RECLAMATION

Managing Water in the West

FINAL ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

NELSON RESERVOIR, MILK RIVER PROJECT SAFETY OF DAMS MODIFICATION

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

Montana Area Office

January 2014

Mission Statements

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

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.

DECISION NOTICE
AND
FINDING OF NO SIGNIFICANT IMPACT
NELSON DIKES MODIFICATION

MT-222-14-01F

FINDING

Based on the analysis of the environmental impacts as described in the Environmental Assessment (EA), the Bureau of Reclamation (Reclamation) finds that all potentially significant issues and resource impacts have been identified, evaluated, addressed, and resolved. In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and the Council on Environmental Quality's Regulation for Implementing the Procedural Provisions of the NEPA (40 CFR Parts 1500-1508), Reclamation has determined that the proposed action will not have a significant impact on the quality of the human environment and that an Environmental Impact Statement is not required.

DECISION

Reclamation has decided to implement the Proposed Action Alternative as described in the final EA. Under this alternative, the purpose and need of this Federal action will be met and the risk of failure at Nelson Reservoir will be significantly reduced. From an environmental compliance standpoint, implementation of this Federal action may take place following approval of this decision document and completion of required contracting actions.

SUMMARY OF ENVIRONMENTAL EFFECTS

Reclamation has analyzed the effects of the Proposed Action Alternative in the final EA. The effects of the Proposed Action Alternative are summarized below:

Water Quantity

The Propose Action Alternative would require Nelson Reservoir to be drawn down to elevation 2205.0 feet while construction activities are occurring on Dikes C and DA. Once construction activities are complete the reservoir can be refilled and return to normal operations. The short-term drawn down will not have significant impacts on long term water quantity in Nelson Reservoir.

Water Quality

Impacts to water quality would be minimal and very minor in nature due to the drawing down of the reservoir for construction activities. No significant impacts to water quality are expected as a result of the Proposed Action Alternative.

Fisheries

Minor and short-term impacts to the Nelson Reservoir fishery are expected with the short-term draw down of the reservoir. Reclamation is committed to coordinating with the Milk River Joint Board of Control, Malta Irrigation District and Montana Fish, Wildlife & Parks (MTFWP) during the refilling process to make sure fishery impacts are only limited to Nelson Reservoir and not Fresno Reservoir.

Impacts to the fishery are not expected to be significant in nature as a result of the Proposed Action Alternative.

Wildlife

The Proposed Action Alternative would create temporary noise and habitat disturbances as a result of the proposed construction. Once construction is complete wildlife habits are expected to return to normal. No significant impacts to wildlife resources are expected as a result of this action.

Threatened and Endangered Species

Species such as the pallid sturgeon, black footed ferret, whooping crane, greater sage-grouse, and Sprague's Pipit are not known to inhabit the immediate area around Nelson Reservoir. The piping plover and red knot are species that can be found around Nelson Reservoir occasionally.

Consistent with the 1990 Biological Opinion and the 1995 Memorandum of Understanding (MOU), Reclamation will continue to monitor plover activities around the reservoir during the spring fill. If a nest is identified, filling will stop and the water elevation will be maintained below the nest elevation. Once the nest has been relocated, abandoned, or the young have hatched; reservoir filling can resume. If nests are planned to be relocated, in accordance with the 1995 MOU, consultation with the U. S. Fish and Wildlife Service will occur prior to any nests being relocated.

The Proposed Action Alternative may affect, not likely to adversely affect the piping plover. A no effect determination is made on all other species.

Lands/Vegetation

Temporary and short-term impacts are expected with the removal of topsoil on the dikes and borrow area. Temporary and short-term impacts are also expected with the removal of the borrow material that will be used in the new construction of the Dikes. The borrow area will be re-contoured and reclaimed as well as the dikes. Impacts are not expected to be significant with the Proposed Action Alternative.

Recreation/Access

Temporary closures or detours on the dikes are expected with this construction activity. The boat ramp located near the dikes will not be usable during the draw down but boat launching will still be available from the shoreline. There is not expected to be significant impacts to recreation at Nelson Reservoir during the proposed construction project.

Climate Change

The Proposed Action Alternative would not have a long term increase in emissions that would result in a significant impact to climate change.

Noxious Weeds

Noxious weeds would be minimized by cleaning and inspecting construction equipment. Additionally construction areas will be reclaimed with weed free seed, following establishment these areas would be surveyed and treated as appropriate to eliminate noxious weeds. There would be no significant impacts from noxious weeds with the implementation of this action.

Socioeconomics

There will be no significant impacts to socioeconomics.

Cultural Resources

There will be no historic properties affected for the proposed undertaking.

Indian Trust Assets

The Proposed Action Alternative would not have significant impacts to tribal water rights or other Indian Trust Assets.

Executive Orders

Executive Order 11990 – Protection of Wetlands

The proposed action is in compliance with this Executive Order and was determined to have no effect on wetlands.

Executive Order 11988 – Floodplain Management

The proposed action is in compliance with this Executive Order and was determined to have no effect on floodplains or floodplain management.

Executive Order 13186 – Protection of Migratory Birds

The proposed action is in compliance with this Executive Order and determined to have no negative effects on migratory birds.

Executive Order 13007 – Indian Sacred Sites

The proposed action is in compliance with this Executive Order and was determined to have no effect on Indian Sacred Sites.

Executive Order 12898 – Environmental Justice

This proposed action is in compliance with this Executive Order and was determined to have no effect on minority or low income populations.

ENVIRONMENTAL COMMITMENTS

- Best Management Practices (BMP) (Final EA – Appendix A) would be used to minimize impacts of erosion and sedimentation around construction areas.
- Coordinate with Montana Fish, Wildlife & Parks, Milk River Joint Board of Control and Malta Irrigation District to talk about refilling operations of Nelson Reservoir. This would help minimize fishery impacts to Fresno Reservoir.
- Borrow area will be re-contoured and reclaimed using native weed-free seed at the end of construction.
- Dikes C and DA need to be reclaimed and erosion control measures will need to be in place to reduce the chances of erosion and water quality impacts.
- BMP will be used to minimize weed infestation in disturbed areas.
- Consult with the U. S. Fish and Wildlife Service if piping plover nests are found and need to be relocated.

