



— BUREAU OF —
RECLAMATION

DKAO-EA-2024-02 Environmental Assessment

Environmental Assessment for the Heart Butte Safety of Dams Modification Project

Heart Butte Unit

Pick-Sloan Missouri Basin Program, North Dakota

Missouri Basin and Arkansas-Rio Grande-Texas Gulf Region



Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

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.

Cover Photo: Heart Butte Dam Spillway and Heart River (Reclamation Photo 2024)

This Page Left Blank Intentionally

Contents

Chapter 1: Introduction	7
Heart Butte Dam Background	7
Dam Design.....	8
History of Conduit Seepage	10
Purpose and Need for the Proposed Action	10
Legal Authority.....	11
Chapter 2: Alternatives	12
Alternative Development.....	12
No Action Alternative.....	12
Proposed Action Alternative.....	13
Project Site Layout.....	13
Seepage Cutoff	13
Seepage Filter System.....	14
Seepage Berm, MSE Wall, and Temporary Cofferdam	15
Conduit Grouting	17
Water Operations During the SOD Modification Project.....	17
Need for Reservoir Drawdown During Construction	17
Estimated Reservoir Drawdown Timeline.....	18
SOD Modification Communications Strategy	20
Alternatives Considered and Eliminated from Further Study.....	22
Three-sided Filter Around the Outlet Works Conduit	22
Four-sided Filter Around the Outlet Works Conduit.....	22
Four-sided Filter Around the Stilling Basin.....	23
Cutoff Wall Along the Centerline of the Dam.....	23
Permanent Reservoir Restriction.....	23
Dam Breach.....	24
Chapter 3: Affected Environment and Environmental Consequences.....	24
Surface Waters and Hydrology.....	25
Affected Environment.....	25
Environmental Effects of the Proposed Action Alternative	32
Environmental Effects of the No Action Alternative.....	35
Transportation and Roads.....	36
Affected Environment.....	36

Environmental Effects of the Proposed Action Alternative	36
Environmental Effects of the No Action Alternative	36
Land and Vegetation Resources	37
Affected Environment.....	37
Environmental Effects of the Proposed Action Alternative	39
Environmental Effects of the No Action Alternative	40
Recreation.....	40
Affected Environment.....	40
Economic Benefit Provided by Heart Butte Dam and Lake Tschida	42
Environmental Effects of the Proposed Action Alternative	42
Environmental Effects of the No Action Alternative	44
Wildlife and Fisheries	44
Affected Environment.....	45
Environmental Effects of the Proposed Action Alternative	46
Environmental Effects of the No Action Alternative	49
Threatened and Endangered Species and Designated Critical Habitat	50
Whooping Crane	50
Northern Long-eared Bat.....	52
Western regal fritillary.....	55
Monarch.....	56
Environmental Effects of the Proposed Action Alternative	57
Environmental Effects of the No Action Alternative.....	59
Cultural Resources.....	59
Affected Environment.....	59
Environmental Effects of the Proposed Action Alternative	61
Environmental Effects of the No Action Alternative	62
Paleontological Resources.....	62
Affected Environment.....	62
Environmental Effects of the Proposed Action Alternative	63
Environmental Effects of the No Action Alternative	63
Socioeconomics	64
Affected Environment.....	64
Environmental Effects of the Proposed Action Alternative	67
Environmental Effects of the No Action Alternative	67
Climate Change	68
Affected Environment.....	68
Environmental Effects of the Proposed Action Alternative	69

Environmental Effects of the No Action Alternative	70
Indian Trust Assets	70
Affected Environment.....	71
Environmental Justice	71
Affected Environment.....	72
Potential Effects of the Proposed Action Alternative	73
Potential Effects of the No Action Alternative	73
Summary Overview of Project Impacts	73
Temporary Impacts.....	73
Permanent Impacts	73
Chapter 4: Environmental Commitment and Mitigation Measures	77
Chapter 5: Coordination	81
Permits and Authorizations Required.....	82
Chapter 6: References	85

List of Figures

Figure 1. Project Location Map	8
Figure 2 Lake Tschida (Heart Butte) Reservoir Allocations (not to scale).	9
Figure 3. Profile of the dam spillway.....	10
Figure 4. Project Area Details.....	13
Figure 5. Seepage Cutoff Elements	14
Figure 6. Rendering of proposed excavation at the downstream side of the dam.	15
Figure 7. Draft Design Drawing of Proposed Action Alternative – Seepage Filter and Berm Cross Section on North Side of Spillway.	15
Figure 8. Draft Design of Temporary Cofferdam.....	16
Figure 9. Conceptual Layout of Completed Modification Project.	17
Figure 10. Estimated reservoir elevation during construction.	19
Figure 11. Reservoir elevation at 2030.00 ft.....	20
Figure 12. Watersheds and Hydrologic Sub-Basins'	26
Figure 13. Period of Record Annual Discharge (acre-feet) for Heart Butte Dam.	28
Figure 14. Heart Butte Reservoir Elevation 1950 to Present.....	29
Figure 15. Irrigation Service Area of the Western Heart River Irrigation District.....	31
Figure 16. Wetland 1 Location	33
Figure 17. LANDFIRE Analysis Map of Heart Butte Project Lands.....	38
Figure 18. Project Area Soils Analysis.....	39
Figure 19. Lake Tschida Recreation Areas.....	42
Figure 20. Central Flyway Whooping Crane Corridor and Confirmed Sightings.....	52
Figure 21. Northern long-eared bat Range within ND and Positive Pd detections	54

List of Tables

Table 1. Estimated Reservoir Drawdown Timeline as of October 2024 20

Table 2. Heart Butte Modification Project Communication Strategy..... 21

Table 3. Recorded Precipitation in Grant County North Dakota (NOAA 2024)..... 27

Table 4. Lake Tschida Storage Space Allocations..... 28

Table 5. . Heart River and Lake Tschida Section 303(d) listed waters (NDDEQ 2023)..... 29

Table 6. Expected impact to District irrigation..... 33

Table 7. Historic Mean monthly streamflow of Main Stem Heart River monitoring stations. 34

Table 8. Historic Mean monthly streamflow of Lower Heart River tributary monitoring stations.
..... 35

Table 9. Lake Tschida Recreation Areas 41

Table 10. Recreation Area Availability and Impact Table during Proposed Action 44

Table 11. Endangered Species Act-Listed Species in the Action Area 50

Table 12. Grant County Population Change Over Time..... 64

Table 13. Population and Age Trends for Morton, Stark, Sioux, Hettinger, Adams, and Burleigh
..... 65

Table 14. Employment and Income in the Analysis Area 65

Table 15. Top Industries in Southcentral North Dakota Counties..... 66

Table 16. Industry Growth and Wages in Southcentral North Dakota Counties..... 66

Table 17. Summary of Temporary and Permanent Impacts of the Proposed Action 74

Table 18. Required Environmental Commitments for the Proposed Action Alternative 77

Table 19. List of Agencies and Individuals Consulted 81

Table 20. Potential Permits and/or Authorizations Required by Agencies and Departments. 82

Table 21. List of Preparers..... 83

APPENDICES

- Appendix A: Class I Results and Cultural Site Management Opportunities
- Appendix B: USFWS IPAC Official Species List
- Appendix C: Public Notices and Responses

Acronyms and Definitions

Action Area – Based on Reclamation’s assessment of the potential direct and indirect effects of the proposed action to federally listed species (50 CFR 402.02)

ADA – Americans with Disabilities Act

AF – Acre Feet

APE – Area of Potential Effect

AUM – Animal Unit Month

BMP’s – Erosion Control Best Management Practices

CAS – Corrective Action Study

CEQ – Council of Environmental Quality

CFR – Code of Federal Regulations

cfs – cubic feet per second

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

Connected Actions – Actions 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)

Corps – U.S. Army Corps of Engineers

District – Western Heart River Irrigation District

DKAO – Dakotas Area Office

DSPR- Dam Safety Priority Rating

Environmental Commitments – Commitments included as an inseparable component of this Proposed Action. They are designed to offset the 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.

EA – Environmental Assessment

EIS – Environmental Impact Statement

EO – Executive Order

ESA – Endangered Species Act of 1973

ESD – Ecological Site Descriptions

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

GHG – Greenhouse gases

IPaC – Information, Planning, and Consultation System

IPCC - Intergovernmental Panel on Climate Change

IPM – Integrated Pest Management Plan

ITA – Indian Trust Assets

Lake Tschida - Heart Butte Reservoir

LF – Landfire

MSE – Mechanically Stabilized Earth

NDDA – North Dakota Department of Agriculture

NDDEQ – North Dakota Department of Environmental Quality

NDGF – North Dakota Game and Fish

NDSHPO – North Dakota State Historic Preservation Officer

NDSU – North Dakota State University

NDDWR – North Dakota Department of Water Resources

NEPA – National Environmental Policy Act of 1969 as amended.

NHPA – National Historic Preservation Act of 1966 as amended.

NIDIS - National Integrated Drought Information System

NLEB – Northern long-eared bat

NOAA – National Oceanic and Atmospheric Administration

NPDES - National Pollution Discharge Elimination System

NRCS – Natural Resources Conservation Service

NRHP – National Register of Historic Places

NRSA - National River and Stream Surveys Association

NWI – National Wetland Inventory

PEM – Palustrine Emergent Wetland

Project Area – The Heart Butte Dam downstream embankment surrounding the outlet works/spillway conduit, conduit, stilling basin, Lake Tschida and Heart River below the dam.

Proposed Project – The subject of this EA, the proposal to modify the dam by performing conduit joint repairs and constructing a seepage cutoff and blanket filtration system at the downstream toe of the dam.

PSMBP - Pick-Sloan Missouri Basin Program

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

RWS- Reservoir Water Surface (feet – local project vertical datum)

SOD – Reclamation Safety Of Dams Program

SWPPP - Storm Water Pollution Prevention Plan

TCP - Traditional Cultural Property

TCJJDA - Tri-Cities Joint Job Development Authority

UND – University of North Dakota

USDA – U.S. Department of Agriculture

USFWS – U.S. Fish and Wildlife Service

VOC - Volatile Organic Compounds

Executive Summary

Heart Butte Dam is located on the Heart River in southwestern North Dakota, approximately 18 miles south of Glen Ullin, ND. The dam forms Lake Tschida and was constructed in 1948-1949 by the Bureau of Reclamation (Reclamation).

The dam was built to provide:

- an irrigation water supply to serve up to 13,100 acres in the Heart Butte Unit
- flood control benefits to the Heart River Valley
- incidental fish, wildlife, and recreation benefits

In the 75 years since construction, Heart Butte Dam has served as a reliable source of irrigation water supply and has consistently provided flood control benefits along the lower Heart River. Lake Tschida and the surrounding public lands have also become a regional recreational hub for southwest North Dakota.

Reclamation is proposing construction of the Safety of Dams (SOD) Modification Project to ensure the continued safe condition of Heart Butte Dam. The need for corrective actions at Heart Butte Dam arises from Reclamation's duty to ensure that Reclamation dams do not present unreasonable risks to people, property, and the environment. Persistent seepage issues into the conduit and in the relic river channel area and the lack of an engineered filter contribute to the risk of dam failure at Heart Butte Dam. Currently, the risk of dam failure is at an unsatisfactory level and corrective actions are needed to reduce the risk of dam failure.

The Project construction would begin in the spring of 2027 with construction estimated to require two to three construction seasons to complete. The Project includes major construction at Heart Butte Dam which requires a reservoir drawdown during the two to three year estimated construction period. The initial stage of drawdown would not occur until after Labor Day 2026 to preserve the 2026 recreation and irrigation benefits.

In spring 2027, the spring inflow would be discharged as quickly as possible based on the downstream flow conditions. Releases are expected to occur until mid-summer 2027 and the 2027 drawdown would target an elevation of 2030 feet. All project and reservoir elevations noted are feet in the local project datum. Once the target reservoir elevation is reached, the gates would be closed, and the lake level would fluctuate in response to the evaporation and inflow conditions that are experienced. During the 2028 construction season, it is expected that a second reservoir drawdown period would be required which would result in a lower-than-normal reservoir elevation. In 2029, it is currently estimated that major construction components requiring reservoir drawdown will be complete and the reservoir will return to the typical lake elevation.

This Environmental Assessment (EA) describes the Proposed Action and evaluates the effects to the human and natural environment as a result of the Proposed Action. A summary of impacts as a result of the Proposed Action Alternative are shown in **Table 17** and discussed in more detail in Chapter 3. However, a brief description of the identified temporary impacts are listed below:

- 1) Lake Tschida: The lower reservoir water levels would result in low dissolved oxygen, eutrophication, the possibility of blue-green algae blooms, possible shoreline erosion,

blowing dust from exposed lakebed silt and sand, temporary increase in noxious weed growth, and the drying of wetland vegetation near current shoreline.

- 2) Recreation, Irrigation and Grazing: Reduced water-based recreation and fishing opportunities, altered grazing schedules for leases, and reduced irrigation benefits in 2027 and 2028. Reduced water flows in the lower Heart River. The downstream campground would be closed for 2027 and 2028.
- 3) Wildlife and Wetlands: Local wildlife disturbance and altered habitat usage, relocation to adjacent habitats. Likely loss of amphibians and a reduction in the established fishery. Permanent loss of a wetland adjacent to the outlet works.

Reclamation will oversee the implementation of these environmental commitments throughout the construction process. All relevant commitments will be integrated into the site-specific design, included in construction contracts and specifications, and enforced before, during, and after construction. Reclamations environmental commitments are fully described in **Table 18**; however, a brief listing of Reclamations environmental commitments include the following:

- 1) Comply with all appropriate Federal, State, and Local laws.
- 2) Erosion Best Management Practices (BMPs) will be followed to prevent runoff of soil, silt, and other debris.
- 3) A 404 permit will be completed and submitted to the Corps, as necessary. Section 401 and 402 certifications will be completed, as necessary. Wetland impacts will be appropriately mitigated according to the standards and direction of the Corps.
- 4) Aquatic Nuisance Species (ANS) regulations enacted by the NDGF will be implemented year-round.
- 5) Reclamation is responsible for compliance with the Migratory Bird Treaty Act.
- 6) Reclamation is responsible for compliance with the Bald and Golden Eagle Protection Act.
- 7) If threatened or endangered species are identified and encountered during construction, all construction activities in the immediate area will be stopped until Reclamation can consult with the USFWS to determine appropriate steps to avoid impacting the species.
- 8) In the event cultural resources or traditional cultural properties are encountered during construction, all ground disturbance activity within the area will be stopped, Reclamation and appropriate authorities will be notified, and all applicable stipulations of the NHPA will be followed.

This Page Left Blank Intentionally

Chapter 1: Introduction

The Bureau of Reclamation (Reclamation) is the lead federal agency and owner of Heart Butte Dam and Lake Tschida Reservoir. Heart Butte Dam was constructed in 1948-1949 to provide an irrigation water supply, flood control benefits to the Heart River Valley, and incidental fish, wildlife, and recreation benefits. Heart Butte Dam is a “High Hazard Potential Dam.” Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life. Reclamation has identified dam safety deficiencies and performed a Corrective Action Study (CAS) to evaluate modification alternatives to reduce the risk of dam failure. Reclamation has also instituted interim risk reduction measures and continues to operate Heart Butte Dam in a safe manner to ensure the continued delivery of the project benefits.

The Bureau of Reclamation Dakotas Area Office has prepared this Environmental Assessment (EA) for the funding and construction of a Safety of Dams (SOD) Modification Project for Heart Butte Dam (Proposed Action Alternative). Reclamation is the lead federal agency for the Proposed Action and is responsible for compliance with the National Environmental Policy Act (NEPA) of 1969 (as amended).

Heart Butte Dam Background

Heart Butte Dam is located on the Heart River in Grant County (southwestern North Dakota), approximately 18 miles south of Glen Ullin, ND (**Figure 1**). Construction was authorized as a component of the Pick-Sloan Missouri Basin Program (PSMBP) in Section 9 of the Flood Control Act of 1944 (S. Doc. No. 247, 78th Cong., 2nd session). The first water storage in Heart Butte Reservoir (Lake Tschida) began in October 1949, and construction on the dam was completed in December 1949.

The dam is approximately 70 miles southwest of Bismarck, North Dakota, and about 65 miles north of the South Dakota state border. Heart Butte Reservoir was permanently renamed Lake Tschida by an act of Congress (Public Law 85-562) in July 1958. Lake Tschida derives its name from Michael Tschida Sr. born in Vienna, Austria, in 1866, who immigrated to the United States in 1890 and was elected the first mayor of Glen Ullin in 1906. He advocated for the construction of the dam knowing the potential benefits.

The National Park Service developed the recreation plan for Heart Butte Reservoir and lands in 1952. Thirteen wildlife management areas were identified and ultimately developed and managed by the North Dakota Game and Fish Department (NDGF). In addition to identifying 13 wildlife areas, the recreation plan identified approximately 4,150 acres of "project lands" adjacent to the reservoir or Heart River, but were not designated for wildlife, recreation, or reservoir management purposes. There are "other" lands that were previously deemed unnecessary for wildlife or other recreation needs at the time and were made available for livestock grazing permits that continue to be issued today.

Public use of Heart Butte Reservoir was administered by the NDGF for recreation and wildlife development from February 22, 1952, through May 25, 1979. NDGF discontinued recreation management on May 25, 1979, but continued wildlife management until 1994. The Grant County Job Development Authority, later renamed as the Tri-Cities Joint Job Development Authority

(TCJJDA), became a managing partner in 2010 and began administering the recreation management program.

The total area within the boundary of Heart Butte Reservoir is 10,975 acres of acquired lands **Figure 1)**. In addition, there are 1,807 permanent easement acres. The water surface area at a lake elevation of 2,064.5 feet is 3,400 acres and the remaining habitat encompasses 7,575 acres. (Reclamation RMP 2022). Reclamation manages these upland acres for:

- Project operation: 34 acres
- Recreation: 327 acres
- Multiple resource management: 6,430 acres
- Group use: 207 acres
- Cabins and trailers: 382 acres
- Miscellaneous area: 195

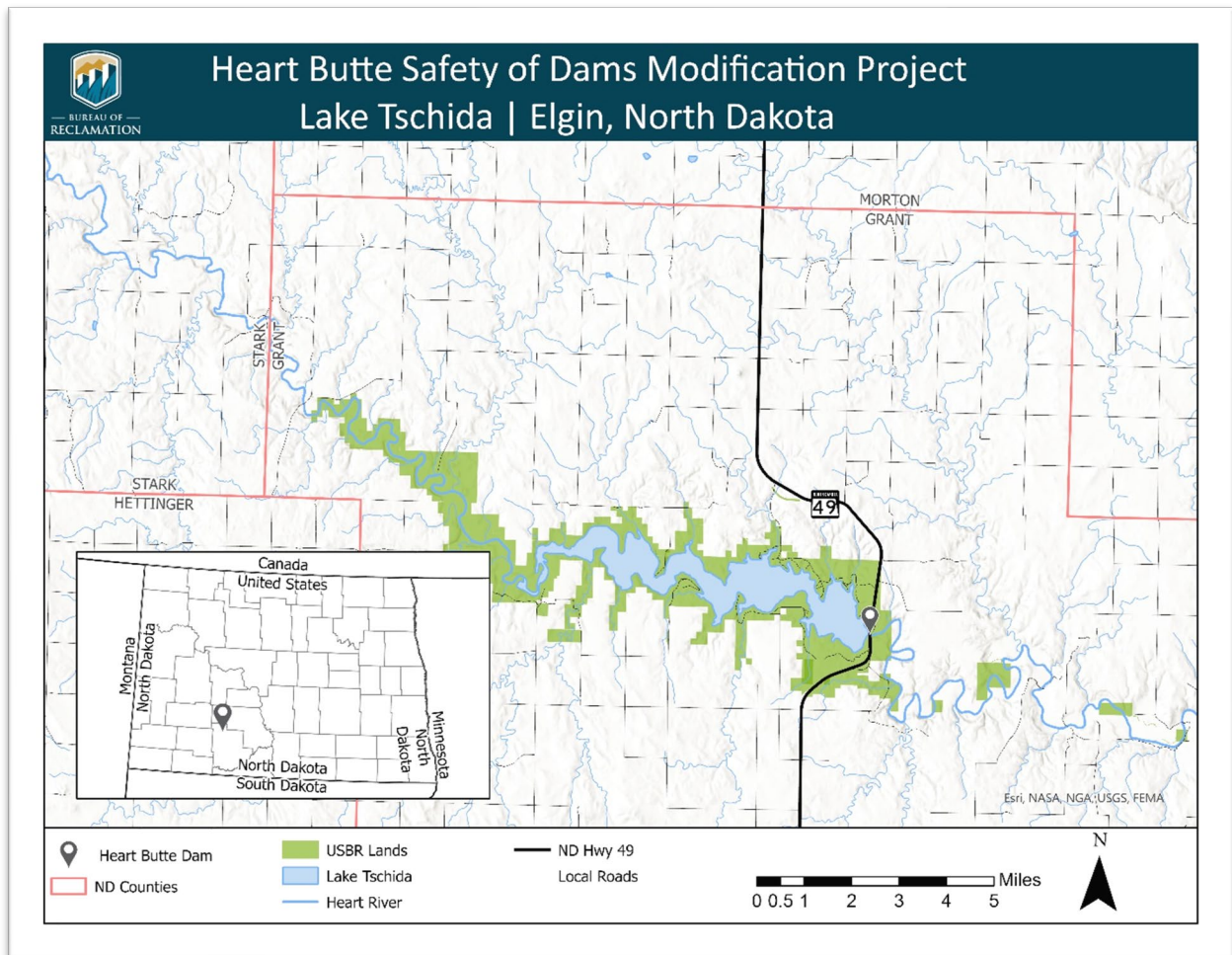


Figure 1. Project Location Map

Dam Design

Heart Butte Dam consists of a rolled earthfill embankment with a structural height of 142 feet and a crest length of 1,850 feet. North Dakota Highway 49 runs across the 40-foot-wide centerline of the

crest. The dam was built to provide an irrigation water supply to serve up to 13,100 acres in the Heart Butte Unit, flood control benefits to the Heart River Valley, and incidental fish, wildlife, and recreation benefits. In the 75 years since construction, Heart Butte Dam has served as a reliable source of irrigation water supply and has consistently provided flood control benefits along the lower Heart River, including flood control for the cities of Mandan and Bismarck.

Reclamation manages the active conservation storage volume in the reservoir to provide authorized project benefits. Additionally, Reclamation and the U.S. Army Corps of Engineers (Corps) have a Field Working Agreement which defines the flood control management responsibilities when the reservoir rises to flood stage.

Lake Tschida has a design maximum storage capacity of 435,123 acre-feet. 222,427 acre-feet of that total is surcharge flood storage (51%), 147,605 acre-feet is exclusive flood control storage (34%), and 60,763 acre-feet (14%) is the managed “active conservation storage” for project purposes. The remaining 4,328 acre-feet (1%) is storage below the minimum outlet works intake elevation of 2030 feet. **Figure 2** below depicts the reservoir capacity allocations and water surface elevation relationship (Reclamation, 2014).

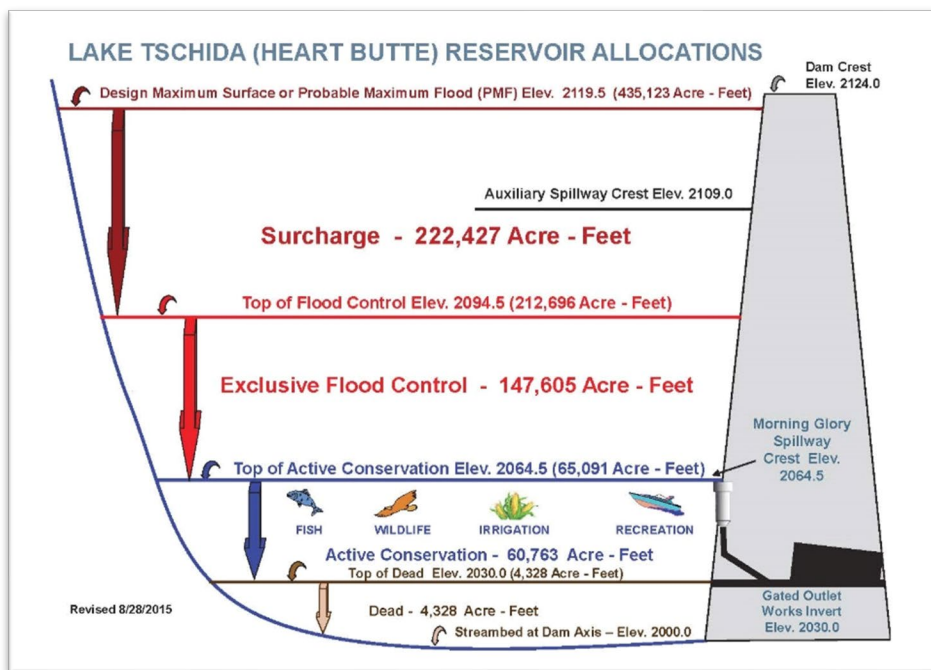


Figure 2 Lake Tschida (Heart Butte) Reservoir Allocations (not to scale).

Heart Butte Dam was constructed with a single penetrating conduit located near the south abutment of the dam. The conduit includes a “double barrel” geometry with the outlet works conduit stacked on top of the service spillway conduit. The two conduits converge and share a common spillway near the center of the dam (**Figure 3**). The service spillway consists of an uncontrolled morning glory type crest structure, a 14-foot diameter reinforced concrete conduit, and a stilling basin. The outlet works conduit consists of a trash rack intake located at the base of the intake structure, an upstream pressure conduit, and two high pressure 4-foot wide by 5-foot-high slide gates installed in series.

The reservoir water surface (RWS) elevation is managed by a combination of flood releases when the water surface exceeds 2064.5 feet and regulated release through the outlet works conduit. The maximum discharge capacity of the morning glory inlet is 5,700 cubic feet per second (cfs) at a water surface elevation of 2118.2 feet. The maximum discharge capacity of the outlet works conduit is 700 cfs at RWS 2067.0 feet.

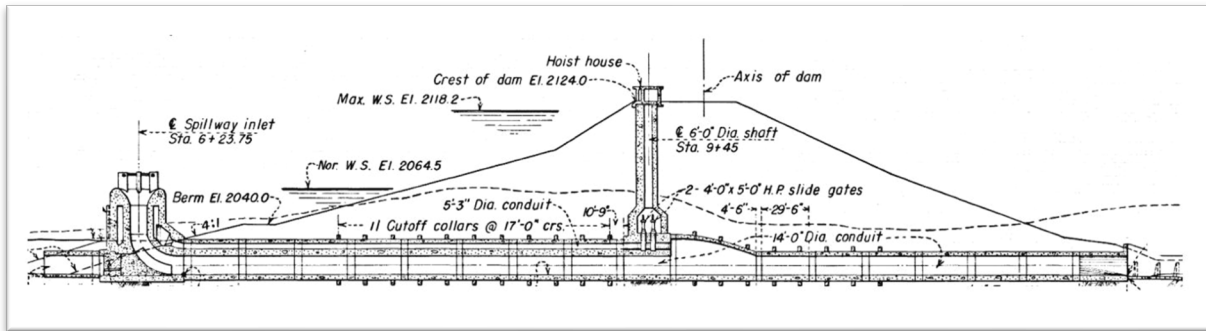


Figure 3. Profile of the dam spillway.

History of Conduit Seepage

During construction in 1949, it was noted that cracks in the three-foot thick concrete outlet works conduit were developing in the transition section near the centerline of the dam. These cracks were monitored during construction and repaired to seal off leakage (Reclamation, 1952). Additional chemical grouting of the cracks was performed in 1953 and no major incidents of seepage carrying embankment material were noted until 2013.

On January 25, 2013, during a routine inspection, fine, gray-colored sand deposits were observed inside the spillway conduit at Heart Butte Dam. Subsequent investigation determined that foundation sand was being transported by seepage through a contraction joint at conduit station 9+62 near the center axis of the dam. In March 2013, the lower portion of the contraction joint was covered with two layers of a geotextile filter fabric that was held in place by a prefabricated stainless-steel plate. This action was considered a temporary repair to prevent further internal erosion of the sandstone foundation into the spillway conduit. However, due to the changed condition, it was postulated that the internal erosion risks had increased, and further evaluation of risk was warranted.

Since 2013, multiple field exploration drilling programs and team risk analyses have been performed to better understand the geology and underlying foundation conditions which drive the risk at Heart Butte Dam. The result of these efforts was a Corrective Action Study (CAS) to “identify and evaluate modification alternatives to reduce the risks of internal erosion potential failure modes associated with various seepage paths in the backfill and the sandstone foundation of the outlet works conduit.”

Purpose and Need for the Proposed Action

The need for corrective actions at Heart Butte Dam arises from Reclamation’s duty to ensure that Reclamation dams do not present unreasonable risks to people, property, and the environment. At Heart Butte Dam, the persistent seepage issues, both into the conduit and in the relic river channel area, and the lack of an engineered filter contribute to the risk of dam failure. Currently, the risk of

dam failure is at an unsatisfactory level and corrective actions are needed to reduce the risk of dam failure.

The Dam Safety Priority Rating (DSPR) system provides a means for Reclamation to establish the urgency of risk-management activities and the relative priority of these actions within the overall inventory of dams. Based on the evaluations conducted for the Corrective Action Study, Heart Butte Dam is currently categorized as a DSPR 2 “urgent” priority. Although the urgent priority category has been selected as appropriate, interim risk reduction measures including increased monitoring, and a stockpile of sand and gravel materials have been implemented, and the dam can be operated routinely as the current performance suggests that the dam is in a stable condition and performing as intended (Reclamation 2023a).

Completion of the SOD Modification Project would serve the following purposes:

- Achieve risk reduction by correcting the existing deficiencies of Heart Butte Dam with the construction of modern state of practice dam safety features.
- Downgrading of the Heart Butte Dam from a DSPR 2 (Urgent Priority) to DSPR 4 (Low to Moderate Priority) or DSPR 5 (Low Priority).
- Continue to meet the primary purposes of Heart Butte Dam, including delivery of irrigation water in accordance with the terms and conditions of Contract No. 149D620001, Repayment Contract between the United States of America and the Western Heart River Irrigation District providing for an irrigation water supply.
- Continue to provide flood control benefits to the lower Heart River valley, including the cities of Mandan and Bismarck.
- Continue to provide fish and wildlife conservation and recreation benefits.

Legal Authority

The SOD Modification project is authorized by the Reclamation Safety of Dams Act of 1978 (Public Law 95-578, November 2, 1978), as amended by Public Law 98-404 (August 28, 1984), Public Law 106-377 (October 27, 2000), Public Law 107-117 (January 10, 2002), Public Law 108-439 (December 3, 2004), and Public Law 114-113 (December 18, 2015). The Act authorizes “the Secretary of the Interior to construct, restore, operate, and maintain new or modified features at existing Federal Reclamation dams for safety of dam purposes.”

