The basic requirements for an irrigation entity to receive PSMBP project use power include:

- The project must be part of the PSMBP or have special legislation.
- The Federal government must have an investment in the project either in whole or in part.
- The project must be recognized by the State as an irrigation district.
- Must receive project water from a Reclamation project.
- Pumps must be owned by the United States or irrigation district.

Currently, within the Unit, project use power is provided only to the District under an electrical power service contract and a power transmission contract. The power service contract between the District and Reclamation provides for the sale of up to 550 kW as the “Contract Rate of Delivery” of PSMBP power to the District. The power transmission contract is between the District, Western Area Power Administration and Mor-Gran-Sou Electric Power Cooperative to provide for transmission service/wheeling Federal PSMBP power over the Cooperative’s transmission lines to District project facilities.

Lower Heart Irrigation Company and individual contract lands do not receive PSMBP project use power for irrigation. Power for electric powered pumps within the Company and for individual contract lands is purchased directly from the local power cooperative, Mor-Gran-Sou Electric Power Cooperative, at a rate significantly higher than the PSMBP power rate. A majority of the pumps are powered by propane or diesel engines due to the lack of electric power service in the area.

Project Area

The Heart Butte Unit is located in southwestern North Dakota along the Heart River in Grant and Morton counties below the dam. The Unit’s primary feature is Heart Butte Dam and Reservoir (Lake Tschida), which is located about 17 miles south of Glen Ullin, North Dakota along State Highway No. 49, which crosses the dam. Scattered tracts of irrigable lands extend from the dam site eastward about 60 miles along the Heart River to the city of Mandan. The Unit is a multipurpose development authorized and designed to provide flood control for downstream areas, irrigation water supply for 13,100 acres, sedimentation control, fish and wildlife conservation, and recreation benefits.

Grant and Morton counties lie west of the Missouri River. The Morton County portion of the river ultimately drains into the Missouri River at the east extent where it is characterized as Missouri Breaks. West Morton and the more western Grant County, are described as Missouri Plateau. Both are characterized by an absence of glacial influence (<http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/nodak.htm>). The eastern extent is characterized by more steep slopes (Missouri Breaks) whereas the western area is intermittently flat. Generally, the project area is cool, semi-arid, and characterized by rotating cyclical drought and wet periods (<http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/nodak.htm>).

Land use is primarily dryland farming and cattle grazing. Crops are dominated by spring wheat but also barley, oats, and sunflowers. Blue grama, wheatgrass/needlegrass associations, little bluestem and prairie sandreed represented in native areas. Trees are limited but represented by

cottonwood gallery forests on the floodplain and juniper and deciduous trees on north facing slopes more able to withstand the colder exposures.

Authority

The proposed contract(s) would be negotiated and executed pursuant to the following authorities:

- The Reclamation Act (Act of June 17, 1902, 32 Stat. 388) as amended and supplemented;
- Subsection 9(e) and 9(d) of the Reclamation Project Act of 1939 (Act of August 4, 1939, 53 Stat. 1187) as amended and supplemented, which authorizes irrigation water service and repayment contracts for the repayment of the cost of providing water service from Reclamation water supply works and distribution works;
- Section 9 of the Flood Control Act of 1944 (Act of December 22, 1944, 58 Stat. 887), which authorizes the comprehensive development of PSMBP, including the general comprehensive plans set forth in H. Doc. No. 475¹ and S. Doc. 191², 78th Cong., 2nd sess., as revised and coordinated by S. Doc. No. 247³, 78th Cong., 2nd sess.

The proposed contract instrument would utilize the authority of Subsection 9(e) of the Reclamation Project Act of 1939 for the payment toward water supply works if a water service contract is utilized. The authority of Subsection 9(d) of the Reclamation Project Act of 1939 would be utilized for retaining existing repayment authority for the distribution works, which has already been repaid. The Subsection 9(d) authority would also be used if a repayment contract is utilized.

National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) Process

Since the contract(s) for water are with the United States, through Reclamation, Reclamation is the lead federal agency with responsibility for environmental compliance including NEPA. This environmental assessment (EA) is being prepared in compliance with NEPA Section 102(2)(A) and the Council on Environmental Quality Regulations Section 1501.3.

According to Reclamation's Departmental Manual

- 43 CFR 516 DM Chapter 14 Section 14.4 Major Actions Normally Requiring an EIS.
A. (3) Proposed repayment contracts and water service contracts or amendments thereof or supplements thereto, for irrigation, municipal, domestic, or industrial water where NEPA compliance has not already been accomplished.

¹ H. Doc. No. 475 presented the U.S. Army Corps of Engineers' plan, also known as the "Pick Plan" named after Colonel Lewis A. Pick, for Missouri River Basin development. This development focused on constructing 1,500 miles of protective levees for flood control and navigation, 18 tributary dams, and five multipurpose dams on the main-stem of the Missouri River above Sioux City, Iowa.

² S. Doc. No. 191 presented Reclamation's plan, also known as the "Sloan Plan" named after William Glen Sloan, for Missouri River Basin development. This development focused on constructing 90 projects that emphasized irrigation (5.3 million acres) and power development versus flood control and navigation. This plan included 85 tributary dams and three main-stem dams.

³ S. Doc. No. 247 was supplemental to H. Doc. No. 475 and S. Doc. 191 and presented the U.S. Army Corps of Engineers and Reclamation's coordinated plan to reconcile the differences between H. Doc. No. 475 and S. Doc. No. 191 by essentially combining the two plans.

B. If, for any of these proposals it is initially decided not to prepare an EIS, an EA will be prepared and handled in accordance with Section 1501.4(e)(2).

Therefore, this NEPA analysis will commence with an EA.

Because the contract(s) would be with Reclamation, a Federal entity, project proponents must comply with Federal laws and regulations concerning cultural resources regarding any new ground disturbing activities associated with or for purposes of irrigation.

Compliance activities associated with Section 106 of the NHPA of 1966, as amended, which is administered in accordance with stipulation III(C) of the Programmatic Agreement between Reclamation, the Advisory Council on Historic Preservation, and the North Dakota State Historic Preservation Officer (SHPO). As with NEPA, Reclamation is the lead Federal agency under the terms of this agreement for compliance with NHPA. This agreement fulfills the agency's Section 106 responsibilities for the proposed action. The agreement specifies that information exchanged will be agreed upon in consultation with the Tribes, SHPO, Bureau of Indian Affairs as appropriate, and other interested publics.

This EA may lead to a Finding of No Significant Impact if impacts are found to be insignificant. However, if significant environmental impacts are identified, Reclamation may proceed with the preparation of an environmental impact statement. This EA is being prepared to assist the deciding official in determining what environmental impacts are likely to occur as a result of proceeding with entering into new or amended Heart Butte irrigation water and PSMBP project power contracts.

Reclamation defines significance in accordance with 40 CFR 1508.27 in reference to context and intensity.

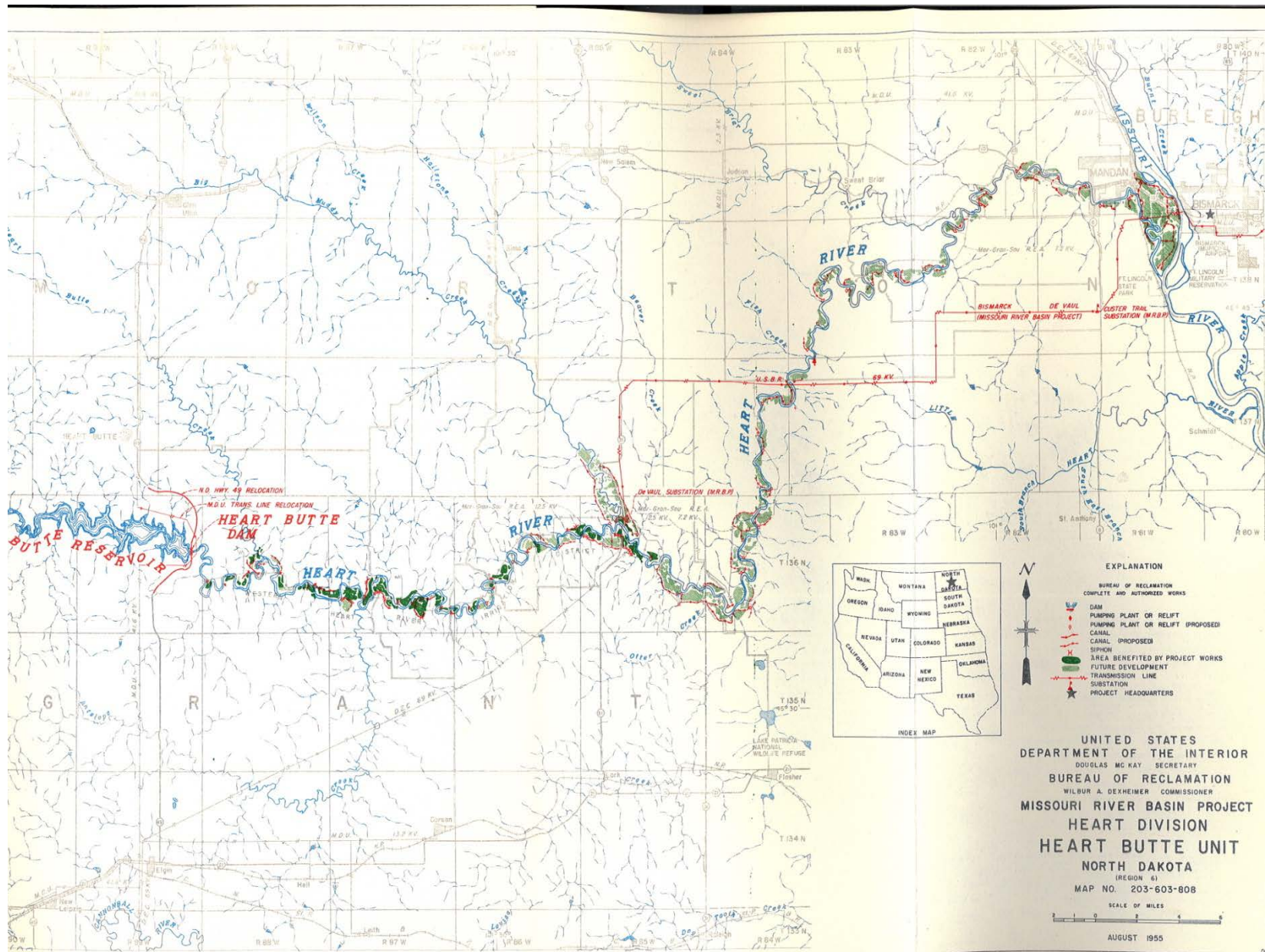


Figure 1-1. Figure depicting initially-planned Heart Butte Unit irrigation development from Heart Butte Reservoir on the western extent, downstream to Mandan, ND.

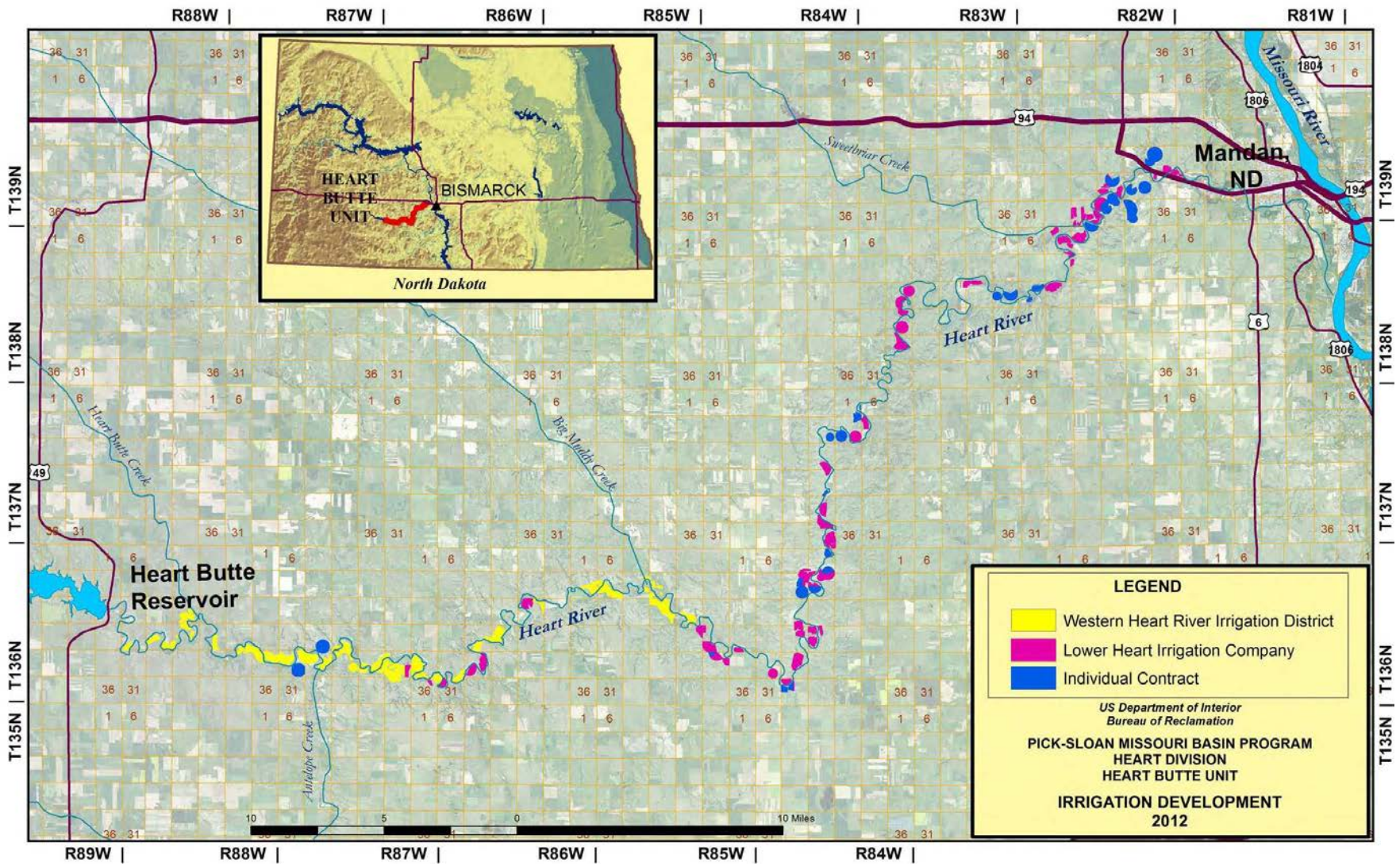


Figure 1-2. Current Heart Butte Unit irrigation development.

Chapter 2

Proposed Action

Reclamation's original intent at the time of constructing Heart Butte Dam was to develop a single irrigation district to efficiently serve the Heart Butte Unit irrigators of the Heart River valley. Things turned out differently for a single entity approach and over time the number and types of irrigation contracts have become numerous, complicated, and more burdensome to administer. Currently, an opportunity exists to implement a unifying action that would benefit the irrigators and Reclamation's contract administration. The proposed action would continue the beneficial uses of the federal water project while a beneficial administrative rearrangement is made. The future organization of the irrigation community, principally for administrative purposes, can be re-arranged in numerous ways to have a desirable benefit but the individuals and acres irrigated would remain the same regardless of how the groups are organized (Table 2-1).

Proposed Action-Contract Renewal and Reorganization: *To continue delivery of irrigation water to the Company, the individual irrigators, and the District that could see irrigators organized under a number of administrative organizational options as agreeable to all irrigators party to the contract, including, but not exclusively, combination with the District which involves the inclusion of lands process, and increase the power Contract Rate of Delivery as necessary. Reclamation's proposed action also represents the preferred alternative or the Community alternative (Appendix - 10). No alternatives are offered for this administrative action.*

There remains 2,300.2 acres of undeveloped irrigation potential based on the 10,000 acre water service alternative chosen in Reclamation's cumulative effects EA/FONSI (1992). Water to irrigate the remaining 2,300.2 acres would be available by contract amendment through the District or the Company or other entity depending on the contract. However, site-specific separate NEPA analysis would be required for development of new lands for irrigation, as has been required since the Company's and Districts contracts were entered into.

It is reasonable to expect that this uncertainty would be resolved through one or possibly a combination of administrative organizational concepts. However, in all cases the acres irrigated and amount of irrigation water used would remain the same, for the time being. Any interest in new irrigation acres would be addressed through site-specific NEPA analysis.

It is anticipated that a majority, if not all, Company and individual contract landowners with existing electric powered pumps would desire to transfer ownership of the pumps to the District for the benefit of receiving PSMBP power. Additional existing propane and diesel powered pumps would likely be converted to electric power in future years. The high cost of constructing electric power transmission lines would represent a limiting factor in the number of pumps converted to electric power.

It is proposed that a second power service contract between the Western Heart River Irrigation District and Reclamation would be entered into to add power "Points of Delivery" (pumps sites) for delivery of PSMBP power under the contract and to increase the power Contract Rate of

Delivery available to the contract. It is also proposed that the power transmission contract between the District, Mor-Gran-Sou Electric, and Western Area Power Administration would be amended to include the additional power “Points of Delivery”.