APPROVED:

Brent C Esplin

Brent C Esplin
Area Manager
Montana Area Office

02 JAN 2014
Date

RECLAMATION

Managing Water in the West

FINAL ENVIRONMENTAL ASSESSMENT

NELSON RESERVOIR, SAFETY OF DAMS MODIFICATION, MILK RIVER PROJECT, MONTANA

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CHAPTER 1 – NEED FOR PROPOSED ACTION

PROPOSED FEDERAL ACTION

The Bureau of Reclamation (Reclamation) proposes dam safety modifications to Nelson Reservoir Dikes C and DA to correct structural deficiencies caused by seepage through the dikes.

PURPOSE AND NEED

The purpose of the proposed Federal action is to modify Nelson Dikes C and DA to meet current safety standards in order to insure that the dam does not present unacceptable risks to people, property, or the environment.

The need for the proposed project is to correct safety related deficiencies which have been identified. Recent routine investigations of the Nelson Dikes have confirmed safety deficiencies exist that could contribute to catastrophic failure of dikes C and DA.

BACKGROUND

The Milk River Project in north central Montana furnishes water for irrigation of 110,000 acres of land. Project features include; Lake Sherburne, Fresno and Nelson storage dams, Dodson, Vandalia, St. Mary, Paradise and Swift Current Diversion Dams, Dodson Pumping Plant, 200 miles of canals, 219 miles of laterals, and 295 miles of drains. The Milk River Project is divided into the Chinook, Malta, and Glasgow Divisions and the Dodson Pumping Unit. The lands extend about 165 miles along the Milk River from near Havre, MT to 6 miles below Nashua, MT.

Nelson Reservoir was constructed in 1915 by the U.S. Reclamation Service (now the Bureau of Reclamation), and is located 19 miles northeast of Malta, Montana. Nelson provides off stream storage of irrigation water for Malta Division lands in the Saco and Hinsdale Areas. Nelson Reservoir is impounded by a series of 5 dikes at a crest elevation of 2228.0 feet and crest length of 9,900 feet (Figure 1.1). The total amount of material needed to construct the five dikes was 233,000 cubic yards of fill, providing for a capacity of 78,950 acre-feet at the current active conservation elevation of 2221.6 feet.

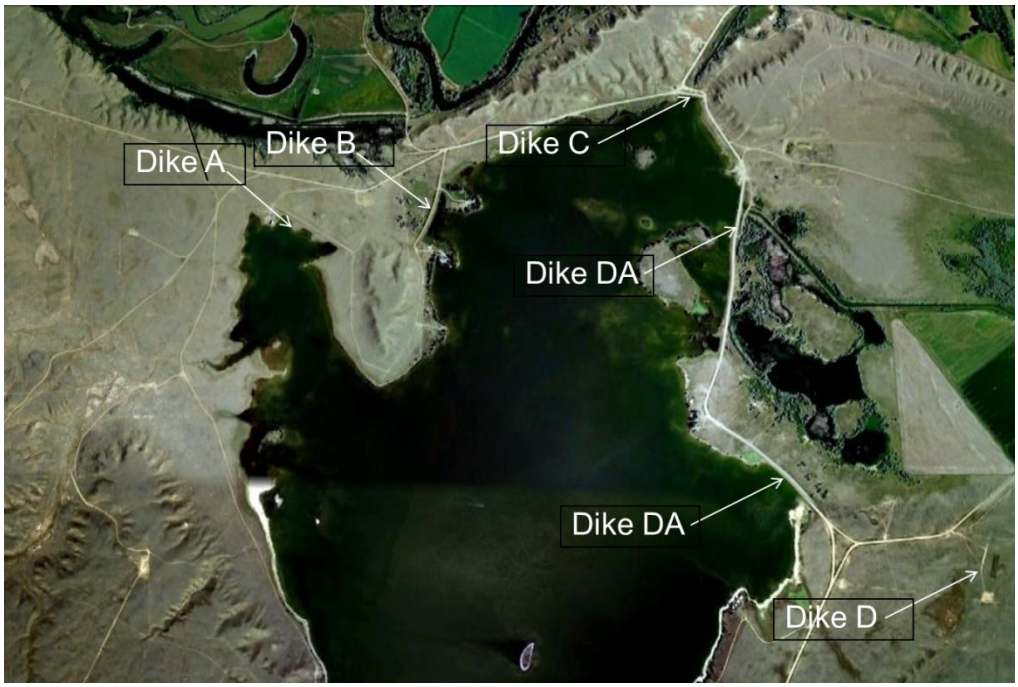

Figure 1.1 – Image showing locations of Nelson's 5 Constructed Dikes

The Nelson Reservoir dikes were constructed on top of glacial till or alluvium that is underlain by poorly graded sands and gravels referred to as glacial outwash deposits. The dike fill material is glacial till consisting of clay, sand, and gravel placed in 12-inch thick lifts and compacted by horse-drawn equipment. The material was borrowed from local borrow areas downstream from the dam. The original construction of the dikes did not include toe drains, cutoff trenches, or filters, which are common design features in modern structures.

Nelson Reservoir has experienced significant seepage from the time it was first filled until now. In 1917, over 300 acres of land was purchased, mostly between Nelson Reservoir and the Milk River downstream of dikes A and B due to inundation of the land resulting from reservoir seepage. Seepage losses through the dikes were estimated to be approximately 20,000 acre-feet per year. Project operations have since been adjusted to accommodate the seepage issues by limiting the full reservoir elevation to 2221.6 feet rather than the original full water elevation of 2223.0 feet.

Even with the lower full pool water elevation, large areas of seepage are occurring below Dikes C and DA. An increase of three feet in reservoir elevation from 2218.0 feet to 2221.0 feet, results in a dramatic change in seepage conditions. At low reservoir conditions, most of the downstream toe is dry but at maximum reservoir elevation, seepage covers about half of the downstream area including the area around the outlet works. The seepage is attributed mostly to the permeable outwash deposits in the foundation of the dikes. Water from the reservoir flows through these pervious zones and emerges in the downstream area. Currently the water seeping through both dikes is unfiltered, meaning there is no protective sand filter zone used to safely capture seepage and prevent erosion of the dike materials. The lack of this filter zone increases the potential for material within the dikes to be eroded from seepage water moving through the dikes.

Seepage concerns primarily originate from observations of unfiltered concentrated seeps into the outlet works of both dikes. Seepage is occurring through cracks in the outlet works and from the

embankments adjacent to the outlet works. Ground penetrating radar (GPR) surveys were performed in 2006 to locate potential voids that may be occurring around each of the outlet works. A total of 37 holes were drilled through the conduits at Dike C and DA. Voids were found in 11 of 37 core holes. The majority of the voids sized from 1/4-inch to 3/4-inch were located at the upstream portion of the conduit, about 30 feet from outlet works gate (Figure 1.2). Additionally, a large void was discovered at the downstream end of the outlet at Dike C (Figures 1.3, 1.4).