National Environmental Policy Act

To comply with the National Environmental Policy Act and related environmental laws and regulations, federal agencies must consider the potential environmental effects of their decisions regarding approval of projects or projects receiving federal funding. In addition, Reclamation must evaluate connected actions as required in the Council of Environmental Quality (CEQ) 40 Code of Federal Regulations (CFR) 1508.25 in evaluating the effects of the entire action. This EA documents the proposed federal action, alternative actions considered, expected impacts of those actions, and compliance with environmental laws and regulations (Reclamation 2003) (refer “Historical and Regulatory Background” below for further details).

Reclamation is solely responsible for the preparation of this EA to fulfill the NEPA requirements for this Proposed Action, CEQ Regulations (40 CFR 1500-1508) and related environmental regulatory requirements.

This EA may lead to a Finding of No Significant Impact (FONSI) if impacts are found to be insignificant or, if significant environmental impacts are identified, Reclamation may proceed with the preparation of an environmental impact statement. Reclamation defines significance in accordance with 40 CFR 1508.27 in reference to context and intensity.

Chapter 2: Alternatives

This section describes all practical and reasonable alternatives developed to meet the purpose and need as described in the previous section. The alternatives were developed in accordance with NEPA Section 102 (2)(H) to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources.”

Alternative Development

Several risk reduction alternatives were developed through the CAS and field exploration processes. The modification alternatives that were developed were evaluated by a team comprised of personnel from Reclamation’s Dam Safety Office, Technical Service Center, Missouri Basin Regional Office, and the Dakotas Area Office. Preliminary designs and cost estimates were prepared for each alternative and an external Consultant Review Board contributed additional subject matter expert review prior to designation of the Proposed Action Alternative.

The No Action Alternative and the Proposed Action Alternative analyzed in this EA are described below. Alternatives were eliminated from further consideration if they did not meet the Project’s purpose and need, would require excessive cost expenditures, or would have substantial adverse environmental effects. Alternatives considered, but eliminated from detailed study are briefly described at the end of this section.

No Action Alternative

The No Action Alternative serves as a baseline from which to measure benefits and impacts to the human environment that may occur as a result of the Proposed Action Alternative. The baseline refers to the existing condition, including past, present, and ongoing activities or actions in the project area. This includes original construction of the Heart Butte Dam and Reservoir to present day activities; either natural or human caused. Under this alternative, no Federal action would be taken to correct safety deficiencies at Heart Butte Dam, and the conduit would remain in its present condition. This alternative would have the lowest present economic cost but would not address the risks for internal erosion failure. If no action is taken, unfiltered seepage through the embankment or foundation would continue, and the risk of potential failure would remain above Reclamation’s Public Protection Guidelines. Over time, the risk of dam failure is likely to increase beyond the present condition.

Due to the risks to public safety and property, this alternative would not satisfy the purpose and need for the project. Although the no action alternative does not satisfy the purpose and need, it was included in the analysis to provide a frame of reference for determining impacts of alternatives in accordance with the guidance presented in Reclamation’s NEPA Handbook (Reclamation 2012).

Proposed Action Alternative

Under the Proposed Action Alternative, Heart Butte Dam would be modified to correct safety deficiencies in accordance with the SOD program guidance and CAS recommendations. The Proposed Action would combine two traditional approaches for seepage remediation in embankment dams. This alternative would use both seepage cutoff elements and seepage filtration elements to address the risk of internal erosion. Additionally, the proposed action includes chemical grouting of the conduit joints and foundation void grouting performed from within the conduit. The need for all of these project features is driven largely by the unique single penetrating conduit layout and the potential need for flood management operations during the modification construction period.

Project Site Layout

Construction traffic would use existing roads in the vicinity of Heart Butte Dam. **Figure 4** depicts the general project construction site, the borrow, stockpile, and contractor use areas. The downstream campground would be closed to the public during construction and the project would avoid damaging or removing trees as noted in Chapters 3 and 4. Highway 49 would be used for primary access to the site and is expected to remain open during construction. Temporary lane closures or reduced speeds may be required and would be communicated to the public and the North Dakota Department of Transportation as needed throughout the project. Reclamation may also use the Rimrock North boat ramp area to access the reservoir and morning glory inlet during low reservoir periods for inspection of the trashrack and for secondary contractor access to the conduit during construction.

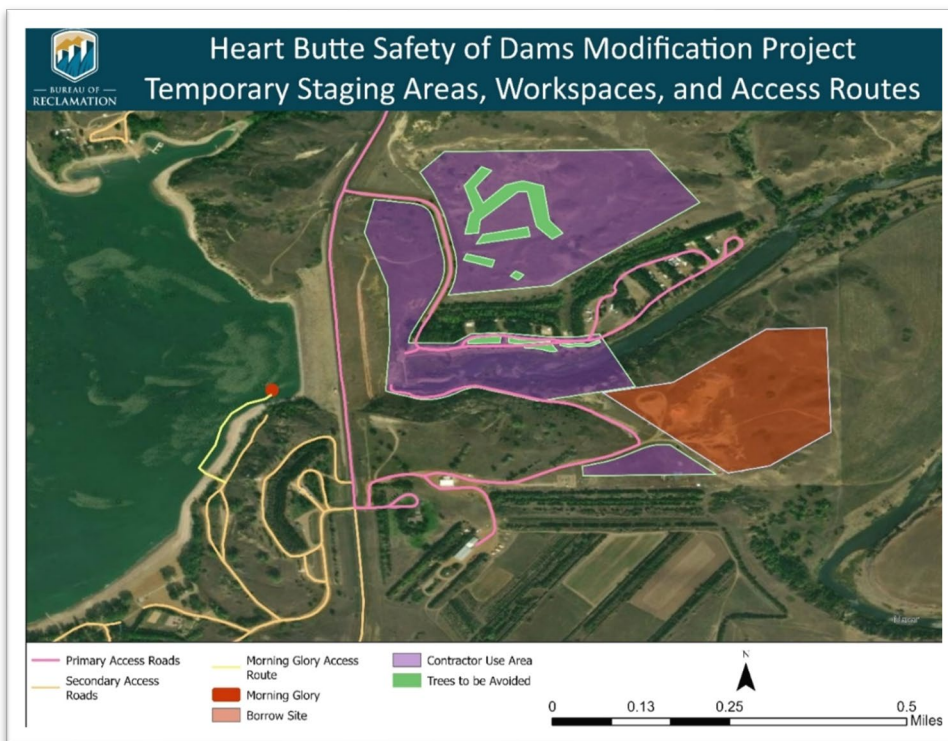


Figure 4. Project Area Details

Seepage Cutoff

The cutoff element is proposed to be installed as a jet grout treatment zone underneath the outlet works conduit, along the sides of the conduit, and along the right side (when looking downstream) of the stilling basin. The jet grout cutoff wall would be constructed along the right side of the outlet works spillway chute and would extend downstream of the outlet works for a length of approximately 220 feet. A two-stage filter and toe drain would be constructed around the perimeter of the jet grout cutoff wall to allow collection and monitoring of the discharge at the downstream end of the stilling basin. **Figure 5** provides a draft design plan view of the seepage cutoff elements in the vicinity of the outlet works stilling basin. The jet grout elements would provide a cutoff to the shale bedrock foundation and divert seepage flow to the left or right of the spillway stilling basin where it would be collected and routed through a sand and gravel filter (two-stage filter) prior to discharge at the downstream end of the dam. The jet grout cutoff elements would require a field test section constructed at the beginning of the project to evaluate and refine the grouting parameters.

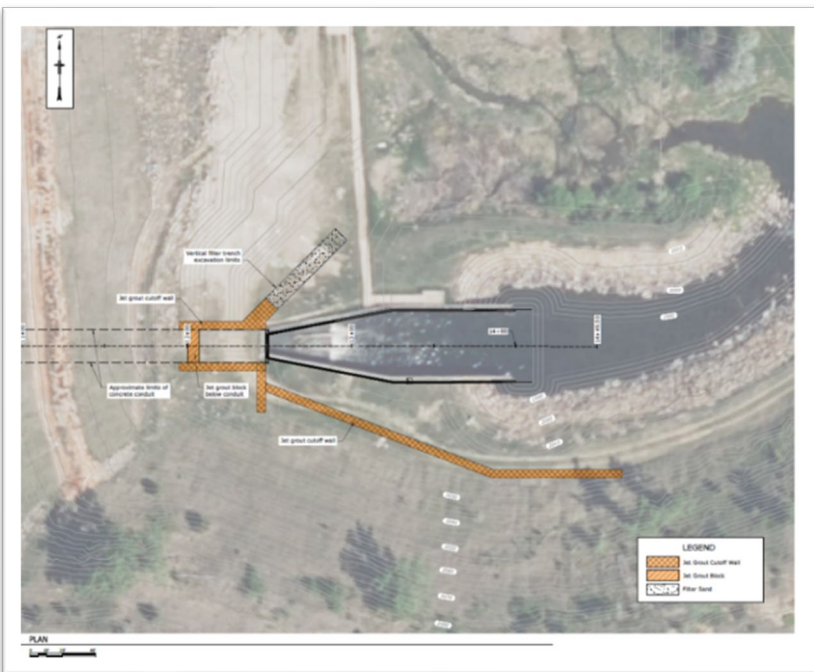


Figure 5. Seepage Cutoff Elements

Seepage Filter System

The sand and gravel seepage filter system is designed to ensure that future dam seepage will encounter a filtered exit, providing a safe and stable seepage path that eliminates the potential for internal erosion of foundation or embankment materials. On the left side of the spillway, the jet grout treatment zone beneath the conduit would be in contact with a deep vertical sand filter trench which is designed to collect and filter any seepage that would be diverted by the jet grout cutoff. The deep filter trench would be constructed to the same depth (1977 feet) as the cutoff wall to key into the shale bedrock foundation. The vertical filter trench would connect to a blanket filter seepage collection system on the left side of the outlet works conduit, spillway chute, and within the footprint of the relic river channel for a distance of approximately 165 feet downstream. The blanket filter system is designed to intercept the seepage paths that are currently present in the relic river channel area. A two-stage filter would also be constructed at the downstream end of the spillway

chute. **Figure 6** below shows a rendering of the proposed excavation at the downstream side of the dam. **Figure 7** shows a draft cross section of the sand filter trench and drainage collection system.

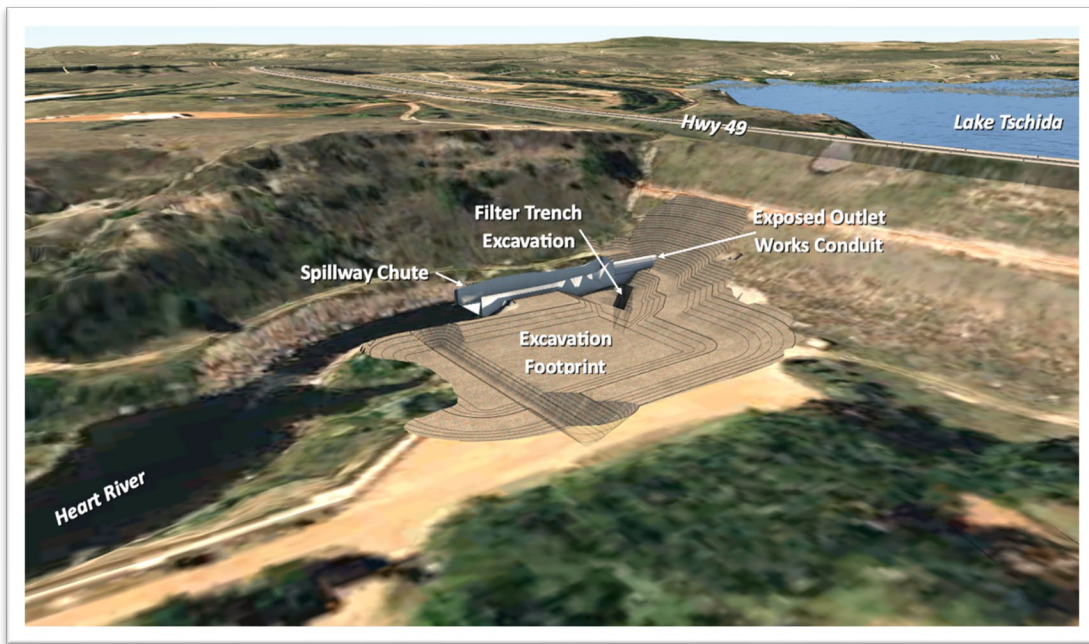


Figure 6. Rendering of proposed excavation at the downstream side of the dam.

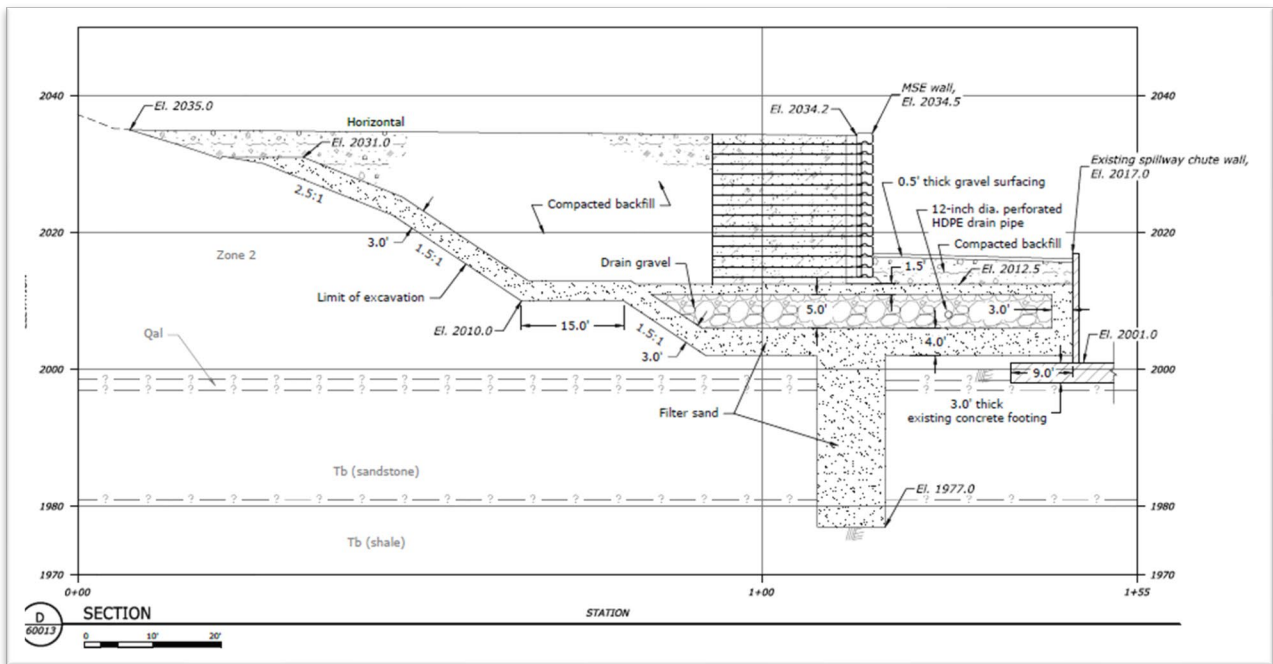


Figure 7. Draft Design Drawing of Proposed Action Alternative – Seepage Filter and Berm Cross Section on North Side of Spillway.

Temporary Cofferdam, Seepage Berm, and MSE Wall

To facilitate construction, a temporary cofferdam (**Figure 8**) may be constructed downstream from the stilling basin and across the relic river channel area. The cofferdam would allow for excavation in

dry conditions and provide a temporary construction access to both sides of the work area. The cofferdam may require a conduit or hardened overflow section depending on the expected need for reservoir release operations while the cofferdam is in place. In addition to the cofferdam and filter system, a seepage berm, and mechanically stabilized earth (MSE) retaining wall would be constructed over the top of the downstream end of the conduit and the filter system. The seepage berm and MSE wall are designed to add weight over the filter and drainage system to prevent a heave condition if the system becomes pressurized during future flooding.

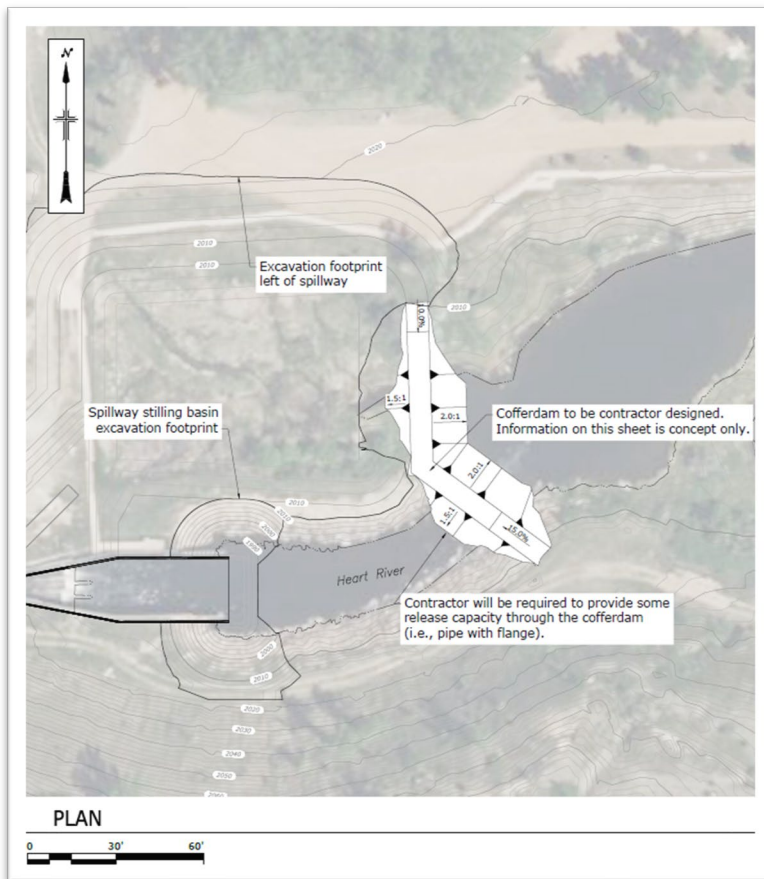


Figure 8. Draft Design of Temporary Cofferdam

The existing maintenance access road would be re-located to the downstream end of the seepage berm, and the existing fishing platform would be replaced and remain accessible to the public. The MSE retaining wall facing would be specified with a natural, non-glossy, appearance. **Figure 9** shows a conceptual layout rendering of the seepage berm and MSE wall near the spillway chute.



Figure 9. Conceptual Layout of Completed Modification Project.

Conduit Grouting

The Proposed Action also includes chemical grouting of the conduit construction joints and void grouting through the base of the conduit. Both of these efforts would be performed from within the spillway conduit. The joint grouting consists of rows of chemical grout which would be injected at an angle into the conduit joints. This effort would seal off leakage that occurs through the conduit construction joints and mitigate against future deterioration of the conduit. The void grouting would consist of low-pressure backfill grouting through the floor of the conduit to fill any voids that may have developed under the base of the conduit since construction. Both of these grouting aspects are important for the long-term success of the modification project.

Water Operations During the SOD Modification Project

Water operations coordination is a critical component of the SOD modification project. The project would be phased with distinct periods of discharge and no-discharge throughout construction because the spillway conduit is the only method to release water through Heart Butte Dam. Some construction aspects can occur with spillway discharge while others require spillway shutdown or reservoir drawdown.

Need for Reservoir Drawdown During Construction

Reclamation has conducted multiple reviews of the project constructability and construction risk. All of these evaluations have emphasized the importance of the reservoir drawdown. As outlined above,

the proposed action includes major construction at Heart Butte Dam. Multiple factors drive the need for a reservoir drawdown during the estimated construction period and the single penetrating conduit layout limits the ability to discharge steadily during construction. The following construction factors would dictate the timing and duration of the reservoir drawdown and no-discharge timeline.

- The deep excavation for two-stage filter construction on the downstream side of the dam would require continuously pumped dewatering wells to enable safe excavation. Reservoir drawdown to the minimum elevation is needed to enable the effective dewatering of the foundation.
- Conduit grouting operations would take place inside the spillway conduit and at the downstream end of the stilling basin. The drawdown is needed to ensure that there is adequate time and reservoir storage available to complete the work without uncontrolled spillway flow. An uncontrolled spill would occur if the reservoir would rise to the morning glory sill elevation of 2064.5 feet.
- The downstream end of the outlet conduit would be exposed during construction and there would be a risk of failure if the conduit was required to pass outlet flows without the surrounding embankment material.

Estimated Reservoir Drawdown Timeline

As of October 2024, Reclamation is scheduled to solicit bids on the project in the spring of 2026 and begin construction in the spring of 2027. Construction is currently estimated to require two to three construction seasons depending on future schedule refinement and the conditions that are experienced during the project. Major spring flood conditions, high reservoir inflow during the late summer, or contracting delays are factors that could affect the schedule during construction. Reclamation has developed two and three-year construction schedules and is engaging with prospective contractors during the design process to further refine the proposed project schedule. The project would be phased and specified in an effort to reduce the duration of the impacts to irrigation delivery and recreation to the greatest extent possible.

Reclamation would evaluate the conditions leading up to project implementation and may begin the drawdown in the fall prior to the first year of construction. The initial stage of drawdown would not occur until after Labor Day 2026 to preserve the 2026 recreation and irrigation benefits. If conditions are favorable, and a contract for construction has been awarded in 2026, Reclamation would engage with the contractor and may begin the initial drawdown in fall 2026. In 2026, the reservoir would remain in the historic normal lake level above 2055 feet and winter releases would be maintained near average to minimize the potential for hazardous ice conditions on the reservoir. Additional, notification would be provided to the public as construction approaches and before any project related drawdown occurs.

Figure 10 below is provided as a visual best estimate of the reservoir level during construction. The estimate is based on average reservoir inflow conditions and maximum available discharge. Lower than average inflow conditions will tend to shorten the project duration while wetter than average conditions, especially in the late summer, could result in a longer duration. The shaded area is intended to be representative of the uncertainty based on varying future reservoir inflow conditions and construction requirements. Currently, it is estimated that Lake Tschida would be able to return to typical lake levels in 2029, however, the construction progress and inflow to the reservoir will dictate the actual reservoir elevation and re-fill timeline.

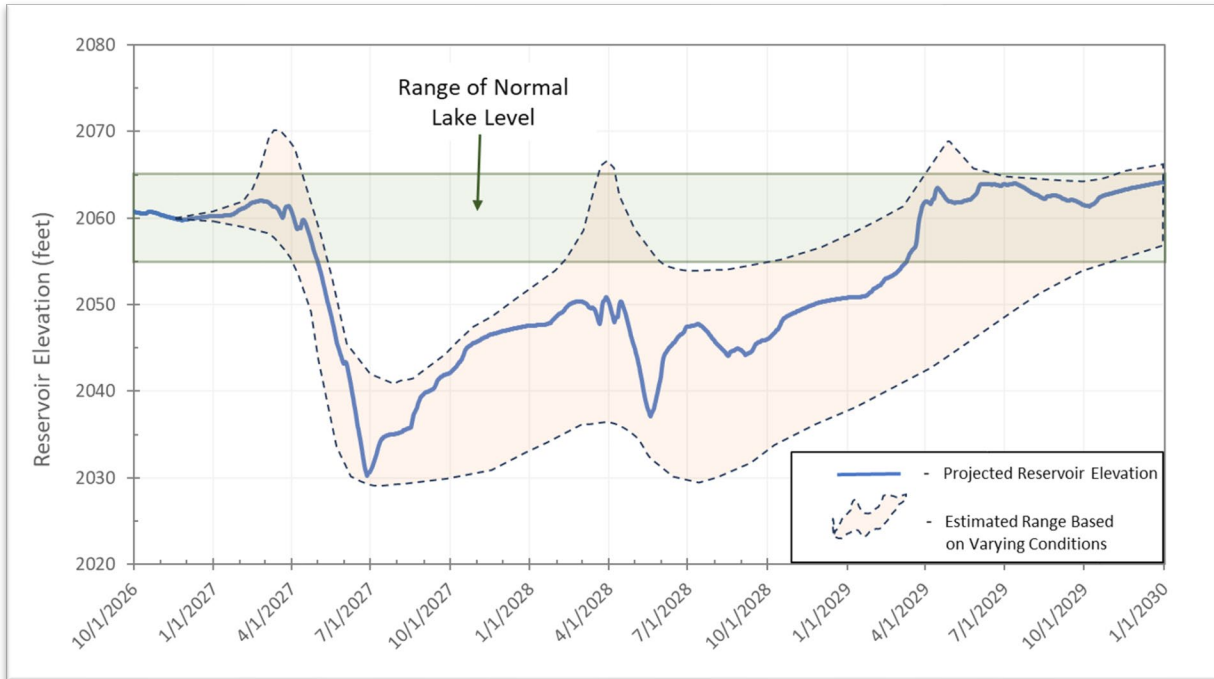


Figure 10. Estimated reservoir elevation during construction.

In spring 2027, the spring inflow would be discharged as quickly as possible based on the downstream flow conditions. The maximum gated outlet works release is approximately 700 cfs and the discharge capacity decreases as the lake elevation decreases. Releases are expected to occur until mid-summer 2027 and the 2027 drawdown would target an elevation of 2030 feet. Once the target reservoir elevation is reached, the gates would be closed, and the lake level would fluctuate in response to the evaporation and inflow conditions that are experienced. If the reservoir rises above a specified threshold for each aspect of construction, additional periods of reservoir discharge may be required.

In 2027, the project activities would focus on the site preparation, development of the dewatering system, jet grouting operations, and the vertical filter trench. Construction of the jet grout cutoff and dewatering system would occur early in the construction season and the operations within the conduit would occur through the fall and potentially into the winter as conditions allow. During the 2028 construction season, it is expected that a second reservoir drawdown period would be required to provide available reservoir storage during conduit grouting, and filter blanket construction. The reservoir elevation in 2028 would be dependent on the construction progress in 2027 and could potentially be as low as 2030 feet as depicted in **Figure 10**. The reservoir will generally be maintained at the highest possible elevation that provides safe working conditions. The final stages of construction would consist of the seepage berm, MSE wall, and site re-development. As noted previously, future project schedule refinement and conditions during construction will determine the actual project duration. The following table (**Table 1**) identifies the general project timing expectations as of October 2024.

Table 1. Estimated Reservoir Drawdown Timeline as of October 2024

Timeframe	Estimated Reservoir Condition	Estimated Elevation Range (feet)
July - December 2026	Minimal change to typical lake level	2065-2055
January - June 2027	Period of reservoir drawdown for the project	2055-2030
July - December 2027	Much lower-than-normal lake level	2030-2050
January - June 2028	Discharge of spring inflow to reach target lake level for construction	2050-2030
July - December 2028	Likely lower than average lake level as construction continues	2030-2050
January - June 2029	Goal timeline for re-filling the reservoir	2050-2065
July - December 2029	Estimated return to typical lake level	2065-2055

Figure 11 depicts the extent of the Lake Tschida water surface at drawdown to the minimum lake elevation of 2030 feet. The lake surface would be approximately 650 acres with a maximum depth of 20 feet, however, the reservoir level would fluctuate during the project and it is expected that the duration of the minimum reservoir elevation would be brief, as depicted in **Figure 10**, based on average inflow conditions.

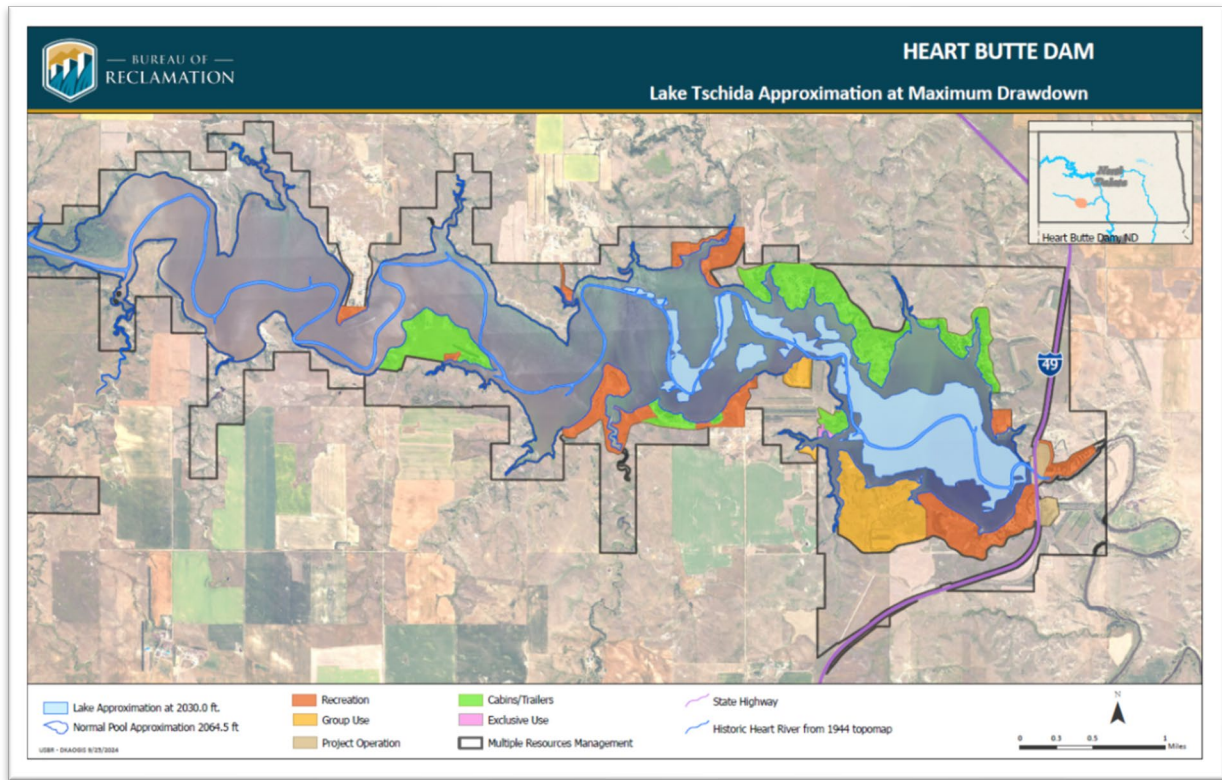


Figure 11. Reservoir elevation at 2030 ft.

SOD Modification Communications Strategy

During the project, access to the downstream campground and the Heart River below the dam would be closed. To keep the public informed of changing recreation conditions, irrigation releases,

and reservoir elevations prior to and during construction, DKAO has developed a communication strategy as shown in **Table 2**.

Table 2. Heart Butte Modification Project Communication Strategy.