A summary of current and authorized contract irrigated acres and estimated Project Use Power requirements are presented in Table 2-1.

Table 2-1. Acreage and Electric Power Summary

	Current Development	Proposed Action With Current Irrigation Development	Proposed Action With Future Irrigation Development
Contract Irrigated Acres			
Western Heart River Irrigation District	2593.0	7699.8 /1	10,000 /4
Lower Heart Irrigation Company	3103.0	0	0
Individual Contracts	2003.8	0	0
Total Acres	7699.8	7699.8	10,000
Number of Pump Sites			
Western Heart River Irrigation District	35		
Lower Heart Irrigation Company	45 /2	105	140 /5
Individual Contracts	24 /2	0	0
Total Pump Sites	104	105	140
Number of Electric Power Contract “Points-of-Delivery” /3			
Western Heart River Irrigation District	35	75	100 /5
Lower Heart Irrigation Company	0	0	0
Individual Contracts	0	0	0
Total	35	75	100
Project Use Power “Contract Rate of Delivery” Required (kW)			
Western Heart River Irrigation District	550	1800	2250 /5
Lower Heart Irrigation Company	0	0	0
Individual Contracts	0	0	0
Total Project Use Power kW	550	1800	2250
Potential Future Irrigation Development (acres) /4			
Heart Butte Unit future acres	2300.2 /4	2300.2 /4	

/1 - The total acreage remains the same whether all existing parties join the District, Company or other entity.

/2 - Numbers are approximate since several pumps serve lands in both the Company and lands under individual contract.

- /3 - A given electric meter/"Point-of-Delivery" may serve two or more pump sites.
- /4 - 2,300.2 acres of irrigation development remain under Reclamation's selected alternative of up to 10,000 acres of irrigation development (Reclamation 1992).
- /5 - The numbers provided are estimates due to the uncertainty of how additional lands would be developed for irrigation and how many current and new pump sites would be served by electric power.

Environmental Mitigation Commitments

This section presents environmental commitments which have been developed in consultation with Federal and State agencies, Tribes, and the public through construction of projects and responses to public NEPA project scoping over the last decade in North Dakota by Reclamation and project sponsors. These commitments are included as an inseparable component of the Proposed Action and are designed to offset potential for significant environmental effects resulting from the Proposed Action.

Reclamation is responsible to ensure that irrigators abide by these commitments.

These environmental commitments will be implemented to (1) prevent, minimize, or offset the occurrence of potential for adverse environmental effects and (2) ensure compliance with applicable Federal and State regulations designed to protect fish and wildlife resources, important habitats and sensitive areas, cultural resources, human health and safety, and the public interest.

Intakes and New Irrigated Lands
Within 5 years of entering into a new contract or contract amendment all pump intakes must be screened with ¼ inch or smaller screen openings with an approach velocity of not more than ½ foot/sec.
New intakes must comply with screen opening and approach velocity standards at the time of intake construction.
New pipe burial or excavation for delivery of Heart Butte Unit irrigation water must be reviewed by Reclamation for environmental compliance.
To the extent possible, intakes shall not withdraw water from the bottom 2 feet of water in the river channel; noting that it is not physically possible to meet such a restriction in some of the project area since the Heart River flow is less than 2 feet deep in many places.
If Intake lines are buried in the river bed during future construction, project shall include backfilling the trench to original contours and securing appropriate Army Corps of Engineers permits prior to trenching.
Operators constructing and installing a new intake are responsible to contact Army Corps of Engineers Bismarck Regulatory Office (701-255-0015) for appropriate permits.
New pumping plant sound levels shall not exceed 75 dB at 50 feet.
Intakes must be marked and be readily identifiable during day or night hours as appropriate for navigation traffic.
Reclamation will continue to meet its responsibility to ensure environmental (NEPA and NHPA, etc) compliance is completed for new lands to receive irrigation water before construction or irrigation takes place.

Best Management Practices and Water Conservation

Water conservation techniques will be furthered by Reclamation and the irrigators shall develop and operate under a water conservation plan and Best Management Practices such as providing buffer strips between cultivated fields and the river's edge.

As a water conservation measure, the District and/or the Company must provide Reclamation with expected irrigation demands to enable Reclamation to better regulate releases from the reservoir to minimize unnecessary releases during drought periods.

Endangered Species, Fish and Wildlife

Unanticipated threatened or endangered species encountered within the irrigation District, Company lands, or other contracted lands should be reported to Reclamation in order that Reclamation may consult with the Service to avoid impacts to the species.

Intake design specifications that were created jointly by state and federal agencies and recommended by North Dakota Game and Fish Department to protect endangered, endemic, and sport fish stocks will be followed (Refer to **Intakes and New Irrigated Lands**).

New power lines, for the purposes of serving Reclamation irrigation water pumps, to the extent possible, should be:

- (a) Buried (Service 2010, Stehn and Wassenich 2006) to minimize electrocution hazards to raptors and minimize impacts to all birds, bats, and particularly benefit whooping cranes. Use Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006, Avian Power Line Interaction Committee, Edison Electric Institute, Raptor Research Foundation, Washington, D.C., or similar standards will be used. <http://www.eei.org/ourissues/TheEnvironment/Land/Documents/AvianProtectionPlanGuidelines.pdf>(pp 30 -42)

And Reducing Avian Collisions with Powerlines, the state of the art 2012 (APLIC), **or**

- (b) any new, above ground power lines and an additional equal length of existing power lines in the same vicinity as suitable whooping crane habitat should be marked with visibility enhancement devices to benefit migrating whooping cranes as well as all migratory birds and bats.

Historic Properties and Culturally Sensitive Areas

All future cultural resource investigations, for new undertakings, will be performed according to the procedures specified in the programmatic agreement among Reclamation, the State Historic Preservation Office, and the Advisory Council on Historic Preservation for Reclamation activities in North Dakota. Cultural resource inventories will be performed under the direction of an archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-9). All appropriate cultural resource activities will be completed prior to the commencement of ground-disturbing activities, including Class I and Class III surveys and consultation with the SHPO. All cultural resources, except those exempted in the programmatic agreement, will be avoided if their significance cannot be established prior to disturbance. If avoidance is not practicable, Reclamation, in consultation with the SHPO would determine if the site is eligible for nomination to the National Register of Historic Places [36CFR800.4(c) and 36CFR60.4]. If the site is eligible as a historic property, initially Reclamation, SHPO, and other interested parties, depending on the type of property, will consult to determine a plan of mitigation. If an adverse effect cannot be avoided, the Advisory Council on Historic Preservation will be contacted. All ensuing activities will comply with the NHPA, as amended, and the Archaeological Resource Protection Act.

Historic Properties and Culturally Sensitive Areas-continued

The Tribes will be consulted concerning the locations of unmarked burials or cemeteries. All such burials or cemeteries will be avoided to the extent possible. If a burial or cemetery cannot be avoided or is encountered during construction, Reclamation will comply with the Native American Graves Protection and Repatriation Act if graves are discovered on Federal or trust lands or within reservation boundaries. Reclamation will comply with North Dakota Century Code 23-06-27: "Protection of Human Burial Sites, Human Remains, and Burial Goods" for graves on private or State-owned lands.

If unrecorded cultural resources or traditional cultural properties are encountered during construction, all ground disturbance activity within the area will be stopped until the resource can be evaluated and Reclamation can consult with the SHPO and evaluate the resources per 36 CFR Part 800.13. Reclamation and appropriate authorities will be notified, and all applicable stipulations of the NHPA will be followed. Activities in the area will resume only when compliance has been completed.

Future Modifications and Changes to the System

There remains a difference of 2,300.2 acres remaining from the total 10,000 acre alternative selected by Reclamation's 1992 FONSI (**Table 3-1**). How that acreage is contracted is part of the decision to be made from this EA. The Community Alternative would eliminate the need to continue to write individual water service contracts with private irrigators that are not part of the Company or District or other entity. However, those 2,300.2 acres could be contracted through the Company, the District, or other entity and Reclamation would continue to meet its responsibilities to ensure NEPA and NHPA compliance for new acreage proposed to be irrigated.

Regardless of the determination of the deciding official, any additional water or Project – Use Power demand, where irrigation is not currently used, would require compliance with NEPA and National Historic Preservation Act. Environmental compliance for any and all new acreage must be completed before construction takes place and before a contract would be signed.

Should future interest in irrigation exceed the 10,000 acres of the current standing FONSI (Reclamation 1992), additional environmental analysis would be required to determine cumulative impacts of irrigating in excess of 10,000 acres up to the authorized acreage of 13,100 acres, within the Heart Butte Unit.

Chapter 3

Affected Environment and Environmental Effects of Issuing Long Term Water Service and Project Power Contracts for Heart Butte Unit Irrigation on the Heart River Downstream of Heart Butte Dam

The affected environment (area) encompasses the communities, land, water, and air-sheds that might be affected by the project. The boundaries of the affected area for each resource extend to where effects can be reasonably and meaningfully measured. All lands lie within the originally defined boundaries of the Heart Butte Irrigation District.

The proposed project area is long but relatively continuous rather than vastly diverse. It is characterized by existing agriculture including irrigated lands developed adjacent to the Heart River. This includes existing remotely located farms and small ranches and buildings, and some isolated wetland basins that do not appear to be influenced by the river (Reclamation 1992), are adjacent to the Heart River. Regardless of how the irrigators are ultimately organized the acreage would not change from 7699.2 acres. The only measureable difference identified would be the total number of pumps served by PSMBP project use power which would be determined by how the irrigation parties are organized and choose to power their pumps.

Reclamation completed an irrigation contract EA (DK-600-03-01) in 2003 and renewed an irrigation contract in 2005 with the Western Heart River Irrigation District and most recently the Mile Marker 28 Irrigation Project. Public scoping, consultation and coordination with state and local governments and the public has resulted in the development of methods and recommendations for minimizing or prohibiting adverse environmental effects from the proposed action. Since these environmental commitments have been found to be successful in mitigating the potential for adverse effects Reclamation has made them part of the proposed action.

Reclamation would continue to retain responsibility for environmental compliance for any new applications for irrigation water or irrigation expansion up to the maximum of 10,000 acres, including NEPA and identification and consultation on cultural resources that may be impacted by ground disturbing activities associated with the delivery of federal water. Reclamation has proposed what amounts to an administrative action. As previously stated, no additional acres are proposed at this time. The same physical acres (7,669.8 acres) would continue to be irrigated by the same landowners (including individuals, the District, and the Company) only differing by how they are administratively arranged, organized, or contracted.

Resources analyzed herein include: Water Availability, Project Use Power, Water Quality, Climate Change, Endangered Species, Socioeconomics, Indian Trust Assets, and Environmental Justice. An additional 2,330.2 acres of capacity could be added under this contract in the future, pending additional site specific NEPA compliance.

Water Availability

Existing Environment

Heart Butte Reservoir

Heart Butte Reservoir (**Figure 3 -1**) has a live capacity of 214,169 acre-feet, of which 147,027 acre-feet comprise the exclusive flood control capacity above the spillway crest (elevation 2064.5 [spillway crest elevation] to 2094.5), and 61,915 acre-feet comprise the active conservation capacity (elevation 2030.0 to 2064.5). There are also 5,227 acre-feet of dead storage below the outlet works. The reservoir surface area is 3,299 acres at the spillway crest elevation of 2,064.5. The reservoir area occupies 10,957 acres, of which 3,299 acres are below the top-of-active conservation pool elevation of 2,064.5 and 7,658 acres are above the top-of-active conservation.

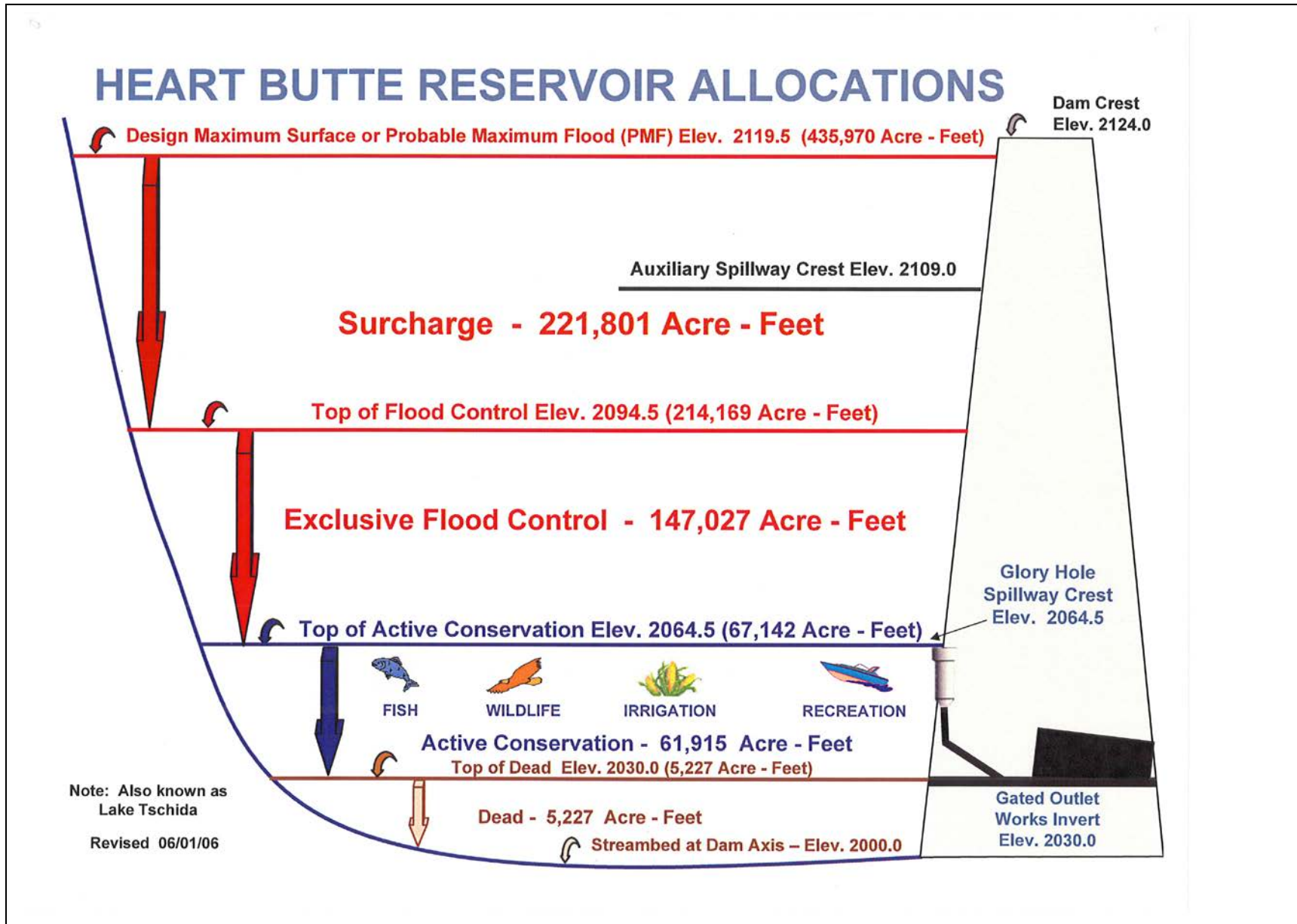
The above described areas and capacities of Heart Butte Reservoir are based on a survey of sediment accumulation in Heart Butte Reservoir that was conducted in the fall of 1992 and winter of 1992-1993. Results of the sedimentation survey are presented in a report “*Heart Butte Reservoir - 1992 Sedimentation Survey – U.S. Department of the Interior, Bureau of Reclamation*”. Based on the survey, total storage in Heart Butte Reservoir at the top-of-active conservation storage (elevation 2064.5) was reduced from 76,044 acre-feet to 67,146 acre-feet, or 8,898 acre-feet has deposited during the 43 years since construction of Heart Butte Dam. Approximately 7,281 acre-feet of the 8,898 acre-feet deposited in the active conservation pool between elevation 2430.0 and 2064.5. The average sediment accumulation rate up to the spillway crest elevation (2064.5) is about 207.4 acre-feet per year. The rate of deposit up to the top of flood control elevation (2118.2), is about 241.3 acre-feet per year. (Note: Values presented in the 1992 Sedimentation Survey report differ slightly from values in the area-capacity tables developed in 1993).

Inflows into Heart Butte Reservoir vary considerably from year-to-year (**Figure 3-2**). Water year inflows have varied from a maximum of 306,872 acre-feet in 1982 to a minimum of 857 acre-feet in 2008. The median water year inflow from 1950 through 2012 is 64,612 acre-feet. The above inflow values are net inflows after reservoir evaporation and seepage losses.

Historical September end-of-month Heart Butte Reservoir elevations are presented in **Figure 3-3**. The minimum September end-of-month elevation is 2049.23, which occurred in 1991 during the extended drought from 1988 through 1992.

Heart Butte Unit acres irrigated during the drought from 1986 through 1992 and corresponding changes in reservoir storage per acre irrigated are listed in **Table 3-1**. Emphasis on improved scheduling of water releases from Heart Butte Reservoir and water conservation measures implemented by Reclamation and the irrigation entities were significant factors in the trend of less water released per acre irrigated during the drought.