Figure 1.2 – Embankment Piping into Outlet Works Conduit

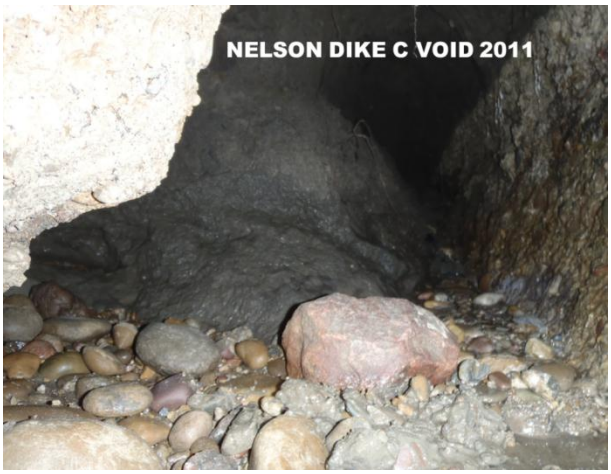

Figure 1.3 – Dike C Void

Figure 1.4 – Seepage around North Canal Outlet

DAM SAFETY PROGRAM OVERVIEW

In keeping with the mission to ensure that Reclamation facilities do not present unacceptable risk to people, property and the environment, Reclamation's Dam Safety Program was officially implemented in 1978 with passage of the Reclamation Safety of Dams Act, Public Law 95-578. This act was amended in 1984 under Public Law 98-404.

Under Reclamation's Safety of Dams Act, dams must be operated and maintained in a safe manner. Safe operation is ensured through safety inspections, analyses utilizing current technologies and designs, and corrective actions if needed based on current engineering practices.

The Safety of Dams (SOD) Program focuses on evaluating and implementing actions to resolve safety concerns at Reclamation dams. Under this program, Reclamation completes studies, identifies and accomplishes needed corrective actions on Reclamation dams. The selected course of action relies on assessments of risks and liabilities with environmental and public involvement input to the decision-making process.

OTHER ACTIONS OCCURRING NEAR NELSON RESERVOIR

Reclamation, the Fort Belknap Indian Community and other interested Tribal representatives, the Montana Department of Transportation, and the Bureau of Land Management met in September, 2013 regarding a collaborative effort to return a cultural resource back to Reclamation land in the general area of Proposed Action Alternative. The Fort Belknap and Tribal representatives were informed of the schedule of the Proposed Action Alternative construction and the lack of access to the proposed restoration area during the construction period. No objections were voiced. Reclamation will provide a copy of Reclamation's State Historic Preservation Officer (SHPO) consultation letter for this Federal undertaking to the Fort Belknap Indian Community Tribal Historic Preservation Officer.

CHAPTER 2 - ALTERNATIVES

NO ACTION ALTERNATIVE

Under the No Action Alternative, Reclamation would allow safety deficiencies at Nelson Reservoir to continue. The present deficiencies and risks at Nelson Reservoir would continue to present an increasing risk for loss of life or property.

The No Action Alternative is not considered a technically viable option because it does not address the identified risks to the downstream public. Failure of Nelson Reservoir would place approximately 742 people at risk. Property and infrastructure damages could exceed $410.5 million if Dike DA were to fail and $391.3 million if Dike C were to fail (Table 2.1) (Reclamation 2013).

Property Category	Nelson Dike DA failure damages	Nelson Dike C failure damages
Building-Related Losses	$10.1	$8.8
Transportation	$270.6	$160.6
Essential Facilities	$2.1	$0
Utilities and Other Infrastructure	$84.3	$77.1
Vehicles	$1.2	$0.8
Agriculture	$42.2	$144.0
Total	**$410.5**	**$391.3**

Table 2.1 – Estimated Damages Summary (Millions)

Although the No Action Alternative is not an acceptable choice for Reclamation, it is analyzed and included for comparative purposes to analyze impacts associated with the Proposed Action Alternative.

PROPOSED ACTION ALTERNATIVE

Conduit Section

Reclamation proposes to modify both Nelson Dikes C and DA to control the unfiltered movement of water through the embankments and around the conduits. The modification consists of a sand filter diaphragm placed around and beneath the outlet works conduits at both dikes. The filter diaphragms would be placed near the downstream toe of the embankments and extend under the new section of conduit to the conduit headwall. A gravel and pipe drainage system would be constructed on both sides of the conduits to drain the filter diaphragm, terminate at the downstream headwall, and drain freely into the canal. In order to install the filter diaphragm, the downstream section of conduit, estimated to be approximately 60-80 feet, would be removed. The conduit would be reconstructed

after filter placement. Sufficient cover to prevent heave or blowout would be installed above the filter and conduit. The remaining section of conduit would be modified to provide additional sealing of the concrete to prevent seepage from entering the conduit (Figure 2.1).

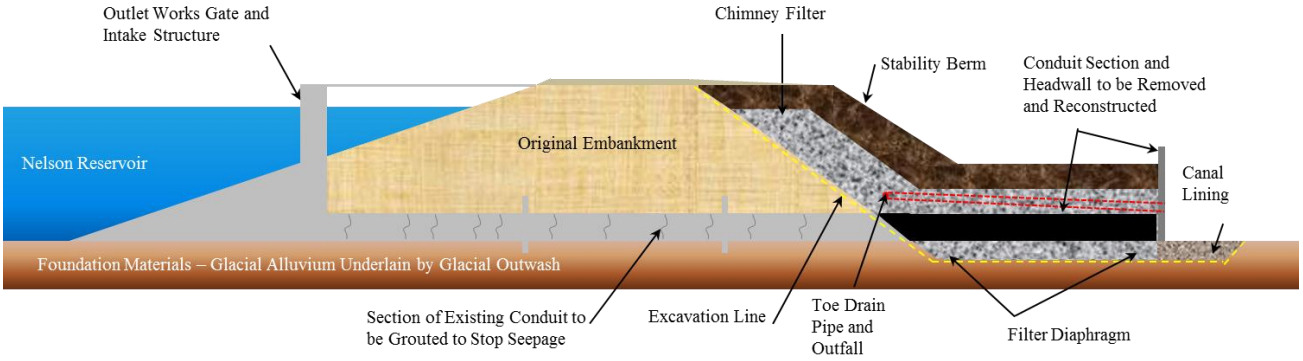

Figure 2.1 - Preferred Alternative, Section through the conduit

Embankment Section

The downstream face of the entire embankment of Dike C and about 1000 feet of Dike DA would be stripped of vegetation and topsoil to a depth of about 1-2 feet to expose the existing embankment materials. A new sand chimney filter zone, toe drain system, and berm would then be constructed on the downstream face (Figure 2.2).