Message	How	Audience	When	Where
Project update, respond to questions.	Public Meeting	All interested parties	October 22, 2024	Lake Tschida Welcome Center
Environmental Assessment Notification	Mass mailing to notification list	All interested parties	May 10, 2024 & November TBD, 2024	Mass mailing
Emergency Action Plan and general update, respond to questions.	Emergency Action Plan Orientation Exercise and Communication Drill	County Emergency Managers, Cooperating agencies, Managing Partners	Annually, Typically in February/March	Lake Tschida Welcome Center, Heart Butte Shop Virtual Meetings as needed
General updates, respond to questions.	Annual Heart Butte Association Meeting	Cabin and Trailer owners	Annually, Typically in April	Elks Lodge Bismarck, ND
General updates, respond to questions.	Western Heart River Irrigation District Meeting	Irrigators	Annual in-person meetings, update calls quarterly	Carson, ND
General updates, respond to questions.	Joint Jobs Development Agency Annual Meeting	General Public, managing partners, cooperating agencies	Annually, typically in July	Heart Butte Maintenance Shop or Lake Tschida Welcome Center
Archaeological Resource Protection Notice	Mass mailing to notification list; Reclamation and TCJJDA websites	Cabin and Trailer owners, general public	Annually for mailing of physical notice	Mass mailing; https://www.usbr.gov/gp/dkao/heart_butte/index.html ; HOME (laketschida.org)
Environmental Assessment updates	Reclamation website	All	Ongoing	https://www.usbr.gov/gp/dkao/heart_butte/index.html
General updates	TCJJDA Website	All	Ongoing	HOME (laketschida.org)
General updates	NDGF	All	Ongoing	https://gf.nd.gov/
Real time reservoir elevation and release data	Available on Missouri Basin Hydromet data system	Irrigators, stakeholders, affected agencies	Ongoing	Missouri Basin HydroMet (usbr.gov) Telephone and email notifications from the dam tender as needed

Message	How	Audience	When	Where
Project Status During Construction	Reclamation website, Media Interactions as requested	All interested parties	Ongoing	https://www.usbr.gov/gp/dkao/heart_butte/index.html

*News releases and/or public involvement products will be prepared and distributed to appropriate media outlets during the environmental assessment process to provide updates to the public and interested parties as to the progress of the proposed Federal action.

Alternatives Considered and Eliminated from Further Study

The following alternatives were evaluated during the Heart Butte Corrective Action Study Process but were eliminated from further study because they did not meet the purpose or need for the Proposed Action or because potentially fatal flaws were identified during the evaluation. All of the structural alternatives that were considered would require a reservoir drawdown because of the need for grouting performed from within the conduit, or to provide reservoir storage capacity during construction, similar to the proposed action alternative.

Three-sided Filter Around the Outlet Works Conduit

A three-sided filter and drainage system was proposed to address the potential for internal erosion of the conduit backfill above the foundation. The filter and drainage system for this alternative was proposed to be constructed at the downstream end of the outlet works conduit and would not have included treatment of the foundation below the conduit. This alternative was carefully considered because of the potential for significantly reduced project impacts and cost with a shorter construction duration. Additional geologic investigation and risk analysis concluded that the foundation sandstone is erodible, and that additional modification effort was necessary to reduce the risk of internal erosion which could occur beneath the outlet works conduit. This alternative was eliminated from further consideration because of inadequate risk reduction.

Four-sided Filter Around the Outlet Works Conduit

A four-sided filter around the outlet works conduit was also considered. This alternative was similar to the three-sided filter but would require complete removal and re-construction of a 102-foot section of the outlet works conduit to allow a filter and drainage system to be constructed in the foundation of the conduit. This alternative required construction of a large temporary earth retention system with a height of 43 feet to support the removal of the existing conduit. After construction of the filter, the conduit would be formed and replaced with cast-in-place concrete. The two-stage filter was designed similarly to the proposed action alternative, but this alternative did not include a jet grout cutoff component, or the blanket filter system in the relic river channel.

Compared to the proposed action alternative, additional construction risk was identified with this alternative due to the complete removal of a portion of the outlet works conduit. As noted above, even with reservoir drawdown to the minimum elevation, there is potential for the reservoir to rise to an elevation which would require the outlet works conduit to be needed for discharge. With this alternative there would be a period of potentially several months where the outlet works conduit would be out of service. If a major flood occurred during that time, it would be necessary to implement emergency actions to put the conduit back into service to enable the flood releases. Additionally, this alternative included construction risks related to the major excavation and shoring system needed at the downstream toe of the dam. This alternative was estimated to provide

adequate long-term risk reduction but was not the technically preferred alternative based on the construction risk. (Reclamation 2023a).

Four-sided Filter Around the Stilling Basin

Similar to the previous alternative, a four-sided filter system constructed around the outlet works stilling basin was evaluated. In this alternative, a 104-foot section of the outlet works stilling basin would be demolished to enable the placement of a new filter and drainage system surrounding the stilling basin and keyed into the shale bedrock foundation. After construction of the filter and drainage system, the stilling basin would be formed and replaced with cast-in-place concrete. The two-stage filter was designed similarly to the proposed alternative, but this alternative did not include a jet grout cutoff component, or the blanket filter system in the relic river channel. This alternative would require a similar earth retention shoring system to the previous alternative, but the excavation would be smaller and slightly further downstream.

Similar to the previous alternative, additional construction risk was identified with this alternative due to the complete removal of a portion of the outlet works stilling basin which would take the stilling basin out of service, potentially for several months. In a construction flood situation, emergency actions would be required to put the stilling basin back into service to enable the flood releases. This alternative was estimated to provide adequate long-term risk reduction but was not the technically preferred alternative based on the construction risk. (Reclamation 2023a).

Cutoff Wall Along the Centerline of the Dam

A three-foot-wide cutoff wall along the centerline of the dam was evaluated. The cutoff wall would be installed through the embankment from the crest of the dam along Highway 49. The base of the cutoff wall would be keyed into the foundation shale unit. The feasibility level design proposed the use of a cement-bentonite slurry wall with a maximum depth of 147 feet. The wall would have been excavated and placed in a continuous manner, using a hydromill due to the required depth. This would necessitate the closure and temporary re-route of the state highway and reconstructing the disturbed sections of the highway after the cutoff wall was installed.

This alternative would require a reservoir draw down similar to the proposed action because of the need for jet grouting to be performed from within the conduit to ensure a complete cutoff of seepage around the outlet works conduit. This alternative did not include the blanket filter system installed in the relic river channel area.

This alternative would have resulted in a significant impact to Highway 49 and would have required a major traffic detour for the project duration. There were also constructability challenges identified with the conduit to wall closure section installation. Additionally, this alternative had an estimated field cost of over two times greater than the other structural alternatives. This alternative was estimated to provide adequate long-term risk reduction but was not the technically preferred alternative because of the cost, the major impact to Highway 49, and the constructability challenges (Reclamation 2023a).

Permanent Reservoir Restriction

A permanent reservoir restriction alternative that would require the reservoir to be reduced to the minimum elevation of 2030 feet on a permanent basis was considered. This alternative would eliminate or significantly reduce the benefits provided by Heart Butte Dam. Even with the reduced

reservoir elevation, the dam would have the potential to fill during high inflow periods because of the limited outlet works discharge capacity. This alternative would not adequately reduce the risk of dam failure to acceptable levels and is not considered to be a viable alternative (Reclamation 2023a).

Dam Breach

The Dam Breach Alternative would remove the dam embankment and return the river to its condition before the dam was constructed. The dam was built across a short, narrow canyon, and a partial embankment breach was not considered to be a viable alternative because of the difficult flood hydraulics that a partial breach would create. Over time, a full breach would restore the natural hydraulics of the Heart River. The reservoir would be eliminated and as a result there would be no future risk of dam failure. This alternative is viable from a dam safety perspective but would eliminate all existing project benefits including irrigation storage, flood control, wildlife habitat, and recreation.

The Dam Breach Alternative would involve several tasks. The dam embankment would be excavated, and the outlet structures would be removed. A hardened channel and overflow banks would need to be designed and constructed to restore river flows across the dam footprint. A temporary bridge would need to be built downstream of the dam before excavation could commence, and a second permanent bridge would need to be constructed on the existing alignment once the embankment was completely removed.

The Dam Breach Alternative would also affect a large amount of land upstream of the dam. The existing reservoir has over 3,100 acres of water surface with 55 miles of shoreline. The breach would leave a large sediment covered landscape. Sediments accumulated in the reservoir would need to be removed from the original river channel and be disposed to restore the river channel to operable condition. Side gullies and small creeks that formerly drained into the river would also need to be cleared of sediment to return these flow channels to operable condition. Finally, vegetation would need to be established over the thousands of acres of land that would be uncovered by the dam breach. There are some remaining uncertainties about the full extent of what a dam breach would involve, however, an appraisal level cost estimate was performed, and the cost was nearly 4 times higher than the preferred alternative.

Removal of the dam would also eliminate the flood control benefit of Heart Butte Dam and downstream populations would be more susceptible to dangerous flooding on a regular basis. This alternative is not viable because of its high cost and because it would place downstream populations at risk of dangerous flooding. (Reclamation 2023a). Additionally, because construction of Heart Butte Dam was congressionally authorized, dam removal would also require authorization by Congress.

Chapter 3: Affected Environment and Environmental Consequences

This section describes the existing conditions and potential direct, indirect, and cumulative environmental consequences associated with implementing the Proposed Action Alternative. Cumulative impacts related to present and reasonably-foreseeable future actions are also discussed at the end of each resource section. The Proposed Action is combined with reasonably foreseeable

future actions to identify potential cumulative impacts. The affected environment includes a description of resources in the Project Area, including potentially affected communities, land, water, and air-sheds that might be affected by the Proposed Action Alternative. Environmental consequences may be direct (resulting from construction, operation, or maintenance) or indirect (subsequent to a direct effect but not directly resulting from the Proposed Action Alternative), positive (beneficial) or negative (adverse), and long term (permanent, long-lasting) or short term (temporary). A summary of the temporary and permanent impacts that could occur from the Proposed Action are presented in **Table 17**. Environmental Commitments would be implemented to reduce, minimize, or eliminate impacts and are discussed for each resource and summarized in **Table 18** in Chapter 4 and are an inseparable part of the Proposed Action.

Areas of potential impacts are resource-specific and defined for each individual resource. The boundary of the affected area extends to where effects can be reasonably and meaningfully measured. Direct effects generally occur within the project area. However, some impacts may occur on a broader scale, encompassing areas beyond the Project Area. Direct and indirect impacts are discussed in each resource section below.

Evaluation of potentially affected resources and environmental impacts associated with implementing the Proposed Project Alternative activities are focused on the following resources: Surface Waters and Hydrology, Transportation and Roads, Land and Vegetation Resources, Recreation, Wildlife and Fisheries, Threatened and Endangered Species, Cultural Resources, Paleontological Resources, Socioeconomics, Climate Change, Indian Trust Assets, and Environmental Justice.

Surface Waters and Hydrology

This section focuses on the surface water resources and hydrology of Grant County, North Dakota, with particular emphasis on Lake Tschida and the Heart River. These water bodies are integral to the region's ecological balance and agricultural productivity. The Heart River watershed, comprising the Upper and Lower Heart drainage basins, is characterized by its diverse hydrological features, including tributaries such as Heart Butte Creek and Antelope Creek. Understanding the dynamics of surface water flow, precipitation patterns, and seasonal variations is crucial for assessing the potential impacts of the proposed action. This section will explore the hydrological characteristics of the area, including mean precipitation, drought conditions, and the influence of land use on water quality, providing a comprehensive overview of the current state of surface water resources, irrigation practices, and their significance to the local environment.

Applicable Laws, Executive Orders, and Regulations

The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act (CWA) of 1977, provides the authority to the Environmental Protection Agency (EPA) and the Corps to establish water quality standards, control discharges into surface waters, develop waste treatment management plans and practices, and issue permits for discharges (Section 402) and for dredged or fill material (Section 404).

Executive Order (EO) 11990 issued on May 24, 1977 (aka No Net Loss of Wetlands) requires each Federal agency to provide leadership and guidance to minimize the loss and degradation of wetlands. In addition, each agency must avoid undertaking new construction within wetlands unless there are

extenuating circumstances (Section 2 (a)) and each agency must provide public review of any proposals of construction within wetlands (Section 2 (b)).

Affected Environment

The primary affected surface water resources include Lake Tschida and the Heart River. Other major streams within the Heart River drainage basin include the Green River, Heart Butte Creek, Antelope Creek, Big Muddy Creek, and Sweetbriar Creek. For the purposes of this EA, the surface waters and hydrology section evaluates potential impacts of the proposed action within Heart Butte Reservoir lands to the confluence of Heart Butte Creek. The Heart River watershed is composed of the Upper Heart and Lower Heart drainage basins, the surface area for each is approximately 1,714 and 1,633 square miles, respectively (USDA et al 2017). (Figure 12).

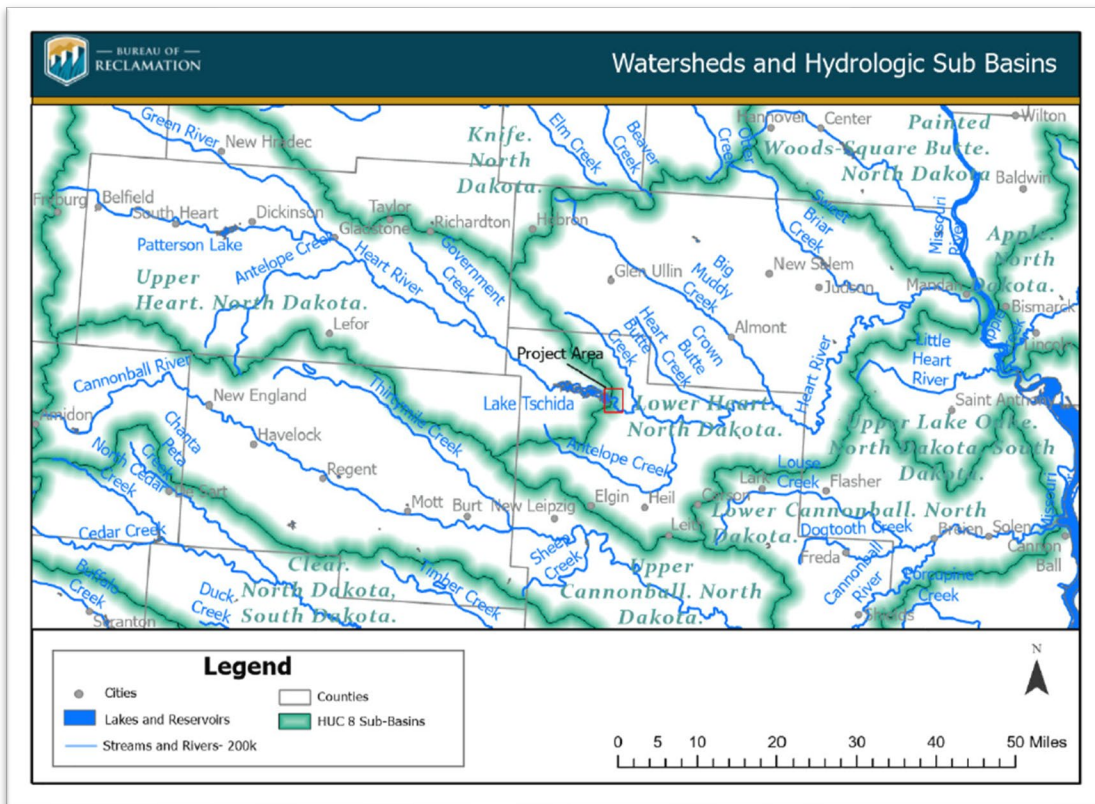


Figure 12. Watersheds and Hydrologic Sub-Basins'

The Project Area has a mean precipitation of 17.47 inches annually with most of the precipitation occurring April through September and almost half of the precipitation occurring in just three months of May through July (NOAA 2024). The Project Area also averages 36.2 inches of snowfall per year, but rarely receives more than 3 inches in any event; however, snow accumulates on the ground for much of November through March. Numerous wetlands and unnamed drainages all contribute to the hydrology of the two drainage basins. The highest recorded rainfall in the last decade was in 2011 and again in 2014 with 25.82 inches and 25.83 inches recorded respectively. Precipitation totals in Grant County for the last 5 years are shown in Table 3.

Table 3. Recorded Precipitation in Grant County North Dakota (NOAA 2024)

Year	Recorded Precipitation(inches)
2023	19.97
2022	18.12
2021	12.26
2020	18.18
2019	20.24

Thus, construction would be impeded by snow in the winter months and by rainfall several days each month from May through July. The optimum construction season is late spring into fall. Grant and Morton Counties and southwest North Dakota have experienced seasonal droughts and drier years when compared to other regions of North Dakota. The U.S. Drought Monitor shows the location and intensity of drought areas across the United States by using 5 classifications: D0: Abnormally Dry, D1: Moderate Drought, D2: Severe Drought, D3: Extreme Drought, and D4: Exceptional Drought. The southern half or approximately 58.79 % of Grant County experienced abnormally dry or D0 level drought conditions in during summer 2024 (NIDIS 2024). Historically, Grant County has experienced D2 level droughts in 2003-2005, again in 2007 and 2009 in over 50 to 100% of the land area. In 2005, 2018 and more recently in 2021 near 100% of the land area in Grant County was experiencing D3 level drought conditions. In addition, parts of southwest North Dakota have experienced D3 level of extreme drought conditions in fall 2024. Morton County was slightly less affected in 2024 with approximately 14.78% of the county in D2 level drought.

Heart River

The Heart River is approximately 180 miles long and follows a meandering course through southwest North Dakota, to its confluence with the Missouri River south of Mandan. The Heart River Valley is bordered by escarpments and steep rolling hills. The river originates at an elevation of 2,900 ft. and enters the Missouri River at elevation 1,620 ft. Principal tributary streams entering the river above Heart Butte Dam include Government Creek and the Green River. Below Heart Butte Dam include Antelope Creek, Big Muddy Creek, and Sweet Briar Creek.

Agriculture is the primary land use and industry in Grant and Morton Counties with small grain row crop, hay production, and ranching and grazing cattle as primary sources of income. There are also several livestock feeding operations in the watershed. According to NDSU (2024), animal feeding operations (AFOs) are those that feed, stable, and confine animals for a total of 45 days or more in any given 12-month period, and vegetative growth or post-harvest residues are not sustained during the normal growing season in the facility. The North Dakota Department of Environmental Quality (NDDEQ) identified 791 concentrated livestock feeding areas within the watershed above Heart Butte Dam (NDDEQ (formerly DOH) 2006). These concentrated operations: are an AFO of large size, discharge pollutants into waters of the state, or have been designated as a concentrated AFO by NDDEQ. If inadequately treated, feedlots may increase concentrations of nutrients, sediments, and coliform bacteria in the river and Lake Tschida (NDDEQ 2006).

The North Dakota Department of Agriculture (NDDA) annually monitors pesticides in the state's surface waters. Two sites are sampled along the Heart River, one near Richardton, ND, the other near Mandan, ND. In 2022, six unspecified pesticides were detected near Richardton and two pesticide detections near Mandan sample points. However, based on EPA thresholds for pesticide

effects on aquatic life and human health maximum contaminant levels, the levels detected were not high enough to negatively impact aquatic ecosystems or human health (NDDA 2022).

Lake Tschida

Lake Tschida is the primary water feature on the landscape in Grant County and the largest lake in southwest North Dakota. **Figure 13** illustrates the annual discharge recorded by Reclamation’s Hydromet data system at Lake Tschida over the period of record 1950-2023. The annual discharge has varied from less than 10,000 ac-ft during significant drought years to over 300,000 ac-ft during the record flood year of 1982 (Reclamation 2024). Over the period of record, the average annual discharge is 85,961 ac-ft which is 1.4 times the active conservation volume of Lake Tschida (**Table 4**).

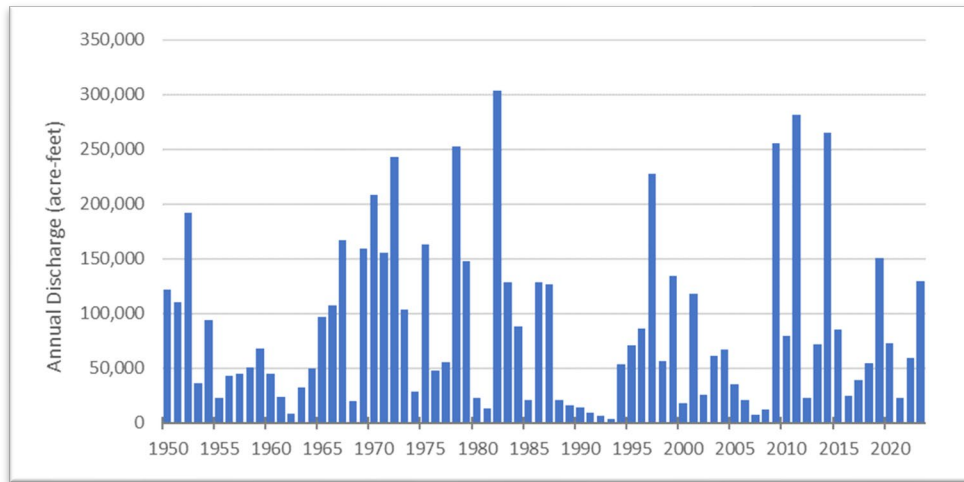


Figure 13. Period of Record Annual Discharge (acre-feet) for Heart Butte Dam.

Table 4. Lake Tschida Storage Space Allocations

Storage Designation (Zone)	Elevation in feet		Storage Space in acre-feet (AF)
	From	To	
Surcharge	2094.5	2119.5	222,427
Exclusive Flood Control	2064.5	2094.5	147,605
Annual Flood Control and Multiple Use	2030.0	2064.5	60,763
Permanent	2000.0	2030.0	4,328
Total Storage	-	-	435,123

The closure of Heart Butte Dam in October 1949 resulted in a quick filling of Lake Tschida by April 1950. Since that time, Lake Tschida has remained within a relatively steady elevation between 2055 and 2065 ft. **Figure 14** shows the daily reservoir elevation collected by the data collection system at the dam. Lake Tschida receives runoff from a 1,714 square mile drainage area (USGS 2024b) and the reservoir fills and spills over the morning glory inlet in most years.

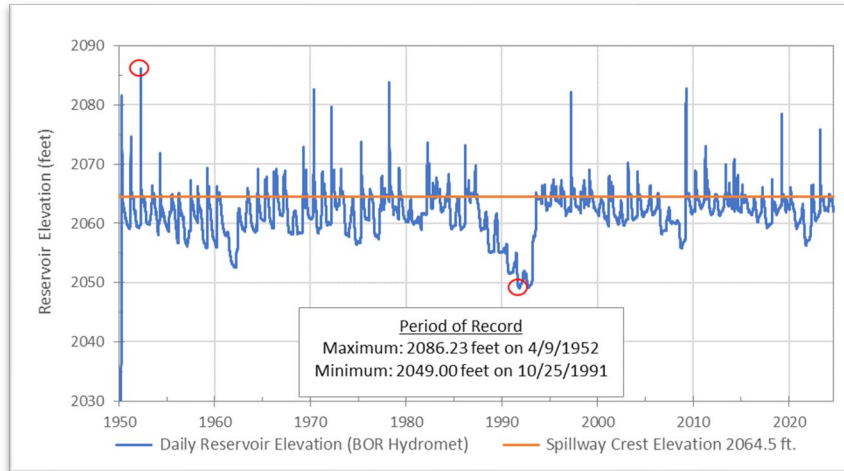


Figure 14. Heart Butte Reservoir Elevation 1950 to Present.

In flood years, inflow to Lake Tschida can exceed 10,000 cfs and the morning glory inlet limits the flood release to 3,000 to 4,000 cfs as the reservoir rises into the exclusive flood control pool. In drought years, the peak inflow may be less than 200 cfs and the lake may remain below the spill elevation. Discharge from Lake Tschida is typically continuous with the exception of shutdowns for maintenance and inspection.

Patterson Reservoir

Dickinson Dam lies approximately 80 river miles upstream from Heart Butte Dam on the Heart River and is also managed by the Bureau of Reclamation and provides irrigation water and associated project benefits near Dickinson, ND. The dam forms Patterson Reservoir which has an active conservation storage capacity of 8,041 acre-feet. It not anticipated that operations at Dickinson Dam would be altered as a result of the Heart Butte SOD modification project.

Existing Water Quality

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. In the most recent state water quality assessment (NDDEQ 2023), Lake Tschida and three other areas along the Heart River are listed as CWA Section 303(d) waters, which means they are considered water quality limited (**Table 5**).

Table 5. Heart River and Lake Tschida Section 303(d) listed waters (NDDEQ 2023).

Description	Location (County)	Designated Use	Use Support	Impairment
Heart River from its confluence with Plum Creek downstream to its confluence with Government	Stark	Recreation	Fully Supporting, but Threatened	E. coli

Creek (20.02 Miles)				
Heart River from Patterson Lake, downstream to its confluence with the Green River (25.12 Miles)	Stark	Fish and Other Aquatic Biota	Not Supporting	Benthic-Macroinvertebrate Bio-assessments
Heart River from its confluence with Fish Creek downstream to its confluence with Dead Heart Slough (33.95 Miles)	Morton	Recreation	Fully Supporting, but Threatened	E. coli
Lake Tschida (5018 Acres)	Grant	Fish Consumption	Not Supporting	Methylmercury
		Recreation	Fully Supporting, but Threatened	Nutrient/Eutrophication Biological Indicators

Four water quality impairments which threaten or do not support designated uses along the Heart River and Lake Tschida were documented. The impairments include: E. coli, benthic-macroinvertebrate bio-assessments, methylmercury, and nutrient/eutrophication indicators.

Sources of E. coli include animal feedlots, riparian area grazing, and failing or poorly designed septic systems. The National River and Stream Surveys (NRSA) evaluates the biological condition of waterbodies by analyzing characteristics of communities of organisms that occur there, such as benthic macroinvertebrates (aquatic insects, crustacean, worms, and mollusks that live at the bottom of rivers and streams); a value of <40 using the NDDEQ index of biological integrity indicates poor condition, not supporting its designated use. Based on fish tissue data and fish population survey, fish consumption and average concentrations of methylmercury could be calculated for Lake Tschida. This data did not meet EPA criteria for fish tissue methylmercury (0.3 µg/g); therefore, Lake Tschida was assessed as not supporting fish consumption. Sources of methylmercury can be anthropogenic or natural; however, no specific causes or sources have been identified for mercury in North Dakota fish. Eutrophication occurs from nutrient loading sourced from fertilizers used in agriculture which often contain high levels of nitrogen and phosphorus can contribute to nuisance algae and plant growth. The NDDEQ posted advisories for Lake Tschidas harmful algae blooms in 2018, 2019, and 2020. More recently, Lake Tschida was posted for a low toxin level algal bloom advisory in July 2024 by NDDEQ (NDDEQ 2024).

Irrigation from the Heart River

Reclamation has one repayment contract with the Western Heart River Irrigation District (District) to provide stored water to 62 irrigators to irrigate 7,766 acres along the Heart River. District irrigators operate and maintain individual river pumping plants to serve District Lands in Grant and Morton Counties. **Figure 15** depicts the irrigation service area of the Western Heart River Irrigation District. The District is the only entity that contracts with Reclamation to use the water that is released from Lake Tschida.

During the irrigation season, generally May through September, water releases are requested by District irrigators through the Irrigation District manager, who contacts the Dam Operators office. Water releases are made at a rate sufficient to supply the anticipated needs of irrigators downstream. Releases for irrigation are usually limited to less than 100 cfs to enable the use of many low water river crossings used by irrigators along the Heart River. During the winter months, and when the reservoir water surface is below the spillway crest of 2064.50 feet, river releases of about 8 cfs are made to accommodate downstream landowners' livestock watering needs.

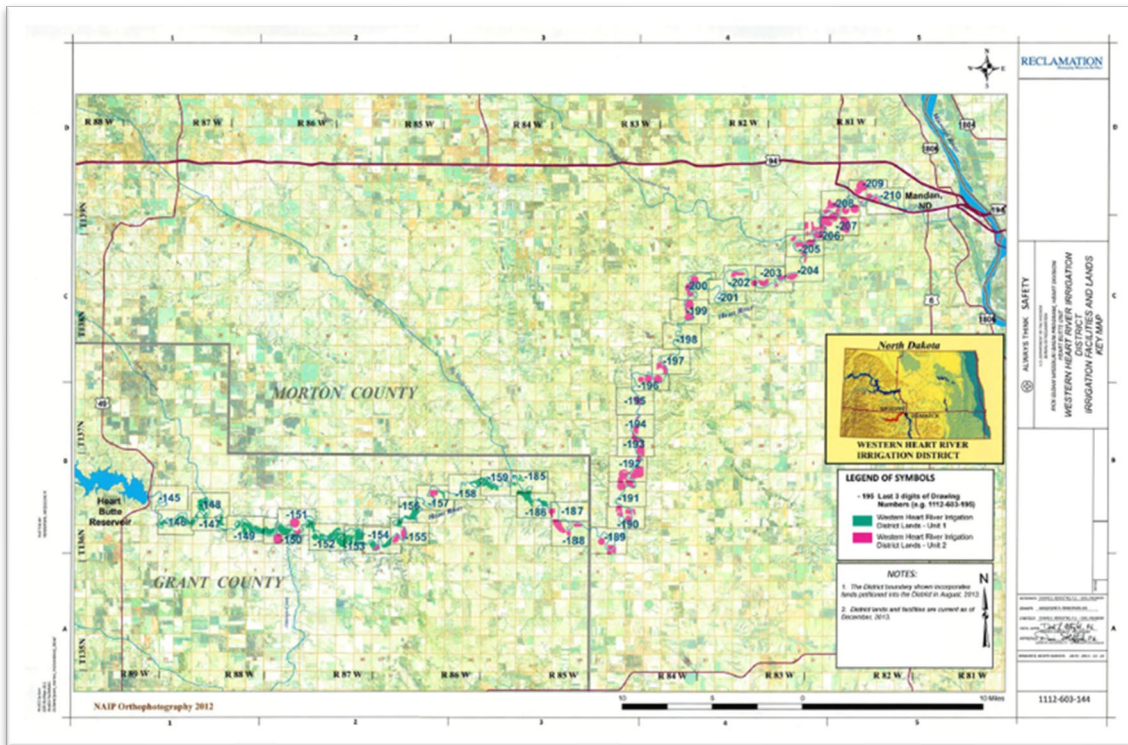


Figure 15. Irrigation Service Area of the Western Heart River Irrigation District.