Figure 3-1.



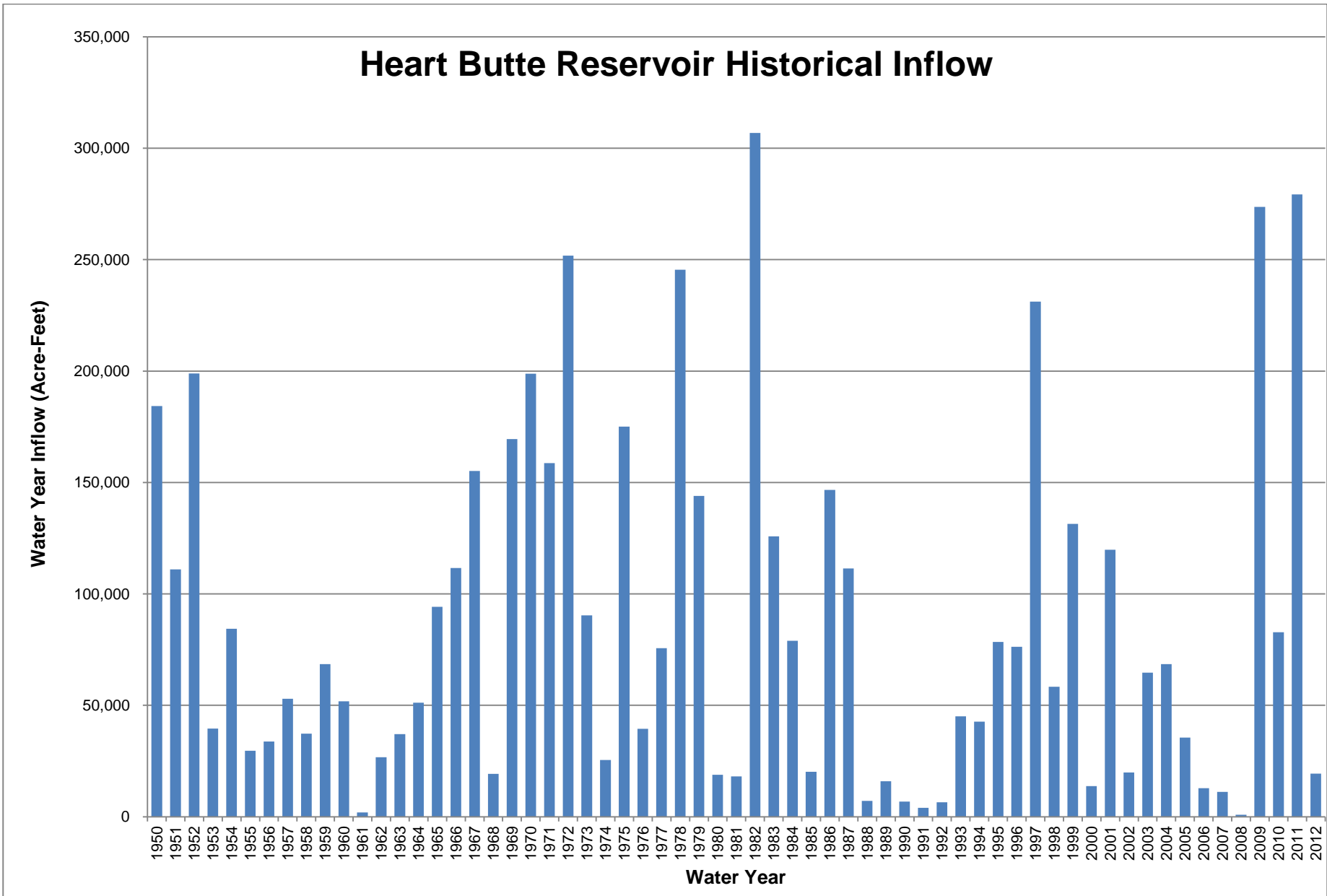


Figure 3-2.

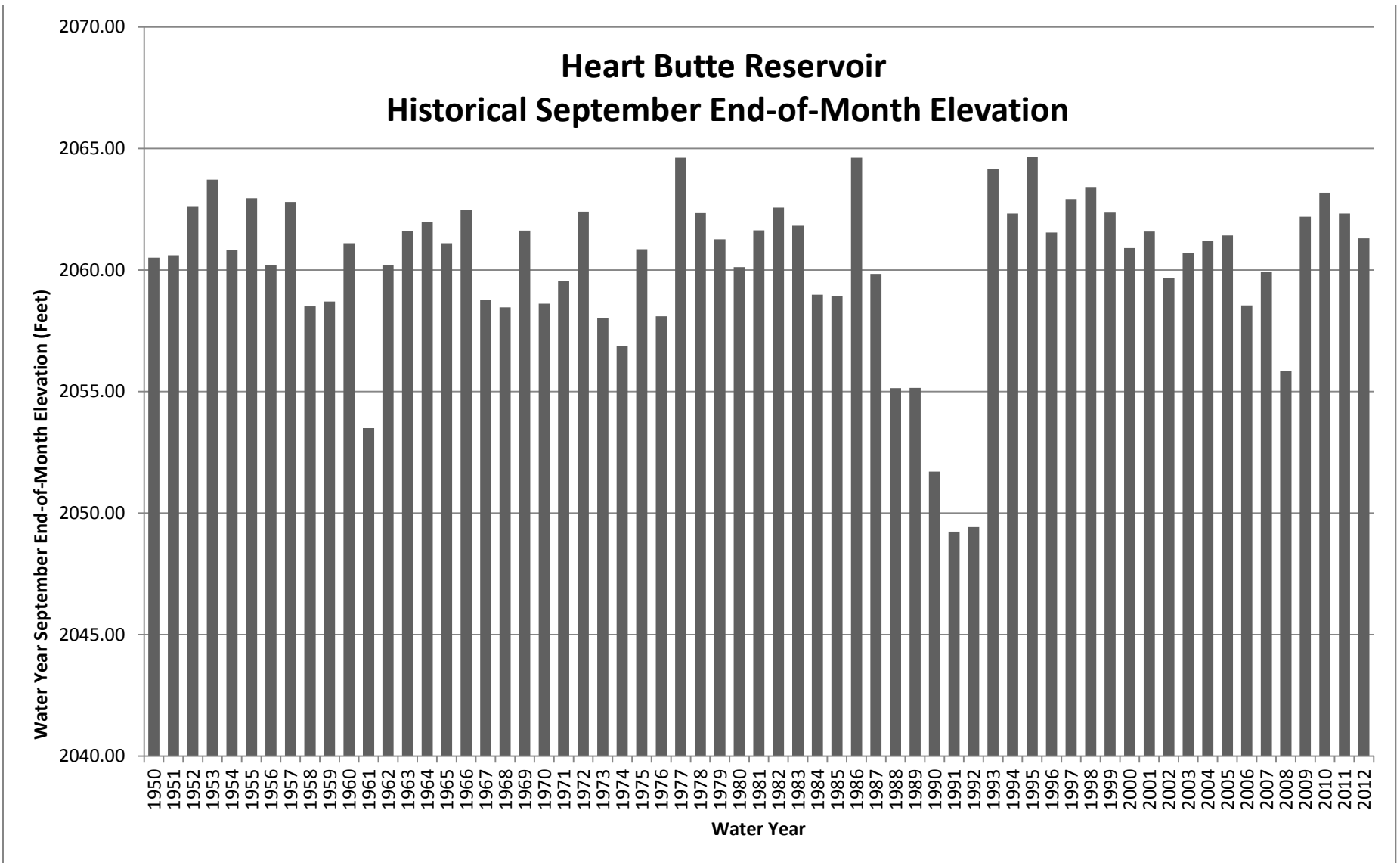


Figure 3-3.

Water Year	Acres Irrigated	Reservoir End-of-September Elevation (feet m.s.l.)	Reservoir End-of-September Water Storage (acre-feet) /1	Reservoir End-of-September Change In Water Storage (acre-feet)	Change In Water Storage Per Acre Irrigated (ac-ft/ac)
1986		2064.62	67538		
1987	5659	2059.84	52708	-14830	-2.62
1988	5842	2055.14	40234	-12474	-2.14
1989	6912	2055.15	40258	24	0.00
1990	7177	2051.7	32532	-7726	-1.08
1991	6357	2049.23	27739	-4793	-0.75
1992	6753	2049.42	28089	350	0.05
Average	6450			-6575	

/1 – Acre-feet of storage values are based on the 1992 sedimentation survey.

Table 3-1.

The historic maximum reservoir elevation recorded to date is 2,086.2 feet or 21.7 feet above the spillway crest. The minimum recorded elevation is 2049.00 feet, 15.5 feet below the spillway crest (**Appendix-14**).

Since 1951, a span of 62 years, spring snowmelt and summer rains have caused the reservoir to spill yearly except for 16 years (26%): i.e. 1961, 1962, 1968, 1974, 1980, 1981, 1985, 1988, 1989, 1990, 1991, 1992, 2000, 2002, 2007, and 2008. However, in 5 of the 16 “no-spill” years, water was within one foot of spilling effectively reducing the number to 11 years or 18%. At the record low drawdown of 2049.0 in October of 1991, the reservoir had a surface area of approximately 1,814 acres, which exposed 1,485 acres of land that would have been under water at the top of the conservation pool.

Heart River

The Heart River is about 120 miles long and follows a meandering course easterly from west of Dickinson, North Dakota, to its confluence with the Missouri River south of Mandan, North Dakota. The Heart River Valley is bordered by escarpments and steep rolling hills. The river originates at elevation 2,900 and enters the Missouri River at elevation 1,620. Prior to construction of Dickinson and Heart Butte Dams between 1949 and 1950, the river valley was subject to severe flooding nearly every year. Since construction of the dams, this condition has been largely eliminated. Typical flows near the river's mouth at Mandan range from 20 ft³/s during winter months to 8,000 to 10,000 ft³/s during flood periods. Approximately 5 to 8 ft³/s is released from Heart Butte Reservoir during the winter to provide river flows similar to historic conditions for downstream domestic use.

Principal tributary streams entering the river below Heart Butte Dam include Antelope Creek, Muddy Creek and Sweet Briar Creek. After the exclusive flood control pool is emptied, flows during the irrigation season vary from 20 ft³/s to 150 ft³/s, depending on downstream irrigation demands.

There are numerous wetlands along the Heart River. Most of these wetlands fill up in the spring and gradually dry up over the summer. Wetland hydrology does not appear to have a hydrologic connection to irrigation adjacent to the Heart River (Reclamation 1992).

Environmental Effects

Impacts of various levels of Heart Butte Unit irrigation acreage development on the availability of water from Heart Butte Reservoir were previously addressed by Reclamation (1992). Alternatives of irrigation development considered were: 1) 13,100 acres (Heart Butte Unit Authorized Development). 2) 10,000 acres (Proposed Action accepted by the deciding official as supportable), 3) 8,000 acres, and 4) 6,761 acres (No Action).

As noted in the 1992 EA, under the 10,000-acre development alternative Heart Butte Reservoir would be drawn down about 1.4 feet lower each irrigation season in a typical year compared to then-current level of 6,671 acres of irrigation development through 1989 in comparison to today's acreage of 7699.8. The maximum drawdown in September would be 3.9 feet lower than the 6,671-acre no-action alternative in the 1992 EA. In an extreme drought such as 1987 through 1991 the reservoir could be lowered to about 2040.0. However, reservoir elevations as low as 2,040 feet still provide more than 8,800 acre-feet (based on the 1992 sedimentation survey) of conservation pool storage above the dead pool.

Results of a 1992 Heart Butte Reservoir sedimentation survey indicate no substantive change in the impacts presented in the 1992 environmental assessment. Historic minimum, median and maximum reservoir elevations presented were based on actual reservoir elevations. The record low reservoir elevation occurred in 1991, one year prior to the sediment accumulation survey.

Summary

Availability and quantity of water in Heart Butte Reservoir and in the Heart River are not significantly different than when Reclamation determined that 10,000 acres was supportable and signed its FONSI in 1992. The proposed action for irrigation water contracting being analyzed in this environmental assessment involves no change in the total acres irrigated. Therefore, the impacts of various alternatives for organization of Heart Butte Unit irrigation development under a new contract do not differ. The acres irrigated, irrigation water requirements, and dates of water releases are the same regardless of how the irrigators are organized. The total contracted acreage and specific acres and the total potential maximum acres irrigated or 10,000 acres would remain the same.

Irrigation acreage has expanded approximately 800 acres since the 1992 environmental analysis, or at the rate of about 40 new acres irrigated per year over 20 years. More than 2000 acres remain in the expansion development capacity of the project as determined in Reclamation's 1992 EA/FONSI. There has been no significant change in effects from those reported in the 1992 EA through 2012. Water would continue to be available to serve project purposes

including: flood storage and irrigation according to Reclamation’s permit from the North Dakota State Water Commission, which limits the use purposes for water from the Heart Butte Reservoir. In addition, discharges from the reservoir would continue to mimic seasonal flows.

Project Use Power

“Project use power” is reduced rate, electrical energy required to operate Reclamation project facilities in conformance with the Reclamation project authorization.

The basic requirements for an irrigation entity to receive PSMBP project use power include:

- The project must be part of the PSMBP or have special legislation.
- The Federal government must have an investment in the project either in whole or in part.
- The project must be recognized by the State as an irrigation district.
- Must receive project water from a Reclamation project.
- Pumps must be owned by the United States or irrigation district.

Existing Western Heart River Irrigation District Electric Power Contracts

Currently, within the Unit, project use power is provided only to the District under separate electrical power service and a power transmission contracts.

The power service contract between the District and Reclamation provides for the sale of PSMBP power to the District.

- Power and energy is delivered by the United States to the Points of Delivery specified in Exhibit C of the Contract.
- There are currently 35 power points of delivery/pump sites specified in the Contract.
- The Point of Delivery is on the low voltage side of the pumping plant transformers.
- Transformers and electric meters are owned and maintained by Mor-Gran-Sou Electric Power Cooperative.
- The current "contract rate of delivery" (CROD) is 550 kW.
- The peak annual project kW demand used in each of the past 10 years has been:

Yr	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
kW	461	381	358	262	359	298	306	201	180*	139

*Corrected value

- The current electric power rate is 2.5 mills per kwh (\$0.0025/kwh) with a seasonal minimum payment of \$2.75 per kW.

The existing power transmission contract is between the District, Western Area Power Administration and Mor-Gran-Sou Electric Power Cooperative to provide for transmission service/wheeling Federal PSMBP power over the Cooperative’s transmission lines to District project facilities. Points of Delivery could be added dependant on the final form of Irrigator Organization.

- Power wheeling costs are paid to the Cooperative by Western Area Power Administration.
- Power wheeling costs are based on kwh's used by the District with an annual minimum of \$15,000.00.

Lower Heart Irrigation Company and individual contract lands do not receive PSMBP project use power for irrigation. Power for electric powered pumps within the Company and for individual contract lands is purchased directly from the local power cooperative, Mor-Gran-Sou Electric Power Cooperative, at a rate significantly higher than the PSMBP power rate. A majority of the pumps are powered by propane or diesel engines due to the lack of electric power service in the area.

Summary

Under the Preferred Alternative/Community Alternative, the current power service and power transmission contracts would be amended or new contracts would be entered into to increase the Contract Rate of Delivery (CROD) available to the District to meet project use power demands. Under the "Proposed Action and current level of irrigation development", i.e. 7,699.8 acres, it is estimated that the District's CROD would be increased from 550 kW to 1800 kW. Should irrigation demand reach 10,000 acres, an increase of the CROD to approximately 2250 kW would be required.

Irrigators within the Company and those holding individual water service contracts could transfer ownership of their electric-powered pumps to the District as a requirement to receive reduced rate PSMBP power. Several irrigators could convert their propane or diesel powered pumps to electric powered pumps if it is determined to be economically feasible to do so. The high cost of providing electric power transmission service to remote sites would be the limiting factor.

A summary of current and authorized contract irrigated acres and estimated Project Use Power requirements were presented in **Table 2-1**.

Water Quality

Existing Environment

Water quality along the Heart River is dependent upon many factors, including source of streamflow, composition of rocks and soils over which water flows, land use, location, time of year, and volume of streamflow. During periods of low flow, most of the flow is derived from groundwater inflow, which is mineralized, and the resulting streamflow has large dissolved-solids concentrations. During periods of high flow, most of the flow is derived from snowmelt or rainfall runoff, which is not mineralized, and the resulting streamflow has lower dissolved-solids concentrations.

The Heart River watershed has a surface area of about 3,300 square miles. Above Heart Butte Dam, land use is approximately 95 percent agricultural, about half of which is cultivated (NDDH 2006). Land use in the watershed below Heart Butte Dam is similar. The North Dakota

Department of Health identified 791 concentrated livestock feeding areas within the watershed above Heart Butte Dam (NDDH 2006). If inadequately treated, feedlots may increase concentrations of nutrients, sediments, and coliform bacteria in the river. In the most recent state water quality assessment (NDDH 2012), the Heart River from its confluence with Fish Creek to its confluence with Dear Heart Slough near Mandan is classified as fully supporting designated uses, but threatened due to concentrations of *E. coli*.