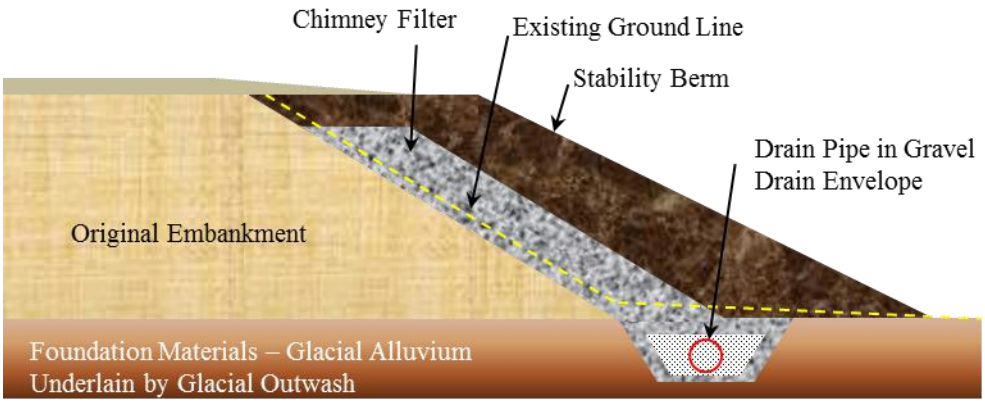

Figure 2.2 – Preferred Alternative, Section through the dike embankment

Utility Relocation

Prior to construction two underground utilities (phone and gas lines), one overhead power line, and one domestic water well would need to be relocated. A buried gas line and phone line cross the construction area at Dike C (Figure 2.3). At Dike DA, a buried phone line and overhead power line crosses the construction area (Figure 2.4).

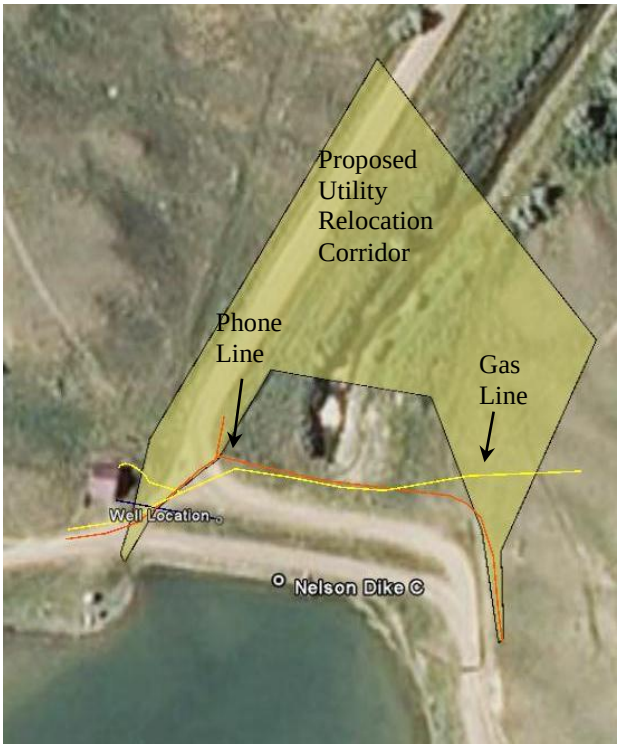

Figure 2.3 – Dike C Utilities

Figure 2.4 – Dike DA Utilities

The phone and gas lines would need to be relocated a minimum of 100 feet downstream from the location where the outlet conduit discharges into the canals below each dike. The overhead power line would need to be raised or removed so that safe working clearances for equipment can be achieved.

A domestic water well was installed in the toe of Dike C in 1969. This water well provides water service to Lot 92 of Nelson Reservoir cabin lease program. This well would need to be removed and relocated due to the construction activities on Dike C. All hardware within the well would be removed and the well permanently sealed with bentonite slurry or cementatious grout.

Construction Schedule

In the spring of 2015 construction equipment would be mobilized to the staging area (Figure 2.5) and materials would be stockpiled prior to construction. The borrow area, staging area and the downstream side of Dikes C and DA would be stripped of all vegetation. Topsoil would be stockpiled and be replaced once construction has concluded. Approximately 465 cubic yards of topsoil would be stripped from the borrow area and stockpiled on site. This would facilitate the removal of approximately 3750 cubic yards of material to be placed at the downstream berm on each embankment.