Contracted irrigators through Reclamation are not the only Heart River water users. The North Dakota Department of Water Resources (DWR) manages the regulation and appropriation of the waters of the state based on the Prior Appropriation Doctrine. The DWR MapService was used to identify 13 active (perfected or conditionally approved) surface water permits for the Lower Heart River, primarily for irrigation in the vicinity of Mandan, ND. The DWR requested in a letter dated December 16, 2024, that water be made available for any downstream senior appropriators during the Project construction and efforts be made to minimize impacts on water availability. The total approved annual water use is 1,372 ac-ft which may be beneficially applied to 761 acres. Of that total, 313 ac-ft and 174 acres of irrigation have a priority date prior to the Bureau of Reclamations water permit (Permit 250B) of 1946-03-13. The Mandan Parks District and the USDA Northern Great Plains Research Laboratory are two of the larger volume prior appropriators of Heart River Water for irrigation of their facilities. Between 2014 and 2023, the total reported surface water usage for all surface water permits near Mandan was an average of 329 acre-feet per year (DWR, 2024). This appropriation of water from the Heart River is considered to be the natural flow and is not contracted with Reclamation.

Environmental Effects of the Proposed Action Alternative

Under the Proposed Action Alternative, minor adverse impacts to water quality in Lake Tschida would result. Lake water would be directly affected via reduced reservoir elevations resulting in a temporary decline in dissolved oxygen, with an increase in eutrophication over the summer. The eutrophication may lead to a blue green algae bloom. Temporary releases may occur as inflows from the Heart River drainage will continue into Lake Tschida during construction. Due to current low levels of detection of E.coli in the Heart River only, it is likely to remain under EPA thresholds in Lake Tschida and downstream. The NDDEQ has been designated the agency for regulation of the pollution control standards within the Clean Water Act including standards for E. coli levels. Since methyl-mercury is already not supporting fish consumption in Lake Tschida, this trend would likely continue with or without this project.

Operations at Patterson Reservoir would continue as normal, and water would continue to flow into Lake Tschida during the drawdown and through construction. It is likely that the inflow would form new braided channels into the lake bottom and feed the remaining standing water pools while the reservoir elevation is low. The drawdown would expose significant acreage of lakebed and new shoreline, with the potential for blowing dust from the bare areas of lakebed silt and sand. These effects would be directly related to the Proposed Action Alternative.

An indirect effect of the Proposed Action Alternative is that the groundwater adjacent to Lake Tschida may temporarily decrease in elevation during the reservoir drawdown. A reduction in the local water table may have a moderate adverse impact on shallow wells that are used for domestic purposes around Lake Tschida. Some wells are reportedly used for drinking, but it is believed that most cabin and trailer owners haul water in for drinking and cooking and reserve the well water for lawn watering, showering, and sanitation. Well driller logs are available on the NDDWR MapService and a review of these logs was conducted. 157 well driller logs were identified for wells near the lake and the majority of the well depths reviewed range from 70 to 150 feet deep depending on the age and location of the well.

The maximum reservoir drawdown is approximately 35 feet. It is unknown how many wells may be impacted by the temporary low reservoir level. Older shallow wells, wells that have experienced low production during previous droughts, or wells that serve multiple connections are the most likely to experience reduced productivity during the reservoir drawdown period. Reduced lawn watering and additional monitoring of the water levels during drawdown would likely be required to prevent wells from going dry. Reclamation will continue to evaluate this indirect effect prior to and during construction. Additionally, Reclamation will coordinate with the managing partner to identify deep wells that are likely to remain reliable and provide access to cabin and trailer owners as needed.

The Proposed Action Alternative would result in a moderate adverse impact to Wetland 1. This alternative will directly and permanently remove the wetland (**Photo 1 and Figure 16**) from the landscape of the downstream area. Wetland 1 was delineated on July 17, 2024 (Report pending) and it is part of the historic Heart River channel. The wetland currently exists as a 0.65-acre freshwater emergent wetland according to the National Wetlands Inventory (NWI) database and is fed by seepage through the dam embankment and from ground and surface water inflow from the north. This wetland is classified under the NWI code system as a PEM1C wetland. PEM1C code represents a Palustrine-Emergent-Persistent-Seasonally flooded wetland. The Aquatic Resources Delineation Report describing this wetland will be completed in 2025. Reclamation has partnered

with Ducks Unlimited and the Southwest North Dakota Mitigation Bank to mitigate for the permanent loss of this wetland. Reclamation would request a Nationwide Permit (NWP) from the Corps Regulatory Office in Bismarck upon completion of final design. Compensatory mitigation for the loss of the 0.65-acre wetland would be completed as a 1:1 ratio through the Ducks Unlimited mitigation bank.



Figure 16. Wetland 1 Location



Photo 1. Wetland 1 (facing southeast)

The Proposed Action Alternative would have a moderate adverse impact to District irrigators due to the lack of irrigation water delivery for at least one season. Although this impact is temporary, releases from Heart Butte Dam are the sole source of irrigation water for the District. An average of 8,990 acre-feet per year were released for irrigation use from 2017 to 2021. The normally dependable water supply provided by releases from Heart Butte Dam enable increased agricultural production for District Irrigators. The annual irrigation benefit was estimated to be \$309,076 in 2021 dollars (Reclamation, 2023c).

The timing and duration of the impact of the Proposed Action will depend on future construction schedule refinement and the conditions that are experienced during construction. As described in Chapter 2, Reclamation is seeking to minimize the impact to the District through project phasing and early engagement of potential construction contractors. As of October 2024, it is expected that there would be at least one irrigation season where Reclamation is unable to supply the District with irrigation water during the late summer period of the greatest need for irrigation water supply. Reclamation has communicated this impact with the District through regular updates during the project planning and Corrective Action Study process. Additionally, the District has requested a two-year notification in anticipation of expected shortages to allow District irrigators to plan for the loss of the ability to irrigate. **Table 6** below outlines the expected impact to District irrigation water supply.

Table 6. Expected impact to District irrigation.

Irrigation Season	Expected Impact to Irrigation
2026	No expected impact, drawdown may begin after irrigation season
2027	Higher than normal flow during the drawdown, and no ability to provide irrigation releases in late summer

2028	Potential for impact depending on construction progress. A project goal is to provide timely irrigation release during ongoing construction
2029	Project goal to provide irrigation release during ongoing construction (if third construction season is needed)
2030	No expected impact

As noted in Chapter 2, no impacts are expected to occur in 2026. Initial drawdown reservoir releases starting in September 2026 would be limited to approximately 100 cfs with a target of RWS of 2055 ft. Typical winter releases of 8-10 cfs would occur, and the spring 2027 inflow would be discharged as quickly as possible based on the downstream flow conditions. The maximum outlet works release capacity is approximately 650 cfs at RWS 2064 and the capacity decreases to 300 cfs at RWS 2032.

The reservoir drawdown is expected to require 60 to 90 days of maximum discharge depending on the starting reservoir elevation and the inflow that is received. Typically, late spring and summer releases are limited to 100 cfs to enable irrigators to use low-water crossings to access fields on both sides of the river. Reclamation would coordinate with the District on the release rate, but it is expected that the ability to use the low water crossings during the drawdown period in 2027 would be impacted. The District has indicated that alternate access options are generally available and that they would be supportive of increased releases with the goal of limiting the disruption to a single irrigation season. The drawdown releases would be available for irrigation use by the District and would be tracked and reported to NDDWR in accordance with the typical water use reporting procedures. Once the target reservoir elevation is reached in mid-summer, the outlet works gates would be closed and the no-discharge construction period would begin. After that time, District irrigators would have no irrigation water supply unless they would apply and be approved for a temporary water permit through the NDDWR permitting process.

Low volume releases may occur from project dewatering and unwatering; however, the Heart River would have much lower-than-normal flow during the no-discharge construction period. Immediately below the dam to the confluence of Heart Butte Creek, the Heart River would likely have little to no flow, be ponded in areas, and would collect water through groundwater, rainfall, and limited construction site discharge. **Table 7** contains the mean monthly discharge in cfs for multiple selected monitoring locations from 2000-2023. The months of July through December are included because they are the most likely months for no discharge conditions. Generally, the discharge from Lake Tschida makes up 50 to 60 percent of the Heart River flow in July and 30 to 45 percent of the flow in November and December.

Table 7. Historic Mean monthly streamflow of Main Stem Heart River monitoring stations.

Monitoring Location	Drainage Area (mi ²)	Mean monthly streamflow (cfs)					
		July	Aug	Sep	Oct	Nov	Dec
Heart Butte Dam Discharge	1,714	107	98	58	48	20	19
Heart River at Stark Bridge Near Judson, ND	2,930	182	154	114	106	61	42
Heart River Near Mandan, ND	3,310	211	167	129	122	76	54

* All data (except dam discharge) was collected from USGS National Water Information System: Web Interface and represents the mean monthly flow from 2000-2023

Three gaged tributaries are located between the dam and the mouth of the Heart River. Table 8 depicts their mean monthly flow as provided by USGS. The stream gages are monitored seasonally and are typically not operational from September through February. Flow on the tributaries will not be impacted by the project and will continue to provide water to the Heart River as usual.

Table 8. Historic Mean monthly streamflow of Lower Heart River tributary monitoring stations.

Monitoring Location	Drainage Area (mi ²)	Mean monthly streamflow (cfs)					
		July	Aug	Sep	Oct	Nov	Dec
Antelope Creek Near Carson, Nd	221	11	7.4	3.5	n/a	n/a	n/a
Big Muddy Creek Near Almont, ND	456	23	18	15	n/a	n/a	n/a
Sweetbriar Creek Near Judson, ND	157	7.6	9.4	7.7	n/a	n/a	n/a

* All data was collected from USGS National Water Information System: Web Interface and represents the mean monthly flow from 2000-2023

The communication strategy described in Chapter 2 would be implemented prior to reservoir drawdown and throughout the duration of the project to keep the downstream stakeholders and general public informed of timing, accommodations, and changing conditions. A temporary cofferdam with gated conduit may also be constructed across the downstream river channel to allow for access of construction equipment. Coordination with the Corps, NDDEQ, and NDDWR would take place as needed for all permitting requirements.

The overall disturbance to the waterbody at the construction site is a minor adverse impact from the Proposed Action Alternative. Reclamation will employ erosion control measures including revegetation, stabilization, and industry standards such as straw wattles and silt fences through the duration of the project. For additional environmental commitments to be part of the project, please see Chapter 4.

Environmental Effects of the No Action Alternative

Under the No Action Alternative, no construction would occur at Heart Butte Dam and corrective actions would not be implemented. Without the proposed structural modifications, dam failure could occur. Consequences of dam failure can include loss of life, property damage, lost benefits such as water storage, irrigation water delivery, recreation, and flood control, significant economic impacts, and environmental damages. Results of large downstream flows include the release of reservoir sediment and a loss of irrigation water supply. The Heart River would return to natural flows, including flooding events, resulting in changes to water flow and quality, sedimentation, plant communities, fish and wildlife habitat, recreation opportunities, and irrigation techniques and abilities.

Transportation and Roads

Lake Tschida lies in a rural area of north central Grant County and is accessed solely by North Dakota State Highway 49. This portion of Highway 49 connects Elgin to Glen Ullin, so traffic on this Highway likely consists of local residents, farm and ranch traffic, and school buses. The gravel roads are maintained by Reclamation and the State Highway is maintained by the NDDOT. Low water crossings maintained by private owners and used by local residents for agricultural activities are also present downstream of the Dam. For the purposes of this EA, the transportation and roads section evaluates potential impacts of the proposed action within Grant County.

Affected Environment

Main access to the Project Area, see Figure 4 in Chapter 2, would include North Dakota State Highway 49 and Reclamation maintained gravel roads to the Downstream Area campground, the south side of the downstream area, and the road to the visitor station. A traffic count conducted on Highway 49 in 2022 through the North Dakota Department of Transportation (NDDOT) recorded 484 vehicles per day at a location north of the Reservoir and 435 vehicles south of the Reservoir (NDDOT 2024).

Environmental Effects of the Proposed Action Alternative

Under the Proposed Action, the direct impacts would be adverse, with a minor amount of increased construction traffic in the Project Area due to construction activities. Heavy equipment and truck traffic may cause temporary damage to roads and ditches. Reclamation would coordinate with NDDOT on Highway 49 accessibility during construction. After construction completion, Reclamation would work with NDDOT to ensure Highway 49 is restored to the pre-construction conditions. Low water crossings used by district irrigators are expected to be temporarily inaccessible during the drawdown period, which is a minor adverse impact from the Proposed Action. This impact would be communicated to the District and Reclamation would notify the District in advance of the impact and any periods of low discharge which may enable the crossings to be used.

Transportation needs and current traffic served by local highways and roads is expected to continue. Future repair projects and improvements of existing roads are likely to contribute to cumulative actions and activity on the landscape in Grant County. In addition, Reclamation will continue to maintain and improve the roads to our facilities at Lake Tschida as needed. The North Dakota Department of Transportation is currently (Summer 2024) resurfacing Hwy 49 between Elgin and Glen Ullin, including the highway surface at the crest of Heart Butte Dam. Reclamation is unaware of any other proposed transportation projects by any state, federal, or private entities.

The communication strategy described in Chapter 2 would be implemented prior to reservoir drawdowns and throughout the duration of the project to keep the public safe and informed of timing, accommodations, changing conditions and areas closed and open to access.

Environmental Effects of the No Action Alternative

The No Action Alternative would maintain current roadway and transportation conditions. If a dam failure were to occur, Highway 49 would be unsafe for travel and crossings downstream of the dam would likely be inundated and potentially destroyed due to the heavy outflow of water.

Land and Vegetation Resources

Land and vegetation resources are broadly defined as the combination of geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology that comprise the native habitats in the Project area. Classification systems used to delineate land resources vary based on scale. Ecoregions are a broad classification system used by the EPA to denote land areas sharing similar environmental resources (Bryce et. al 1996). Ecoregions are divided into several levels, with Level 1 being the broadest classification and Level IV being the most detailed.

The NRCS uses Ecological Site Descriptions (ESDs) to classify and delineate land units based on soils and how each area would respond to management activities or disturbance. This classification system is more applicable to projects on the local level since it uses detailed soil survey maps. However, soil surveys are limited depending on the scale at which the survey was conducted. Therefore, for the purposes of this EA, the land and vegetation resources analysis below uses a combination of the EPA ecoregions NRCS ESDs, LANDFIRE data, and Web Soil Survey to determine the baseline conditions and potential impacts of the proposed action within Heart Butte Reservoir lands.

Affected Environment

Lake Tschida is located within the broad Northwestern Great Plains (Level III) ecoregion and situated entirely within the Level IV Missouri Plateau ecoregion. On the Missouri Plateau, west of the Missouri River, the landscape opens up to become the “wide open spaces” of the American West. The topography of this ecoregion was largely unaffected by glaciation and retains its original soils and complex stream drainage pattern. A mosaic of spring wheat, alfalfa, and grazing land covers the shortgrass prairie where herds of bison, antelope and elk once grazed (Bryce et al 2008). Native plant communities would typically include Blue grama (*Bouteloua gracilis*), wheatgrass (*Pascopyrum smithii*), needlegrass (*Hesperostipa* sp.), little bluestem (*Schizachyrium scoparium*), and prairie sand reed (*Calamovilfa longifolia*). Invasion from non-native species occurs primarily near existing disturbances (i.e., roads). Smooth brome (*Bromus inermis*), sweetclover (*Melilotus* sp.) and crested wheatgrass (*Agropyron cristatum*), all non-native plants, were typically present adjacent to existing roads but are also scattered within native areas.

There are nine grazing permittees on Heart Butte Reservoir lands, and six of them rely on the reservoir for livestock watering. The combined acreage grazed by permittees totals to 4,492 acres. Grazing permits are updated and open for bidding every 5 years. The current grazing permits will be in effect until 2027. The carrying capacity for each pasture has been determined by the Bureau of Reclamation, in conjunction with the Natural Resource Conservation Service. Each permit states the number of animal unit-months (AUMs) that each permittee is allowed to graze. Reclamation reserves the right to terminate each grazing permit at the end of each year with 30 days written notice to the permittee.

Reclamation utilized the LANDFIRE (LF) and the Landscape Fire and Resource Management Planning Tool to evaluate landcover within Heart Butte Project lands. LF data provides detailed insights into the current and historical conditions of vegetation, fuels, fire regimes, and disturbances. It generates a comprehensive and consistent suite of over 25 geospatial layers, along with a reference database and quantitative vegetation models that cover the entire nation. This data is essential for landscape assessments, analyses, and natural resource management. According to LF data,

dominant land cover is Northwestern Great Plains mixed grass prairie and Northwestern Great Plains shrubland (LANDFIRE 2023). Species that occur in the area include western wheatgrass, blue grama, and green needlegrass, with invasion by smooth brome grass and Kentucky bluegrass. Shrubs species include buffaloberry, snowberry, and skunkbush sumac (**Figure 17**).

Small-grain agriculture and hayland production is a primary landcover type surrounding Heart Butte Project lands. These include Western Cool Temperate Row Crops, Western Cool Temperate Wheat, and Western Cool Pasture and Haylands.

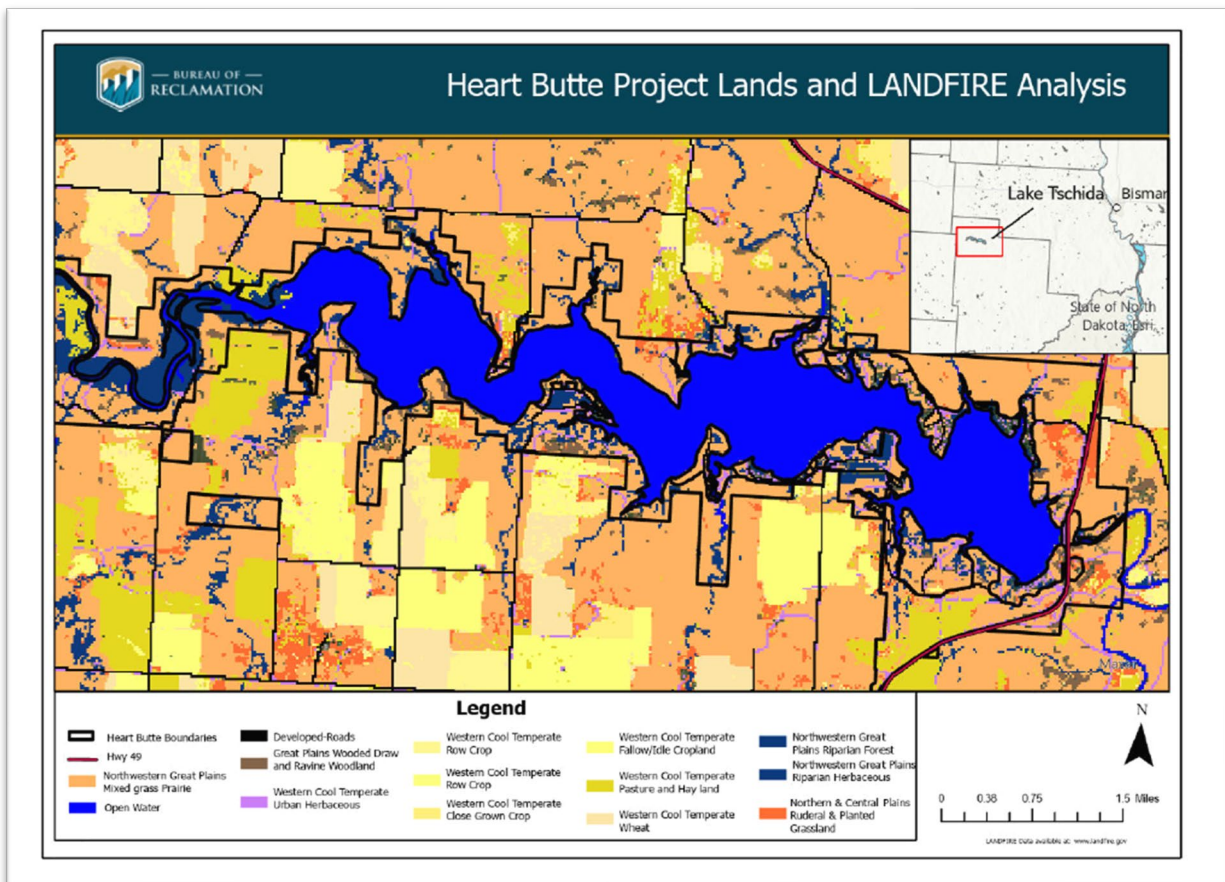


Figure 17. LANDFIRE Analysis Map of Heart Butte Project Lands

There are 13 plant species declared noxious weeds by the state of North Dakota, which include: absinth wormwood, Canada thistle, dalmatian toadflax, diffuse knapweed, houndstongue, leafy spurge, musk thistle, palmer amaranth, purple loosestrife, Russian knapweed, saltcedar, spotted knapweed, and yellow toadflax. Counties are able to list additional weeds if needed, Grant County has additionally listed baby’s breath, black henbane, hoary cress, and waterhemp (NDDA 2024). Noxious weeds are surveyed and sprayed annually on Reservoir lands by DKAO staff according to the DKAO Integrated Pest Management Plan (Reclamation 2020).

Soils in the project area have been previously disturbed due to dam construction, campground construction, and excavating borrow pits. According to the Web Soil Survey, no prime farmland or

farmland of statewide importance occur in the Project Area that haven't already been affected by construction of the downstream campground area (NRCS 2024).

The soils analysis data was populated from Web Soil Survey and shown in **Figure 18**. Dominant soils in the Area of Interest is a Flasher-Verbar-Parshall complex (15.3%), Velva fine sandy loam (14.3%), and Cabba-Chama-Shambo loams (11.9%). These soils all consist of a fine loamy sand weathered from sandstone parent material.

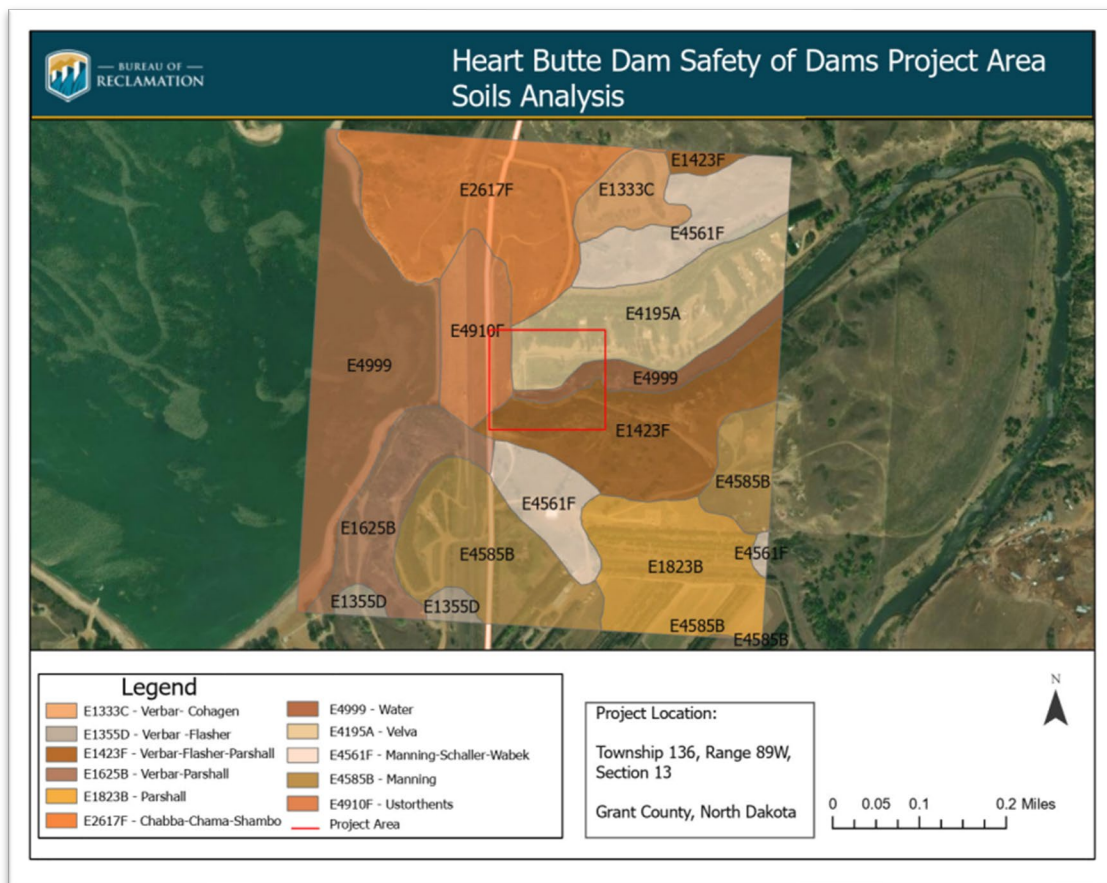


Figure 18. Project Area Soils Analysis

Environmental Effects of the Proposed Action Alternative

Under the Proposed Action Alternative, ground disturbance would occur in the Project Area near the conduit and current borrow areas that may be expanded during construction. A minor adverse impact from this disturbance is the potential for noxious weed colonization. All areas of disturbance would be re-seeded with a native seed mix approved by Reclamation. Noxious weeds will be surveyed and treated in accordance with the DKAO Integrated Pest Management (IPM) Plan (Reclamation 2020) prior to and after construction to prevent the spread of weeds to new areas.

The newly exposed mud flats of the lakebed will likely have the direct effect of producing excellent germination conditions for noxious weeds and pioneering plants such as Canada thistle, white and yellow sweet clover, wormwood, bindweed, and others. Shoreline and recreation areas near the edges and around the shoreline of Lake Tschida may be the most susceptible to windblown seed.

The grazing schedule for permittees will be adjusted to accommodate lower reservoir elevations. This is a minor adverse impact from the Proposed Action. In the event of poor range conditions due to lower reservoir elevations, and the carrying capacity of the rented pastures is reduced, the permit states that the rental fee charged to the permittee will be reduced proportionately.

Reclamation does not anticipate any cumulative impacts or changes to current land use or vegetation resources in Grant County or within Heart Butte Project Lands. Current agricultural practices and land uses are expected to continue throughout the area.

Environmental Effects of the No Action Alternative

The No Action Alternative would result in Reclamation not correcting the conduit deficiencies, which may result in future dam failure. Downstream effects to vegetation and soil resources would likely include increased erosion, changes in distribution, composition, and structure of plant communities, the spread of noxious weeds, and changes in habitat use by wildlife resulting from effects of a major flooding event.

Recreation

Recreation is an important part of the regional economy and to the North Dakota economy as a whole. Lake Tschida supports a robust recreational and outdoor community that enjoy private summer cabins, popular rental cabins, developed and primitive camping, birding, horseback riding, hiking, boating, and water sports. Heart Butte Project lands also provide public land access opportunities for upland game hunting for white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), ring-necked pheasant (*Phasianus colchicus*), wild turkey (*Meleagris gallopavo*), and sharptailed grouse (*Tympanuchus phasianellus*).

A recent survey of fishing and hunting in North Dakota estimated total annual fishing expenditures for resident and non-resident of \$787.8 million, resident and non-resident hunting expenditures of \$186.6 million 2017-2018 season (the most recent data) (North Dakota State University 2019). These expenditures generate notable economic benefits throughout the state and in Grant County and include both trip-related expenditures (e.g. food and lodging) and equipment expenditures (e.g. rods, reels, and firearms). For the purposes of this EA, the recreation section evaluates potential impacts of the proposed action on recreation opportunities that are provided at and around Lake Tschida.

Affected Environment

Lake Tschida is Grant County's largest body of water and the most popular recreation site in the area, well known for its water-based activities, such as swimming, boating, water skiing, and year-round fishing. The Heart River downstream of the dam offers popular fishing areas and water access for canoeing and kayaking. The nearest comparable waterbodies include Patterson Lake, Lake Sakakawea, and Shadehill Reservoir, each approximately 80 miles to the west, north, and south, respectively.

Nine designated recreation areas are located at Lake Tschida, which include electrical camping, boat ramps, shower houses, and one concessionaire (**Figure 19**). Recreation areas and other uses at Lake Tschida and their acreage are given below in **Table 9**. A user survey was conducted in 2021 as part

of a Resource Management Plan, which was completed in 2022. Out of 278 respondents, the recreation activities most participated in at Lake Tschida include relaxing, swimming, sunbathing, and walking/hiking.

Table 9. Lake Tschida Recreation Areas

Recreation Areas	Amenities
Crappie Creek	Primitive and developed camping, shelters, restrooms, boat ramp, information, comfort station, well water stations, and dump station
Downstream Campground	Primitive and developed camping, shelters, restrooms, cabin rentals, playground, fishing pier, and well water station
Hawabesi and Southside	Primitive and developed camping, shelters, restrooms, boat ramp, cabin rentals, boat wash, fish cleaning station, and swimming beach
Koehlers Point	Primitive camping, restrooms, boat ramp, and swimming beach
Schatz Point/Hidden Shelter	Primitive camping, shelters, restrooms, boat ramp, Americans with Disabilities Act (ADA) fishing Pier, water station, hidden shelter horse campground, and playground
Sled Creek	Primitive camping, restrooms, and boat ramp
Rimrock	Primitive and developed camping, shelters, restrooms, boat ramp, cabin rentals, Lake Tschida Visitors Center, boat wash, fish cleaning station, dump station, volleyball area, and swimming beach
Rattlesnake Day Use Area	Day use shelter
North Concession Area	Boat ramp, ADA Fishing Piers, concessionaire, shelters, and restrooms

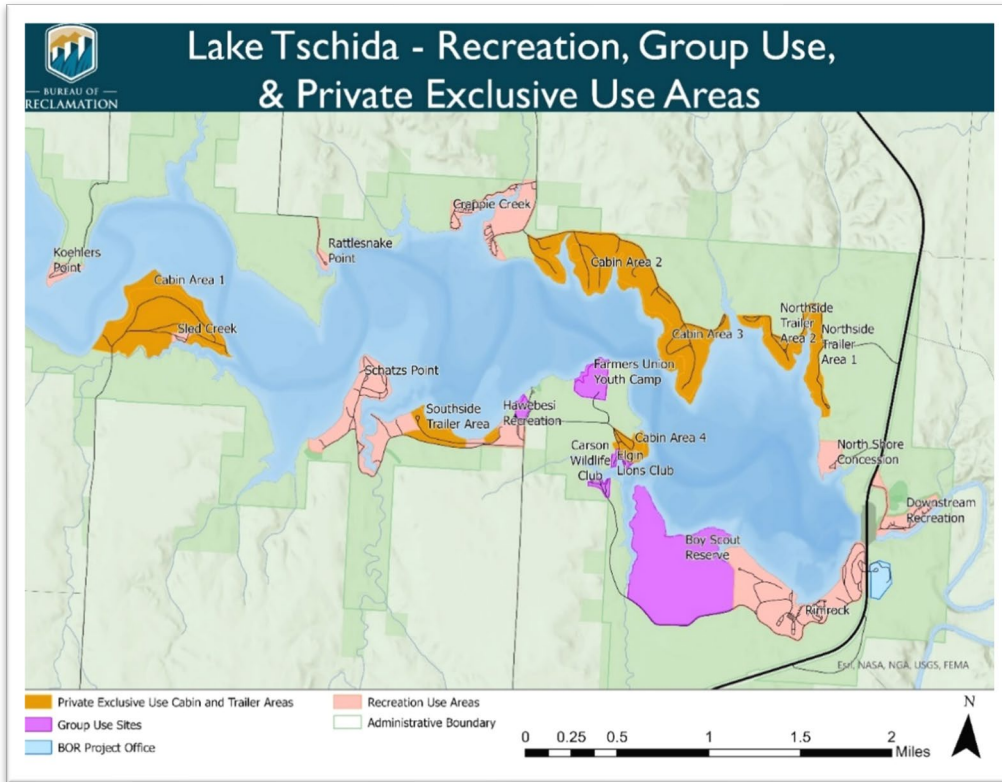


Figure 19. Lake Tschida Recreation Areas

Economic Benefit Provided by Heart Butte Dam and Lake Tschida

As part of the SOD requirements, an economic benefit and cost analysis was completed to determine the least cost alternative for the proposed project. Recreation benefits were calculated using traffic counts and an estimation of visitor activities. Nine recreation activities were determined from discussions with DKAO personnel, which included motorized boating, non-motorized boating, swimming, fishing, big game hunting (deer), upland game hunting (pheasants, grouse), small game hunting (rabbits, squirrels), waterfowl hunting (ducks, geese), and hiking, walking, and birdwatching. An estimated economic value per visit was developed for each of these recreation activities based on a nationwide database of recreation economic studies providing values per visit by activity, indexed to 2021 dollars. Estimates of visitation percentages by activity were obtained through correspondence from DKAO and TCJJDA. Traffic counts obtained from Heart Butte Reservoir Recreation Use Reports from 2012 to 2021 were used to develop the average annual visitation rate of 155,147 visits. Based on the information above, annual recreation value at Lake Tschida was estimated at \$3.1 million (Reclamation 2023c).