Table 3-2 shows mean concentrations of selected constituents in Lake Tschida and the Heart River near Mandan. Concentrations of total dissolved solids and major constituents are slightly lower at the Heart River near Mandan than at Lake Tschida, but this difference may simply reflect the much longer period of record at Mandan.

Table 3-2. Mean concentrations of selected water quality constituents at Lake Tschida and the Heart River near Mandan.

Parameter	2000-2001 mean concentration at Lake Tschida near Heart Butte Dam¹	1971-2012 mean concentration in Heart River near Mandan²
Total Dissolved Solids (mg/l)	1273	938
Hardness as Calcium (mg/l)	454	317
Sulfates as SO ₄ (mg/l)	694	413
Chlorides (mg/l)	12.4	12.7
Conductivity (umho/cm)	1794	1319
Total Phosphorus as PO ₄ (mg/l)	0.042	0.056
Nitrate + Nitrite as N (mg/l)	0.113	0.158
Arsenic (ug/l)		1.63
Selenium (ug/l)		0.83

¹ Source: North Dakota Department of Health (2006).

² Source: USGS data, available online at http://nwis.waterdata.usgs.gov/nd/nwis/qwdata/?site_no=06349000

Nutrient concentrations are slightly higher in the Heart River near Mandan than in Lake Tschida, likely due to agricultural runoff. At Lake Tschida near the dam, the total nitrogen to total phosphorus ratio (N:P) averaged 21:1 in 2000-2001, indicating that the lake was phosphorus limited. When nitrogen is the conservative nutrient, primary production is rarely limited. Instead, this is a state that favors primary producers that are able to affix nitrogen or are tolerant of low-nitrogen conditions (NDDH 2006). In the Heart River near Mandan, the average N:P ratio is 43:1, again indicating that phosphorus is the limiting nutrient. From 1971-2012, concentrations of nitrate plus nitrite in the Heart River near Mandan averaged 0.158 mg/l, and only one sample out of 86 exceeded the state's guideline of 1.0 mg/l.

Arsenic and selenium are naturally occurring in many North Dakota surface waters, but may be further mobilized in irrigation return flow and agricultural runoff. These trace elements were frequently detected in the Heart River near Mandan, but all samples were below chronic and acute aquatic life standards and human health standards.

The North Dakota Department of Agriculture annually monitors pesticides in the state's surface waters. In 2010, two pesticides were detected in the Heart River near Mandan. Clopyralid and 2,4-D were each detected in a single sample (NDDA 2010). The clopyralid concentration was 0.13 ug/l. The aquatic life benchmark for clopyralid is 56,600 ug/l, or 435,000 times higher than the concentration detected in the Heart River, suggesting a very minimal risk to aquatic life. The 2,4-D concentration was 0.19 ug/l. There is no aquatic life benchmark established for 2,4-D. The drinking water maximum contaminant level for 2,4-D is 70ug/l, or about 368 times higher than the concentration detected in the Heart River, suggesting that the detected concentration does not pose a human health risk (NDDA 2010).

Environmental Consequences

Short-Term and Long-Term Effects

Existing water quality in the Heart River near Mandan reflects ongoing irrigation. This reach of the river is listed as fully supporting designated uses, but threatened due to E. coli concentrations. E. coli contamination results from runoff containing animal wastes, likely from feedlot operations and unrelated to the ongoing irrigation. The Heart River near Mandan meets applicable water quality standards, and concentrations of many constituents are lower downstream of the irrigation area than in Lake Tschida. Continuation of a long term contract to deliver irrigation water from Lake Tschida would not adversely affect water quality in the Heart River.

Cumulative Effects

No cumulative effects on water quality are anticipated as a result of continued Project irrigation. Agricultural practices that could potentially affect water quality, including application of fertilizers and pesticides common to modern farming operations, would continue.

Actions to Minimize Effects

Best Management Practices or BMP's (page 2-4), part of the proposed action will serve to minimize risk to future water quality.

Summary

Heart River water is suitable for irrigating Heart Butte Unit lands. Effects of application of this water to groundwater or surface water quality over the long term are uncertain, but water quality monitoring downstream of existing irrigation does not indicate any significant adverse effects. With application of BMPs, the potential for contaminating surface water or groundwater with agricultural chemicals should be as low or lower under the proposed action as under current farming practices.

Endangered Species And Designated Critical Habitat

Existing Environment

Reclamation's detailed biological assessment for the Emmons County EA and FONSI (Reclamation 2009) and the biological assessment for the South Central Rural Water District Phase IV EA and FONSI (Reclamation 2012) and Reclamation (2011a) a biological assessment for the Turtle Lake Irrigation Project in Spring 2011 (DK-5000-10-02) are noted here by reference. Rather than replicate that information the biological assessment for the Heart River Irrigation Contract(s) will consist of a brief presentation of those species that may be present

during migration or chance occurrence since all lands are currently under modern agricultural practices including long term irrigation and actively farmed with no changes in the operation of these lands expected or proposed.

The large study area was described in the Introduction and Background. Reclamation consulted the U.S. Fish and Wildlife Service (Service), North Dakota Ecological Services Office web site and species list constructed through the Information, Planning, and Conservation System (IPaC) that provided a list of endangered and threatened species and critical habitats for consideration. An official list of species for consideration was received via email, September 20, 2012 and re-verified February 27, 2012. Reclamation also consulted the North Dakota Natural Heritage Database and consulted the Service, North Dakota Ecological Services Office endangered species website at http://www.fws.gov/northdakotafielddoffice/county_list.htm October 20, 2012, to verify the latest list of species for consideration and to determine which species potentially occur within the project area. In addition, the North Dakota Bird List Server archives were searched for records that might be relevant to the Grant and Morton County areas of the Heart River. Records were searched for Sprague's pipit, least tern, piping plover, and whooping crane.

The list for Grant County includes gray wolf, whooping crane, and the candidate species Sprague's pipit (**Table 3-3**). The list for Morton County includes those same species plus the following: interior least tern, piping plover and its critical habitat, and pallid sturgeon primarily due to the confluence of the Heart with the Missouri approximately 8 miles downstream of the last Reclamation served irrigation intake. Reclamation also added black-footed ferret.

This section constitutes the endangered species Biological Assessment for the Proposed Action as required under Section 7(c) of the Endangered Species Act of 1973, as amended.

All lands affected by this action were previously developed for irrigation and have been under traditional modern farming practices. Any new lands to be irrigated by Heart Butte Reservoir water in the future require separate NEPA analysis.

Environmental Baseline

Previous, Ongoing, and Reasonably Foreseeable Projects in the Action Area

The Missouri River Main stem Reservoir System consists of a series of six large dams constructed on the Missouri River by the Corps starting at Fort Peck in Montana in 1940 and ending with the southernmost reservoir at Gavins Point Dam at Yankton, South Dakota constructed as part of the Flood Control Act of 1944.

Reclamation has also constructed more than 40 water development projects in the Missouri River Basin. These projects consist of 55 single and multipurpose dams and reservoirs managed for irrigation, municipal and industrial water supply, power generation, flood control, recreation, and fish and wildlife benefits. Heart Butte Dam is one of those projects. Combined, these projects deliver irrigation water to 2.3 million acres of land, provide municipal water to more than 40 communities, and represent a total generating capacity of 720,000 kilowatts. The Heart Butte Unit lies in the Heart River Valley, a tributary of the Missouri River. The Action Area for this proposed action includes Heart Butte Reservoir and downstream along the Heart River to about 8 miles from the confluence with the Missouri River.

Table 3-3. Federally threatened, endangered and candidate species identified by the Service as being potentially present in the action area of Heart Butte Unit along the Heart River in Grant and Morton Counties, North Dakota (September 20, 2012).

Species	Status
Birds	
Whooping crane (<i>Grus americana</i>)	Endangered
Interior least tern (<i>Sterna antillarum athalassos</i>)	Threatened
Piping plover (<i>Charadrius melodus</i>)	Threatened
Sprague's pipit (<i>Anthus spragueii</i>)	Candidate
Fish	
Pallid Sturgeon (<i>Scaphirhynchus albus</i>)	
Mammals	
Gray wolf (<i>Canis lupus</i>)	Endangered
Critical Habitat	
Piping plover (<i>Charadrius melodus</i>)	Threatened

Dickinson Reservoir is a small Reclamation reservoir upstream of Heart Butte Reservoir in the midst of the “oil patch” experiencing rapid oil and gas extraction development and population growth. Although there is need for water for purposes of oil extraction no formal requests have been made for water from Reclamations small reservoir. Due to the uncertainty of demand for the limited amount of water available from storage effects cannot be adequately evaluated.

Potential Species and Designated Critical Habitat Effects

Assessments for threatened and endangered species were originally conducted by evaluating past and present occurrences of the species, and by determining if potential habitat exists within the project area for Heart Butte Unit. Then a determination was made on each wildlife species as a result of the project’s activities. No Federal threatened or endangered plant species permanently reside within the action area. All four of the bird species likely pass through the action area as a result of bi-seasonal migration. Sprague’s pipit may inhabit prairie adjacent to the action area where sufficiently large enough blocks of habitat exist. The whooping crane is most likely to pass through some part of the action area annually. Environmental commitments were identified as part of the Proposed Action of this EA that will offset potential for impacts to effect any of the species.

Reclamation’s findings as to endangered, threatened, or candidate species and critical habitat are made for the proposed action since Service’s authority for Section 7 is for federal proposed actions not private or otherwise. Effects are essentially the same regardless of how the irrigators are ultimately organized, since actual acres irrigated are the same irrigated acres under contract and receiving water. Differences in administrative organization and number of pumps accessing P-SMBP project pumping power would represent the only changes.

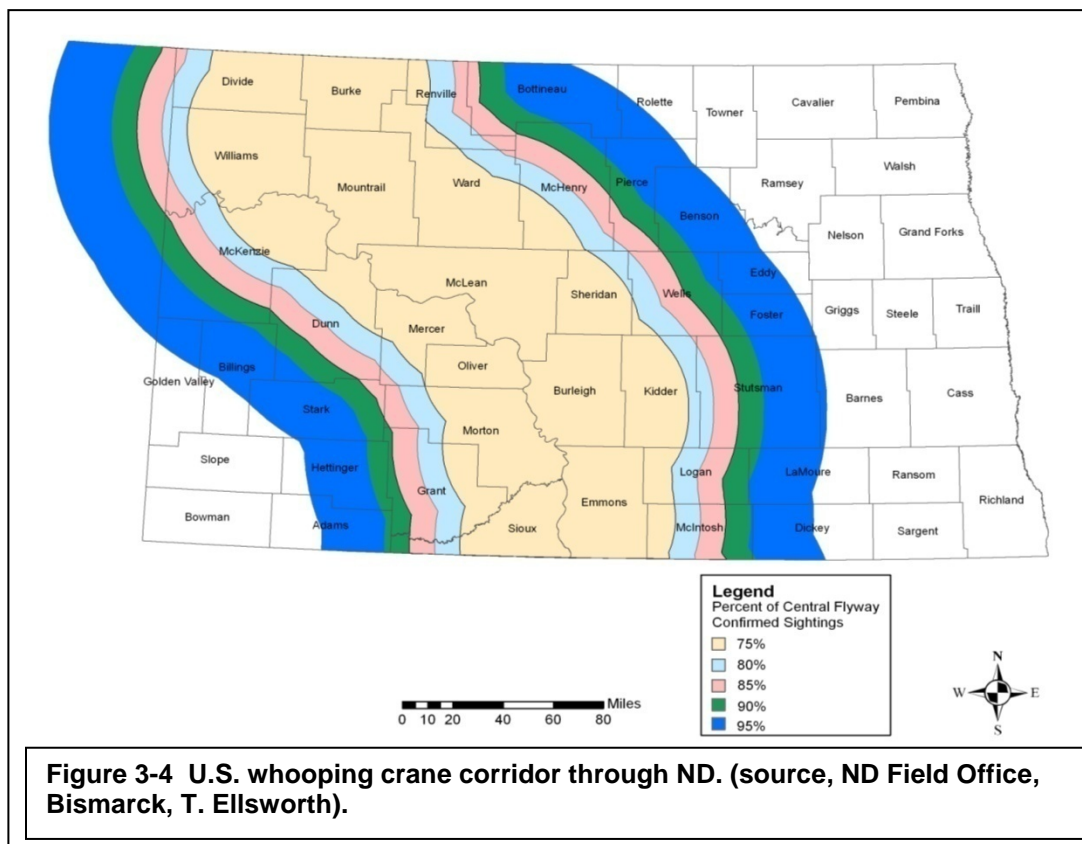
Whooping Crane (Endangered)

Status Update-An exclusively North American species, the whooping crane migrates through west and central North Dakota counties during spring and fall. The Heart Butte Unit action area lies within the 75 percent and 80 percent whooping crane migratory sighting corridor (Figure 3-4). Cranes prefer to roost on wetlands and stock dams with good visibility. Total Wood Buffalo population was estimated at 300 birds including 34 chicks fledged from 69 nests in September 2012 while the winter count methodology estimated 257 birds (ci=178-362)



(<http://whoopingcrane.com/>) last visited March 1, 2013). Changes in population assessment techniques make prior estimates incomparable with the new assessment estimates.

Potential stop-over roost habitat may exist across the entire action area where shallow wetlands or river sandbar habitat exhibit sufficient visibility of the view-shed. Sufficient visibility can be a limiting factor in the river bottom itself along much of the action area. Use of harvested grain fields during stop over feeding represents the more likely scenario of use as birds proceed along their migratory path. Whooping cranes are easily disturbed when roosting or feeding making the quiet of the Heart River valley attractive for potential roosting or feeding where appropriate habitat components exist.



Feeding sites often consist of waste grain fields or very shallow water. Fall migration occurs in North Dakota from late September to mid October, while spring migration occurs from late April to mid June. Birds can appear in all parts of North Dakota, although most sightings are in the western two-thirds of the state which includes the action area. Whooping cranes are usually found in small groups of seven or fewer individuals, often accompanying sandhill cranes. Sightings in the nearby Huff Hills area south of the Heart River and adjacent to the Missouri River and along the Heart Butte Unit have been recorded (Terry Ellsworth, NDES Office, personal communication).

Direct Effects

Much of the irrigation in the Heart Unit remains gravity flow, flood irrigation, especially those acres contracted through the Lower Heart Irrigation Company. Some irrigators have transitioned to center pivot sprinkler irrigation and especially those individuals most recently contracted. Center pivots are not uncommon on the landscape nor do they represent unknown obstacles to whooping cranes as they can be seen across the landscape from Canada to Texas.

Indirect Effects

Since the Heart Butte Unit lies within that area where 80 percent of migrating whooping crane sightings occur Reclamation would recommend that power lines constructed in the future to serve Heart Unit irrigators within ½ mile of suitable roosting habitat be:

- buried <http://APLIC.org> (2005, 2006, 2012) to the extent practicable or
- above ground power lines and an additional equal length of existing power lines in the same vicinity as likely whooping crane roosting habitat should be marked with visibility enhancement devices (Service 2010).

Interrelated/Interdependent Effects

No Interrelated/Interdependent Effects were identified for the decision to contract Heart Butte Unit irrigation as proposed.

Cumulative Effects

Power companies are more aware than ever of the risk posed by above ground powerlines to such birds as whooping cranes. As described in Project Use Power a limited number of new power lines may be constructed to serve gas/diesel powered pumps that could be converted to electric power. However, the number is uncertain at this time. Generally speaking, the size, high visibility, and disbursement of new center pivots reduce the likelihood of collision to the level of insignificant and discountable and similarly for marked powerlines. Although power line construction is not a Reclamation action Reclamation can recommend appropriate mitigation measures. Irrigation pipeline, on the ground surface and buried pipe or powerlines do not pose a threat to whooping cranes. Pole supported powerlines in remote areas, to serve irrigation pumps, pose an uncertain level of risk to birds over time. Marking lines has become accepted standard practice over the last decade.

Findings: *Following the environmental mitigation commitments and construction techniques, the managed design, and requirement for additional NEPA for future additional irrigators*

within the Heart Butte Unit reduces impacts and limits the potential for impacts to whooping crane. No new irrigation is proposed under this action and no new lands would be added under this action. Burial or marking of power lines and the high visibility of center pivot systems reduce the likelihood of collision. Therefore, effects would be insignificant and discountable within the action area. Reclamation has made a not likely to adversely effect determination for Wood-Buffer Population of whooping cranes for the decision to renew contract(s) for irrigation water in the Heart Butte Unit.

Piping Plover (Threatened) Designated Critical Habitat

Direct Effects to Designated Critical Habitat

Primary physical constituent elements of designated critical habitat of north population piping plover include: (1) Shallow, seasonally to permanently flooded, mixosaline to hypersaline wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats; (2) springs and fens along edges of alkali lakes and wetlands; and (3) adjacent uplands 200 ft (61 m) above the high water mark of the alkali lake or wetland.