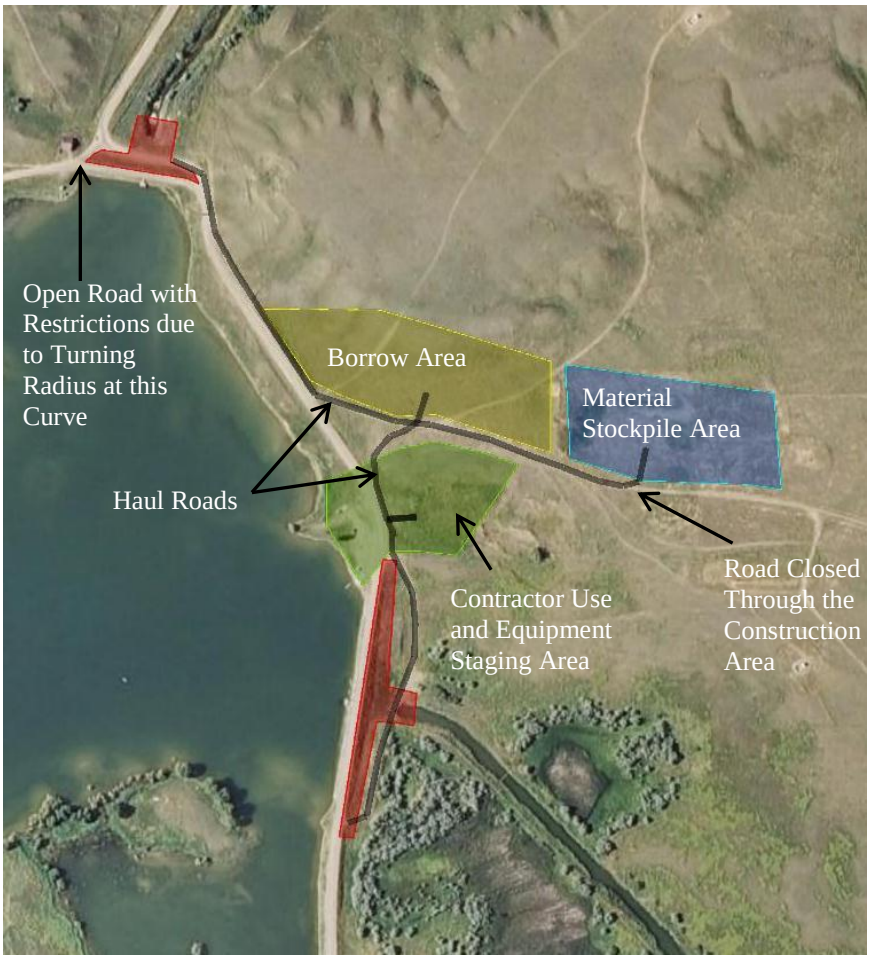

Figure 2.5 – Areas Impacted by Construction

On August 25th, 2015 the reservoir draw down would be completed to elevation 2205.0 feet, (16.5 feet below normal full pool), and excavation around the conduits would begin. To ensure that the construction area is dry, two small berms, approximately six feet high and forty-two feet in length would be constructed in front of both outlet works. The berms would contain approximately 100 cubic yards of borrow material. Once the berms are in place construction on the conduits could continue.

The conduit portions removed would be replaced and backfilled by about mid-October unless the weather is unusually cold or wet. Also during this time, the filter and berm materials would be placed on the downstream face of the dikes. This would include borrowing berm materials from the adjacent borrow area. At this time, the construction of the dikes and conduit modifications are anticipated to be completed sufficiently to allow for the removal of the berms in front of the outlet works and the reservoir would begin refilling, assuming conditions are right (please see the *Reservoir Operations* section in Chapter 4 for additional details on refilling). In the weeks to follow the remaining construction would be substantially completed (weather permitting), borrow areas would be reclaimed and the berms would be reseeded to native vegetation historically found in the area. Depending on weather conditions some wrap-up construction activities, final grading, seeding and touchup work may need to be completed the following spring.

Repayment Contract

In accordance with the Safety of Dam Act of 1978 (Public Law 95-578), as amended, the project water users (Table 2.2) are responsible for repayment of 15 percent of all the reimbursable costs that will be accrued due to Safety of Dam modifications at Nelson Reservoir. The total cost of this project is estimated to be approximately $7 million dollars, making the reimbursable portion of the project about $1.05 million. This amount will be further reduced by statutory credits which are available to the Milk River Project in the amount of approximately $804,000. With this reduction in costs the total amount that is reimbursable by the water users is estimated at about $246,000 or about $2.19 per acre. Actual project costs could be higher or lower than estimated, so the reimbursable portion will be adjusted to 15 percent of actual total costs following the completion of the project less the actual statutory credits.

Municipal	
City of Chinook	City of Havre
Hill County Water Supply	North Havre County Water District
Grandview Cemetery Association of Saco	City of Harlem

Irrigation	
Malta Irrigation District	Glasgow Irrigation District
Dodson Irrigation District	Fort Belknap Irrigation District
Alfalfa Valley Irrigation District	Zurich Irrigation District
Paradise Valley Irrigation District	Harlem Irrigation District
Individual Pump Contractors	

Table 2.2: Milk River Project Water Users

Reclamation policy requires the execution of a repayment contract before a construction contract for a safety of dams modifications is awarded. On August 30, 2013 the Commissioner of Reclamation approved a waiver from this policy to allow Project water users to provide their estimated share of the modification costs in advance of awarding the safety of dams construction contract in lieu of executing a repayment contract. Therefore, water users have four options when repaying modification costs:

1. No Contract Option: Upfront payment of estimated proportionate share estimated at $2.19 per acre which will be adjusted to actual cost after completion of the modification.

2. 1 Year Repayment Contract: Repayment of actual proportionate share in 1 annual payment following completion of the modification.

3. 3 Year Repayment Contract: Repayment of actual proportionate share in 3 annual payments following completion of the modification.

4. 5 Year Repayment Contract: Repayment of actual proportionate share in 5 annual payments following completion of the modification.

ALTERNATIVES CONSIDERED BUT DROPPED

Breach the Dam

The dam breach alternative was eliminated because, while it is technically true that all dam safety risks would be eliminated, the cost of construction for the breach section, stabilization of the reservoir sediment field, and economic impacts associated with the loss of project benefits would be substantially more than the cost of the modification. In addition, the adverse environmental impacts of the breach option are far greater than the impacts associated with the proposed SOD corrective action alternative.

Full Dike Replacement

Full dike replacement (Alternative 2) was considered to be technically viable but was eliminated due to higher costs and greater environmental impacts. This alternative required a greater amount of excavation, structure removal and time needed for a reduced reservoir elevation. This alternative provided similar risk reduction as the Preferred Action Alternative but with a greater cost.

CHAPTER 3 - AFFECTED ENVIRONMENT

Water Quantity

The Milk River project begins at the headwaters of Swiftcurrent Creek in Glacier National Park. Beginning in March water is released from Sherburne Dam into Swiftcurrent Creek where it flows southward into St. Mary Lake. From St. Mary Lake water flows down the St. Mary River approximately one mile where it is then diverted by the St. Mary Diversion Dam into the St. Mary Main Canal. Water then travels through 29 miles of canal before being discharged into the north fork of the Milk River. Once in the Milk River water travels 216 miles north into Canada before turning south and reentering the United States. Once back in the United States, water is stored in Fresno Reservoir which is located 14 miles west of Havre, MT. Fresno is an earthfill dam with a structural height of 110 feet and a capacity of 91,746 acre-feet at elevation 2575.0 feet (normal full pool). From Fresno Reservoir water is conveyed to Malta Divisions lands north of the Milk River and through the Dodson South Canal for lands south of the Milk River. Leftover water in the Dodson South Canal is then conveyed to Nelson Reservoir for storage.

Nelson Reservoir is located 19 miles northeast of Malta, MT, this reservoir serves as an offstream storage for irrigation of Malta Division lands in the Saco and Hinsdale areas. A series of dikes, with a maximum structural height of 28 feet and a total crest length of 9,900 feet provide for storage of 78,950 acre-feet of water. Nelson Reservoir has two outlets. The south outlet at Dike DA releases water to the Nelson South Canal to irrigate Malta Irrigation District lands south of the Milk River (Figure 3.1, 3.2). Releases to the Nelson South Canal are affected at reservoir levels below 2211.0 feet. The capacity of the Nelson South Canal is 300 cfs.