Environmental Effects of the Proposed Action Alternative

Under the Proposed Action Alternative, construction is expected to require two to three years to complete. Reservoir drawdown may begin in late fall 2026 with the goal to reach the minimum reservoir elevation of 2030 feet in the summer of 2027. Construction would begin in 2027 and continue through 2028, potentially into 2029. The timing, duration, and reservoir level during construction will depend on future schedule refinement and the conditions that are experienced during construction. Lower than average inflow conditions will tend to shorten the duration while

wetter than average conditions, especially in the late summer, will result in a longer duration. Chapter 2 contains additional detail on the expected project duration and timing as of October 2024. Reclamation is seeking to shorten the project duration by engaging with prospective contractors during the design process.

A direct effect of the Proposed Action Alternative is that the downstream campground would be closed to the recreating public for the duration of the project, resulting in minor adverse impacts of decreased revenue to the managing partner and decreased recreating opportunities for the public (**Table 10**). The remaining recreation areas would be open. However, boat and swimming access to water would be limited to concentrated areas during the project as another direct result of the Proposed Action Alternative.

The NDGF recommends temporarily extending the Rimrock boat ramp to accommodate the fishing public until reservoir levels reach normal operating conditions. Based on the elevations in **Figure 10**, the goal is to maintain reservoir elevations between 2030.00 ft. and 2045.00 ft. for the 2027 season to conduct the repairs safely. At elevation 2050.00 ft., two boat ramps at Rimrock campground may be feasible to extend and Reclamation would evaluate the substrate and consider this option as the drawdown occurs. Due to location and the extension length required to access necessary water depth to launch a boat, all other boat ramps would be unusable until completion of construction and the reservoir begins filling to normal conditions. Cabin and trailer owners would not be able to access the water from their lots. One concessionaire operating at the Northshore Concession Area would likely experience a reduced revenue for the summer of 2027 and 2028. These impacts result directly from the Proposed Action Alternative.

Once reservoir drawdown is complete, water based recreational activities would be directly affected, both on Lake Tschida and within the Heart River, primarily to the confluence of Heart Butte Creek. Multiple minor adverse impacts are expected as a result. The reduced surface area of the lake and closed or limited boat ramps may not allow for water access during construction. Alternatively, there could be a potential for higher amounts of boat congestion in these areas during any periods that the boat ramps are usable. As noted in Chapter 2, the project will have distinct periods of discharge and no discharge that will affect Lake Tschida and the lower Heart River. During the no discharge periods, canoeing, kayaking, and shore fishing opportunities within the lower Heart River would be reduced.

Winter recreation taking place on the reservoir, including minor adverse impacts to ice fishing and snowmobiling, could be indirectly impacted during the project if unsafe ice conditions are present. This is a consideration during any winter season and is typically mitigated by ensuring that the outflow does not significantly exceed the inflow. To prevent the occurrence of unsafe ice conditions during the winter, inflow will continue to be monitored and outflow would be matched or lower than the inflow to prevent the formation of unsupported ice.

Fisheries may experience a temporary increase in harvest but may also have a moderate adverse impact of being more susceptible to winter kill during the low water elevations, which would negatively impact the fishery as a direct result of the Proposed Action Alternative. Future stocking timing and rates would be coordinated with the NDGF and are discussed in more detail in the Wildlife and Fisheries section. The communication strategy described in Chapter 2 would be implemented prior to reservoir drawdowns and throughout the duration of the project to keep the

recreating public safe and informed of timing, accommodations, changing conditions and areas closed and open to access.

Table 10. Recreation Area Availability and Impact Table during Proposed Action

Recreation Area	Temporary Impacts	Permanent Impacts
Crappie Creek	Open without water access	None identified
Downstream Campground	CLOSED	None identified
Hawabesi and Southside	Open without water access	None identified
Koehlert Point	Open without water access	None identified
Schatz Point/Hidden Shelter	Open without water access	None identified
Sled Creek	Open without water access	None identified
Rimrock	Open with LIMITED water access	None identified
Rattlesnake Day Use Area	Open without water access	None identified
North Concession Area	Open without water access	None identified

Possible Improvements Facilitated by the Drawdown

Reclamation is considering multiple recreation improvement projects during the drawdown. A minor beneficial impact from the Proposed Action is the improvement of fishing opportunities for anglers as an indirect result of dredging and removal of silt and sediment deposits from popular shoreline fishing areas during the drawdown. Vegetation management and navigability improvements would be evaluated and considered during the drawdown.

Recreation activities at Lake Tschida such as fishing and water sports have increased in popularity and that trend is likely to continue. Reclamation and TCJDDA are continuing to develop new opportunities for public recreation and improve existing areas at Lake Tschida which would contribute to cumulative impacts, activity, and result in beneficial effects within Grant County. Reclamation is unaware of any other proposed recreation development projects by any state, federal, or private entities.

Environmental Effects of the No Action Alternative

Under the No Action Alternative, no federal action would take place to correct the dam safety deficiencies. In the event of a future dam failure, reservoir-based recreation opportunities would not persist, water-based recreation would shift to from lake to river-based recreation, and managing partner revenues would be significantly impacted and result in adverse effects.

Wildlife and Fisheries

Lake Tschida occupies one primary landscape condition and resulting wildlife habitats found in North Dakota. The Missouri Plateau landscape is an unglaciated region occupying the rolling plains, sandstone outcroppings, and badlands formations that exist southwest of the Missouri River and Lake Sakakawea. This landcover type and the characteristic species occupying this habitat was utilized to determine species which potentially occupy Heart Butte Reservoir lands. For the purposes of this EA, the wildlife and fisheries section evaluates potential impacts of the proposed action

within Heart Butte Reservoir lands and within the lower Heart River to the confluence of Heart Butte Creek.

Affected Environment

Birds

Several upland game species are common to the area and have designated hunting seasons including sharp-tailed grouse (*Tympanuchus phasianellus*), ring-necked pheasant (*Phasianus colchicus*), mourning dove (*Zenaidura macroura*), wild turkey (*Meleagris gallopavo*), and Hungarian partridge (*Perdix perdix*). These species typically inhabit upland grasses near developed agricultural fields, shelter belts, and roadside ditches in the Missouri Plateau region within Heart Butte Reservoir lands.

Shorebirds common to the Missouri Slope include killdeer (*Charadrius vociferus*), upland sandpiper (*Bartramia longicauda*), marbled godwit (*Limosa fedoa*), long-billed curlew (*Numenius americanus*), Wilsons phalarope (*Phalaropus tricolor*), and spotted sandpiper (*Actitis macularius*). Within Heart Butte Reservoir lands these species occupy the shorelines of Lake Tschida, isolated wetlands, and semi-permanent streams.

Migratory birds primarily include waterfowl and waterbirds and may either breed or migrate through Heart Butte Reservoir lands in the spring and fall. Characteristic waterfowl species of the Missouri Plateau include northern pintail (*Anas acuta*), mallard (*Anas platyrhynchos*), blue-winged teal (*Spatula discors*), Northern shoveler (*Spatula clypeata*), and gadwall (*Mareca strepera*).

Raptors and eagles known to occupy the Missouri Plateau region include red tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), merlin (*Falco columbarius*), and prairie falcon (*Falco mexicanus*).

Grassland birds found in the Missouri Plateau region include Sprague's pipit (*Anthus spragueii*), eastern kingbird (*Tyrannus tyrannus*), horned lark (*Eremophila alpestris*), eastern bluebird (*Sialia sialis*), American crow (*Corvus brachyrhynchos*), common yellowthroat (*Geothlypis trichas*), clay-colored sparrow (*Spizella pallida*), vesper sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), bobolink (*Dolichonyx oryzivorus*), chestnut-collared longspur (*Calcarius ornatus*), and brown-headed cowbird (*Molothrus ater*).

Mammals

Large game animals known to exist within Heart Butte Reservoir lands include pronghorn (*Antilocapra americana*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), moose (*Alces alces*), and elk (*Cervus canadensis*). Other furbearers include beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Neovison vison*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), weasel species (Genus *Mustela*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), American badger (*Taxidea taxus*), and mountain lions (*Puma concolor*).

The arid conditions and high percentage of grazing within the Missouri Plateau offers habitat for the black-tailed prairie dog (*Cynomys ludovicianus*), swift fox (*Vulpes velox*), sagebrush vole (*Lemmyscus curtatus*), Merriam's shrew (*Sorex merriami*), and the northern grasshopper mouse (*Onychomys leucogaster*).

Reptiles and Amphibians

The more arid habitats offered in areas of the Missouri Plateau offer resources for the prairie rattlesnake (*Crotalus viridis*), plains spadefoot (*Spea bombifrons*), short-horned lizard (*Phrynosoma hernandesi*), sagebrush lizard (*Sceloporus graciosus*), smooth green snake (*Opheodrys vernalis*), and plains hog-nosed snake (*Heterodon nasicus*) (NDGF 2015). NDGF identifies two amphibians as Level 1 Species of Conservation Priority, the plains spadefoot and Canadian toad (*Anaxyrus hemiophrys*). Two reptile species also occur in the Level 1 category, the smooth green snake and plains hog-nosed snake (2015).

Fisheries

Lake Tschida is a main waterbody and is known as one of the top fisheries in the state of North Dakota. Common fish species known to Lake Tschida include the walleye (*Sander vitreus*), northern pike (*Esox lucius*), sauger (*Sander canadensis*), white bass (*Morone chrysops*), freshwater drum (*Aplodinotus grunniens*), yellow perch (*Perca flavescens*), and channel catfish (*Ictalurus punctatus*). Northern pike and yellow perch reproduce naturally in Lake Tschida. In 2024, North Dakota Game and Fish Department (NDGF) stocked 94,650 walleye (*Sander vitreus*) to enhance the fishery (NDGF 2024). Other species stocked since 2018 include black crappie (*Pomoxis nigromaculatus*), yellow perch (*Perca flavescens*), and gizzard shad (*Dorosoma cepedianum*). Perennial streams and wetlands within Heart Butte Reservoir lands offer several prolific minnow species which provide stable food sources for many birds and mammals. The fathead minnow (*Pimephales promelas*), northern redbelly dace (*Chrosomus eos*), creek chub (*Semotilus atromaculatus*), and brook stickleback (*Culaea inconstans*) are common to prairie streams in North Dakota. The presence of minnows is a primary indicator of a healthy ecosystem (NDGF 2021).

Environmental Effects of the Proposed Action Alternative

Birds

Direct impacts to gamebirds and migratory bird species such as those identified above may result from vehicle collisions, human disturbance, or loss of habitat. This is a minor adverse impact from the Proposed Action. Construction of the Proposed Action Alternative would permanently remove Wetland 1 from the landscape. Adjacent habitat is available for use by waterbirds; however, the habitat loss may have a moderate adverse impact on birds that utilized it. The Proposed Action may cause minor adverse impacts to upland gamebirds due to temporary disturbances that would induce flushing into adjacent habitats. Migratory Bird Treaty Act Environmental Commitments are listed in **Table 18** and include a preconstruction nest survey if construction would take place during the nesting season (May 1-July 15).

The drawdown of Lake Tschida would directly result in exposed mud flats likely to be temporarily revegetated by pioneering species such as yellow and white sweet clover (*Melilotus officinalis/albus*) and Canada thistle (*Cirsium arvense*). Many species of birds, especially the ring-necked pheasant are likely to fill into these flats of the lakebed during the drawdown.

The exposed mudflats would offer temporary and minor beneficial impacts by providing local and migrating shorebirds increased foraging and breeding habitat opportunities. The Proposed Action may result in temporary, minor adverse impacts to open water species (such as waterfowl) as they may have reduced or altered foraging and breeding habitats.

The exposed bluffs and drainages near the Project Area offers excellent raptor and migratory bird nesting habitat. Multiple direct and minor adverse impacts to raptors and eagles are discussed below.

Disturbance or nest abandonment resulting from construction and human presence could occur. According to Ebird.org (Ebird 2024), Golden eagles have been sighted from the Downstream Campground and the Lake Tschida Welcome Center as recently as 2020 and may pass through the Project area during construction. There are no known golden eagle nests within 0.5 mile of the Project Area. Bald eagles are a common sighting at Lake Tschida and within the Lower Heart River Valley. According to Ebird.org, recent observations include observances from the Downstream Campground in August of 2024 and a pair were observed from the Rimrock Campground in October of 2024. According to Ebird.org, the nearest known historical bald eagle nest is located approximately 25 miles east of Heart Butte Dam and was confirmed active with young in 2021. There are no known bald eagle nests within 0.5 mile of the Project Area.

Fish-eating raptors may have increased foraging opportunities during the drawdown, which may then reduce during construction due to reduced available open water. Many raptors including ferruginous hawks, golden eagles, and rough legged hawks (*Buteo lagopus*) are known to be sensitive to human disturbance during nesting season, and the Proposed Action Alternative could indirectly contribute to that issue. Nest abandonment can occur from persistent noise or a clear line-of sight of the activity. Flushing raptors or eagles from active nesting sites during inclement weather is known to contribute to increased mortality. Pre-construction surveys would include a site visit and review of any available data on locations of bald and golden nesting sites. Bald and Golden Eagle Protection Act Environmental commitments are listed in **Table 18** and include visibility, timing, and distance restrictions for construction near active nests.

Mammals

The Proposed Action may cause multiple minor adverse impacts to various mammals. Direct impacts to large game could include loss from increased vehicle collisions, displacement due to increased disturbance, and loss of habitat. Large game such as white-tailed deer rely on habitat cover such as woody draws, sloughs, and grasslands typically near croplands or woody shrublands suitable for browsing type food sources. Mule deer often occupy rougher country within the Missouri Plateau such as badland and open butte landscapes. Pronghorn are found occupying harvested agricultural fields and short-grass prairie. Smaller mammals such as red fox, American badger, coyote, long-tailed weasel (*Mustela frenata*), racoon, and mink (*Mustela vison*) are known to exist on Project Area lands. These mammals may utilize the exposed mudflats for foraging and access to the water's edge, and possibly occupy these areas after vegetation by pioneering species. The Proposed Action Alternative would result in the temporary disturbance within and around the Project Area during construction.

Direct impacts to small non-game mammals includes temporary habitat loss and disturbance of suitable habitats in grasslands and uplands. Direct mortality, displacement, or movements of resident individuals into adjacent habitats may increase exposure to harms such as increased predation or mortality from vehicular traffic.

A minor beneficial impact from the Proposed Action is that white-tailed and mule deer are likely to move into the temporarily revegetated flats of the lakebed and utilize the area for cover and browse. Other local mammals would have altered access to water sources and exposure to the newly exposed mud flats, which may cause minor adverse impacts to energy use and fitness.

Reptiles and Amphibians

Direct impacts to amphibians would be limited to disturbances to aquatic or semi-aquatic environments. Wetland 1 provides habitat for amphibians within the Project Area and would be lost to future use, representing a moderate adverse impact from the Proposed Action. Downstream impacts to these aquatic habitats may occur from habitat degradation such as sedimentation, or contamination from harmful chemicals. Depending on the drawdown and inundation timeframes, direct mortality to amphibian eggs and tadpoles may result, temporarily impacting local amphibian populations. This is a minor adverse impact from the Proposed Action. Timing of high-flow releases from the dam could also adversely impact downstream amphibian populations. The Proposed Action Alternative would utilize industry standard BMPs to reduce threats from erosion and sedimentation during construction and reclamation.

Although rarely seen and uncommon in some areas, reptilian and amphibian populations are known to exist within the Project Area. Direct impacts to reptiles include losses from temporary surface disturbances of suitable habitats such as arid grasslands and uplands within the Project Area. Amphibians may temporarily lose access to some shallow backwater wetlands along the edges of Lake Tschida, which would constitute a minor adverse impact from the Proposed Action. However, ponding from rainfalls and localized inflows from adjacent drainages will continue to provide potential wetland habitat that could have minor beneficial impacts. The drawdown could disrupt amphibian breeding and site fidelity patterns, potentially impacting survival and reproductive success. Mortality, displacement, or movements of resident individuals into adjacent habitats may increase their exposure to harms such as increased predation or mortality from vehicular traffic. These results are minor adverse impacts from the Proposed Action. After construction, the habitats would once again become available to these species.

Fisheries

Due to the required drawdown to el. 2030.00 feet, multiple direct and moderate adverse impacts on the fishery of Lake Tschida are expected. Approximately 650 acres of water would remain at a maximum depth of 20 feet compared to the normal range of 3,100 ac with a maximum depth of 55 feet in a typical year. The inflows from the Heart River would continue to provide inflow to the reservoir during construction. Reclamation expects a fish die-off to occur. Although the extent of the fish population die-off is unknown, it is expected that the fish size and stocks would be reduced after construction is completed. Rough fish such as common carp (*Cyprinus carpio*), bigmouth buffalo (*Ictiobus cyprinellus*), channel catfish (*Ictalurus punctatus*), and black bullhead catfish (*Ameiurus melas*) may have a higher survivability in a shallow lower oxygen environment. Although survivability rates are unknown, many fish up to certain size may pass through the trash rack openings (**Photo 2**) which are approximately 5.5 inches x 23 inches during the drawdown and flush into the lower Heart River system. Remaining fish may be exposed to lower oxygen circulation and be subject to winter kill. Reclamation and the NDGF are continuing to analyze the expected water quality conditions during construction and develop appropriate mitigation for the fishery.

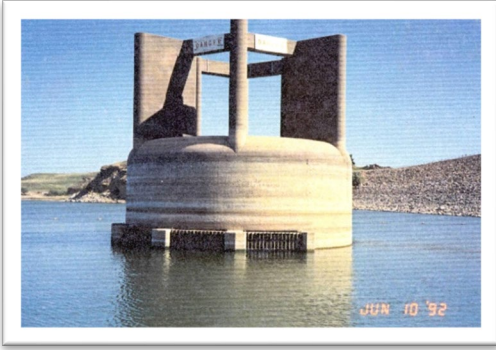


Photo 2. Morning glory inlet structure with top of trash rack visible.

The NDGF may cease currently scheduled stocking efforts leading up to the drawdown. Restocking efforts led by the NDGF would resume on a robust schedule after Lake Tschida returns to a reasonable depth and in time, mitigate the adverse impacts incurred from the Project.

Multiple minor beneficial impacts may result from the Proposed Action. Periodic drawdowns of lakes can be beneficial in the long term by reestablishing vegetation, nutrients, and oxygen into once barren silt filled flats. In addition, the exposed mud flats are likely to yield high germination rates for common pioneering species which flourish in exposed soils such as Canada thistle, yellow and white sweet clover, absinthe wormwood (*Artemisia absinthium*), and field bindweed (*Convolvulus arvensis*). After the Project is completed, this flooded vegetation may provide prime spawning areas particularly for Northern pike and yellow perch.

Other aquatic sources such as perennial streams and wetlands provide habitat for approximately 30 species of minnows found in North Dakota. Another direct and minor adverse impact of the Proposed Action Alternative is that distribution of aquatic animals including amphibians, reptiles and fish species may shift to different sections of the lower Heart River system as the drawdown occurs and again as the construction is completed. Similar to impacts to amphibians, aquatic habitats may be adversely impacted by habitat degradation from sedimentation or contamination from harmful chemicals. Although those potential impacts would likely be minor, the Proposed Action would use industry standard BMPs such as silt curtains, straw wattles, and silt fences during construction so sedimentation or chemical contamination would be minimized.

Current land use practices and activities which continuously cause disturbance to wildlife are expected to continue in Grant County. Disturbances from agricultural activities, road improvement projects, highway traffic, water consumption, and recreation activities all have the potential to cause cumulative disturbances to wildlife. Hunting, trapping, and fishing enthusiasts will continue to utilize both the Heart Butte Project Lands and private lands for access to public wildlife resources. Reclamation is unaware of any other large development or improvement projects which may add to cumulative impacts to wildlife and fisheries in Grant County.

Environmental Effects of the No Action Alternative

Under the No Action Alternative, the project would not be constructed. Impacts to wildlife and fisheries, including complete loss of the fishery, all recreation benefits and all habitat provided by the reservoir would occur due to dam failure. Significant changes to hydrology would include a return to

a riverine system vs the current lake system, which would alter the types of fish and wildlife species that would thrive in the area. Plant community structure, composition, and distribution would shift from a lake system with emergent vegetation and deep water to a riverine system, with woody vegetation and more shallow, flowing water.

Threatened and Endangered Species and Designated Critical Habitat

This section constitutes the Biological Assessment for the Proposed Action as required under Section 7(c) of the Endangered Species Act of 1973, as amended, in compliance with regulations found at 50 CFR Part 402 *Interagency Cooperation – Endangered Species Act of 1973, as Amended*.

The Action Area identified is based on Reclamation’s assessment of the potential direct and indirect effects of the proposed action to federally listed species (50 CFR 402.02). The evaluation of federally listed species focuses on the aquatic and terrestrial environments that may be influenced by the activities of the Proposed Action. Due to the requirement to temporarily reduce the elevation of Lake Tschida to the minimum reservoir elevation of 2030.00 feet and cease or curtail releases from the dam into the Heart River, the Proposed Action results in temporary effects to hydrology both on Lake Tschida and within the lower Heart River to the confluence of the Heart Butte Creek approximately 12 river miles east of the Project Area. For the purposes of this EA, the Action Area for the threatened and endangered species section includes the immediate Project Area, a 0.5-mile buffer around Lake Tschida, and the lower Heart River to the confluence of Heart Butte Creek.

Reclamation utilized the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website on January 3, 2025, for an updated list of endangered, threatened, or proposed species or designated critical habitat within the action area (**Appendix B**). The official species list was obtained from USFWS for species that may occur within the Action Area and are shown in **Table 11**.

Table 11. Endangered Species Act-Listed Species in the Action Area

Species	Status	Designated Critical Habitat	Effect Determination
Northern Long-Eared Bat (<i>Myotis septentrionalis</i>)	Endangered	No	No Effect
Whooping Crane (<i>Grus americana</i>)	Endangered	No	No Effect
Western regal fritillary (<i>Argynnis idalia occidentalis</i>)	Proposed Threatened	No	Not Likely to Jeopardize
Monarch (<i>Danaus plexippus</i>)	Proposed Threatened	No	Not Likely to Jeopardize

Whooping Crane

Whooping cranes reach approximately 5 feet tall and have a wingspan that can reach 7½ feet. Whooping cranes are almost entirely white with black wingtips and have a red patch on the head that extends from the cheek along the bill. The eyes are yellow, and they have black legs (**Photo 3**).



Photo 3. Whooping Cranes foraging

Source : <https://www.fws.gov/midwest/whoopingcrane/>

Population Range-wide

The whooping crane was listed as endangered in 1967 (*Federal Register* 32:4001). Whooping crane recovery efforts have made great strides over the years, with new populations being established in Florida and Wisconsin. The birds that migrate through North Dakota are part of the Aransas-Wood Buffalo Population (AWBP) population. Approximately, 536 whooping cranes were estimated during the January 2023 survey, near Corpus Christi TX (USFWS 2022). The previous winter survey from 2021-2022 estimated 543 whooping cranes, showing a relatively stable population over the last two years.

The whooping crane recovery plan includes scientific information about the species and provides objectives and actions needed to down-list the species (USFWS 2012). Recovery actions designed to achieve these objectives include protection and enhancement of the breeding, migration, and wintering habitat for the Aransas-Wood Buffalo population. The goals are to allow the wild flock to grow and reach ecological and genetic stability; reintroduction and establishment of geographically separate self-sustaining wild flocks to ensure resilience to catastrophic events; and maintenance of a captive breeding flock that is genetically managed to retain a minimum of 90 percent of the whooping cranes' genetic material for 100 years. All three efforts to maintain a self-sustaining breeding population outside of the AWBP population through reintroduction have failed. Efforts continue in Wisconsin, Florida, and Louisiana.

According to the latest 5-year review (USFWS 2012) the repeated lack of success to establish breeding populations elsewhere suggests efforts to increase and sustain the AWBP population to 1,000 individuals is the most likely strategy for the eventual down-listing and recovery of the whooping crane.

Action Area

The whooping crane frequently migrates with sandhill cranes by passing through North Dakota each spring and fall while migrating between its breeding territory in northern Canada and wintering grounds on the Gulf of Mexico. They prefer freshwater marshes, wet prairies, shallow portions of rivers and reservoirs, grain and stubble fields, shallow lakes, and wastewater lagoons for feeding, loafing, and roosting. Fall migration occurs in North Dakota from late September to mid-October, while spring migration occurs from late April to mid-June (**Figure 20**). Birds can appear in all parts of North Dakota, although most sightings are in the western two-thirds of the state. In 2018, the USGS delineated a migration corridor that outlines the percentage of confirmed crane sightings based on current and historical sighting reports (Pearse et al 2018). The Proposed Action is located within this migration corridor where 90 percent of sightings have occurred.

Grant, Hettinger, Morton, and Stark Counties contain a considerable amount of agricultural industry which in combination with wetlands and intermittent drainages can provide suitable stopover habitat. These wetland/agricultural matrix areas provide both small grain foraging and roosting areas which are known to be selected for stopover by migrating whooping cranes.

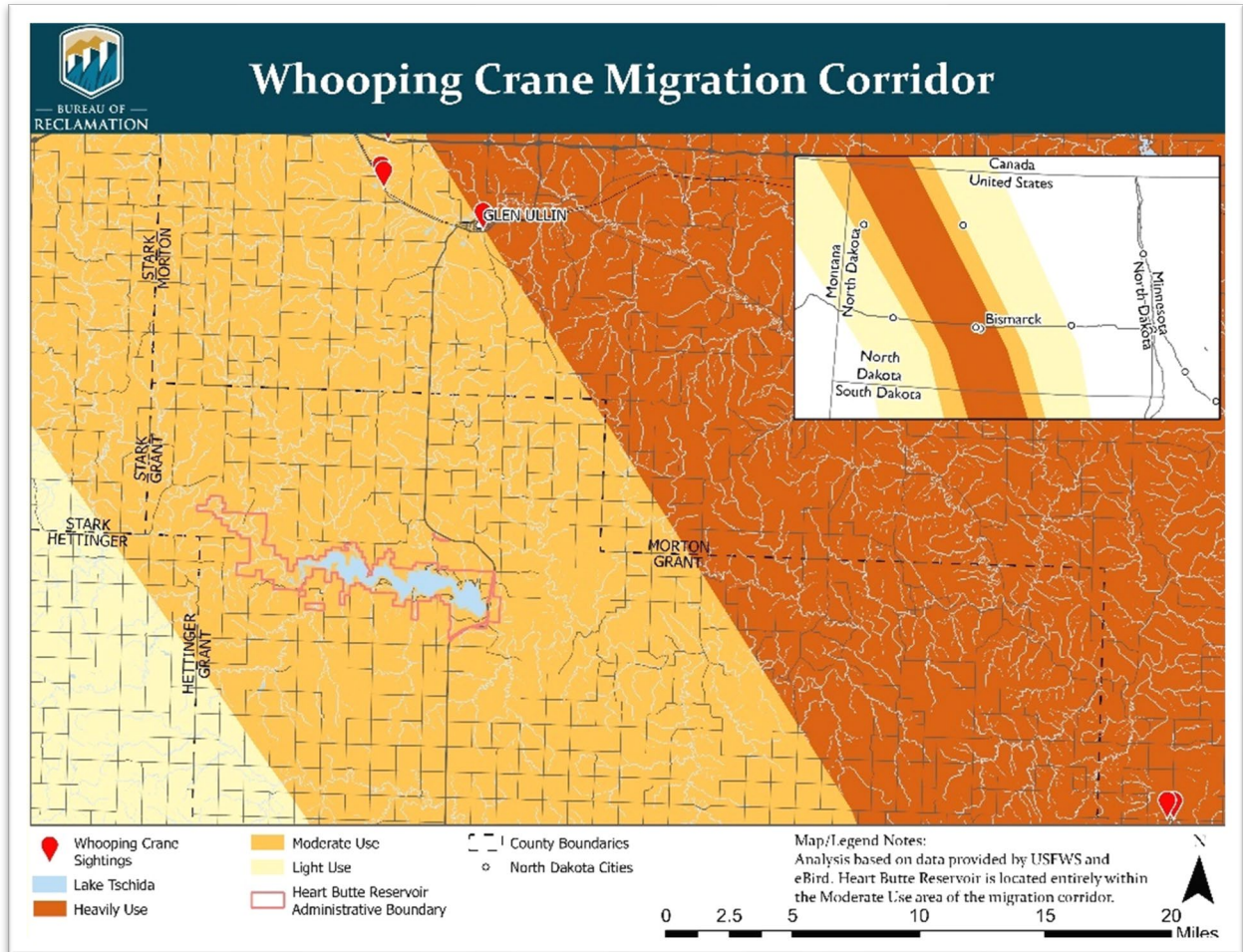


Figure 20. Central Flyway Whooping Crane Corridor and Confirmed Sightings

Northern Long-eared Bat

Northern long-eared bats (NLEB) are a medium-sized bat, with very long ears. Their length is 3.0 – 3.7 inches with a wingspan of 9 – 10 inches. The fur color is medium to dark brown on the back with a tawny to pale brown on their underside (Photo 4).