Heart Butte Unit irrigation is already developed and actively farmed. No new irrigation is proposed under the contract that would not undergo separate NEPA compliance. There is Designated Critical Habitat where the Heart River empties into the Missouri but there is no Designated Critical Habitat in or around the irrigated lands served by the Heart Butte Reservoir. Reclamation does not deliver irrigation water beyond approximately 3 miles upstream of the sheet pile weir at Highway 6, Mandan or approximately 8 miles upstream of the confluence with the Missouri River (Figure 3-5). No work is planned for areas containing designated critical habitat and no irrigators contracting with Reclamation are irrigating within areas of designated critical habitat. Only existing irrigated lands are part of this action.

Indirect Effects to Designated Critical Habitat

The proposed action would deliver Heart Butte Reservoir water to the Heart Butte Unit irrigators. The entire shoreline of the Missouri River has been designated critical habitat where the constituent elements are present. Contracted irrigators will follow the environmental mitigation commitments. No indirect effects to designated critical habitat were identified.

Interrelated/Interdependent Effects to Designated Critical Habitat

These are actions that would represent “connected” action effects under NEPA but represent an interdependent effect in the case of the Endangered Species Act (ESA). No interdependent effects due to signing a new contract with irrigators were identified.

Cumulative Effects to Designated Critical Habitat

Contracting for irrigation water within the Heart Butte Unit may result in an increased demand for irrigation water. However, the number of acres irrigated have only increased by approximately 800 acres since 1992 which represents an annual rate of increase of 40 acres of new irrigation per year over the last 20 years. Regardless of future demand Reclamation’s environmental mitigation commitments and environmental compliance requirements would

address potential for affects to designated critical habitat including Section 7 consultation for any new irrigated acreages in the future.

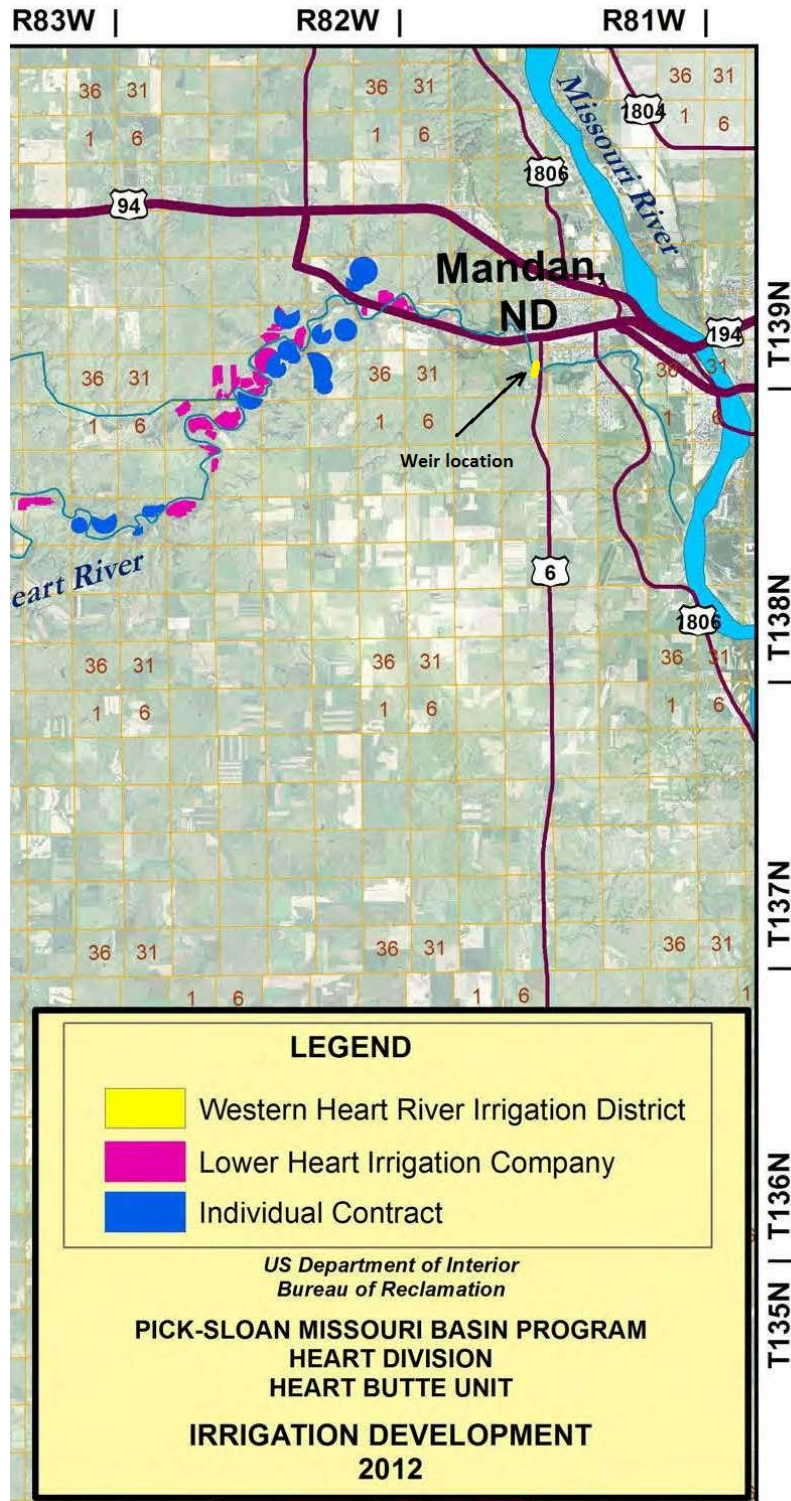


Figure 3-5. Location of Highway 6 weir (yellow line) on eastern extent of Heart River at Mandan; also depicted is the eastern most contracted irrigation area in pink. 3-17

Summary of Effects to Designated Critical Habitat

The potential direct, indirect, and cumulative effects to designated critical habitats were identified which include: increased interest in and for irrigation water for Heart Butte Reservoir.

***Findings:** In the proposed action and contract, environmental mitigation commitments (see Proposed Action) and additional NEPA analysis of any future federal actions including to add additional irrigated acres, potential for effect to designated critical habitat is reduced to insignificant and discountable levels. Additionally, there would be no adverse modification of designated critical habitat resulting from the contract for Heart Butte Reservoir irrigation water.*

Piping Plover (Threatened)

Rangewide Status Refer to Reclamation 2009, 2011a, and 2012.

Local Status Piping plovers use barren sand and gravel bars and shorelines of the Missouri River and more importantly the shorelines of prairie alkali lakes. The action would continue to deliver irrigation water to existing irrigated fields under traditional agricultural practices. Sandbars are more numerous in some reaches of the Heart River than others.



Piping plovers primarily migrate through the Heart Butte Unit but information regarding their use of the area is limited since water levels are usually too high and hiding sand bars that would provide nesting sites during the nest selection site period. Piping plovers could nest there but there is no documentation in support of nesting activity in the action area. However, most nesting in North and South Dakota is associated with saline wetland shorelines even more than Missouri River sandbars (Terry Ellsworth, NDES Office, personal communication). Plovers are not likely to be present and nesting along the Heart River during the growing season. A search of the ND Bird List-Serv archives (October 2012) revealed negative results for piping plover reports on the Heart River.

Direct Effects

No plovers would be disturbed in traditional nesting areas on the Missouri River since the Heart Butte Unit irrigation does not extend to the Missouri River. The last irrigator to receive water from Reclamation is at the western extent of the city of Mandan, about 8 miles upstream from the confluence with the Missouri River and designated critical habitat. Similarly, all irrigated acres considered in the proposed contract(s) are already developed and there would be no effect to plover use of saline wetlands in the action area.

High spring water conditions can preclude the use of traditional nesting areas, including designated critical habitat and force birds to seek out untraditional or alternative nesting areas. High water conditions can persist for years in saline basins resulting in an unpredictable redistribution of birds seeking nesting sites. High water on the most commonly utilized nesting habitats would likely mean high water on the Heart River as well which annually extends into the early nesting season and sometimes beyond. Birds would traditionally be expected to continue north in search of suitable available nesting habitat.

Indirect Effects

No indirect effects to piping plovers were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed. Refer to Designated Critical Habitat above.

Interrelated/Interdependent Effects

No interrelated/interdependent effects were identified to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

***Findings:** As a result of environmental mitigation commitments, potential for impacts to piping plovers is reduced to insignificant and discountable for the contracting and delivery of irrigation water from the Heart Butte Reservoir. Therefore, Reclamation has made a no effect determination for piping plover for the contracting and delivery of irrigation water from the Heart Butte Reservoir as proposed.*

Gray Wolf (Endangered)

Rangewide Status-Refer to Reclamation 2009, 2011, and 2012.

Gray wolves have gone through a myriad of listing classifications challenged in the courts with regard to eastern and western North Dakota which involve 2 different populations. The latest listing considers the wolf endangered within the Heart Butte Unit action area (<http://www.fws.gov/midwest/wolf/esastatus/index.htm> - accessed 10/24/12).



Local Status The gray wolf remains an infrequent, sporadic visitor to North Dakota, occasionally entering the state from Minnesota or from Manitoba, Canada in the northeast or less likely, animals from the Distinct Population Segment to the west. The ever increasing wolf population in Minnesota and the accompanying expansion of wolf range westward and southwestward in the state have led to an increase in dispersing wolves in North Dakota. No surveys have been conducted to document the number of wolves in North Dakota. However, there are occasional lone dispersing individuals and occasional pairs that appear primarily in the eastern portion of the state.

Due to the relative absence of secluded habitat in most of North Dakota there is considerable uncertainty in whether a wolf pack will establish or become more common in the state. However, due to proximity, as the Minnesota population continues to increase North Dakota should expect to see additional transients.

Direct Effects

No direct effects to gray wolf were identified to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Indirect Effects

No indirect effects to gray wolf were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Interrelated/Interdependent Effects

No interrelated/interdependent effects are anticipated to gray wolf were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Cumulative Effects

No cumulative effects to gray wolf were identified to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

***Findings:** Since gray wolves are rare, sporadic transients in North Dakota and individuals are not known to be established in the action area and North Dakota is not identified as a recovery area and the proposed action does not create unique conditions that might otherwise attract wolves and lead to conflicts, Reclamation has made a no effect determination for gray wolves for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.*



Pallid Sturgeon (Endangered)

Rangewide Status The pallid sturgeon is native to the Missouri River, the lower reaches of the Platte, Kansas, and Yellowstone Rivers, the Mississippi River below its confluence with the Missouri River, and the Atchafalaya River. Although the species' range is large, catch records are extremely rare, with few captures of sub-adults in recent years. The species appears to be nearly extirpated from large segments of its former range and may be close to extinction (Service 1993). Although critical habitat has not been designated, six Recovery-Priority Management Areas were identified in the draft recovery plan. Four of these RPMAs are on the Missouri River. The Heart River and its confluence with the Missouri River in the Garrison reach lie outside of the recovery priority areas identified in the Pallid Sturgeon Recovery Plan (Service 1993). The greatest amount of potential and receiving attention in the Dakotas is the Lower Yellowstone River for its potential recoverable breeding habitat more than one hundred miles upstream of the study area (Steven Krentz, USFW, personal communication).

Local Status

The Heart River empties into the Garrison reach of the Missouri River at the upper extent of Oahe Reservoir. This reach was not described as a Priority Recovery Management Areas for the pallid sturgeon in Service's Pallid Sturgeon Recovery Plans (Service 1993, 2009) like due to its many alterations. The number of physical modifications to the Heart River including irrigation intakes near the Missouri River that have existed since prior to listing, the many manmade modifications and barrier obstructions, combined with drastic fluctuations in flows eliminate it as a "recoverable" habitat for pallid sturgeon (Steven Krentz, USFW, Personal Communication).

Numerous intakes, unrelated to the proposed action, are located in the 8 miles of the Heart River downstream of Reclamation contracted irrigation intakes.

Modifications to the Heart River include Dickinson dam more than 100 miles upstream from the Missouri River. “Texas” style crossing start just below Dickinson dam. Heart Butte dam is the next large man made obstruction. Hard rock crossings exist almost to the confluence with the Missouri River, having been constructed to facilitate landowner river crossings under the common, summer and fall low water conditions. Some of these obstructions represent year around impassable blockage to fish passage while others represent seasonal blockage. Dependent on water level, these “crossings” serve as seasonal blockades, especially during the low flow. A sheet pile weir upstream of the Highway 6 bridge in southwest Mandan, although not a complete blockade represents one if not the furthest downstream obstruction. There is a rock/concrete coffer dam about a hundred yards upstream of the sheet pile structure that serves the Mandan Municipal golf course irrigation needs. On some stretches of the river more than one rock crossing exists per mile.

According to Steven Krentz of the Service (personal communication) a limited number of old age pallid sturgeon may exist in the Missouri River near the Heart. The Heart River, near the mouth, could potentially serve as a refugia or nursery for juvenile pallid sturgeon in the Heart River below the sheetpile weir at Highway 6 if there were juvenile fish there (Steven Krentz, USFW, Personal Communication 10/2012). However, the only known source of juveniles would have to pass through the entire system from the Lower Yellowstone region, Lake Sakakawea and through the Garrison dam and would still be at risk of impingement from intakes near the mouth of the Heart. A single pallid embryo was positively identified above the Lake Sakakawea pool through pelagic survey efforts during the massive high water discharge events of 2011 (Lyman Kirst 2012). However, existence of pallid reproduction or larvae in the vicinity of the Heart River is fully speculative at this date.

The sheet pile weir may not be a complete weir. The gap may allow limited adult fish passage when flows over the top allow, for purposes of maintaining access to spawning habitat of spring runs of endemic and game fish in the lower Heart River, especially for the first several miles from the mouth. It is likely more conducive to downstream passage. Intake screen requirements would be implemented over a 5 year period for existing intakes. Those same standards would be required immediately for any new intakes not yet constructed.

Direct Effects

No direct effects to pallid sturgeon were identified with continuation of a long term water and power contract to deliver irrigation water from Heart Butte Reservoir as proposed. All lands under the proposed action are already actively farmed and irrigated. All intakes are currently screened adequately for adults. There has been no documentation of juvenile pallid sturgeon capable of swimming upstream in the Heart River current. Under the proposed action, environmental commitments would include a 5 year phase-in of screen replacement with intake screens that would limit approach velocity to ½ foot/second or less and screen mesh not to exceed ¼ inch openings similar to the current requirements in the District’s contract (see Environmental Mitigation of the Proposed Action). Adult pallid sturgeon would not be

jeopardized by screened intakes. The authors were not able to find evidence that juveniles could attain access to the area above the sheet pile weir or any of Reclamation's contracted intakes.

Indirect Effects

No indirect effects to pallid sturgeon were identified to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Interrelated/Interdependent Effects

No interrelated/interdependent effects to pallid sturgeon were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Cumulative Effects

No cumulative effects to pallid sturgeon were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed since all acres are already under irrigated farming practices.

***Findings:** Since all acres are already under irrigated farming practices this proposed action primarily represents an administrative action. Although pallid sturgeon may exist in very low numbers in the Garrison reach, Missouri River the magnitude of alterations to the Heart River eliminate potential recovery as pallid sturgeon habitat. The potential for juvenile pallid sturgeon access to the river is highly uncertain. Intake screen management and maintenance, river modifications, and distance to the first Reclamation contracted irrigator reduce impacts to pallid sturgeon to insignificant and discountable. Reclamation has made a not likely to adversely effect determination for pallid sturgeon for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.*

Black-footed Ferret (Endangered)

Local Status In North Dakota their original range was confined primarily to the Southwest quarter of the state, south and west of the Missouri River. Until the Mellette County, South Dakota and later Meteteese, WY populations were found black-footed ferrets were Considered extirpated and that apart from them, it is unlikely that any other wild populations remain (Lockhart et al. 2006). A minimum of 700 individuals were known to occur in 4 experimental reintroduction populations including: Aubrey Valley, AZ, Shirley Basin, WY, Cheyenne River, SD, and Conata Basin, SD and there are numerous other experimental populations as well (Service 2008a). That total has been nearly halved by the more recent effects of plague (http://www.argusleader.com/article/20121227/NEWS/312270022/Video-Ferrets-spotted-comeback-trail?nclick_check=1).



In spite of the fact that the black-footed ferret is not on the official species list provided by the Service, Reclamation chose to discuss the species due to the recent mention in the newspaper of ferrets west of Mobridge, SD. There are limited black-tailed prairie dog towns within or adjacent to the Heart Butte Unit. However, until recently, the black-footed ferret is generally considered extirpated in North Dakota. There are no known wild black-footed ferret populations

or individuals in the vicinity of the Heart Butte Unit action area. No prairie dog towns would be disturbed or disrupted since all acres eligible for contract are already irrigated under modern farm practices.

There are at least 6 experimental black-footed ferret populations now in South Dakota (Service 2008a). The Cheyenne River Indian Reservation experimental population is closest to the Heart Butte Unit separated by about 150 miles of prairie and 2 major east west highways and the Grand and Cannonball Rivers. Most recently, black-footed ferrets were discovered in South Dakota outside of experimental population areas, west of Mobridge, SD (http://www.argusleader.com/article/20121227/NEWS/312270022/Video-Ferrets-spotted-comeback-trail?nclick_check=1). The genetic origin of this group of ferrets has yet to be verified but is geographically located nearly 100 miles south of the Heart Unit. This distance is significant because black-footed ferret dispersal is limited by ferret diet which is about 90% prairie dogs and distance. Pioneers move from one prairie dog town to another (Esch et al 2005). It is unknown if spacial array of prairie dog towns at adequate distance between this closest population in South Dakota and the Heart Unit study area to successfully support dispersal across that distance. Known recorded black-footed ferret pioneering movements are less than 7km (ibid).