Figure 3.1 and 3.2 - Nelson South Canal Outlet Works

The north outlet at Dike C releases water to the Nelson North Canal (Figures 3.3 and 3.4) which releases water back to the Milk River for use in the Glasgow Irrigation District and controls storage levels in Nelson Reservoir. The North Canal has a capacity of approximately 250 cfs. Glasgow Irrigation District usually receives 100 cfs for a 10 day period from Nelson Reservoir but this amount is highly variable from year to year.

Figure 3.3 and 3.4 - Nelson North Canal Outlet Works

Following the irrigation season, normally mid to late September, storage content in Fresno and Nelson Reservoirs are evaluated. During this time, water in excess of 50,000 acre-feet in Fresno Reservoir is transferred to Nelson Reservoir for storage. Water is not always transferred to Nelson Reservoir during the fall of the year as it is dependent on Dodson South Canal maintenance activities and the current water storage at Nelson Reservoir.

The water level in Nelson Reservoir slowly decreases by approximately 1,800 acre-feet per month through the winter due to seepage through the dikes. The seepage rate depends upon the amount of storage in Nelson Reservoir, the higher the elevation the more seepage that occurs.

Reclamation meets with the irrigation districts in March and/or April to review the water supply conditions, determine preliminary irrigation allotments for the Milk River Project, and determine how much water will be moved to Nelson Reservoir. A full irrigation allotment is approximately 2.1 acre-feet of water per acre. The volume of water moved to Nelson Reservoir in the spring should be enough to satisfy the irrigation allotment for Malta Irrigation District water users on the Nelson South Canal and half the allotment for Glasgow Irrigation District.

Initiating diversions to Nelson Reservoir in the spring is dependent upon ice and snow conditions at Dodson Dam and in the Dodson South Canal. Inflows to Nelson Reservoir are limited by canal

capacity of approximately 300 to 350 cfs. Inflows not only consist of Fresno Reservoir releases but also any natural spring time runoff that is captured in the Milk River below Fresno and above Dodson Dam.

During the irrigation season, the full Dodson South Canal capacity is needed to meet irrigation demands, and little water is added to Nelson Reservoir during this time period as inflows are matching outflows. However, releases from Nelson Reservoir to the Nelson South Canal are discontinued for approximately 10 days beginning about June 25 for de-mossing of the canal. During this 10 day period, storage in Nelson Reservoir increases (Figure 3.5).

Nelson Reservoir filling is coordinated around nesting of the piping plover, a threatened species that is observed occasionally in the area. Currently, the peak content of Nelson Reservoir is to occur on or prior to May 15. If no plover nesting is identified through field surveys, then Nelson Reservoir can continue to fill. If plover nesting activity is documented then water levels in Nelson Reservoir are to remain steady or decreasing until nesting is completed and young of the year have vacated the area (FWS Biological Opinion 1990).

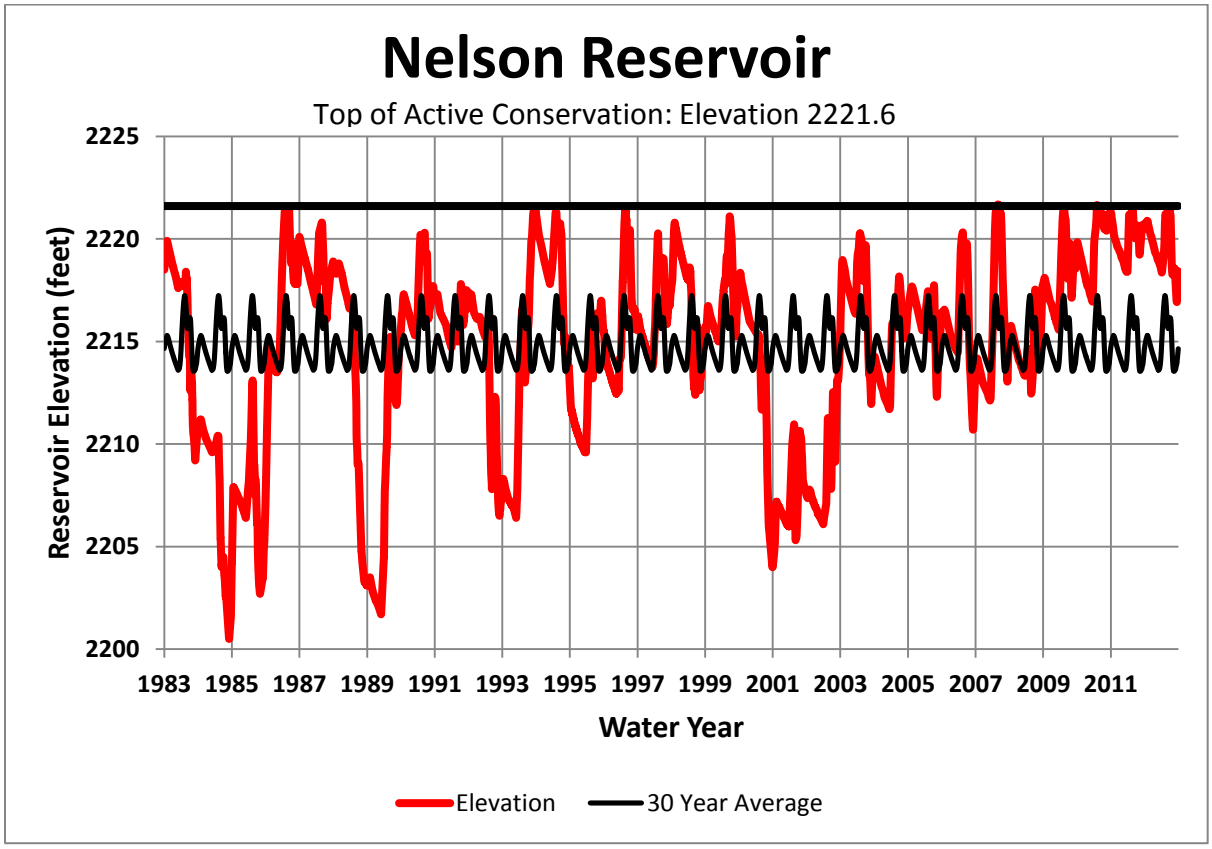

Figure 3.5 - graph of the pool elevations over the past 30 years.