Photo 4. Northern long-eared bat

Source : <https://www.fws.gov/wyominges/Species/NLEBat.php>

Population Range-wide

The northern long-eared bat was listed as threatened in 2015 (*Federal Register* 80:17974-18033) with a 4(d) rule in 2016 (*Federal Register* 81:1900-1922). In 2023, the species was uplisted to endangered across its range (*Federal Register* 81:73488-73504) (USFWS 2023). The range of the northern long-eared bat includes much of the eastern and north-central United States and all of North Dakota (**Figure 21**). The northern long-eared bat spends winters hibernating in caves and mines. In summer, the northern long-eared bat roosts underneath bark of live and dead trees, rock crevices, caves, mines, barns, and sheds. Breeding of the species begins in late summer or early fall. After copulation, females undergo delayed fertilization where they store the sperm through hibernation and fertilize the egg with the stored sperm in early spring (USFWS 2022b).

The dramatic decline of the northern long-eared bat is mostly due to white-nose syndrome. White-nose syndrome is caused by the introduced fungus *Pseudogymnoascus destructans* (Pd). Pd thrives in cold damp places where bats hibernate for the winter. Pd grows on bats while they are inactive and causes damage to the skin and soft tissues. The name white-nose syndrome comes from the fungus which appears like white fuzz on the nose or other hairless parts of the bats, including their wings (White Nose Syndrome Response Team, 2024). There are many unknowns regarding white-nose syndrome, however it is expected that the disease will continue to spread throughout the United States. Other sources of decline include impacts to hibernacula, degradation of summer habitat, and wind farm operation.

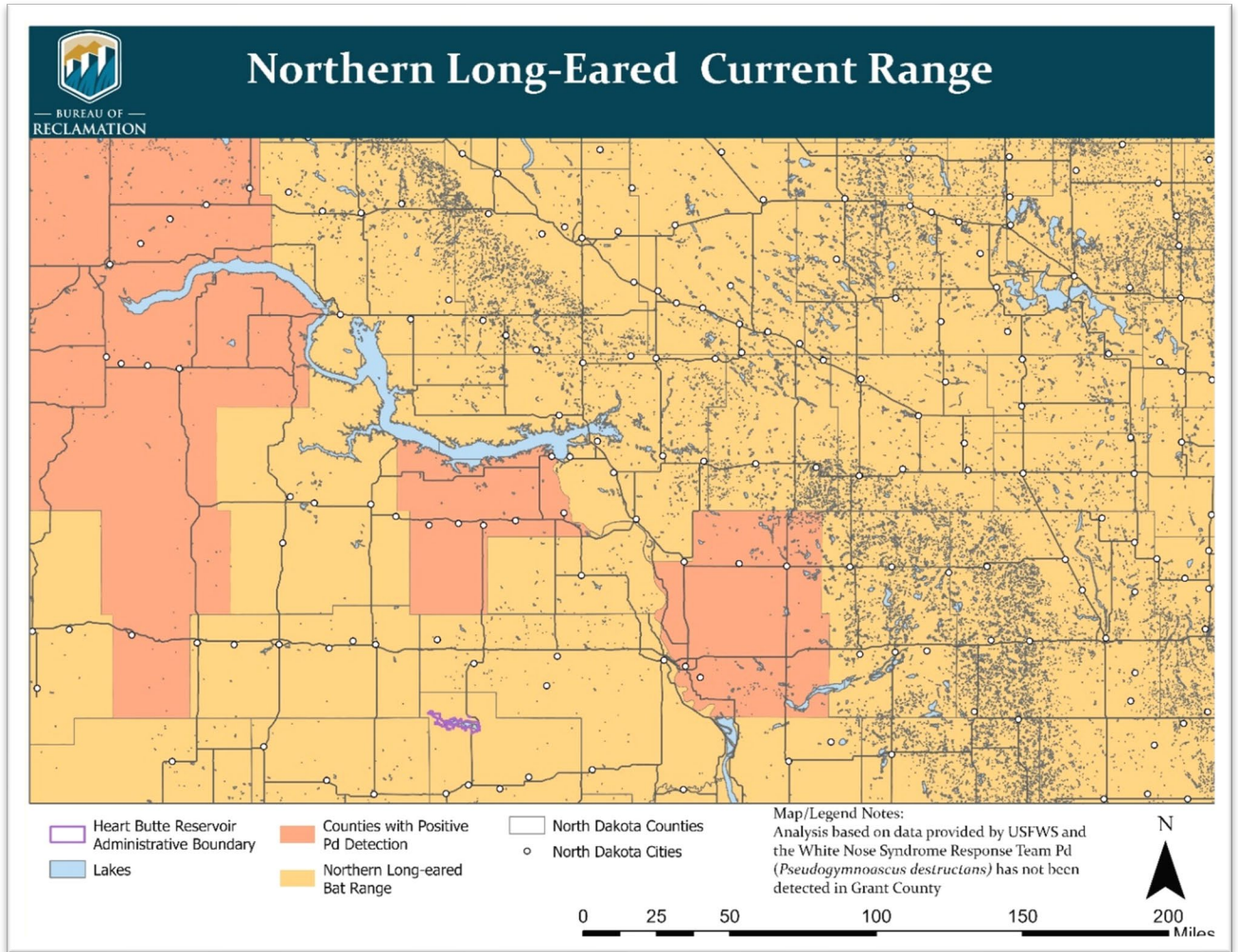


Figure 21. Northern long-eared bat Range within ND and Positive Pd detections

Action Area

The northern long-eared bat historically occupied the eastern half of the state of North Dakota, but more recent surveys have documented distributions across the entire state (Figure 21). Summer surveys in North Dakota have detected this species south and west of the Action Area (North American Bat Monitoring Program (North American Bat Monitoring Program, 2024). The species is known to roost in large deciduous trees along wetland areas. In North Dakota the species is known to roost in cottonwood and ash trees closely tied to the Missouri and Little Missouri River systems (Nelson, 2015). Although unknown to Reclamation at this time, it is possible that northern long-eared bats use suitable habitat located within the area surrounding Lake Tschida, considering the proximity to the lake and the Heart River. However, Reclamation has yet to undertake surveys for NLEB roosting locations and is unaware of documented hibernacula or maternity roost trees within the lands surrounding Lake Tschida. Reclamation has reviewed available sources of data from the USFWS and the North American Bat Monitoring Program for northern long-eared bat. Detections continue to be rare but occurrences have been documented using a variety of sampling techniques including acoustic monitoring and live capture (North American Bat Monitoring Program, 2024).

Western regal fritillary

Western regal fritillaries are a subspecies of the regal fritillary that inhabit tall and mixed-grass prairies of the Great Plains. They have patterned orange forewings and dark hindwings with two distinct bands of spots. Wingspans of adults typically range from 2.7 to 4.1 inches (**Photo 5**). The regal fritillary is non-migratory and only produces one generation per year. Adults are typically most active from June to August, with breeding typically occurring in July. Females delay laying their eggs until late August. The larvae hatch in late September to October, and after finding cover in leaf litter, will enter diapause. In spring, the larvae emerge and seek out violets and will continue to feed and grow until May when they pupate. Adults feed on nectar of a variety of flowering plants, but larvae are highly dependent on violets (*Viola spp.*)



Photo 5. Western regal fritillary

Source: https://ecos.fws.gov/docs/species_images/doc7288-250px-thumbnail.jpg

Population Range-wide

USFWS proposed listing the western regal fritillary as a threatened species in August 2024. Concurrently, the eastern subspecies of the regal fritillary has been proposed as endangered. The historic range of the regal fritillary extended across large swaths of the eastern and central United States. The western regal fritillary currently occupies the remnant prairies of the central United States. Its current range is expected to cover the majority of North and South Dakota.

Factors contributing to the decline of the species include the expected continued loss and fragmentation of large, intact native grasslands through conversion by agriculture and development; invasive plants and woody vegetation; the reduction of violets and nectar sources from the broadcast application of herbicides; and periodic disturbances from fire, mowing, and haying that are too large, frequent, or intense (USFWS 2024).

Action Area

The historic range of the Western Regal Fritillary extended across most of North Dakota, with the notable exception of the southwest corner. This fritillary species is highly adapted to the life stages

of, and dependent on, the availability of violet species (*Viola* spp.). The action area is dominated by non-native grasses and lacks a diversity of forbs. The quality of foraging habitat for adults is poor, and more importantly, there are no violets within the action area.

Monarch

The monarch is a species of butterfly in the order Lepidoptera, it is among the most recognizable and iconic pollinator species of North America. They are identified by their distinct patterned black and orange wings. Adults have a wingspan of 3 to 4 inches and weigh half a gram on average. A typical adult will live approximately 2 to 5 weeks, with the exception of overwintering adults who can live 6 to 9 months after entering into diapause. The population of monarchs within the Dakotas are migratory, utilizing the available habitat during the warm summer months. Adult monarchs feed on the nectar of a variety of flowering plants but they only lay their eggs on milkweed species. Larval monarchs feed on milkweed plants and sequester toxic cardenolides as a defense against predators (USFWS 2020).



Photo 6. Monarch

Source : <https://www.fws.gov/media/monarch-butterfly-swamp-milkweed>

Population Range-wide

After review, the USFWS has determined that listing the monarch butterfly as endangered or threatened species is warranted but precluded by higher priority actions to amend the list of endangered and threatened wildlife and plants (*Federal Register* 85:81813-81822).

There are two main populations of migratory monarchs in North America. One breeds west of the Rocky Mountains and overwinters in California. The second, the population to which the monarchs found in North Dakota belong, breed east of the Rocky Mountains and overwinter in Mexico (USFWS 2020). The primary drivers affecting the health of the two North American migratory populations are changes in breeding, migratory, and overwintering habitat (due to conversion of grasslands to agriculture, urban development, widespread use of herbicides, logging/thinning at overwintering sites in Mexico, unsuitable management of overwintering groves in California, and drought), continued exposure to insecticides, and effects of climate change (USFWS 2020b).

Action Area

Monarchs occur in North Dakota from early May to mid-September, with peak breeding season from June to August. The action area contains suitable breeding habitat for monarchs. As

pollinators, monarch feed on the nectar of a variety of flowering plants, however they only breed where milkweeds are found. There are nine native milkweed species known to occur within the lands surrounding Lake Tschida and milkweed can grow in a variety of areas including grasslands, cropland edges, and road-side ditches.

Environmental Effects of the Proposed Action Alternative

The term “effects of the action” refers to the direct and indirect effects of a Proposed Action on listed species and designated critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR §402.2). Reclamation reviewed the Action Area settings, life history, habitat information, and environmental baseline for each of the federally listed species to evaluate potential effects. The results of this analysis are reported below.

Reclamation has identified four potential conclusions as described in the ESA regulations regarding analyses for impacts on listed species or critical habitat:

- **No effect** - the appropriate conclusion when the action agency determines its Proposed Action will not affect listed species or critical habitat, or
- **May affect** - appropriate conclusion when a Proposed Action may pose any effects on listed species or their critical habitat.
- **Is not likely to adversely affect** – the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial.
 - Beneficial effects are contemporaneous positive effects without any adverse effects to the species.
 - Insignificant effects relate to the size of the impact and should never reach the scale where take occurs.
 - Discountable effects are those extremely unlikely to occur.
- **Likely to adversely affect** – the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the Proposed Action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant or beneficial.
- **Not likely to jeopardize** – the appropriate conclusion in which the proposed action is not likely to jeopardize the continued existence of the proposed species.

For proposed species, Reclamation would determine if the proposed action has the potential to jeopardize the species proposed for listing as threatened or endangered under the ESA. There is no determination requirement for candidate species.

Determination of Effects by Species:

Whooping Crane

The Project Area is located within the western half of the whooping crane migration corridor. According to ebird.org, the nearest known recent sighting was near Hebron ND in 2021 where 7 individuals were observed in foraging in a stubble field in mid-April. Another observance occurred in 2019 near Flasher where 5 individuals were also observed in mid-April.

Direct effects and stressors to whooping cranes occur from disturbances during the Proposed Action and include flushing of migrating adults or subadults from suitable stopover habitats. The habitats within the immediate viewshed around the Project Area include considerable topography for the area, and do not appear to offer suitable stopover habitat.

Indirect effects and stressors include changes in the environment which would occur later in time such as the presence of a new building or powerlines. The newly installed seepage berm would be a new feature on the landscape, however its unlikely to cause any deterrence from suitable stopover habitat by migrating whooping cranes.

The mudflats and ponded shallow areas of Lake Tschida exposed during the construction period combined with the small grain agriculture in the area may provide new additional suitable stopover habitat during the migration season (March 15-May 15 and September 10 – November 15). The lower flows in the Heart River downstream of the dam during construction may also offer more shallow ponded roosting areas during the construction period.

If a whooping crane is sighted within 1-mile of the Project Area, the viewshed and likelihood of disturbance would be considered and Reclamation would initiate consultation with the Service. Neither direct nor indirect effects to the whooping crane have been identified or are reasonably certain to occur as a result of the Proposed Action. Therefore, the proposed action will have **“no effect”** on the whooping crane.

Northern Long-Eared Bat

During the active season in North Dakota (March 31-October 31), the northern long-eared bat may utilize suitable roosting trees adjacent to the Project Area and within the Action Area including the lower Heart River and wooded drainages surrounding Lake Tschida. During the active season individuals may also pass through the Project Area while foraging for insects. However, Reclamation is unaware of any positive survey results, nor have maternity roost trees or hibernacula been identified within the Action Area.

Direct effects and stressors to northern long-eared bats primarily occur from the destruction of occupied roost or maternity trees. Other potential direct effects could also occur from vehicle strikes, general equipment disturbances, noise and dust associated with the construction site. Indirect effects typically associated with northern long-eared bats include the removal of large amounts of forested habitats and the resulting loss of connectivity between roosting habitats. The Proposed Action would not require any removals of suitable roosting trees. Neither direct nor indirect effects to northern long-eared bats have been identified or are reasonably certain to occur as a result of the Proposed Action, therefore, the proposed action will have **“no effect”** on the northern long-eared bat.

Western Regal Fritillary

The Project area and workspaces required for the Project have been previously disturbed and consists of non-native dominated smooth brome and crested wheatgrass. These habitat characteristics are unfavorable for the regal fritillary therefore Reclamation anticipates this project is **“not likely to jeopardize”** the continued existence of the regal fritillary.

Monarch

As a candidate the monarch will be re-evaluated every year and status and recovery actions determined at that time. Project activities would avoid large stands of milkweed and other known

monarch habitat. Reclamation recommends incorporating conservation or restoration measures into any potential project design to ensure that any potential effects on monarch butterflies would be temporary. Reclamation anticipates this project is “**not likely to jeopardize**” the continued existence of the monarch.

Reclamation, as well as other federal and state agencies rely on the Endangered Species Act to avoid effects to threatened and endangered species. Continued protections and mitigations for federally funded projects are expected to continue to avoid the loss of the listed species in Grant County. As discussed in the previous section, land use practices and activities which continuously cause disturbance to wildlife are expected to continue in Grant County. Reclamation and TCJJDA are continuously evaluating development projects within the cabin and trailer areas in addition to federally funded improvement opportunities in consideration of the ESA. Reclamation is unaware of any other state, federal, or private development or improvement projects which may add to cumulative impacts to threatened and endangered species in the Action Area.

Summary of Effects

Reclamation has found that the Proposed Action Alternative would cause “No Effect” to the whooping crane or Northern long-eared bat and is “Not likely to Jeopardize” the continued existence of the regal fritillary or the monarch. Although not required, Reclamation requested written concurrence from the FWS Field Office in Bismarck that the Proposed Action Alternative would have no effect on listed species or critical habitat. The USFWS Bismarck Field Office responded in a letter dated December 6, 2024, gave recommendations for the piping plover (*Charadrius melodus*) and the Dakota skipper (*Hesperia dacotae*), which are not on the USFWS Official Species list for the Project Area. Nevertheless, it was recommended if native grasslands are disturbed, these areas be evaluated for Dakota skipper prior to construction. In addition, the Bismarck Field office noted that the exposed mud flats of Lake Tschida may provide temporary piping plover foraging or breeding habitat and that surveys may be required if plovers are present within 0.5 mile viewshed of work activity.

In the event any threatened or endangered species are encountered during activities, the contractor will contact Reclamation. Reclamation will consult with the USFWS to determine the appropriate steps to avoid any effects to these species, including cessation of construction.

Environmental Effects of the No Action Alternative

Under the no action alternative, no federal action would be taken to correct the deficiencies with the dam, which may result in future dam failure. **The no action alternative would have no effect on the whooping crane or northern long eared bat and is not likely to jeopardize the existence of the regal fritillary.**

Cultural Resources

Affected Environment

Reclamation manages cultural resources within the Heart Butte Reservoir lands in accordance with Section 110 and Section 106 of the National Historic Preservation Act (NHPA) and other applicable laws and regulations. Under Section 110 of the NHPA, Reclamation has completed cultural resource surveys of the Heart Butte Reservoir lands and has conducted some formal evaluations to determine what cultural resource sites are eligible for listing on the National Register of Historic Places

(NRHP). Sites that are determined to be eligible for listing on the NRHP are given high cultural resource management consideration and status as historic properties. Section 106 of the NHPA requires Reclamation to consider effects to historic properties when planning and implementing actions such as those identified in this EA. The Heart Butte Dam has been evaluated for NRHP eligibility and has been recommended as eligible for listing on the NRHP (Godfrey 2013; NDSHPO REF: 13-1243; August 15, 2013).

The Heart Butte Reservoir is located in the Heart River Study Unit, which is one of 13 Study Units (drainage basins) used for prehistoric and protohistoric archeological site studies and management in North Dakota (Gregg et al. 2021). The majority of the cultural resource sites within the reservoir lands are prehistoric lithic scatters and historic farmsteads. Lithic scatters are distinct accumulations of stone (lithic) tools and/or debris from tool making. The historic farmsteads consist of the remains of farms from the recent past and include foundations, depressions, standing and/or collapsed farm structures. Additional site types include prehistoric occupation sites, stone circles, cairns, and quarry sites. Occupation sites are scatters of artifacts, bone, pottery sherds, and fire-cracked rock. Stone circle sites, also called tipi ring sites, are distinguished by one or more circular rings of stone. Cairns are a pile or clustering of stones of varying size and shape. Rock cairns have been used for various purposes including, but not limited to, capping human burials, and ceremony, cache, trail, and boundary markers. Quarry sites are areas that were used for the procurement of tool, fuel, and construction materials in both prehistoric and historic time periods.

The Heart Butte Reservoir lands were originally surveyed by the River Basin Survey staff of the Smithsonian in 1946-1948 (Cooper 1947; Hlady 1947; Hewes 1949; Cooper 1958). Following a 27-year hiatus in archaeological investigations, small scale cultural resource surveys were performed in 1975 (Franke) and in 1979 (Loscheifer and Greer; Ward-Williams). These small-scale surveys continue to be performed into the present day, primarily for utility and road projects (Persinger 1987; Burbidge and Borchert 1989; Good 1989; Bluemle 2000; Heidman 2012). An intensive, large-scale survey of the Heart Butte Reservoir was undertaken in 1980-1981 (Plochman et al. 1982). In 1989, Reclamation surveyed land where a new overflow spillway would be constructed (MacDonald 1983; Robson 1983). A shoreline survey of the reservoir was conducted by the University of North Dakota (UND) in 1990 (Picha and Gregg 1991) and 1992 (Gregg). The 1990 survey led to additional reconnaissance surveys and test excavations by University of North Dakota (UND) in 1992-1993 (Toom et al. 1999). Further test excavations, controlled surface collections, and survey work were carried out by UND personnel in 1998, 1999, and 2000 (Jackson et al. 2001), in 2001-2002 (Jackson and Toom 2005; Toom 2002), and in 2008 (Jackson and Toom 2013).

Excavation was undertaken at the Beadmaker site (a prehistoric occupation site) in 2003 by UND to salvage a larger portion of the significant deposit, before river erosion destroyed that part of the site. The report for this work is currently being prepared by the State Historical Society of North Dakota. Following the 2003 excavation work, Reclamation carried out a bank stabilization project along the cutbank. The stabilization work was evident and the bank appeared stable and protected from further undercutting and failure when the site was revisited in 2008 (see Jackson and Toom 2013). Since the shoreline survey in 2008, the protective rock-filled gabions have failed and tension cracks running parallel to the riverbank, approximately one meter back from the bank edge, are now present along the length of the site area. The drawdown of the reservoir water level associated with the Proposed Action Alternative would provide a valuable management opportunity for Reclamation to remedy this and identify and treat any additional areas of bank instability impacting NRHP eligible historic properties or unevaluated cultural resource sites.

Environmental Effects of the Proposed Action Alternative

For the Proposed Action Alternative, activities would occur within the project's Area of Potential Effects (APE). The APE includes the modifications to the actual Heart Butte Dam structure, any associated borrow areas, access routes, temporary staging areas and workspaces, as well as the exposed lakebed and any upstream areas that will be subject to changes in reservoir water levels and streamflow (see Figure 4). The temporary drawdown of the reservoir water level necessary for the Proposed Action Alternative is part of the cumulative effects of the reservoir and its management. The potential impacts associated with this undertaking will be most intense at the construction site for the modifications to the Heart Butte Dam and any associated borrow areas where extensive earth-moving activities will take place. The use of established roads for access poses limited, if any, impact to cultural resource sites. Temporary staging and work areas, as well as borrow areas will be located in approved locations that have been cleared for any historic properties and verified by Reclamation's Area Archaeologist.

This proposed undertaking may affect cultural resource sites by exposing cultural deposits associated with those sites located on the banks of the impoundment or with components closer to the pre-dam streambed of the Heart River that have been continuously inundated. Sites along the banks of the Heart River farther upstream, outside of the normal impoundment area, may also be more visible and accessible during this period due to changes in streamflow's during the reservoir drawdown. Considering the historical trend data for reservoir elevations between 1950-present that range between a low of 2049 feet and a maximum of 2086.23 feet (Figure 14), the act of drawing down the reservoir will change very little from baseline conditions in terms of effects to cultural resources along the reservoir banks and shoreline. The most significant impact is expected to be the potential exposure of cultural materials and features in cutbank profiles and the exposed lakebed, making such deposits vulnerable to unauthorized collection or other destructive human activity. Reclamation will devise an enhanced signage plan to inform the public of the prohibition of and penalties for unauthorized collection, excavation, or disturbance to archaeological sites or cultural materials on Federal lands. Reclamation will also put notices concerning these prohibitions and penalties on the project website, managing partner website, and send an informational letter to cabin owners annually throughout the project schedule.

A Class I cultural resource inventory was completed by Reclamation's Area Archaeologist on October 9, 2024. Within a one-mile radius of the APE for the proposed undertaking, there are a total of 153 recorded cultural resource sites, 37 isolated find locations, and six (6) site leads with unverified locational precision. Of these 196 recorded cultural resources, 169 are located on lands under Reclamation management. Among these are nine (9) NRHP eligible historic properties and 52 sites that have not yet been evaluated for NRHP eligibility status. There are also 21 isolated find locations, where very limited cultural materials have been observed not numerous enough to qualify as archaeological sites without further investigation. Thirty-nine (39) locations with cultural deposits are identified on the map in Appendix A as resources for which further investigation could be aided by the drawdown of reservoir levels due to the following conditions: 1). proximity to the reservoir shoreline, 2). proximity to the banks of the Heart River channel, 3). partial inundation or potential for inundated deposits, and 4). eligible, unevaluated, or unclear NRHP eligibility status. This preliminary analysis will be formalized through a detailed review of previous management recommendations for each site or locality as well as consultation with the North Dakota State Historic Preservation Officer (ND SHPO) and appropriate Tribal Historic Preservation Officers

(THPO) to determine appropriate investigative and management measures that may be taken during the low-water windows associated with this undertaking.

Under the NHPA, several criteria are used to determine if a cultural resource site is eligible for inclusion in the NRHP, which determines its status as a historic property (36 CFR 60.4). The Heart Butte Dam (Site 32GT340) qualifies as a historic property eligible under NRHP Criterion A for its association with Reclamation's Pick-Sloan Missouri River Basin program and the significant role that those developments played in the history of Grant County and the State of North Dakota. The Dam is also eligible under NRHP Criterion C as it embodies distinctive characteristics of a type, period, and method of Reclamation construction for the post-World War II era and is representative of tributary projects engineered under the Pick-Sloan Plan (see Godfrey 2013; ND SHPO REF: 13-1243; August 15, 2013). Additionally, under NHPA, criteria in 36 CFR Part 800 are applied to evaluate how the proposed action may affect the individual aspects of integrity possessed by a historic property. Reclamation consulted with North Dakota SHPO regarding the NRHP eligibility of the Heart Butte Dam and rendered a determination of *No Adverse Effects* to the Heart Butte Dam and recommended that the project proceed as planned with reference to the structural modifications to the Dam. The North Dakota SHPO concurred on January 16, 2018, with Reclamation's determination for the proposed action with regard to the NRHP eligibility and historical integrity of the Heart Butte Dam (ND SHPO REF: 18-0296, January 16, 2018). Reclamation has since rendered a determination of *No Adverse Effects* for the entirety of the proposed action as the physical effects of the undertaking do not deviate significantly from baseline conditions at individual site locations. Reclamation has sought input and comment from the North Dakota SHPO and the 10 Tribal governments identified as interested parties. The only response received was from the North Dakota SHPO, dated January 8, 2025 (ND SHPO REF: 24-0270). The ND SHPO recommended that Reclamation ensure avoidance of unevaluated Site 32GT151, which is located outside of but adjacent to the contractor use area shown in Figure 4. The ND SHPO concurs with Reclamation's determination of *No Adverse Effects* for the full scope of the proposed action. Concurrence documents are included in Appendix C.

Environmental Effects of the No Action Alternative

The No Action Alternative could result in failure of the Dam as continued seepage through the embankment would result in damage to portions and/or the entirety of the Dam. A complete failure of the Dam would result in an *Adverse Effect* to the Dam, as defined by 36 CFR 800.5, in the form of *destruction* of the site. Complete failure of the Dam would also result in significant adverse effects to hundreds of cultural resource sites within the inundation zone that stretches downstream from the Dam to the confluence of the Heart and Missouri Rivers. Selection of the No Action Alternative could result in consequences that constitute a failure of Reclamation comply with its NHPA Section 110 obligations to protect historic properties.

Paleontological Resources

Affected Environment

The Paleocene age Bullion Creek Formation is the only bedrock formation exposed in the erosional bluffs along the shore of Heart Butte Reservoir, and in road cuts and ravines adjacent to the Reservoir. The Bullion Creek Formation consists of interbedded sandstones, siltstones, mudstones,

and lignites. These rocks were laid down in a fluvial-lacustrine depositional systems about 60 million years ago. Mammal remains are extremely rare in the Bullion Creek formation.

The 2009 Paleontological Resources Preservation Act (P.L. 111-011 Title VI Subtitle D) directs federal agencies to manage, protect, and preserve paleontological resources. Two paleontological resources surveys have been undertaken at the Heart Butte Reservoir. The first survey was done as part of the Smithsonian River Basin Survey in 1946 (see Cooper 1947) and consisted of only a brief study of the area; no fossils were identified during the survey. A recommendation was made in the Cooper (1947) report to have a paleontologist perform a more comprehensive survey of the reservoir; however, no additional surveys were performed until the early 2000s. An in-depth paleontological assessment of the Heart Butte Reservoir was undertaken by the North Dakota Geological Survey in 2001 (Hoganson and Campbell 2002). The 2001 assessment identified 30 fossil localities during the inventory. Identified fauna and flora include freshwater mollusks (*Sphaerium*, *Campeloma nebrascensis*, *Liplacodes*), freshwater fish (*Lepisosteus*), turtle remains (*Plastomenus*), a crocodile like reptile (*Champsosaurus*), petrified wood, and an unidentified mammal bone. Evidence of unauthorized fossil collecting was found at two of the localities. Twenty-one of the 30 recorded localities were determined to be significant, and it was recommended that the fossil sites be visited periodically to determine if unauthorized collecting is occurring and whether natural causes are impacting the sites.

Environmental Effects of the Proposed Action Alternative

Because this alternative includes soil-disturbing activities, there is potential for encountering unknown paleontological materials during construction activities. As the majority of soil disturbing activities would take place on the Dam itself, which is constructed of previously excavated materials, no impacts to paleontological resources are anticipated. However, one of the significant localities identified in the 2001 assessment (see Hoganson and Campbell 2002) is located in proximity to the Project Area. If any ground disturbance takes place near the locality, the locality would be avoided and the nearby ground disturbance monitored by qualified personnel. The monitoring would consist of an examination of the exposed area, including the spoil or storage piles at key times. These times are dependent on the activity but typically are as follows: when bedrock is initially exposed, occasionally during active excavation, and when the maximum exposure is reached and before backfilling has begun. This monitoring and spot-checking must be performed by a permitted paleontologist. The paleontologist has the authority to require a halt in activity at the location while a suspected find is evaluated and reported if necessary. If unknown paleontological resources were discovered during construction activities, construction would be halted until Reclamation's Dakotas Area Office archeologist is notified and appropriate consultations are completed. Additionally, Reclamation would make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. Reclamation will devise an enhanced signage plan to inform the public of the prohibition of and penalties for unauthorized collection, excavation, or disturbance to fossils on Federal lands. Reclamation will also put notices concerning these prohibitions and penalties on the project website, managing partner website, and send an informational letter to cabin owners annually throughout the project schedule.

Environmental Effects of the No Action Alternative

Should Reclamation choose the No Action Alternative, continued seepage through the embankment could result in eventual Dam failure. Paleontological resources would be subject to *Adverse Effects*

due to scouring, erosion, and exposure of near surface resources located within the inundation zone that stretches downstream from the Dam to the confluence of the Heart and Missouri Rivers.

Socioeconomics

The socioeconomic analysis focuses on Grant and Morton County compared to surrounding counties, as well as statewide. Grant County has 1,659.2 square miles of land making it the 12th largest county in North Dakota. Major towns include Elgin, New Leipzig, and Leith with the County Seat residing in Carson. The nearby town of Glen Ullin is in Morton County. Grant County is bordered by five other counties including Morton, Stark, Sioux, Hettinger and Adams Counties. Mandan, North Dakota located in Morton County, holds the nearest largest population, advanced healthcare facilities, and shares the Missouri River with Bismarck.

Affected Environment

Population and Historical Growth

Based on U.S. Census Bureau and World Population Review data, the population living in Grant County North Dakota has decreased since 1920 and has dropped approximately 46% from 1980 to 2024. (Table 12). Compared to Morton County which has seen 32% amount of growth since the 1980s.