Direct Effects

All lands under the proposed action are actively farmed and irrigated. No prairie dog towns would be impacted. No direct effects to black-footed ferrets were identified with continuation of a long term contracts for water and project power to deliver irrigation water from Heart Butte Reservoir as proposed.

Indirect Effects

No indirect effects to black-footed ferrets were identified for long term contracts for water and project power to deliver irrigation water from Heart Butte Reservoir as proposed.

Interrelated/Interdependent Effects

No interrelated/interdependent effects to black-footed ferrets were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Cumulative Effects

No cumulative effects to black-footed ferrets were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed since all acres are already under irrigated farming practices.

Findings: Black-footed ferrets are most likely extirpated from their original range in North Dakota. There are no known populations or individuals in the Heart Butte Unit action area. No prairie dog populations would be impacted and all acres under consideration are already under irrigated farming practices. Therefore, Reclamation has made a no effect determination for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Sprague's Pipit (Candidate)



Local Status Populations in North Dakota have declined dramatically due to the conversion of existing and deterioration of remaining native prairie habitat. North Dakota Heritage database provided no records for Sprague's pipit within the action area. Native prairie exists in areas of dense wetland basins that preclude agricultural practices with the exception of grazing livestock. Sprague's pipit prefers approximately 75 contiguous acres of native prairie as part of a substantially larger block (300 acres) of suitable habitat for nesting but habitat use differs for studies in Saskatchewan versus North Dakota which could simply reflect available habitat.

Source: <http://www.fws.gov/mountain-prairie/pressrel/10-61.htm> accessed 10-24-12.

Direct Effects

All lands under the proposed action are actively farmed and irrigated. No native prairie exists within the irrigated acres of the action area that would be affected but there could be unaffected native prairie within the action area. No direct effects to Sprague's pipit were identified to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed. No areas of native prairie would be affected as all affected acres are already irrigated.

Indirect Effects

No indirect effects to Sprague's pipit were identified to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Interrelated/Interdependent Effects

No interrelated/interdependent effects to Sprague's pipit were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Cumulative Effects

No cumulative effects to Sprague's pipit were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed since all acres are already under irrigated farming practices.

Findings: *Sprague's pipit habitat is present in the action area. However, there would be no disturbance of native prairie as proposed. Therefore, Reclamation has made a no jeopardy effect determination to Sprague's pipit for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed since all acres are already under irrigated farming practices.*

Summary of Findings

- Reclamation has made a determination of no adverse modification of critical habitat.
- Reclamation has made a determination of not likely to adversely effect endangered or threatened species.
- Reclamation has made a determination of no jeopardy for candidate species.

Social and Economic Conditions

Existing Conditions

Introduction

- What are the current social and economic conditions in the Project area that could be affected by the proposed alternative?

This section describes the current condition of regional social and economic indicators in the region that would be directly impacted by the proposed action. Indicators of the social and economic condition within the Project area include population, sectors of economic activity including agriculture and recreation, income, poverty level, labor force, unemployment rate, and educational attainment. The affected area includes Grant and Morton Counties in south-central North Dakota.

Figure 3-6 - Counties in the State of North Dakota (Bureau of Economic Analysis, 2012)



Methods

An evaluation of social and economic conditions requires data on current baseline conditions from which the significance of economic impacts can be measured. Data were obtained from the U.S. Department of Commerce’s Census Bureau and Bureau of Economic Analysis, U.S. Department of Agriculture’s National Agriculture Statistics Service, U.S. Department of Labor’s Bureau of Labor Statistics, and U.S. Department of the Interior’s Bureau of Reclamation.

Existing Condition

The current condition of the following economic indicators in the Project area are described in this section: population, sectors of economic activity, agricultural acreage and incomes, recreation expenditures and benefit values, median household and per capita personal income, poverty rates, labor force totals, unemployment rates, and educational attainment levels.

Population

The Project area is rural in nature, with a 2010 population in Grant and Morton Counties totaling 29,865 with the majority of this population within the City of Mandan. The county populations over the time period of 2000 to 2010 have declined by 15.7% in Grant County and increased

8.6% in Morton County. This compares to the population of the state of North Dakota as a whole, which has increased 4.7% over the same period. Grant County's relatively small and shrinking population may indicate a decline in economic activity needed to support the population, as well as a decrease in the potential labor supply, which may inhibit future long-term commercial activity.

Table 3-3 - Population for the Project Area (U.S. Census Bureau, 2001) (U.S. Census Bureau, 2011)

Area	2000	2010	Change from 2000 to 2010
Grant County	2,841	2,394	-15.7%
Morton County	25,303	27,471	8.6%
State of North Dakota	642,200	672,591	4.7%

Sectors of Economic Activity

The primary industry sectors of economic activity in the region include agriculture, health care and social assistance, government and government enterprises, and retail trade. **Table 3-2** shows a more complete look at the economic industry in the area and the number of jobs each industry employs.

Table 3-4. Total full-time and part-time employment by North American Industry Classification System (NAICS) industry for the Project area (Bureau of Economic Analysis, 2012)⁴

Industry	Grant County		Morton County	
	2010 Estimate	% of TE	2010 Estimate	% of TE
Total employment (TE)	1,621	100.00	11,985	100.00
Farm employment	507	31.28	839	7.00
Nonfarm employment	1,114	68.72	11,146	93.00
Private nonfarm employment	913	81.96	9,296	77.56
<i>Forestry, fishing, and related activities</i>	(D)	-	(D)	-
<i>Mining</i>	0	0.00	(D)	-
<i>Utilities</i>	(D)	-	129	1.08
<i>Construction</i>	35	2.16	827	6.90
<i>Manufacturing</i>	(D)	-	863	7.20
<i>Wholesale trade</i>	45	2.78	655	5.47
<i>Retail trade</i>	99	6.11	1,357	11.32
<i>Transportation and warehousing</i>	(D)	-	623	5.20
<i>Information</i>	(D)	-	197	1.64
<i>Finance and insurance</i>	79	4.87	432	3.60
<i>Real estate and rental and leasing</i>	32	1.97	131	1.09
<i>Professional, scientific, and technical services</i>	(D)	-	646	5.39
<i>Management of companies and enterprises</i>	0	0.00	74	0.62
<i>Administrative and waste management services</i>	(D)	-	164	1.37
<i>Educational services</i>	10	0.62	(D)	-
<i>Health care and social assistance</i>	224	13.82	(D)	-
<i>Arts, entertainment, and recreation</i>	25	1.54	179	1.49
<i>Accommodation and food services</i>	40	2.47	861	7.18
<i>Other services, except public administration</i>	(D)	-	649	5.42
Government and government enterprises	201	12.40	1,850	15.44
<i>Federal, civilian</i>	34	2.10	128	1.07
<i>Military</i>	17	1.05	201	1.68
<i>State and local</i>	150	9.25	1,521	12.69
<i>State government</i>	(D)	-	142	1.18
<i>Local government</i>	(D)	-	1,379	11.51

⁴ (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals. (Bureau of Economic Analysis, 2012)

Agriculture

Agriculture represents an important aspect of the regional economy, both in terms of direct income and employment effects on other industry. The table below shows the amount of agricultural land and production in the Project area. The table also provides data for the state of North Dakota to provide perspective for the counties information.

Table 3.5. Agricultural Statistical Highlights in Grant and Morton Counties and the State of North Dakota in the 2007 Census of Agriculture (U.S. National Agricultural Statistics Service, 2012)

Area	Land in Farms (acres)	Market Value of Agricultural Products Sold	Market Value of Agricultural Products Sold, Average per Farm	Net Cash Farm Income of the Operations, Average per Farm
Grant County	1,058,178	\$79,870,000	\$151,270	\$66,443
Morton County	1,165,098	\$117,251,000	\$140,252	\$55,875
State of North Dakota	39,674,586	\$6,084,218,000	\$190,310	\$80,983

In the agriculture sector, the main crops in Grant County are wheat, forage, sunflower seed, barley, and corn. While in Morton County, the main crops include wheat, forage, barley, sunflower seed, and oats. Livestock and bee colony production also plays a key role in the agriculture sector in the area (U.S. National Agricultural Statistics Service, 2012).

Recreation

Recreation is an important part of the regional economy and to the North Dakota economy as a whole. A survey of fishing, hunting, and wildlife viewing in North Dakota estimated total annual fishing expenditures of \$94 million, hunting expenditures of \$129 million, and wildlife watching expenditures of \$23 million in 2006 (Service 2008b). These expenditures generate notable economic benefits throughout the state and include both trip-related expenditures (e.g. food and lodging) and equipment expenditures (e.g. rods, reels, and firearms).

Lake Tschida (Heart Butte Reservoir) is Grant County's largest body of water and the most popular recreation site in the area. Lake Tschida is well known for its water-based activities, such as swimming, boating, water skiing, and year-round fishing. Other popular recreation activities include picnicking, camping, hunting, and snowmobiling. A 2005 study compiled the average annual number of group visits to Lake Tschida and determined the figure to be 44,947. This study also placed an annual value of \$4.3 million (\$5.2 million in 2012 dollars) on the aggregate recreation benefits that Lake Tschida visitors experience (Kinsey, 2005).

Other recreation areas in the region include Cedar River National Grassland and Lake Patricia National Wildlife Refuge.

Income and Poverty

An important economic measure of impacts associated with an action is the effect on income and related impacts on poverty rates. Frequently used measures of income include median household income and per capita income. Median household income is a good measure of the total available resources a household has to spend on goods and services as a total unit, although per

capita income is a better measure of the economic resources available to each person for goods and services. The term “median” represents the statistical middle in a set of measurements ordered from smallest to largest.

Large households may have greater income as a unit, but may be relatively poor in terms of providing goods and services for each individual; therefore, both measures of income provide important information. The poverty rate indicates the percentage of the population that falls below the official threshold of poverty. The poverty threshold varies according to household size and location. The poverty threshold for 2010 was an income of \$22,050 for a family of four (U.S. Department of Health and Human Services, 2012). While the threshold in some sense represents the needs of families, it should be interpreted as a statistical yardstick rather than as a complete description of what people and families need to live.

The table below presents the median household income, per capita income, and poverty rate. The county and state figures are compared against the United States as a whole.

Table 3-6. Estimated 2010 Income and Poverty Rates for Grant and Morton Counties, the State of North Dakota, and the United States in 2010 Inflation-Adjusted Dollars (U.S. Census Bureau, 2012) (Bureau of Economic Analysis, 2012)

Region	Median Household Income (S1903) ¹	Per Capita Personal Income ⁵	Percent of Individuals Below Poverty Threshold (S1701) ¹
Grant County	\$39,500 (+/-4,032)	\$43,551	13.0% (+/-3.1)
Morton County	\$50,591 (+/-3,254)	\$35,722	8.2% (+/-1.6)
State of North Dakota	\$46,781 (+/-452)	\$42,890	12.3% (+/-0.4)
United States	\$51,914 (+/-89)	\$39,937	13.8% (+/-0.1)

¹ Margin of error (+/-) is in parenthesis; (S1903) and (S1701) represent table numbers from the U.S. Census Bureau

Grant County has a statistically significant lower median household income than Morton County or the State of North Dakota; however, the per capita personal income data does not reach the same conclusion. There may be many reasons for this occurring, such as having a small sample size or different measurement techniques. Grant County’s poverty level is statistically significantly higher than the Morton County poverty level; however the Grant County poverty level is comparable to the overall State of North Dakota average.

Labor Force, Unemployment, Educational Attainment

Labor force, unemployment, and educational attainment are indicators of the number of workers potentially available to support current and future economic activity and the population’s level of training to provide skilled labor for commercial activities. The small population of the study region limits the size of the available labor force. Large demands for labor would need to be supplied from outside the region. Labor force data are presented in the table below.

⁵ Definition of personal income: “Income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), rental income of persons with CCAdj, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.” (Bureau of Economic Analysis, 2008)

In addition, as of June 2012, the unemployment rate in the study region was generally very low. The weighted average unemployment (weighted by the size of the labor force) was 3.3 percent for the study region, which is slightly higher than the average for the state of North Dakota. Unemployment rates for the study area are presented in the table below.

Educational attainment is an indicator of the skill level of the labor force and the attractiveness of the area to businesses and industry considering expanding or locating in the area. This can influence the future labor force and income potential of the region. The percentage of the population 25 years of age or older with a high school diploma or the equivalent for each county and the percentage with a bachelors degree or higher is shown in the table below.

Table 3-7. Estimated June 2012 Labor Force, Unemployment, and Estimated 2010 Educational Attainment for Grant and Morton Counties, the State of North Dakota, and the United States
(U.S. Bureau of Labor Statistics, 2012) (U.S. Census Bureau, 2012)

Region	Labor Force	Employed	Unemployment Rate	High School Graduate or Higher	Bachelors Degree or Higher
Grant County	1,259	1,222	2.9%	87.1%	16.4%
Morton County	15,465	14,940	3.4%	87.8%	22.3%
State of North Dakota	398,500	385,992	3.1%	89.4%	26.3%
United States	156,385,000	143,202,000	8.4%	85.0%	27.9%

The percentage of the population 25 years of age or older in Grant and Morton Counties that have a high school diploma or the equivalent is 87.1% and 87.8%, respectively. This compares to 89.4% for the state of North Dakota overall. Additionally, the percentage of the population in Grant and Morton Counties that have a bachelor’s degree or higher is 16.4% and 22.3%, respectively. This compares to 26.3% for the state of North Dakota overall. The lower level of bachelor’s degrees in the region, specifically Grant County, may limit some employment opportunities to the current population.

Consequences

Introduction

- What would the effect of the Project be on social and economic issues?

This section addresses how the proposed action may affect the regional economy.

Methods

Regional economic impacts of the proposed action were considered in order to evaluate the project’s influence on the regional economy.

Results

Proposed Action

Under the proposed action, community alternative, the Lower Heart Irrigation Company and individual contract irrigators would merge with the Western Heart Irrigation District, join together, or form a new irrigation entity and enter into a long-term (up to 40 years) water service or repayment contract. Therefore, the regional economy would likely operate at levels similar to the current conditions.

Cumulative Effects

The proposed action would likely keep area costs and benefits the same. No change in economic activity associated with irrigation and recreation activities would result in no overall change to the regional economic impact. However, it is reasonably foreseeable that under the community alternative pumping costs to irrigators would decrease for those irrigators eligible to receive project power which is available at a reduced rate.

Actions to Minimize Effects

Since there would be no negative economic and social impact results based on these analyses, no associated environmental commitments are needed.

Summary

No regional economic impacts are expected as a result of the proposed action.

Climate Change

Existing Conditions

The climate of the area is typically continental with a wide range of both annual and daily temperatures. Cold and dry air masses from polar regions intensify winters while warm and moist air masses from the Gulf of Mexico account for most of the area's precipitation. Most of the 18 inches of annual average precipitation comes in the form of rain. Average daily temperatures range from 12.8° F. in January to 71.1° F. in July. The average daily minimum temperature in January is 2.2° F and the average daily maximum temperature in July is 83.5° F. Daylight hours range from less than nine in December to more than 16 in June.

Environmental Effects

Introduction

The proposed administrative action would have no measureable effect on climate through emissions of greenhouse gasses. However, climate change could affect project irrigation in several ways. If the average temperature increases in the Northern Great Plains, seasonal runoff and annual stream flow in the Heart River could change, thus affecting the amount of water available in Heart Butte Reservoir to meet future demands. Likewise, increased temperatures, particularly in the winter, could reduce snowpack and affect runoff volumes and patterns. Additionally, climate change could affect the timing and volume of irrigation demands.

Methods

The Intergovernmental Panel on Climate Change (IPCC) and the U.S. Climate Change Science Program periodically release climate change assessments. In 2011, Reclamation released an assessment of potential climate change effects on major river basins in the western U.S. These assessments and other peer-reviewed scientific literature were used to qualitatively assess potential effects of climate change on the project.

Results

Emissions of CO₂ from continued operation of this project would be low, and would neither individually nor cumulatively contribute to climate change. Water availability and need could, however, be affected by climate change. Should average temperatures rise in the project area, demand for additional water to meet the already identified need may increase. Changes in annual precipitation could affect the volume and seasonality of runoff in the Heart River, the source of water for the project.

According to the most recent report issued by the IPCC, virtually all climate model simulations agree that average annual temperatures in central North America, which includes the project area, will continue to increase during this century (Christensen et al. 2007). For the northern Great Plains, including the project area, the median projected increase is about 4°F for years 2030 – 2059 as compared to 1950 – 1979 (Reclamation 2010).