Water Quality

Nelson Reservoir is classified as a freshwater eutrophic water body, characterized by an abundant accumulation of nutrients that support a dense growth of algae and other organisms. Often times in

eutrophic systems vegetation will decay depleting shallow waters of oxygen during the hot summer months.

In an assessment by Montana Department of Environmental Quality in 2012 (MDEQ 2012) Nelson Reservoir was classified as a B-3 use-class water body. B-3 means that, "waters are suitable for drinking, culinary, and food processing purposes after conventional treatment; also suitable for bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply" (MDEQ 2012).

Nelson also received a category 5 designation meaning "waters where one or more applicable beneficial uses have been assessed as being impaired or threatened" (MDEQ 2012). Nelson Reservoir was given this designation because of phosphorus loading from farming practices, limited fisheries due to water level fluctuations, algal blooms, and mercury within fish tissue (MDEQ 2012).

In 2007 Nelson Reservoir was issued a consumption advisory from the Department of Public Health and Human Services for elevated levels of contaminants, specifically mercury and polychlorinated biphenyls (PCBs), which are harmful to human health. The consumption advisories are generally designed to protect pregnant women, women of childbearing age, children, and anglers who regularly consume fish in larger quantities over long periods of time. The major factor leading to this advisory in Nelson Reservoir is mercury. Mercury is a widespread and naturally occurring element that concentrates in many soils and rocks around Nelson Reservoir. Once mercury has entered a body of water it is converted to methyl mercury by bacteria and other biological processes within the water body. Fish readily absorb this form of mercury into their tissues from the water and food they digest. High levels of mercury have been found in walleye, northern pike, black crappie, lake whitefish, and yellow perch in Nelson Reservoir (FWP 2007).

Fisheries

Nelson Reservoir is primary managed as a put-grow-and-take fishery for walleye. Although Nelson Reservoir has been primarily managed as a walleye fishery it also contains a good northern pike and yellow perch population. According to Montana Fish, Wildlife and Parks (MTFWP) Statewide fisheries management plan, Nelson will be managed as a multi-species fishery with an emphasis on walleye management that promotes healthy walleye growth and adult densities. Species found in the reservoir are listed below (Table 3.1).

Common Name	Scientific Name	Common Name	Scientific Name
Walleye	*Sander vitreus*	**Northern Pike**	*Esox lucius*
Yellow Perch	*Perca flavescens*	**Black Crappie**	*Pmoxis nigromaculatus*
Lake Whitefish	*Coregonus clupeaformis*	**Smallmouth Bass**	*Micropterus dolomieu*
Channel Catfish	*Ictalurus punctatus*	**Bigmouth Buffalo**	*Ictiobus cyprinellus*
Burbot	*Lota lota*	**Bullhead**	*Ameiurus melas*
Common Carp	*Cyprinus carpio*	**Emerald Shiner**	*Notropis atherinoides*
Fathead Minnow	*Pimephales promelas*	**Goldeye**	*Hiodon alosoides*
Lake Chub	*Couesius plumbeus*	**Longnose Dace**	*Rhinichthys cataractae*
Longnose Sucker	*Catostomus catostomus*	**River Carpsucker**	*Carpiodes carpio*
Shorthead Redhorse	*Moxostoma macrolepidotum*	**Smallmouth Buffalo**	*Ictiobus bubalus*
Spottail Shiner	*Notropis hudsonius*	**Stonecat**	*Noturus flavus*
White Sucker	*Catostomus commersoni*		

Table 3.1 – Species Composition in Nelson Reservoir (MT Natural Heritage Program)

MTFWP has stocked on average 100,000 walleye fingerlings since 2003 to supplement the adult walleye population. This is the only species that has been stocked in Nelson Reservoir. Fingerlings that are released average from 1.1 inches to 3.5 inches in size (MTFWP website).

Two environmental factors currently affect the fishery within Nelson Reservoir. Mercury and toxic algal blooms have been known to have detrimental effects to fish, these factors were discussed in the previous section (water quality).

Wildlife

The area around Nelson Reservoir provides habitat for several different wildlife species including big game, small mammals, raptors, water/shore birds, upland game, reptiles and amphibians. Species lists are presented below:

Mammals

The rolling prairie surrounding the reservoir is primarily covered in sagebrush and grass land communities. These habitats provide both critical summer and over wintering habitat for mule deer (*Odocoileus hemoinus*), white-tailed deer (*Odocoileus virginianus*), white-tailed jack rabbit (*Lepus townsendii*), desert cottontail (*Sylvilagus audubonii*), and raccon (*Procyon lotor*).

Raptors

Birds of prey, or raptors have been observed within or adjacent to the project area. Cottonwood trees along the Milk River provide nesting habitat for raptors such as the species listed below (Table 3.2):

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
American Kestrel	*Falco sparverius*	**Bald Eagle**	*Haliaeetus leucocephalus*	**Barn Owl**	*Tyto alba*
Cooper's Hawk	*Accipiter cooperii*	**Ferruginous Hawk**	*Buteo regalis*	**Golden Eagle**	*Aquila chrysaetos*
Great Horned Owl	*Bubo virginianus*	**Northern Harrier**	*Circus cyaneus*	**Osprey**	*Pandion haliaetus*
Red-tailed Hawk	*Buteo jamaicensis*	**Rough-legged Hawk**	*Buteo lagopus*	**Sharp-shinned Hawk**	*Accipiter striatus*
Swainson's Hawk	*Buteo swainsoni*	**Turkey Vulture**	*Cathartes aura*		

Table 3.2 – Raptors Found Around Nelson Reservoir (MT Natural Heritage Program)

Waterfowl

Numerous water birds occur in the project area such as waterfowl, shore birds, and other wading species. Nelson Reservoir provides great opportunity to see the following waterfowl species (Table 3.3):

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
Blue-winged Teal	*Anas discors*	**Bufflehead**	*Bucephala albeola*	**Canada Goose**	*Branta canadensis*
Canvasback	*Aythya valisineria*	**Cinnamon Teal**	*Anas cyanoptera*	**Clark's Grebe**	*Aechmophorus clarkii*
Common Goldeneye	*Bucephala clangula*	**Common Loon**	*Gavia immer*	**Common Merganser**	*Mergus merganser*
Eared Grebe	*Podiceps nigricollis*	**Gadwall**	*Anas strepera*	**Greater White-fronted Goose**	*Anser albifrons*
Green-winged Teal	*Anas crecca*	**Hooded Merganser**	*Lophodytes cucullatus*	**Horned Grebe**	*Podiceps auritus*