Table 12. Grant and Morton County Population Change Over Time

Year	County Population Totals		Population Change		Growth Rate	
	Grant	Morton	Grant	Morton	Grant	Morton
2024	2,192	34,085	-109	+770	-4.74%	+2.31%
2020	2,301	33,315	-93	+5,745	-3.88%	+20.84%
2010	2,394	27,570	-447	+2,267	-15.73%	+8.96%
2000	2,841	25,303	-708	+1,603	-19.95%	+6.76%
1990	3,549	23,700	-725	-1,477	-16.96%	-5.87%
1980	4,274	25,177	-735	+4,867	-14.67%	+23.96%
1970	5,009	20,310	-1,239	-682	-19.83%	-3.25%
1960	6,248	20,992	-866	+1,697	-12.17%	+8.80%
1950	7,114	19,295	-1,150	-889	-13.92%	-4.40%
1940	8,264	20,184	-1,870	+537	-18.45%	+2.73%
1930	10,134	19,647	+581	+933	+6.08%	+4.99%
1920	9,553	18,714	+7,476*	+6,595*	+359.94%*	+54.42%*

Source: World Population Review 2024, since 1910

In the broader context of rural North Dakota, Grant and Morton Counties, and many of the rural counties in southwest North Dakota have all seen a population decline over the past many decades. Rural areas dependent on agriculture have been in decline since the 1980s (NDSU 2023). Small towns struggle to maintain relevance due to a general lack of services, and social and professional opportunities. Younger generations tend to seek opportunities in larger communities.

Demographically, these rural populations in North Dakota are composed of older individuals. The 65+ populations are on the rise, while the younger generation groups decline (NDSU 2023). A cause of this emigration is that younger generations often seek educational or employment opportunities in more urban areas and they do not return. Family operated farms have given way to larger corporate agricultural operations. These small communities are usually in remote locations where it is difficult to attract businesses and jobs.

The median age in Grant County is 49.4 while 29.3% of the population is over 65, the highest when compared to the surrounding counties (**Table 13**). In addition, when compared to other counties, Grant County has the lowest percentage of 20–39-year-olds represented in the population. Trends in nearby counties where larger cities such as Dickinson and the Bismarck/Mandan area reflect continued growth since 1980.

Table 13. Population and Age Trends for Morton, Stark, Sioux, Hettinger, Adams, and Burleigh Counties compared to Grant County and Statewide Source: US Census Bureau 2022

Location	Population (Pop.) in 1930	Pop.in 1980	Pop. in 2000	Pop. in 2010	Pop. in 2020	Percent Change 1980-2020	65+ Age Group in 2020	20-39 Age Group in 2020
Grant	10,134	4,274	2,841	2,394	2,301	-46.16%	29.3% (674)	15.2% (351)
Morton	19,947	25,177	25,303	27,471	33,291	+32.22 %	16.5% (5,493)	29% (9,668)
Stark	15,340	23,687	22,636	24,199	33,646	+42.04 %	13.3% (4,474)	29.1% (9,819)
Sioux	4,687	3,620	4,044	4,153	3,898	+7.67%	8.1% (315)	24.9% (973)
Hettinger	8,796	4,275	2,715	2,477	2,489	-41.77%	25.9% (641)	29.3% (731)
Adams	6,343	3,584	2,593	2,343	2,200	-38.61%	27.7% (609)	18.1% (399)
Burleigh	19,769	54,811	69,416	81,308	98,458	+79.63 %	18.1% (17,920)	27.1% (26,775)
Statewide	680,845	652,717	642,200	672,591	779,094	+19.36 %	16.7% (130,108)	29.3% (228,925)

Economic Conditions

Compared to other counties in the region, Grant County has an average median household income and per capita income (**Table 14**). In addition, the unemployment rate and percentage of individuals living below the poverty level is average to slightly higher percentage when compared with nearby counties and statewide. The unemployment rates across the state remain low and Grant County shows a lower unemployment rate at 1.8% when compared to the state average of 2.1% as of July 2024.

Table 14. Employment and Income in the Analysis Area

¹United States Census Bureau 2022b, ²United States Bureau of Statistics 2023.

Location	Individuals living below poverty level (2022) ¹	Unemployment Rate (2022) ²	Median Household Income (2022) ¹	Average Weekly Income (2023) ²
Grant	15.4%	1.8%	\$57,069	\$913
Morton	8.1%	2.1%	\$79,555	\$1,037
Stark	10.1%	1.7%	\$78,734	\$1,334
Sioux	39.7%	2.6%	\$41,201	\$991
Hettinger	10.2%	1.7%	\$66,797	\$986
Adams	13.4%	2.3%	\$57,950	\$929
Burleigh	11.1%	1.9%	\$81,893	\$1,168
Statewide	11.5%	2.1%	\$71,970	\$1,205

Top Industries

Job Service North Dakota (2021) evaluated top industries and total employment in 2020 for counties in southcentral North Dakota (**Table 13**). Job Service surveyed employment within Burleigh, Emmons, Grant, Kidder, McLean, Mercer, Morton, Oliver, Sheridan, and Sioux counties (Region 7).

The Health Care and Social Assistance industry had the largest number of individuals with 15,327 employees and 20% of the workforce in these counties. These top five industries shown in **Table 15**, account for 43,681 employees, 56% of the total.

All other industries include professions such as equipment and machinery repair, religious services, personal care services such as salons, funerary services, pet care or advocacy services.

Table 15. Top Industries in Southcentral North Dakota Counties
Job Service North Dakota (2021)

Top Industries 2020	Percentage of Workforce	Total Employment
Health Care and Social Assistance	20%	15,327
Retail Trade	12%	9,040
Public Administration	9%	7,098
Educational Services	8%	6,257
Accommodation and Food Services	8%	5,959
All Other Industries	44%	33,796
		77,477

Industry Growth and Wages

As noted above, the Health Care and Social Assistance industry held the largest share of employment in 2020. However, the Agriculture, Forestry, Fishing, and Hunting industry showed the highest employment growth since 2010 within these counties. From 2010 to 2020 total employment in this industry went up from 329 to 495. Wage growth also increased in this industry from \$31,174 to \$46,627. The Finance and Insurance industry experienced the highest wage growth from 2010 to 2020 from \$45,110 to \$75,239 (**Table 16**).

Table 16. Industry Growth and Wages in Southcentral North Dakota Counties

Job Service North Dakota (2021)

Industry	Average Wage from 2000/2010/2020	Number of Employees 2000/2010/2020	Total Establishments 2000/2010/2020
Health Care and Social Assistance	\$27,271/\$41,161/\$56,674	9,469/13,007/15,327	304/408/589
Agriculture, Forestry, Fishing and Hunting	NA/\$31,174/\$46,627	NA/329/495	35/62/126
Finance and Insurance	\$31,939/\$45,110/\$75,239	2,553/3,390/3,161	313/393/424

Environmental Effects of the Proposed Action Alternative

Although recreational watersports, fishing and other tourism would be temporarily limited during the drawdown and project construction, it is not expected to result in any loss of employment to the area. TCJDA and Reclamation would continue to remain staffed at Heart Butte Dam and Lake Tschida to provide continued service to the open campgrounds, manage and maintain facilities, and provide public services.

Construction crews are expected to be in the local area for the duration of project construction which would bring income to the region and local nearby businesses in Glen Ullin, New Leipzig, and Elgin.

The annual irrigation benefit provided to the District by irrigation releases from Heart Butte Dam was estimated to be \$309,076 in 2021 dollars (Reclamation, 2023c). Although irrigators would be temporarily impacted during the 2027-2028 seasons, the Proposed Action Alternative seeks to ensure a continued reliable source of irrigation water supply into the future. With this continued stable irrigation water supply, District irrigators will continue to benefit from Heart Butte Dam as envisioned in the original project authorization.

Economic benefits would be expected into the future as recreational and irrigation opportunities continue to have the potential to expand and provide economic possibilities around the area. While economic benefits may not be drastic or occur immediately, they would be long-term and have the potential to increase steadily over the continued life of the Heart Butte Dam.

The Proposed Action Alternative would result in continued safe operations of Heart Butte Dam and Lake Tschida for another generation. Lake Tschida provides a steady stream of tourism, revenue, and interest into Grant County. Reclamation also recognizes the high value of Lake Tschida, and that the lake is widely and affectionately viewed as the heartbeat of the region. Reclamation is unaware of any other large development or improvement projects which may add to cumulative impacts to socioeconomics in Grant County

Environmental Effects of the No Action Alternative

Under the No Action Alternative, Heart Butte Dam would not be repaired and would eventually pose a serious safety threat to the communities downstream.

Climate Change

Reclamation's mission is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Climate change could impact water supply, water demands, and other environmental conditions that affect Reclamation's ability to fulfill its mission. Reclamation policy defines climate change as "a change in the state of the climate identified by using statistical tests, by changes in the mean and other statistical properties, measured over an extended period, typically decades or longer." (Reclamation CMP P16, in accordance with 523 DM 1).

CEQ released updated NEPA guidance on GHG emissions on January 9, 2023. This new guidance was directed by Executive Order 13990 (Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis) to assist federal agencies to better assess climate impacts. The updated guidance allows for planning flexibility and additional project review in the future.

Reclamation studies climate with a combination of hydrologic data, forecasting tools, and modeling methods. This effort is continually evolving and will be used to identify and adapt to changing climate conditions. Estimating future climate at a local scale involves complex analysis and significant uncertainty. Even with this uncertainty, climate studies and models provide a functional planning tool to evaluate potential future activities. Reclamations West-Wide Climate and Hydrology Assessment and Missouri River Basin Report are two reports that have been used to provide context for future changes in climate for projects within the Missouri River Basin.

Contributors to Climate Change

Intergovernmental Panel on Climate Change (IPCC) scientists and experts conclude that the observed changes in global surface temperature are very likely due to observed increases in anthropogenic greenhouse gas (GHG) concentrations, which trap heat in the atmosphere (IPCC 2023). Carbon dioxide (CO₂) is an example of a GHG that occurs naturally and is emitted to the atmosphere through both natural processes and human activities. Other GHGs are synthesized and emitted solely through human activities (e.g., fluorinated gases).

The principal GHGs identified by the EPA that enter the atmosphere due to human activities are CO₂, methane (CH₄), nitrous oxide (N₂O), and fluorinated gases. CO₂ is the primary GHG emitted through historical and continuing rising contributions from unsustainable energy use, land use and land-use changes, and high rates of consumption.

Affected Environment

For the purposes of this EA, the climate change section evaluates potential impacts of the proposed action on Lake Tschida, within Grant County and within North Dakota. Predicted changes in precipitation patterns from climate change modeling could affect Heart River flows and operation of Heart Butte Dam at Lake Tschida. Climate change is analyzed here in two ways: 1) how climate change may be affected by implementation of the Proposed Project Alternative and 2) how the Proposed Project Alternative may be affected by climate change.

Climate change is mainly due to earth's warming temperatures resulting from increasing amounts of carbon dioxide and other heat-trapping greenhouse gases in the atmosphere. According to historical

long-term temperature trends, the temperatures in the northern Great Plains Region have risen faster than surrounding regions. North Dakota historical records show an increase of 0.26 degrees Fahrenheit per decade over the last 130 years, and this is the largest of any state in the Great Plains Region (Reclamation 2013).

In North Dakota, climate change may result in increased demand for water, and it is expected that rainfall and runoff amounts will also increase. In downstream states, droughts may become more severe, resulting in an increase of water releases from upstream dams, including those in North Dakota. This could result in reduced water availability throughout the system. The state is likely to see increased flooding from climate change effects such as greater river flows, increasing precipitation, and more severe storms. More intense, heavier storms are also expected (EPA 2016).

Effects on agriculture are expected to be both positive and negative. Warmer temperatures have already extended the growing season by 30 days since the early 1900's, and this trend is expected to continue. Warmer temperatures may also result in increased crop yields, and the fertilizing effect of increasing amounts of carbon dioxide may have the same result. Precipitation increases at the beginning of the growing season could maintain soil moisture for the crops for an extended period. Potential negative effects to agriculture include: 1) excessive spring precipitation resulting in crop fields that are too wet to plant, 2) increasing temperatures may reduce yields of wheat, and 3) warmer winters may promote pests and higher amounts of weeds. In dry years, higher temperatures could result in drier soils, and more days over 100 degrees might stress crops, especially during drought years (EPA 2016).

Grassland ecosystems may see increased productivity with rising amounts of carbon dioxide. It is likely that multiple ecological processes may be disrupted and many species' geographic ranges will shift because of climate change. Earlier growing season are causing flowers to bloom sooner, and small changes in plant development or animal migrations can disrupt many natural ecological processes (EPA 2016).

Multiple effects to human health are also expected from climate change. Vulnerable populations, especially children and the elderly, people with health problems, and those in poverty, will likely be most impacted from extreme heat waves. Increasing severe weather may also cause power failures, which can be especially dangerous to vulnerable populations and people living in remote areas. Illnesses and deaths due to cold weather are likely to decline. Finally, the EPA states that the length and severity of the allergy season is likely to worsen due to longer growing seasons, with plants like ragweed being active for a longer timeframe (EPA 2016).

Environmental Effects of the Proposed Action Alternative

Proposed Action Alternative Effects on Climate Change

Temporary direct emissions of GHGs would occur during construction of the Proposed Action Alternative. Combustion emissions from engine exhaust of construction equipment would include SO₂, NO₂, CO, volatile organic compounds (VOCs), and GHGs. Contractors would be required to maintain equipment exhaust systems to factory or better specifications to minimize emissions and noise. Most emissions produced during the construction period and would be temporary and would not produce a measurable increase of GHG emissions within Reclamation project lands or surrounding areas. Although increased temporary emissions would result from implementation of

the project, these increases are not predicted to result in measurable or significant increases in GHGs.

Completing the Proposed Action Alternative would allow for safe continuation of dam operations for flood control and a stable source of irrigation benefits to the Heart River valley. During times of drought, Lake Tschida will continue to meet the primary purposes of Heart Butte Dam, including delivery of irrigation water, provide flood control benefits to the lower Heart River valley, and provide fish and wildlife conservation and recreation benefits.

Current fossil fuel uses for agriculture, home heating, and transportation needs, among others all contribute to GHS emissions and are expected to continue throughout the area. Reclamation is unaware of any other large development or improvement projects which may contribute to cumulative impacts from climate change in Grant County.

Climate Change Effects on the Proposed Action Alternative

If temperatures continue to rise, aquifers and surface water availability may decline. Changes in timing of precipitation could also result in increased or decreased water demands for agriculture, depending on time of year precipitation and snowmelts. Climate changes could also result in increased water withdrawals from Lake Tschida. The continued water storage capability at Lake Tschida into the future may become even more important as the effects from climate change progress.

Environmental Effects of the No Action Alternative

Under the No Action Alternative, Heart Butte Dam would not be repaired and there would be no temporary release of GHGs from construction activities. The dam would not be able to provide safe continuation of dam operations for flood control and a stable source of irrigation benefits to the Heart River valley.

Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for Indian tribes or individuals. The Secretary of the Interior acts as the trustee and all Department of the Interior agencies share the Secretaries duty to act responsibly to protect and maintain Indian trust assets reserved or granted by the United States to Indian tribes or individuals by treaty, statute, and executive orders. Examples include lands, minerals, hunting and fishing rights, and water rights (Reclamation 1993). Further responsibilities are renewed and described in Joint Secretarial Order 3403 - Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters issued November 15, 2021. The order describes the Interior Departments responsibility “In managing Federal lands and waters, the Departments are charged with the highest trust responsibility to protect Tribal interests and further the nation-to-nation relationship with Tribes.”

Reclamation, as a representative of the Secretary of the Interior, must evaluate whether the Proposed Action may affect ITAs. Joint Secretarial Order 3403 reaffirms the legal trust relationship and the government-to-government relationship between the Secretary of the Interior and Indian tribes. The DOI’s policy is to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian Tribes and tribal members, and to

consult with the tribes on a government-to-government basis whenever plans or actions affect tribal trust resources, trust assets, or tribal health and safety (512 DM 2).

Any impacts to ITAs as a result of the Proposed Action must be addressed within this EA. When an impact to ITAs cannot be avoided, Reclamation would provide appropriate mitigation or compensation to the federally recognized Indian tribes or individuals. The affected environment for ITAs corresponds to the APE for direct effects to cultural resources.

Affected Environment

For the purposes of this EA, the area evaluated for ITAs includes the area of modifications to the actual Heart Butte Dam structure, any associated borrow areas, access routes, temporary staging areas and workspaces, as well as the exposed lakebed and any upstream areas that will be subject to changes in reservoir water levels and streamflow. In accordance with NEPA and related laws, Executive Order 14096, DOI Department Manual 7-Departmental Responsibilities for Consideration and Inclusion of Indigenous Knowledge in Departmental Actions and Scientific Research, and other regulations and policies, Reclamation used the U.S. Department of Housing and Urban Development's online Tribal Directory Assessment Tool (TDAT) to identify the 10 Tribes that are culturally affiliated with the APE in Grant County, ND. These Tribes include:

- Three Affiliated Tribes (Fort Berthold Reservation, ND)
- Standing Rock Sioux Tribe (Standing Rock Reservation, ND & SD)
- Cheyenne River Sioux Tribe (Cheyenne River Reservation, SD)
- Crow Creek Sioux Tribe (Crow Creek Reservation, SD)
- Lower Brule Sioux Tribe (Lower Brule Reservation, SD)
- Oglala Sioux Tribe (Pine Ridge Reservation, SD)
- Rosebud Sioux Tribe (Rosebud Reservation, SD)
- Apache Tribe of Oklahoma
- Fort Belknap Indian Community (Fort Belknap Reservation, MT)
- Santee Sioux Nation (Santee Sioux Reservation, NE)

The Missouri River in North Dakota and its tributaries, particularly the area between the Knife and Heart Rivers, have historically been considered the homeland of the Three Affiliated Tribes (TAT) of Mandan, Hidatsa, and Arikara (Sahnish). The Great Plains surrounding the ancestral homeland of the TAT were also occupied and utilized by a diversity of Indigenous peoples including Sioux, Crows, Blackfeet, Assiniboines, Cheyenne, and Ojibwe (Chippewa) (North Dakota Studies 2024).

Environmental Effects of the Proposed Action Alternative

The boundaries of the Three Affiliated Tribes' territory were set-aside in the 1851 Fort Laramie Treaty. This treaty established the tribal nations' territories and the nations agreed to maintain peaceful relations with one another and with the United States and to allow the United States to construct roads and military posts through Indian country. The Fort Berthold Reservation was eventually established under the Executive Order of 1870 after continued encroachment by foreign settlers into TAT homelands. The reservation boundaries originally included most of the territory established in the 1851 Fort Laramie Treaty. Increased pressure from railroads, settlers, and the U.S. military led to the Executive Order of 1880, which resulted in the involuntary cession of a large

portion of the Three Affiliated Tribe's lands and within 25 years the territory acknowledged in the 1851 Fort Laramie Treaty had been reduced by 90%. Many of the terms of compensation within these various treaties and Executive Orders included financial compensations over 10–50-year terms or compensations of additional land for involuntary land cessions and, for the most part, the terms were never upheld by the U.S. Government.

Reclamation is engaging in consultation with the 10 identified tribes with ancestral interests in the area of potential effects to determine their input concerning the effects of the Proposed Action and to ensure that there are no negative impacts to Indian trust assets. Each tribe was forwarded a copy of the draft EA. Based on Reclamation's analysis and preliminary consultation, no Indian trust assets have been previously identified through government-to-government consultations associated with Heart Butte Reservoir facilities. No comments on the draft EA were received from ancestral tribal authorities.

Environmental Effects of the No Action Alternative

Under the No Action Alternative, Heart Butte Dam would not be repaired, and the consequences of potential dam failure may include impacts to ITAs located outside of the Project Area within the inundation zone. The dam would also not be able to provide safe continuation of dam operations for flood control and a stable source of irrigation benefits to the Heart River valley.

Environmental Justice

EO 12898 (Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations - 1994) requires that measures must be taken to avoid disproportionately high adverse impacts on minority or low-income communities by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means that minorities and low-income groups would not bear a disproportionate share of negative human health or environmental impacts. Meaningful involvement means that affected populations have the opportunity to participate in the decision process and their concerns are considered. In 2023, EO 14096 (Revitalizing Our Nation's Commitment to Environmental Justice for All) was signed, which supplemented EO 12898 to expand the definition of environmental justice and implement a “whole-of-government” approach to address these issues.

Affected Environment

Grant County

Reclamation staff reviewed the EPA's online Environmental Justice Screening and Mapping Tool (EPA 2023) on August 19, 2024, which showed that Grant County had higher percentiles on several indices as compared with most surrounding areas. These indices included environmental justice, socioeconomic, health disparities, and critical service gaps. The environmental justice index highlights block groups with the highest intersection of low-income populations, people of color, and a given environmental indicator. Environmental justice indices where Grant County had higher percentiles compared with surrounding areas included only lead paint. Socioeconomic indexes where Grant County had higher percentiles than surrounding areas included: low income, unemployment rate, and limited English speaking. The health disparity index showed higher percentiles in Grant County when it came to the following metrics: heart disease, cancer, and people with disabilities. The critical service gap index showed higher scores for Grant County in only broadband gaps.

These metrics demonstrate the many aspects of life where rural areas may lack access to some services.

Morton County

Morton County also showed higher percentiles on several indices including environmental justice, socioeconomic, health disparities, and critical service gaps. Parts of Morton County indicate higher percentiles compared to the rest of the United States includes toxic releases to air, lead paint, RMP facility proximity (hazardous waste), and drinking water non-compliance. Health disparities in Morton County include heart disease, lower life expectancy, and cancer when compared to the rest of the United States. Critical Service gaps include access to broadband internet, lack of health insurance, and transportation access burdens. Morton County shows similar challenges to rural living as discussed for Grant County.

Environmental Effects of the Proposed Action Alternative

The Proposed Action would not result in any unfair impacts to any minority or disadvantaged communities or result in permanent risks or adverse environmental impacts to residents living in Grant and Morton Counties. Grant and Morton County residents and other surrounding communities which utilize Lake Tschida or rely on regulated irrigation water services would temporarily lose these benefits during project construction. After the completion of the Proposed Action Alternative, Heart Butte Dam and Lake Tschida would continue to provide irrigation and recreational benefits to the region.

Environmental Effects of the No Action Alternative

The No Action Alternative would result in Reclamation not correcting the existing dam safety deficiencies, which may result in future dam failure and loss of recreation and reliable irrigation benefits.

Summary Overview of Project Impacts

Temporary Impacts

Temporary impacts from the Proposed Action Alternative are primarily stemmed from the drawdown of Lake Tschida along with the construction activities. Irrigators and users of the Heart River downstream of Lake Tschida Temporary disturbance to soils and vegetation would occur as a result of heavy equipment working within the Project Area. Once construction is complete, all temporary workspaces will be reclaimed and restored to near original conditions, as practicable. Reseeding and plantings would occur in the late fall or early spring. In addition, all construction activities will follow the environmental commitments described in Chapter 4.

Permanent Impacts

Permanent impacts from the Proposed Action Alternative includes only the aesthetic changes to the downstream area around the spillway and conduit. The seepage berm and the MSE wall will be new features on the landscape and be visible from the downstream campground and visitors to the spillway fishing area.

Table 17 summarizes the potential temporary and permanent impacts to Surface Water and Hydrology, Land and Vegetation Resources, Transportation and Roads, Recreation, Wildlife and

Fisheries, Threatened and Endangered Species, Cultural Resources, Paleontological Resources, Socioeconomics, Climate Change, Indian Trust Assets, and Environmental Justice. Most impacts identified are of a temporary nature.

Table 17. Summary of Temporary and Permanent Impacts of the Proposed Action

Resource	Impact Description	Duration	Intensity	Environmental Commitment/ Mitigation Implemented
Surface Waters and Hydrology	Decline in dissolved oxygen; increase in eutrophication; potential blue-green algae bloom.	Temporary	Minor Adverse	None.
	Reduction in the local water table may impact water supply to local domestic wells	Temporary	Moderate Adverse	Reclamation will identify reliable wells and provide access to cabin and trailer owners as needed
	Permanent removal of Wetland 1 (0.65-acre freshwater emergent wetland).	Permanent	Moderate Adverse	Reclamation partnering with Ducks Unlimited for mitigation.
	Cease of water delivery to irrigators during construction.	Temporary	Moderate Adverse	Coordination with irrigators about water supply availability.
	Disturbance to waterbody at construction site.	Temporary	Minor Adverse	Implementing erosion control using industry standard BMPs.
Transportation and Roads	Increased construction traffic; potential damage to roads and ditches.	Temporary	Minor Adverse	Coordination with NDDOT. Post-construction restoration.
	Temporary inaccessibility of low water crossings during drawdown period.	Temporary	Minor Adverse	Coordination with irrigation district and alternate routes available.
Land and Vegetation	Ground disturbance near conduit and borrow areas; potential for noxious weed germination.	Temporary	Minor Adverse	Control of noxious weeds planned as needed. Re-seeding with native seed mix.
	Adjusted grazing schedule for permittees to accommodate lower reservoir elevations.	Temporary	Minor Adverse	Coordination with permittees for grazing adjustments.
Recreation	Closure of downstream campground during construction; decreased revenue for managing partner.	Temporary	Minor Adverse	Communication with users about closures.
	Limited boat and swimming access to water; concentrated access areas during construction.	Temporary	Minor Adverse	Designated access points may be established.

Resource	Impact Description	Duration	Intensity	Environmental Commitment/ Mitigation Implemented
	Potential for increased boat congestion in usable areas during construction.	Temporary	Minor Adverse	None.
	Reduced opportunities for water-based recreation (canoeing, kayaking, shore fishing) during no discharge periods.	Temporary	Minor Adverse	None.
	Indirect impacts on winter recreation (ice fishing, snowmobiling) due to unsafe ice conditions.	Temporary	Minor Adverse	Inflow will continue to be monitored and outflow would be matched or lower than the inflow to prevent the formation of unsupported ice.
	Fisheries may experience increased harvest and susceptibility to winter kill during low elevations.	Temporary	Moderate Adverse	Discussed in Wildlife and Fisheries section below.
	Potential dredging and removal of silt during drawdown to improve future fishing opportunities.	Temporary	Minor Beneficial	N/A
Wildlife and Fisheries <i>Birds</i>	Impacts to wildlife from vehicle collisions, human disturbance, or habitat loss.	Temporary	Minor Adverse	None.
	Removal of Wetland 1; negligible impact on waterbirds due to adjacent habitat availability.	Permanent	Moderate Adverse	Wetland mitigation planned for nearby location to compensate for habitat loss.
	Disturbances to upland gamebirds; flushing into adjacent habitats.	Temporary	Minor Adverse	Nest surveys or timing of construction activities adjusted to avoid impacting critical nesting periods.
	Exposed mud flats during drawdown provide foraging and breeding habitat for shorebirds.	Temporary	Minor Beneficial	N/A
	Open water species may experience reduced foraging and breeding habitats.	Temporary	Minor Adverse	None.
	Possible increased foraging opportunities for fish-eating raptors during drawdown; reduced during construction; increased disturbance during construction.	Temporary	Minor Adverse	Pre-construction surveys.

Resource	Impact Description	Duration	Intensity	Environmental Commitment/ Mitigation Implemented
<i>Mammals</i>	Moderate impacts from increased vehicle collisions, habitat loss, and disturbance.	Temporary	Minor Adverse	None.
	Habitat loss for small non-game mammals and potential increased predation.	Temporary	Minor Adverse	None.
	Potential use of temporarily revegetated areas by large and small game.	Temporary	Minor Beneficial	N/A
	Altered access to water sources and exposure to newly exposed mud flats; potentially impacting energy use and fitness.	Temporary	Minor Adverse	None.
<i>Reptiles and Amphibians</i>	Impacts to local populations due to loss of Wetland 1 habitat and potential downstream degradation.	Permanent/Temporary	Moderate Adverse	Wetland mitigation planned for nearby location to compensate for habitat loss.
	Direct mortality to amphibian eggs and tadpoles from drawdown and inundation.	Temporary	Minor Adverse	None.
	Loss of access to shallow backwater wetlands for amphibians.	Temporary	Minor Adverse	None.
	Disruption of amphibian site fidelity patterns affecting survival and reproduction.	Temporary	Minor Adverse	None.
	Potential beneficial habitat from localized inflows and rainfalls post-construction.	Temporary	Minor Beneficial	N/A
<i>Fisheries</i>	Direct adverse impacts due to drawdown reducing lake area and depth.	Temporary	Moderate Adverse	Monitoring water quality conditions and development of appropriate mitigation.
	Expected reduction in game fish population size and stocks post-construction.	Temporary	Moderate Adverse	Restocking efforts would resume after construction on a robust schedule.
	Potential for reestablishing vegetation, nutrients, and oxygen into aquatic habitats.	Permanent	Minor Beneficial	N/A
	Shift in distribution of aquatic species due to drawdown and construction impacts.	Temporary	Minor Adverse	None.

Resource	Impact Description	Duration	Intensity	Environmental Commitment/ Mitigation Implemented
	Potential habitat degradation from sedimentation or contamination.	Temporary	Minor Adverse	Industry standard BMPs implemented.

Chapter 4: Environmental Commitment and Mitigation Measures

Environmental commitments and mitigation measures would be implemented to:

(1) prevent, minimize, or offset the occurrence of, or 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.

Reclamation would ensure the environmental commitments are implemented during construction. All appropriate environmental commitments would be incorporated into the site-specific design, included in all construction contracts and specifications, and applied before, during, and after construction.