On a global scale, warming is projected to reduce precipitation in the subtropics and increase precipitation at higher latitudes (Arnell et al. 2001; Solomon et al. 2007). However, the location of “boundaries” between areas projected to receive more or less precipitation is uncertain. This uncertainty is reflected in considerable disagreement among model outputs for precipitation change at middle latitudes. For example, the median projected change in annual precipitation for central North America is a 3% increase, but model projections range from a decrease of 16% to an increase of 15% (Christensen et al. 2007).

Variability in stream flow over time is strongly influenced by variability in precipitation over seasonal, annual, and decadal time scales. Thus, changes in precipitation could alter the frequency, magnitude, and duration of future droughts. However, many uncertainties remain that limit the ability to project changes in precipitation over regional or sub-regional scales. Modeled changes in average annual precipitation occur more slowly than changes in temperature, and thus, may be more difficult to detect given the large amount of natural variability in precipitation over annual and decadal time scales (Cohen et al. 2001; Christensen et al. 2007).

Agricultural water demand could increase if growing seasons become longer and assuming that farming practices could adapt to this opportunity by planting more crop cycles per growing season. This possibility is based on studies suggesting that the average North American growing season length increased by about 1 week during the 20th century; and it is projected that, by the end of the 21st century, it will be more than 2 weeks longer than typical of the late 20th century (Gutowski et al. 2008). Increased temperatures are expected to change the seasonal pattern of runoff and stream flow (Jacobs et al. 2001). In particular, projections show that warmer winters will result in more winter precipitation falling as rain and less as snow. As a

result, snowpack will decrease, winter stream flow increase, and spring runoff occur earlier (Christensen et al.2007). Changes in seasonal precipitation could also cause lower summer flows (Christensen et al. 2007).

Reclamation (2011b) assessed potential climate change effects on major river basins in the western United States. **Figure 3-7** shows the 25th, 50th (median), and 75th percentiles for changes in temperature and precipitation in the Missouri River basin from a suite of 112 downscaled climate projections. Based on these projections, it is very likely that the local climate will become warmer over the next 50 years. The model consensus also suggests that the climate will become wetter, but considerable uncertainty remains regarding changes in precipitation. Annual runoff is projected to increase over most of the Missouri River basin, including the project area.

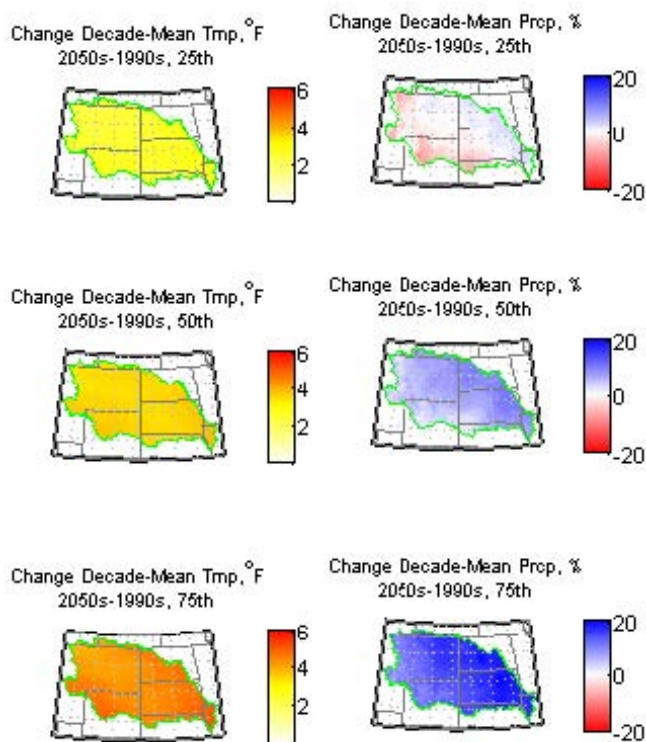


Figure 3-7. Simulated changes in temperature and precipitation in the Missouri River basin for 2050-2059 relative to 1990-1999 (from Reclamation 2011b).

Direct Effects

Continuation of a long term contract to deliver irrigation water from Heart Butte Reservoir would have no measureable effect on global greenhouse gas emissions or other factors that could affect climate.

Cumulative Effects

No cumulative effects to greenhouse gas emissions or other factors that could affect climate were identified for the decision to continue to contract and deliver irrigation water from Heart Butte Reservoir as proposed.

Indian Trust Assets (ITAs)

Introduction

This section addresses the current condition and potential impacts to Indian trust assets (ITAs). The United States has a “trust responsibility” to protect and maintain rights and property reserved by or granted to federally recognized American Indian tribes or to Indian individuals by treaties, agreements, statutes, and executive orders. This trust responsibility is derived from the historical government-to-government relationship between the federal government and Indian tribes as expressed in treaties, agreements, and federal Indian law. This responsibility requires that all federal agencies, including Reclamation, take all actions reasonably necessary to protect ITAs.

ITAs

ITAs are defined as legal interests in property held in trust by the United States for federally recognized Indian tribes or individuals. Examples of things that may be trust assets include “lands, minerals, hunting and fishing rights, and water rights” (Reclamation 1993). These three ITAs are addressed in this section: 1) trust lands; 2) hunting and fishing rights; and 3) water rights.

Trust Lands

Trust lands are the most commonly encountered ITA. *Trust lands* are property set aside for Indians with “...the United States holding naked legal title and the Indians enjoying the beneficial interest” (Canby 1991). Trust lands are most often encountered within or near Indian reservations.

Hunting and Fishing Rights

According to Reclamation’s (1993) ITA policy, *hunting and fishing rights*, as specifically retained or relinquished in treaties, may qualify as ITAs. This is because the right to continue hunting and fishing often was retained in many treaties. Although the courts have not ruled on whether these activities constitute ITAs, they are treated as such here because of Reclamation’s (1993) ITA policy.

Indian Water Rights

Another ITA that potentially could be affected by the Heart River Irrigation Contract(s) is Indian water rights, both surface and groundwater of the tribes in the Missouri River Basin. Such water rights in the basin are a matter of federal law. The basis for this stems from the U.S. Supreme Court’s decision in *Winters v. United States* (1908), which enunciated the Winters Doctrine. According to the doctrine, the establishment of an Indian reservation implied that sufficient water was reserved (or set aside) to fulfill purposes for which the reservation was created, with the priority date being the date the reservation was established. As such, *Indian water rights*, when quantified, constitute an ITA. The U.S. Supreme Court has held that water allocated should be sufficient to meet both present and future needs of the reservation to assure the viability of the reservation as a homeland (*refer to Arizona v. California 1963*). Case law also

supports the premise that Indian reserved water rights are not lost through non-use. However, there are no reservations along the Heart Butte Irrigation Project area. All lands are privately held.

Methods

The method of analysis employed for this study was first to identify the federally recognized tribe that has historic ties to the project area (USGS) through treaties and to identify any trust lands in the Heart River Irrigation Contract Project area. The Heart River Irrigation Project lies on lands originally occupied by the Dahcotah Nation and the Three Affiliated Tribes: Mandan, Arikara, and Hidatsa (USGS 1978). No trust lands were identified within or adjacent to the area of potential effect of the proposed irrigation contract(s), which is defined by private land outside of Indian reservations; it does not include any trust lands.

Although many of the treaties with the tribes in the Missouri River Basin provided for continued hunting and fishing on ceded lands (lands tribes gave up to the United States through treaties), neither those lands nor those activities would be affected by the action alternative. Teton, Lakota, and Yanktonai of the Great Sioux Nation retained hunting and fishing rights in the 1851 Fort Laramie Treaty and hunting in the 1866 Treaty with Sioux Brule/Fort Laramie Treaty (Royce 1899) (Table 3-9).

Table 3-9. Treaties of Missouri River Basin Tribes and Retained Rights (Royce 1899).

Tribe	Treaty	Retained Rights
Arikara (Arikaree) and Mandan (Hidatsa) (Three Affiliated Tribes)	July 27, 1866 at Fort Berthold, Territory of Dakota	
Sioux or Dahcotah Nation Standing Rock Sioux Tribe	1851 Fort Laramie Treaty 1868 Treaty with Sioux Brule etc/Fort Laramie Treaty 1882 Agreement with Sioux of various tribes (not ratified)	1851-hunting and fishing 1868-hunting
Cheyenne River Sioux Tribe	1889 Congressional Act; Great Sioux Settlement	1889-irrigation

Source: <http://www.firstpeople.us/FP-HTML-Treaties/Treaties.html> last accessed 12/7/2012

Summary

Proposed Action. No direct or indirect effects of the proposed action to issue the power and water contracts and continue to deliver irrigation water from Heart Butte Reservoir to affect trust lands or hunting and fishing rights for the decision to issue long term irrigation and power contract(s), as proposed.

Environmental Justice

Existing Conditions

Introduction

- What are the current conditions of the low-income and minority communities within the area that could be disproportionately affected by the proposed community alternative?

This section addresses the current conditions affecting Environmental Justice in the region. Environmental Justice refers to the distribution of affects from a federal action on people with respect to income, race, ethnicity, or some other group characteristic. More specifically, Executive Order 12898 (February 11, 1994) directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations (Executive Office of the President, 1994). Environmental Justice recognizes that no group of people should bear a disproportionate share of negative impacts from an action. The impacts of an action may be considered disproportionately distributed if the percentage of total impacts imposed on a specific group is greater than the percentage of the total population represented by that group. Reclamation considers Environmental Justice issues in the scope of the NEPA analysis based on its relevance with Project impacts.

Methods

An evaluation of Environmental Justice impacts requires an understanding of where impacts would occur and where potentially affected groups are located. Therefore, the analysis of Environmental Justice impacts relies on demographic data to identify and locate various groups. The current conditions used to evaluate potential Environmental Justice concerns were gathered from the U.S. Census Bureau, U.S. Bureau of Economic Analysis, and the U.S. Bureau of Labor Statistics. The data collection included statistics on demographic characteristics, income, poverty levels, and unemployment rates.

Existing Condition

In order to identify potential Environmental Justice issues within the Project area, data for Grant and Morton Counties was compared with the state of North Dakota and the United States. The tables below show demographic and economic characteristics for the study area.

The demographic distribution of the study area is relatively similar to the state of North Dakota. Economic-related data indicate that Grant County has a median household income that is statistically significantly lower than Morton County or the State of North Dakota; however, the per capita personal income data does not reach the same conclusion. There may be many reasons for this occurring, such as having a small sample size or different measurement techniques. Grant County's poverty level is statistically significantly higher than the Morton County poverty level; however the Grant County poverty level is comparable to the overall State of North Dakota average.

Table 3-9. Estimated 2010 Demographic Characteristics of the Study Area (U.S. Census Bureau, 2012)

Race	Grant County	Morton County	State of North Dakota
White	98.7	93.6	90.0
Black or African American	0.0	0.4	1.2
American Indian and Alaska Native	1.1	3.6	5.4
Asian	0.1	0.2	1.0
Native Hawaiian and Other Pacific Islander	0.0	0.1	0.0
Two or More Races	1.3	1.6	1.8
Hispanic or Latino (of any race)	0.3	1.5	2.0

Table 3-10. Estimated 2010 Demographic Characteristics of the Study Area in 2010 Inflation-Adjusted Dollars (U.S. Census Bureau, 2012) (Bureau of Economic Analysis, 2012) (U.S. Bureau of Labor Statistics, 2012)

Demographic Characteristics	Grant County	Morton County	State of North Dakota
Median Household Income [†] (S1903)	\$39,500 (+/-4,032)	\$50,591 (+/-3,254)	\$46,781 (+/-452)
Per Capita Personal Income	\$43,551	\$35,722	\$42,890
Percent of Individuals Below Poverty Threshold [†] (S1701)	13.0% (+/-3.1)	8.2% (+/-1.6)	12.3% (+/-0.4)
Unemployment Rate (June 2012)	2.9%	3.4%	3.1%

[†] Margin of error (+/-) is in parenthesis; (S1903) and (S1701) represent table numbers from the U.S. Census Bureau

Environmental Consequences

Introduction

- What impacts would the proposed action or community alternative have on minority and low-income populations in the area and would these impacts be disproportionate compared to other groups?

This section addresses how the impacts of the proposed alternatives would be distributed throughout the impact area. Since no regional impacts were identified in the Social and Economic Conditions section, the regional economic impacts from the proposed action would not create Environmental Justice impacts.

Methods

Environmental Justice impacts were analyzed by simply comparing impacted areas to those areas with a relatively large number of minority or low-income residents. If a disproportionate share of adverse impacts would occur in an area identified as minority or low-income, then this would be identified as an Environmental Justice concern. The impacts of an action are disproportionately distributed if the percentage of total impacts imposed on a specific group is greater than the percentage of the total population represented by that group. As an example, if 50% of the total negative impacts were imposed on a defined population that constitutes 5% of the impact area population, this would be considered to be a disproportionate impact. Therefore,

the analysis consists of whether any environmental effects create a disproportionate effect on minority or low-income populations.

Results

Proposed Action

There would be no disproportionate effects to minority or low-income communities as a result of implementing the proposed action. The regional economy would continue to operate as it had before.

Cumulative Effects

Actions to Minimize Effects

Since there are no Environmental Justice issues of concern, associated environmental commitments are not needed.

Summary

No Environmental Justice impacts are expected as a result of the proposed action.

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Chapter 4

Compliance With Environmental Statutes

If the Proposed Action Alternative would be implemented it would be accomplished in accordance and compliance with the following environmental laws, regulations, directives and compliance with the following:

- American Indian Religious Freedom Act of 1978 (P.L. 95-341)
- National Historic Preservation Act of 1966 (P.L. 89-665), as Amended 1992 (P.L. 102-575)
- Native American Graves Protection and Repatriation Act (P.L. 101-601)
- Archaeological and Historic Preservation Act (P.L. 93-291)
- Archeological Resources Protection Act of 1979 (P.L. 96-95)
- National Environmental Policy Act of 1969 (42 USC 4321)
- Clean Air Act (33 USC 7401) and Amendments
- Clean Water Act (33 USC 1251 et seq.), Sections 401, 402, and 404
- Endangered Species Act of 1973 (P.L. 93-205) (16 U.S.C. 1531-1544)Farmland Protection Policy Act (P.L. 97-98)
- Fish and Wildlife Coordination Act of 1958 (PL 85-624)
- Indian Trust Responsibilities (512 DM Chapter 2)
- Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments
- Federal Energy Policy Act of 2005
- Executive Order 11988 - Floodplain Management (1977)
- Executive Order 11990 - Protection of Wetlands (1977)
- Executive Order 12898 - Environmental Justice (1994)
- Executive Order 13007 - Indian Sacred Sites (1996)
- Executive Order 11593 - Protection and Enhancement of the Cultural Environment (1971).
- Executive Order 13186- Protection of Migratory Birds (2001) Responsibilities of Federal Agencies To Protect Migratory Birds in furtherance of the purposes of the migratory bird conventions
- Executive Order 13112 signed by President William Clinton on February 3, 1999. Invasive Species
- Migratory Bird Treaty Act (16 U.S.C. 703-711)
- Bald and Golden Eagle Protection Acts (16 U.S.C. 668-668d)
- Fish and Wildlife Coordination Act (16 U.S.C. 661-666c)

List of Preparers

Kelly McPhillips - Environmental Specialist – Dakotas Area Office (DKAO) - Bismarck, North Dakota

Greg Hiemenz - Natural Resource Specialist - DKAO - Bismarck, North Dakota

Duane Krogstad - Civil Engineer - DKAO - Bismarck, North Dakota

Daniel Schaff Gallgher – Economist – Great Plains Regional Office, Billings, MT

Agencies and Persons Consulted

Reclamation sent a scoping notice to approximately fifty individuals including Standing Rock Sioux Tribe and the Three Affiliated Tribes, North Dakota's congressional delegation, appropriate state and federal agency contacts, private individuals, non-governmental organizations, and one in each of the two project area county auditors offices. That complete list is available at Dakotas Area Office.

RESPONSES TO THE SCOPING NOTICE FOR THE EAsee page Appendix-3.

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APPENDIX

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RESPONSES TO SCOPING NOTICE



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640

October 24, 2012

North Dakota Regulatory Office

Mr. Kelly McPhillips
Bureau of Reclamation
PO Box 1017
Bismarck, North Dakota 58502

OFFICIAL FILE COPY RECEIVED		
OCT 29 2012		
REPLY:	YES	NO
INFO. COPY TO:		
DATE	INITIAL	TO
10/29/12	KMcP	Kelly
CLASSIFICATION		
PROJECT		
CONTROL NO.		
FOLDER I.D.		

Dear Mr. McPhillips:

This is in response to your letter dated October 22, 2012, requesting US Army Corps of Engineers (Corps) comments in regards to your draft environmental assessment for issuance of a long term water service contract (up to 40 years) within the Heart Butte Unit with the Lower Heart Irrigation Company (3,103 acres) and irrigators holding expiring, individual water service contracts (2003.8 acres).

Based on the information contained within your letter, it appears a Department of the Army permit may be required for all or part of your proposed project(s). In order for us to fully evaluate your project(s), please complete and submit the Corps permit application (copy enclosed). Be sure to accurately describe all proposed work and construction methodology. Once the application is complete, please mail it to the letterhead address.