Over the past two decades, Reclamation has conducted public scoping and consultation with state and local governments throughout North and South Dakota which have resulted in development and implementation of proven methods that minimize or avoid adverse environmental effects during construction. Environmental commitments applicable to the Proposed Project Alternative are described in **Table 18** below:

Table 18. Required Environmental Commitments for the Proposed Action Alternative

General Best Management Practices
Comply with all appropriate Federal, State, and Local laws.
Follow the BMPs for construction, restoration, and maintenance listed within the construction specifications from a qualified third-party contractor.
Standard construction, industry measures will be taken to minimize fugitive dust emissions during construction activities. Any complaints that may arise will be dealt with in a timely and effective manner.
Erosion Best Management Practices (BMPs) will be followed to prevent runoff of soil, silt, and other debris.
All solid waste materials must be managed and transported in accordance with the states solid and hazardous waste rules. Efforts to reduce, reuse, and recycle materials are to be used.
Surface Waters and Wetlands

A 404 permit will be completed and submitted to the Corps, as necessary. Section 401 and 402 certification will be completed, as necessary. Wetland impacts will be appropriately mitigated according to the standards and direction of the Corps.
If work occurs below the ordinary high-water mark of the Heart River, a Sovereign Land Permit would be obtained prior to construction taking place.
Work within the National Flood Insurance Program (NFIP) regulatory floodplain may require consultation and compliance with the local floodplain administrator to achieve NFIP and community compliance.
The water discharged from Heart Butte Dam will be monitored and reported as water released for maintenance or irrigation purposes as appropriate on the Annual Water Use Report for the year the water was released.
The communication strategy discussed in Table 2 would ensure that all appropriators and irrigators would be aware of any changes to water availability in the Heart River.
A construction permit from the DWR would be required for the modification to the dam.
If more than one acre is disturbed, a permit to discharge storm water runoff may be needed through the DEQ.
Care would be taken to avoid spills of toxic materials that may have an adverse effect on ground water quality. Appropriate containment and spill response kits would be available at the work area. All spills would be reported to the DEQ.
Woody species including those bordering wetlands, shelterbelts, riparian woodlands, woody draws, or woodland vegetation will be avoided to the extent possible. For unavoidable impacts to woody habitats, replacement plants at a 2:1 ratio of native speciation would be planted, as appropriate.
Erosion control measures will be employed as appropriate: Stabilization, erosion controls, restoration, and re-vegetation of all streambeds and embankments will be performed as soon as construction across waterbodies is completed and maintained until stable.
Any disruption or displacement of the streambed and banks other than the planned alterations must be restored to pre-project conditions.
Fish and Wildlife Species and Habitats
To the extent possible, construction will avoid: <ul style="list-style-type: none"> - Wetlands - Federal, State, and Local wildlife areas and refuges - Designated critical habitats
The NDGF would commence restocking efforts at Lake Tschida after Project completion
Native prairie will be avoided to the extent possible. However, if native prairie sod must be broken, existing topsoil will be carefully salvaged and replanted with native pollinator mix including grasses in a timely manner, with a seed mix recommended by Reclamation.
Reclamation is responsible for compliance with the Migratory Bird Treaty Act. If work would occur during the grassland ground-nesting migratory bird season (May 1 – July 15), any project area containing suitable habitat would be mowed prior to May 1. Preconstruction nesting surveys are recommended if mowing is not possible. If work would occur during the nesting raptor season (Feb 1-July 15), woody vegetation to be removed would be checked for occupancy prior to construction.
Reclamation is responsible for compliance with the Bald and Golden Eagle Protection Act. Construction within 660 feet of visible (330-feet if visual screen exists) nesting bald eagles will be avoided from February 1- July 15. Construction within 0.5 mile of visible (660-feet if visual screen exists) nesting golden eagles will be avoided February 1 – July 15.

Aquatic Nuisance Species (ANS) regulations enacted by the NDGF will be implemented year-round prior to and during construction including: removing all aquatic vegetation from vessels, motors, trailers, or construction equipment, all water shall be drained from confined spaces on vessels, boat motors, construction equipment, or bilge(s), all species of ANS must be removed from vessels, motors, trailers, or construction equipment (list can be obtained from NDGF website). The contractor must provide the NDGF a reasonable opportunity to inspect any and all vehicles, vessels, pumps, and equipment that will be used for project prior to those items being launched or placed in waters of the state. A minimum 72 hour notice must be provided to NDGF for scheduling an inspection. Ben Holen, the NDGF ANS Biologist from Jamestown Office (701-368-8368) is to be contacted for scheduling and additional information.

Threatened and Endangered Species

If threatened or endangered species are identified and encountered during construction, all construction activities in the immediate area will be stopped until Reclamation can consult with the USFWS to determine appropriate steps to avoid impacting the species.

Northern long-eared bat: Suitable roost tree removal would only occur during the hibernation period (November 15- March 31). A suitable roost tree is defined as any tree with diameter at breast height greater than 3-inches and containing sloughing bark, snags, or crevices.

Whooping crane: If a whooping crane is sighted within 1-mile of the Project Area, Reclamation would be immediately contacted. The viewshed and likelihood of disturbance would be considered before Reclamation would initiate consultation with the Service. Migration periods for whooping crane are March 15-May 15 and September 10-November 15.

Monarch butterfly: Suitable habitat (stands of milkweed) would be avoided.

Western regal fritillary: Suitable habitat (tall grass and wet prairie habitats featuring native violets) would be avoided.

Other Environmental Commitments

All established ground water monitoring wells will be avoided, where practicable. Multiple established piezometers and monitoring wells will be removed in the construction area. Reclamation will re-establish monitoring instrumentation as needed to ensure the continued effective dam safety monitoring program for Heart Butte Dam.

If established survey benchmarks must be removed or should any monuments be dislodged or damaged during construction, the National Geodetic Survey (Attn: N/CG 162, Rockville, Maryland 20852) will be contacted and reestablished.

No above ground structures will be constructed in the floodplain that could interfere with the above ground movement of floodwaters.

In an effort to minimize the visual impact of constructed features, all exterior-facing elements should be finished in non-glossy earth tones

The seepage berm would be capped with topsoil and revegetated using a native seed mix approved by the area office. The seed mix should consist of a minimum of 40% forbs and 60% grasses.

Historic Properties and Culturally Sensitive Areas

All cultural resource investigations will be performed according to the procedures specified Reclamation's Directives and Standards for Cultural Resource Management (LND 02-01), and the guidelines put forward by the North Dakota State Historic Preservation Office (SHPO) for cultural resource inventory projects. 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 22716, Sept. 1983). 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 and/or the appropriate Tribal Historic Preservation Officer(s) (THPO). All cultural resources will be avoided if their significance cannot be established prior to disturbance. If avoidance is not practicable, Reclamation, in consultation with the SHPO and/or THPO, would determine if the site is eligible for nomination to the National Register of Historic Places (NRHP) [36CFR800.4(c) and 36CFR60.4]. If the site is *Eligible* as a historic property, initially Reclamation, SHPO, THPO, 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 (ACHP) will be contacted. If a site is determined to be *Not Eligible* for listing on the NRHP, Reclamation will make management recommendations to the appropriate land management agency, THPO, and/or SHPO. All ensuing activities will comply with the NHPA, as amended, and the Archaeological Resource Protection Act (ARPA) [16 U.S.C. 470aa-470mm; Public Law 96-95 (1979)].

The Tribes will be consulted concerning shareable information on 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 (25 U.S.C. 3001 et. seq. [Nov. 16, 1990]) if graves are discovered. 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.

The Tribes will be consulted regarding any shareable information regarding traditional cultural properties that could be impacted. Under the National Park Service National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties (TCP), a TCP is an historic property that derives its significance from the role it plays in a community’s historically rooted beliefs, customs, and practices. Reclamation will consult with the appropriate THPO(s) to avoid impacts to TCPs and accommodate access to the sites (Executive Order 13007).

In the event cultural resources or traditional cultural properties are encountered during construction, all ground disturbance activity within the area will be stopped, 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 and appropriate measures implemented.

Paleontological Resources

Under the Paleontological Resources Preservation Act (PRPA) of 2009 (16 U.S.C. 470aaa – aaa-11), paleontological resources, which includes any fossilized remains, traces, or imprints of organisms, preserved in or on the earth’s crust, that are of paleontological interest and that provide information about the history of life on earth, are protected. All previously recorded paleontological resources and paleontologically sensitive zones within the path of the Proposed Action will be inspected by a qualified paleontologist. Avoidance measures will be developed to avoid significant resources and monitoring by qualified personnel will be utilized as necessary.

PRPA does not apply to state, private, or Tribal lands. Therefore, Reclamation, and any other relevant Federal Agency (land manager) would need to be notified of evidence of activities in violation of the PRPA on Federal lands.

Reclamation will devise an enhanced signage plan to inform the public of the prohibition of and penalties for unauthorized collection, excavation, or disturbance to archaeological sites, cultural

materials, and fossils on Federal lands. Reclamation will also put notices concerning these prohibitions and penalties on the project website, managing partner website, and send an informational letter to cabin owners annually throughout the project schedule.

Chapter 5: Coordination

To initiate early communication and coordination, Reclamation sent scoping letters to tribal, federal, state, and local agencies and other interested parties on May 17, 2024. The scoping package included a brief description of the proposed action alternative and a Project location map. Pursuant to Section 102(2) (D) (IV) of the National Environmental Policy Act of 1969, identification of issues and concerns was requested to ensure that social, economic, and environmental impacts are considered in the development of this Project. The scoping process included a 30-day comment period that ended on June 17, 2024. **Table 19** contains the list of agencies and individuals consulted during the scoping period and notified of the posting of the Draft EA. All comments are included in Appendix C.

An invitation for an Open House was sent to the same list of agencies on October 8, 2024. The Open House was held October 22nd, 2024, at the Lake Tschida Welcome Center.

Table 19. List of Agencies and Individuals Consulted

Name/Title/Agency	Name/Title/Agency
Honorable Kelly Armstrong United States Congressman	Wendall Meyer, Federal Highway Administration
Honorable John Hoeven United States Senator	United States Department of Agriculture, Rural Utilities Service
Honorable Kevin Cramer United States Senator	Mary Podoll, State Conservationist, Natural Resource Conservation Service
Governor Doug Burgum, Office of the North Dakota Governor	Bill Peterson, State Historical Society of North Dakota
Jamie Azure, Honorable Chairman, Turtle Mountain Band of Chippewa	Cody Schulz, Director, North Dakota Parks and Recreation
Larus Longie Tribal Historic Preservation Office	Andrea Travnicek, Director, North Dakota Dept Of Water Resources
Greg Link, Conservation/Communications Chief, North Dakota Game and Fish Department	Josh Teigen, Commissioner, North Dakota Dept. of Commerce
President, North Dakota Chapter of the Wildlife Society	Ron Henke, Director, North Dakota Dept. of Transportation
David Bruschwein, P.E. North Dakota Dept. of Health, Municipal Facilities	State Paleontology Dept., North Dakota Geological Survey
Luke Toso, Field Supervisor, United States Fish and Wildlife Service	North Dakota Industrial Commission
David Glatt, Director, North Dakota Department of Environmental Quality	Scott Skokos, Executive Director, Dakota Resource Council

Gregory Delzer, Dakota Water Science Center, United States Geological Survey, Rapid City, South Dakota	Joseph Heringer, North Dakota Dept. of Trust Lands
Loren Wickstrom, North Dakota Bureau of Land Management, Dickinson, North Dakota	Luke Todd, Project Leader, Audubon National Wildlife Refuge
Duane Dekrey, General Manager, Garrison Diversion Conservancy District	Kathy Duttonhefner, North Dakota Parks and Recreation Dept.
Sarah Hewitt, Executive Director, Audubon Dakota Chapter	Sara Meier, Grant County Auditor
Kerry Whipp, National Wildlife Federation	Karen Richard, Stark County Auditor
Nathan Davis, Executive Director, Indian Affairs Commission	Patrik Diehl, Grant County Emergency
Bismarck District, North Dakota Department of Transportation	Cody Mattson, Morton County Emergency
Edward C. Murphy, State Geologist, North Dakota Geological Survey	Burleigh County Water Resource District
North Dakota Irrigation Association	Kenneth Graywater, Jr., Tribal Historic Preservation Officer, Spirit Lake Tribe
Jason Renschler, Bismarck Corps Regulatory Office	Joshua Gormley, Lake Manager, Garrison Project
Sarah Coleman, Director, North Dakota Tourism Division	Jon Eagle, Tribal Historic Preservation Office, Standing Rock Sioux Tribe
Allen Demaray, Tribal Historic Preservation Office, MHA Nation	Janet Alkire, Honorable Chairwoman, Standing Rock Sioux Tribe
Marilyn Bercier, Regional Environmental Scientist	Mark Fox, Honorable Chairman, MHA Nation
Cabin and Trailer Owners at Lake Tschida	Mark Herman, Regional Environmental Scientist, Bureau of Indian Affairs, Great Plains Region
Irrigators of the Western Heart River Irrigation District	
Open House Attendees	Current Grazing Permittees

Permits and Authorizations Required

Implementation of the Proposed Action Alternative may require authorizations or permits from state and federal agencies. **Table 20** lists the permits, licenses, and/or authorizations associated with each Agency/Department.

Table 20. Potential Permits and/or Authorizations Required by Agencies and Departments.

Agency	Authorization/Permit
North Dakota Department of Environmental Quality	<ul style="list-style-type: none"> • Approved Storm Water Pollution Prevention Plan (SWPPP) • National Pollution Discharge Elimination System (NPDES), • Section 402: General Construction Permit • Section 401 Water Quality Certification
North Dakota State Historical Preservation Office	<ul style="list-style-type: none"> • Consultation pursuant to Section 106 of the National Historic Preservation Act, 16 USC 470
North Dakota Department of Water Resources	<ul style="list-style-type: none"> • If any portion of the project encroaches on a FEMA identified 100-year floodplain, a floodplain development permit will be required; • A Sovereign Lands Permit is required if any work is proposed under or on the banks of the Heart River. • If observations wells are encountered during project activities and must be removed, the SWC must be contacted. • The North Dakota Department of Water Resources will be notified regarding any impacts to water resources (i.e. streams or rivers), drains, and wetlands (i.e. ponds, sloughs, lakes, or any series thereof) as any alternations, modifications, improvements, or impacts to those water resources may require a drainage permit(s) or a construction permit(s).
U.S. Army Corps of Engineers	<ul style="list-style-type: none"> • If jurisdictional wetlands are impacted, Section 404 permit and mitigation may be required.

List of Preparers

A list of individuals with primary responsibility for conducting this study, preparing the documentation, and providing technical reviews is below in **Table 21**.

Table 21. List of Preparers

Affiliation	Name	Title	Project Role
Bureau of Reclamation	Ashley Persinger	Supervisory Natural Resource Specialist	Compliance Review Editor
Bureau of Reclamation	Tim Dodd	Civil Engineer	Project Development
Bureau of Reclamation	Chris Langland	Natural Resource Specialist	Endangered Species Act Compliance
Bureau of Reclamation	Andrea Gue	Environmental Division Manager	Compliance Review Editor

Bureau of Reclamation	Terry Stroh	Regional NEPA Coordinator	Quality Control/Quality assurance
Bureau of Reclamation	Sarah Laundry	Area Archeologist	Compliance Review Editor
Bureau of Reclamation	Darrin Goetzfried	Civil Engineer	Project Development
Bureau of Reclamation	Corinna Hanson	Natural Resource Specialist	Compliance Review Editor

Chapter 6: References

- Bluemle, W. (2000). *Heart Butte Cable Line: A Class III Cultural Resource Inventory, Grant County, ND*. Ms. #7655 on file, Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck.
- Burbidge, G. E., and J. L. Borchert. (1989). *Lake Tschida Road Improvement CRS 1912 (52) Grant County, ND*. UNDAR-West, University of North Dakota Archeological Research, Belfield. Submitted to Kadrmas, Lee, and Jackson, Dickinson, ND.
- Cooper, P.L. (1947). *Preliminary Appraisal of the Archeological and Paleontological Resources of the Heart Butte Reservoir, Grant County, North Dakota*. Missouri Valley Project River Basin Surveys, Smithsonian Institution. Submitted to the Missouri River Basin Recreation Survey, Region Two, National Park Service.
- Cooper, P.L. (1958). *Archeological Investigations in the Heart Butte Reservoir Area*. North Dakota. *Smithsonian Institution, Bureau of American Ethnology, Bulletin* 169:1-40.
- Ebird.org (2024). Cornell University. Cornell Lab of Ornithology. <https://ebird.org/home>
- Franke, N.G. (1975a). *Mor-Gran-Sou Cooperative Substation Project*. Heart Butte Dam Negative Declaration Report, State Historical Society of North Dakota, Bismarck.
- Franke, N.G. (1975b). *Report of the Archaeological and Historic Site Survey of Two Areas Along the Shore of Lake Tschida, Grant County, North Dakota*. State Historical Society of North Dakota, Bismarck.
- Godfrey, A. (2013). *National Register Evaluation of Six Dams and Two Irrigation Systems Under the Management and Control of the Bureau of Reclamation in North and South Dakota*. Ms. #14327 on file, Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck.
- Good, K. N. (1989). *A Class III Cultural Resources Survey of U.S. West Communications Rural Underground Telephone Line, Glen Ullin-Elgin-Mott-Toll*. Ms. #5055 on file, Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck.
- Gregg, M.L. (1992). *Heart Butte Reservoir, Grant County, North Dakota: 1992 Archaeological Investigations*. Ms. #6010 on file, Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck.
- Gregg, M.L., A. C. Bleier, and F. Swenson. (2016). The Heart River Study Unit. In *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component*. Produced by and available at the Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck, ND.
- Hewes, G. W. (1949a). *Pottery from the Sites Excavated by the 1947 North Dakota Field Season*. Notebook 1:58-67. Laboratory of Anthropology, University of Nebraska, Lincoln.

- Hewes, G. W. (1949b). *The 1947 Summer Field Session in Archeology, University of North Dakota*. Notebook 1:21- 24. Laboratory of Anthropology, University of Nebraska, Lincoln.
- Heideman, J. (2012). *Class III Archaeological & Historic Architecture Inventory for the AT&T ND04 Lake Tschida Communication Tower Candidate #2 MPLSNDU2837*. Ms. #13909 on file, Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck.
- Hlady, W. M. (1947). *Rock Shelter in the Heart Butte Reservoir*. Ms. on file with the State Historical Society of North Dakota, Bismarck.
- Hoganson, J.W., and J. M. Campbell. (2002). *Paleontological Assessment of the Heart Butte Reservoir Management Area*. Prepared by the North Dakota Geological Survey, Bismarck, North Dakota. Submitted to the Dakotas Area Office, U.S. Bureau of Reclamation, Bismarck, ND.
- Jackson, M. A., and D. L. Toom. (2005). *Heart Butte Reservoir 2001-2002 Archeological Test Excavations, Grant County, North Dakota*. Contribution No. 390. Department of Anthropology, Anthropology Research, University of North Dakota, Grand Forks. Submitted to the Dakotas Area Office, U.S. Bureau of Reclamation, Bismarck, ND.
- Jackson, M. A., and D. L. Toom. (2013). *Heart Butte Reservoir 2008 Archeological Shoreline Survey, Grant County, North Dakota*. Contribution No. 423. Department of Anthropology, Anthropology Research, University of North Dakota, Grand Forks. Submitted to the Dakotas Area Office, U.S. Bureau of Reclamation, Bismarck, ND.
- Jackson, M. A., D. L. Toom, and J. R. Bales. (2001). *Heart Butte Reservoir 1998-2000 Archeological Investigations, Grant County, North Dakota*. Contribution No. 354. Department of Anthropology, Anthropology Research, University of North Dakota, Grand Forks. Submitted to the Dakotas Area Office, U.S. Bureau of Reclamation, Bismarck, ND.
- LANDFIRE. (2023). *LANDFIRE Existing Vegetation Type* [Data set]. Retrieved July 12, 2024. U.S. Department of Agriculture and U.S. Department of Interior.
<https://landfire.cr.usgs.gov/viewer/>
- Loscheider, M., and J. Greer. (1979). *Lake Tschida Survey*. Ms. #1496 on file, Archeology and Historic Preservation Division, North Dakota State Historical Society, Bismarck.
- MacDonald, L. B. (1983). *Heart Butte Dam Emergency Spillway Survey*. Ms. #2844 on file, Archeology and Historic Preservation Division, North Dakota State Historical Society, Bismarck.
- National Integrated Drought Information System. (2024). *Drought Conditions for Grant County*.
<https://www.drought.gov/states/North%20Dakota/county/Grant>
- Natural Resources Conservation Service. (2024). Web Soil Survey.
<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.

- Nelson, J. J., Barnhart, P. R., and Gillam, E. H. (2015). *Distribution and Occurrence of Bat Species in North Dakota*. The Prairie Naturalist. 64.
<https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1067&context=tpn>
- NOAA National Centers for Environmental Information. (2024). *Climate at a Glance: County Time Series*. <https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series>
- North American Bat Monitoring Program, (2024). *NABat database*.
<https://www.nabatmonitoring.org/>
- North Dakota Department of Agriculture.(2022). *Pesticide Surface Water Monitoring Report*. [2022 Pesticide Surface Water Monitoring Report.pdf \(nd.gov\)](https://www.nd.gov/agriculture/pesticide-surface-water-monitoring-report).
- North Dakota Department of Agriculture. (2023). North Dakota County and City Listed Noxious Weeds.<https://www.ndda.nd.gov/sites/www/files/documents/files/2023%20November%20-%20City%20County%20Noxious%20Weeds%20List.pdf>.
- North Dakota Department of Environmental Quality. (2006). *Lake Water Quality Assessment for Lake Tschida Grant County*. [Lake Water Quality Assessment for Lake Tschida Grant County, North Dakota \(nd.gov\)](https://www.nd.gov/deq/lake-water-quality-assessment-for-lake-tschida-grant-county).
- North Dakota Department of Environmental Quality. (2023). *North Dakota 2023 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads*. [2020 2022 Final ND Integrated Report 20230824.pdf](https://www.nd.gov/deq/2023-integrated-report).
- North Dakota Department of Transportation. (2024). *Traffic Counts – State and City*. *Interactive Transportation Information Map*.
https://gis.dot.nd.gov/external/ge_html/?viewer=ext_transinfo.
- North Dakota Department of Water Resources. (2024) Water Permit Database accessed 10/8/2024.
https://www.swc.nd.gov/info_edu/map_data_resources/waterpermits/
- North Dakota Game and Fish Department. (2024). *Fish Stocking Lists*. Web Map.
<https://gf.nd.gov/fishing/stocking>.
- North Dakota State University. (2019). *Resident and Nonresident Hunter and Angler Expenditures, Characteristics, and Economic Effects*. <https://gf.nd.gov/sites/default/files/publications/hunter-angler-spending-2017-2018-final.pdf>.
- North Dakota State University. (2023). *How can Declining Rural Communities in North Dakota be Saved? A Critical Investigation*. <https://library.ndsu.edu/ir/handle/10365/33857>.
- North Dakota State University. (2024). *Animal Feeding Operations Rules and Regulations*.
<https://www.ndsu.edu/agriculture/ag-hub/ag-topics/livestock/beef/nutrition-and-feeding/animal-feeding-operations-rules-and>
- North Dakota Job Service. (2021). *North Dakota Workforce Review*.
https://www.dol.gov/sites/dolgov/files/eta/Performance/pdfs/annual_economic_reports/2021/ND%20PY%2020%20--%20ND%20Workforce%20Review%202021.pdf

- North Dakota Studies. (2024) *Mandan, Hidatsa, Sahnish*. <https://www.ndstudies.gov/mandan-hidatsa-sahnish>.
- Persinger, R. (1987). *A Class III Cultural Resource Survey of Rural Electrical Lines near Lake Tschida, Grant County, North Dakota*. Cultural Research and Management, Bismarck, ND. Submitted to Mor-Gran-Sou Electrical Cooperative, Inc., Flasher, ND.
- Picha, P. R., and M. L. Gregg. (1991). *Heart Butte Reservoir Shoreline Archeological Site Inventory, Grant County, North Dakota*. Contribution No. 268. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the U.S. Bureau of Reclamation, Missouri-Souris Projects Office, Bismarck, ND.
- Plochman, H. A., W. A. Babcock, C. Amos, S. T. Greiser, and T. W. Greiser. (1982). *Cultural Resource Inventory of Heart Butte Reservoir, Grant County, North Dakota*. Historical Research Associates, Missoula, MT. Submitted to the U.S. Bureau of Reclamation, Billings, MT.
- Robson, L. G. (1983). Heart Butte Dam Modification-Initial Investigation, Grant County, North Dakota. On file at the U.S. Bureau of Reclamation, Bismarck, ND.
- Toom, D.L. (2002). *Heart Butte Reservoir 2001 Cultural Resources Survey, Grant County, North Dakota*. Contribution No. 367. Anthropology Research, Department of Anthropology, University of North Dakota, Grand Forks, ND. Submitted to the Dakotas Area Office, U.S. Bureau of Reclamation, Bismarck, ND.
- Toom, D. L., M. L. Gregg, and C. Kordecki. (1999). *Heart Butte Reservoir Archeological Excavations and Reconnaissance, Grant County, North Dakota, 1992 and 1993 Fieldwork*. Contribution No. 328. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the U.S. Bureau of Reclamation, Dakotas Area Office, Bismarck.
- U.S. Bureau of Reclamation. (1952). *Heart Butte Dam, Technical Record of Design and Construction*. (Unnumbered document). U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2005). *Standing Operating Procedures Heart Butte Dam and Reservoir*. Revised April 2023. Controlled by: Bureau of Reclamation, MB-ART Regional Director. Not for public release under FOIA. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2012). Reclamation's NEPA Handbook. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2013). *Literature Synthesis on Climate Change Implications for Water and Environmental Resources. Third Edition*. (Document no. 86-68210-2013-06). U.S. Department of the Interior. <https://www.usbr.gov/climate/docs/ClimateChangeLiteratureSynthesis3.pdf>
- U.S. Bureau of Reclamation. (2014). Technical Report No. SRH-2014-16 2013 Lake Tschida (Heart Butte Reservoir) Sedimentation Survey. U.S. Department of the Interior.
- Bureau of Reclamation. (2020). DKAO Integrated Pest Management Plan. U.S. Department of Interior.

- U.S. Bureau of Reclamation. (2022). *Public Protection Guidelines: A Risk Informed Framework to Support Dam Safety Decision-Making*. Dam Safety Office, Dam Safety and Infrastructure Directorate, Denver, CO. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2023a). *Corrective Action Study Preferred Alternative Heart Butte Dam*. Decision Document / Technical Report of Findings. Technical Service Center, Denver, CO. Controlled by: Bureau of Reclamation, Security, Safety & Law Enforcement, Dam Safety Office. Not for public release under FOIA. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2023b). *Heart Butte Dam Corrective Action Study*. Technical Memorandum No. HB-8312-9. Technical Service Center, Denver, CO. Controlled by: Bureau of Reclamation, Security, Safety & Law Enforcement, Dam Safety Office. Not for public release under FOIA. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2023c). *Heart Butte Safety of Dams Economic Benefits Analysis*. Technical Service Center, Denver, CO. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2023d). *Water Operations Study for Heart Butte Dam*. Technical Memorandum. Dakotas Area Office, Bismarck, ND. U.S. Department of the Interior.
- U.S. Bureau of Reclamation. (2024). Missouri Basin and Arkansas-Rio Grande-Texas Gulf Hydromet Data System data available on the World Wide Web at <https://www.usbr.gov/gp/hydromet/index.html> Station ID = LTR. date accessed 12 September 2024. U.S. Department of the Interior.
- U.S. Bureau of Labor Statistics. (2023). *County Employment and Wages in North Dakota*. https://www.bls.gov/regions/midwest/news-release/countyemploymentandwages_northdakota.htm
- U.S. Census Bureau. (2022). *County Profiles. Population Pyramids*. https://data.census.gov/profile/Grant_County,_North_Dakota?g=050XX00US38037#populations-and-people.
- U.S. Census Bureau. (2022b). *County Profiles. Income and Earnings*. https://data.census.gov/profile/Grant_County,_North_Dakota?g=050XX00US38037#income-and-poverty
- U.S. Department of Agriculture. (2017). Natural Resource Conservation Service, U.S. Geological Survey, and Environmental Protection Agency. *Watershed Boundary Dataset for North Dakota*. <http://datagateway.nrcs.usda.gov>
- U.S. Environmental Protection Agency. (2016). *What Climate Change Means for North Dakota*. (Document no. EPA 430-F-16-036). <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nd.pdf>

- U.S. Environmental Protection Agency. (2023). EPA EJ Screen Online Tool. <https://ejscreen.epa.gov/mapper/index.html?wherestr=Grant+County+North+Dakota>
- U.S. Fish and Wildlife Service. (2010). *North Dakota Whooping Crane Migration Corridor*. U.S. Fish WS, Ecological Services, Bismarck, ND
- U.S. Fish and Wildlife Service. (2012). Whooping Crane (*Grus americana*). 5-Year Review: Summary and Evaluation. U.S. Department of the Interior. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1902.pdf
- U.S. Fish and Wildlife Service. (2016). National Wetlands Inventory website. U.S. Department of the Interior. <http://www.fws.gov/wetlands/>.
- U.S. Fish and Wildlife Service. (2020). *Monarch (Danaus plexippus) Species Status Assessment Report*. U.S. Department of the Interior. <https://www.fws.gov/sites/default/files/documents/Monarch-Butterfly-SSA-Report-September-2020.pdf>
- U.S. Fish and Wildlife Service. (2022). *Whooping Crane Survey Results: Winter 2022-2023*. U.S. Department of the Interior. <https://www.fws.gov/media/whooping-crane-update-winter-20222023#:~:text=The%20U.S.%20Fish%20and%20Wildlife,juveniles%20and%202023%20adult%20pairs>
- U.S. Fish and Wildlife Service. (2022b). *Species Status Assessment Report for the Northern Long Eared Bat (Myotis septentrionalis)*. Version 1.2. U.S. Department of the Interior. <https://www.fws.gov/sites/default/files/documents/Species%20Status%20Assessment%20Report%20for%20the%20Northern%20long-eared%20bat-%20Version%201.2.pdf>
- U.S. Fish and Wildlife Service. (2023). *Endangered and Threatened Wildlife and Plants; Endangered Species Status for Northern Long-Eared Bat*, 88 Fed. Reg. 4908 (January 26, 2023). <https://www.govinfo.gov/content/pkg/FR-2023-01-26/pdf/2023-01656.pdf>
- U.S. Fish and Wildlife Service. (2024). *Endangered and Threatened Wildlife and Plants; Endangered Status for the Eastern Regal Fritillary, and Threatened Status With Section 4(d) Rule for the Western Regal Fritillary*, 89 Fed. Reg. 63888 (August 6, 2024). <https://www.govinfo.gov/content/pkg/FR-2024-08-06/pdf/2024-16982.pdf#page=1>
- U.S. Geological Survey, 2024a, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed September 9 2024, at URL https://waterdata.usgs.gov/nwis/inventory?site_no=06349000&agency_cd=USGS
- U.S. Geological Survey, 2024b, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed September 9 2024, at URL https://waterdata.usgs.gov/nwis/inventory/?site_no=06346500&agency_cd=USGS&camp
- Ward-Williams, L. (1979). *A Short Survey of a Road-Reroute, Heart Butte Dam, Grant County, North Dakota*. Western Water and Power Administration, Billings, MT. Attached to 32GT24 site file at Archeology and Historic Preservation Division, State Historical Society of North Dakota, Bismarck.

Whooping Crane Conservation Association. (2016). *Winter 2015/16 Whooping Crane Survey Results*.
http://whoopingcrane.com/author/wcca_admin/.

White Nose Syndrome Response Team. (2024). *What is White-nose Syndrome*
<https://www.whitenosesyndrome.org/static-page/what-is-white-nose-syndrome>

World Population Review. (2024). *Grant County North Dakota Population*.
<https://worldpopulationreview.com/us-counties/north-dakota/grant-county>