Please be advised, Corps regulatory offices administer Section 10 of the Rivers and Harbors Act (Section 10) and Section 404 of the Clean Water Act (Section 404). Section 10 regulates work impacting navigable waters. Section 10 waters in North Dakota are the Missouri River (including Lake Sakakawea and Lake Oahe), Yellowstone River, James River south of the railroad track in Jamestown, North Dakota, Bois de Sioux River, Red River of the North, and the Upper Des Lacs Lake. Work over, in, or under navigable waters is considered to have an impact. Section 404 of the Clean Water Act regulates the discharge of dredged or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in waters of the United States.

Do not hesitate to contact this office by letter or telephone (701) 255-0015 if we can be of further assistance.

Sincerely,

Daniel E. Cimarosti
State Program Manager
North Dakota

Enclosure





NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov



October 31, 2012

Kelly McPhillips
Bureau of Reclamation
Dakotas Area Office
P.O. Box 1017
Bismarck, ND 58502

Re: Environmental Assessment for Renewal of Long-term Water Service and Project Power
Contracts for the Lower Heart River Irrigation Company and Individual Irrigator Contracts
Grant and Morton Counties

Dear Mr. McPhillips:

This department has reviewed the information concerning the above-referenced project submitted under date of October 22, 2012, with respect to possible environmental impacts. We do not anticipate any environmental impacts from this project.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc

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NOV 1 2012		
REPLY:	YES	NO
INFO. COPY TO:		
DATE	INITIAL	TO
11/5/12	LDG	McPhillips
CLASSIFICATION		
PROJECT		
CONTROL NO.		
FOLDER I.D.		

Environmental Health
Section Chief's Office
701.328.5150

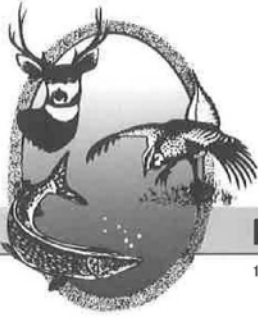
Division of
Air Quality
701.328.5188

Division of
Municipal Facilities
701.328.5211

Division of
Waste Management
701.328.5166

Division of
Water Quality
701.328.5210

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"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

November 13, 2012

Kelly McPhillips
Bureau of Reclamation
Dakotas Area Office
PO Box 1017
Bismarck, North Dakota 58502

Dear Mr. McPhillips:

Re: Lower Heart River Irrigation and Individual Irrigator Contracts

The North Dakota Game and Fish Department has received notification of the Bureau of Reclamations intention to prepare a draft environmental assessment for issuance of a long term water service contract (up to 40 years) within the Heart Butte Unit with the Lower Heart Irrigation Company (3,103 acres) and irrigators holding expiring, individual water service contracts (2003.8 acres). No new irrigation acreage is included in this analysis.

The Department is also concerned the proposed intake could negatively impact fish populations by increasing mortality due to impingement or entrainment if precautions are not incorporated into the design of the project. We suggest the following recommendations be included in the design of the new intake:

1. Intake shall be screened and maintained with $\frac{1}{4}$ " or smaller mesh size openings.
2. Intake velocities shall not exceed $\frac{1}{2}$ foot/second.
3. The intake shall be placed at least 20 vertical feet below the existing water level.
4. The intake shall be elevated 2 to 4 feet off the bottom.
5. If the 20 foot depth is not attainable, then the intake velocity shall be limited to $\frac{1}{4}$ foot per second, with the intake placed at a maximum practicable attainable depth.
6. Pumping sound levels shall not exceed 75DB at 50 feet.

If the intakes need to be modified, we request work does not take place within the river from April 15 to June 1 to protect the fisheries resource. Any disruption or displacement of the streambed and banks besides planned alterations must be restored to pre-project conditions. Erosion control

measures should be implemented to minimize the opportunity for sediments to enter the lake or wetlands and to isolate suspended sediments within the work site (i.e. silt fences, floating turbidity barriers).

Aquatic Nuisance Species (ANS) rules were enacted by the North Dakota Game and Fish Department in 2008. These new regulations are to prevent the introduction of undesirable species of plants and animals. Preventive measures are now required to bring equipment into the state. State law allows for fines up to \$1,000 and the confiscation of equipment.

Required measures include removing any and all aquatic vegetation from vessels, motors, trailers, or construction equipment; all water shall be drained from bilge(s) or confined spaces on vessels, boat motors or construction equipment; all species of ANS (this list can be found on the North Dakota Game and Fish Department website) must be removed from vessels, motors, trailers or construction equipment; and water must be drained from confined spaces on vessels, boat motors or construction equipment. These ANS preventative measures extend to any and all vehicles, vessels, trailers, pumps and such equipment that will be used in the project or any/all construction efforts connected with this project in or on the waters of the State. This requirement should be included if occurring during the open water season or if the operation proceeds on the ice pack.

The contractor or his agents or subcontractors must provide the Department a reasonable opportunity to inspect any and all vehicles, vessels, pumps and equipment that will be used in the project in or on the waters of the state prior to those items being launched or placed in the waters of the state. A minimum of 72 hour notice must be provided to the Department for scheduling an inspection. The Department's ANS Biologist, Mr. Fred Ryckman, is to be contacted at the Riverdale Office (701-770-0920) for equipment inspections or any additional information regarding ANS prevention protocols.

Sincerely,



Greg Link
Chief

Conservation & Communication Division

blk



North Dakota Department of Transportation

Francis G. Ziegler, P.E.
Director

Jack Dalrymple
Governor

NOV 16 2012

REPLY: YES NO

INFO. COPY TO:

DATE	INITIAL	TC
11/16	KMS	Kelly

CLASSIFICATION _____
PROJECT _____
CONTROL NO. _____
FCI/PER ID. _____

November 14, 2012

Kelly B. McPhillips
United States Department of the Interior
P.O. Box 1017
Bismarck, ND 58502-1017

DRAFT EA FOR ISSUANCE OF A LONG TERM WATER SERVICE CONTRACT WITHIN HEART BUTTE UNIT WITH LOWER HEART IRRIGATION COMPANY, MORTON COUNTY, MANDAN, NORTH DAKOTA

We have reviewed your October 22, 2012, letter.

This project should have no adverse effect on the North Dakota Department of Transportation highways.

However, if because of this project any work needs to be done on highway right-of-way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Kevin Levi at 701-328-6955.

ROBERT A. FODE, P.E., DIRECTOR – OFFICE OF PROJECT DEVELOPMENT

57/raf/js

c: Kevin Levi, Bismarck District Engineer



North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
701-328-2750 • TTY 800-366-6888 • FAX 701-328-3696 • INTERNET: <http://swc.nd.gov>

REPLY: YES NO		
INFO. COPY TO:		
DATE	INITIAL	TO
11/20	KMP	Kelly
CLASSIFICATION		
PROJECT		
CONTROL NO.		
FOLDER I.D.		

November 14, 2012

Kelly B. McPhillips
Bureau of Reclamation
PO Box 1017
Bismarck, ND 58502

Dear Ms. McPhillips:

This letter is in response to your request for comments or concerns concerning the Bureau of Reclamation's preparation of an Environmental Assessment (EA) for the renewal of long-term water service and project power contracts for the Lower Heart River Irrigation Company and individual irrigator contracts. After reviewing the information provided, we have no specific comments regarding the scoping process for the development of the EA. I do however ask that you continue to comply with the Water Permit No. 250B that was issued for the Heart Butte Unit project.

The North Dakota State Water Commission (Commission) fully supports and encourages irrigation development in the state. The Commission's mission is "to improve the quality of life and strengthen the economy of North Dakota by managing the water resources of the state for the benefit of its people." In the spirit of our mission – irrigation provides economic benefit not only to our state's agricultural producers, but also to the entire state, especially during drought conditions.

I would appreciate receiving a copy of the draft Environmental Assessment when it is completed.

Thank you very much for providing the opportunity to provide comments.

Sincerely,

Todd Sando, P.E.
Chief Engineer-Secretary to the State Water Commission

TS:LW:dp/261

JACK DALRYMPLE, GOVERNOR
CHAIRMAN

TODD SANDO, P.E.
CHIEF ENGINEER AND SECRETARY

CONTROLLED - 87-12

due Dec 7

WESTERN HEART RIVER IRRIGATION DISTRICT
P.O. Box 142
Carson, ND 58529
November 23, 2012

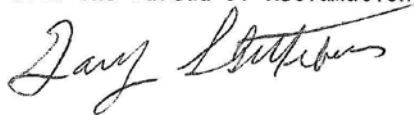
4/00

Bureau of Reclamation
P.O. Box 1017
Bismarck, ND 58502

Dear Sirs:

The directors of the Western Heart River Irrigation District request that you draft a sample contract to merge the Western Heart River Irrigation District with the Lower Heart Irrigation Company and the individuals who have direct water contracts with the Bureau of Reclamation.

Sincerely,



Gary Skretteberg
Secretary - Western Heart River Irrigation District

OFFICIAL FILE COPY RECEIVED		
NOV 27 2012		
REPLY:	YES	NO
INFO. COPY TO:		
DATE	INITIAL	TO
		<i>Rich</i>
<i>11/27</i>	<i>PDF</i>	<i>Rich</i>
<i>11/27</i>	<i>PDF</i>	<i>Jeff Dark</i>
CLASSIFICATION		
PROJECT		
CONTROL NO.		
POL PERIOD		

Final EA Mailing List

HONORABLE HEIDI HEITKAMP
UNITED STATES SENATOR

HONORABLE JOHN HOEVEN
UNITED STATES SENATOR

HONORABLE KEVIN CRAMER
MEMBER UNITED STATES HOUSE

MR ERIC STASCH
OAHE PROJECT MANAGER

PRESIDENT
NORTH DAKOTA CHAPTER OF THE
WILDLIFE SOCIETY

STEVE DYKE
NORTH DAKOTA GAME AND FISH DEPT

HONORABLE CHAIRMAN
CHARLES W. MURPHY
STANDING ROCK SIOUX TRIBE

MR DAVID L. GLATT, PE, CHIEF
NORTH DAKOTA DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SECTION

MR JEFFREY TOWNER
FIELD SUPERVISOR
US FISH AND WILDLIFE SERVICE

MR TODD SANDO
STATE ENGINEER
NORTH DAKOTA STATE WATER
COMMISSION

US GEOLOGICAL SURVEY

FIELD OFFICE SUPERVISOR
DICKINSON FIELD OFFICE
BUREAU OF LAND MANAGEMENT

MR. DAVID KOLAND, GENERAL MANAGER
GARRISON DIVERSION CONSERVANCY
DISTRICT

MS. GENEVIEVE THOMPSON
AUDUBON DAKOTA CHAPTER

MR. GARY PEARSON
NATIONAL WILDLIFE FEDERATION

MR. SCOTT DAVIS
EXECUTIVE DIRECTOR
INDIAN AFFAIRS COMMISSION

MR MARK TRECHOCK
DAKOTA RESOURCE COUNCIL

HONORABLE CHAIRMAN
TEX G. HALL
MANDAN, HIDATSA, AND ARIKARA NATION

MR DANIEL E CIMAROSTI
BISMARCK REGULATORY OFFICE

THE NATURE CONSERVANCY

MR ROD BECK
USDA RURAL UTILITIES SERVICE

STATE CONSERVATIONIST
USDA NATURAL RESOURCE CONSERVATION
SERVICE

PRESIDENT DACOTAH CHAPTER
SIERRA CLUB

MR MERLAN E PAAVERUD
ATTENTION MS SUSAN QUINNELL
STATE HISTORICAL SOCIETY OF NORTH
DAKOTA

MR PAUL BULTSMA
DUCKSUNLIMITED

MR SHAWN MCKENNA
EXECUTIVE DIRECTOR
NORTH DAKOTA WILDLIFE FEDERATION

MORTON COUNTY AUDITOR

LOWER HEART IRRIGATION COMPANY

MR JAMES BOYD
NORTH DAKOTA DEPARTMENT OF COMMERCE

MR JOHN HOGANSON
STATE PALEONTOLOGIST

LYNN HELMS
NORTH DAKOTA INDUSTRIAL COMMISSION

MR MARK ZIMMERMAN
DIRECTOR
NORTH DAKOTA PARKS AND
RECREATION DEPARTMENT

MR FRANCIS G ZIEGLER
DIRECTOR INFRASTRUCTURE SUPPORT
NORTH DAKOTA DEPT OF TRANSPORTATION

GRANT COUNTY AUDITOR

NORTH DAKOTA IRRIGATION ASSOCIATION

WESTERN HEART RIVER IRRIGATION DISTRICT

MS KATHY DUTTENHEFNER
ND PARKS AND RECREATION DEPARTMENT

MR GREGG J WICHE
WATER RESOURCES DIVISION
US GEOLOGICAL SURVEY

NORTH DAKOTA WILDLIFE FEDERATION

HEART BUTTE DAM AND RESERVOIR WATER-YEAR HIGH AND LOW WATER SURFACE ELEVATIONS

Streambed at Dam Axis	Elevation 2000.00	0 Acre-feet
Top of Dead Storage	Elevation 2030.00	5,277 Acre-feet
Top of Active Conservation	Elevation 2064.50	67,142 Acre-feet
Top of Flood Control	Elevation 2094.50	214,169 Acre-feet
Auxiliary Spillway	Elevation 2109.00	328,898 Acre-feet

Year	Low Elevation Month / Day Elevation /1	High Elevation Month / Day Elevation /1
-----	-----	-----
1950	October 04 2007.00 NA	April 19 2081.67 6th
1951	February 19 2058.98	March 30 2074.62 8th
1952	February 5 2059.23	April 09 2086.23 Record high
1953	February 28 2059.80	June 17 2066.45
1954	February 01 2057.99	April 10 2071.95
1955	March 08 2058.56	July 15 2064.99
1956	March 01 2056.71	April 06 2065.05
1957	February 26 2056.04	June 27 2067.25
1958	September 30 2058.50	April 02 2066.20
1959	February 23 2055.80 10th	March 25 2069.30
1960	March 07 2056.00	March 29 2066.26
1961	September 12 2053.50 6th	October 01 2061.00
1962	March 06 2052.50 5th	July 11 2062.60
1963	February 19 2058.60	June 11 2066.00
1964	March 18 2058.51	July 08 2069.16
1965	March 05 2060.43	May 29 2067.95
1966	March 01 2059.12	June 26 2069.18
1967	September 30 2058.76	May 11 2068.93
1968	January 23 2058.18	May 08 2062.18
1969	October 24 2058.25	April 06 2072.86
1970	September 23 2058.54	May 12 2082.70 4th
1971	October 21 2058.34	April 01 2068.72
1972	October 01 2059.56	March 17 2079.75 7th
1973	September 23 2057.93	March 05 2069.20
1974	September 30 2056.87	June 10 2064.25
1975	October 31 2056.39	May 02 2073.80 9th
1976	September 30 2058.10	March 26 2065.77
1977	February 07 2057.40	June 18 2068.00
1978	September 11 2061.40	March 31 2083.77 2nd
1979	March 16 2060.63	April 13 2069.30
1980	September 26 2060.11	June 24 2064.12
1981	August 03 2058.86	September 11 2061.69
1982	January 27 2061.41	April 15 2073.70 10th

HEART BUTTE DAM AND RESERVOIR
WATER-YEAR HIGH AND LOW WATER SURFACE ELEVATIONS
 (CONTINUED)

Year	Low Elevation		High Elevation	
	Month / Day	Elevation /1	Month / Day	Elevation /1
1983	September 09	2061.78	March 16	2067.80
1984	September 30	2058.98	June 23	2068.33
1985	September 30	2058.91	May 22	2064.48
1986	October 01	2058.90	March 06	2073.16
1987	September 30	2059.84	April 06	2069.76
1988	September 27	2055.07 8th	May 12	2062.05
1989	October 14	2055.02 7th	June 07	2061.68
1990	September 27	2051.70 4th	July 06	2056.58
1991	September 30	2049.23 3rd	July 01	2055.12
1992	October 25	2049.00 Record Low	April 30	2051.95
1993	October 12	2049.16 2nd	July 29	2065.30
1994	September 12	2062.16	June 15	2066.61
1995	October 01	2062.32	May 14	2067.43
1996	September 16	2061.22	March 15	2067.33
1997	October 02	2061.53	March 24	2082.19 5th
1998	March 23	2061.76	August 22	2067.27
1999	September 30	2062.39	March 03	2069.04
2000	September 27	2060.90	May 29	2063.99
2001	August 31	2062.60	July 30	2066.31
2002	September 27	2059.61	June 19	2063.85
2003	October 02	2059.62	March 20	2070.32
2004	October 28	2060.60	March 12	2068.77
2005	October 16	2061.04	July 03	2066.46
2006	September 13	2058.18	May 02	2065.16
2007	October 02	2058.54	June 17	2062.72
2008	September 30	2055.84	April 20	2060.52
2009	October 09	2055.74 9th	April 16	2082.73 3rd
2010	November 09	2061.50	April 02	2068.90
2011	September 30	2062.32	April 10	2073.04
2012	September 27	2061.28	May 06	2064.88

Note(s):

/1 - Elevations shown are end-of-day recorded readings.