Lesser Scaup	*Aythya affinis*	**Long-tailed Duck**	*Clangula hyemalis*	**Mallard**	*Anas platyrhynchos*
Northern Pintail	*Anas acuta*	**Red-breasted Merganser**	*Mergus serrator*	**Red-necked Grebe**	*Podiceps grisegena*
Red-throated Loon	*Gavia stellata*	**Redhead**	*Aythya americana*	**Ring-billed Gull**	*Larus delawarensis*
Ring-necked Duck	*Aythya collaris*	**Ruddy Duck**	*Oxyura jamaicensis*	**Sabine's Gull**	*Xema sabini*
Snow Goose	*Chen caerulescens*	**Wood Duck**	*Aix sponsa*		

Table 3.3 – Waterfowl Found Around Nelson Reservoir (MT Natural Heritage Program)

Reptiles/Amphibians

A number of reptiles occur in the general area of the project including (Table 3.4):

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
Barred Tiger Salamander	*Ambystoma mavortium*	**Great Plains Toad**	*Anaxyrus cognatus*	**Eastern Racer**	*Coluber constrictor*
Boreal Chorus Frog	*Pseudacris maculata*	**Northern Leopard Frog**	*Lithobates pipiens*	**Gophersnake**	*Pituophis catenifer*
Greater Short-horned Lizard	*Phrynosoma hernandesi*	**Plains Gartersnake**	*Thamnophis radix*	**Snapping Turtle**	*Chelydra serpentina*
Painted Turtle	*Chrysemys picta*	**Prairie Rattlesnake**	*Crotalus viridis*		

Table 3.4 – Reptiles/Amphibians Found Around Nelson Reservoir (MT Natural Heritage Program)

Upland Game

Upland game birds are known to occur in the rolling grass and sage covered hills around the reservoir. Species that are present include the ring-neck pheasant (*Phasianus colchicus*), mourning dove (*Zenaida macroura*), grey partridge (*Perdix perdix*) and sharp-tail grouse (*Tympanuchus phasianellus*).

Threatened and Endangered Species

The Endangered Species Act seeks to recover and conserve listed species and the ecosystems on which they depend. The action area defined for this section includes Nelson Reservoir, 100 square yards around Dikes C and DA, borrow area and contractor staging area. All lands and water bodies are within Phillips County. The species list provided below (Table 3.5) was obtained on December 19, 2013 from United States Fish and Wildlife Service's (Service) website: http://www.fws.gov/montanafieldoffice/Endangered_Species/Listed_Species.html

Phillips County		
Pallid Sturgeon	*Scaphirhynchus albus*	Endangered
Piping Plover	*Charadrius melodus*	Threatened
Black-footed Ferret	*Mustela nigripes*	Endangered
Whooping Crane	*Grus Americana*	Endangered
Greater Sage-Grouse	*Centrocercus urophasianus*	Candidate
Sprague's Pipit	*Anthus spragueii*	Candidate
Red Knot	*Calidris canutus rufa*	Proposed

Table 3.5 – Listed Species of Phillips County (Updated July 2013)

The pallid sturgeon, black-footed ferret, whooping crane, greater sage-grouse, and the Sprague's pipit are not known to occur within the immediate project area. Two species that do occur occasionally within the project area are piping plover and red knot.

Piping Plover

The piping plover is a small stocky shorebird that has a sand-colored upper body and a white underside. During the breading season the adults will have a black forehead, black breast and an orange bill.

Plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks and wetlands.

The earliest known sighting of piping plovers at Nelson Reservoir has been around April 20th. Most years the plovers show up early May and will stay around the area until August.

Egg laying has typically taken place around the second or third week of May. Once eggs have been laid, both the male and female will incubate the eggs for 25 to 31 days depending on conditions and temperatures. Eggs typically hatch around mid to late June.

For the first couple of weeks after hatching the young will stay around the area with some vacating as early as mid-July. The majority of the plovers disperse by the first couple of weeks in August.

Plover nesting has been documented at several locations around the reservoir including shorelines and sandy island habitat. Nesting has been documented around the reservoir when water surface elevations are at or below 2216.0 feet.

Red knot

The red knot is a medium-sized shorebird about 9 to 11 inches in length. This species migrates annually between its breeding grounds in the Canadian Artic to its wintering grounds near the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South American. Traveling up to 19,000 miles the red knot makes one of the longest distance migrations known in the animal kingdom. During both the northbound and southbound migrations, red knots use key staging and stopover areas to rest and feed before they continue their migration.

Habitats used by red knots in migration and winter areas are similar in character, consisting of costal marine and estuarine habitats with large areas of exposed sediments. In North America, red knots are commonly found along sandy, gravel, or cobble beaches, mudflats, salt marshes or shallow coastal impoundment and lagoons.

In Philips County, the red knot has been observed migrating through the area in the last 5 years. In the Nelson Reservoir Area, red knots have not been observed in 10 to 15 years (Montana Field Guide). It is suspected that the red knot uses the area as a migration stop for feeding and resting only if habitat conditions allow.

Lands/Vegetation

Nelson Reservoir is found within the Montana Glaciated Plains subsection of the Great Plains ecological unit. This region is characterized by plains, terraces, and floodplains that formed in glacial till, gravel deposits, and alluvium over clay shale, sandstone, and siltstone (Nesser et al. 1997) (Figure 3.6).

Figure 3.6 - Rolling Plains Surrounding the Project Area

The prairie landscape surrounding the study area has a gentle rolling nature which was created by episodes of past glaciations when this area was scoured by the Keewatin ice sheet (Jones 2003). In areas lacking surface drainage, small wetlands are sporadically distributed and may have formed in partially filled kettle holes created when stranded ice blocks melted following glaciations (Jones 2003).

Temperature and climate are very dominant factors in determining an area's vegetation. The Nelson Reservoir area is considered semi-arid with a precipitation average of 10 to 12 inches per year. The climate is continental and temperate with frigid winters and warm to hot summers. Average temperatures around the area range from a minimum of 3.6°F in January to a maximum of 84.7°F in July. Extreme drought conditions have been known to occur regularly in two out of every ten years (Jones 2003).

Riparian habitats along the Milk River corridor have been characterized by oxbow marshes, and shrub-dominated terraces. These riparian areas provide critically important wildlife habitat as well as economic and recreational benefits (Finch and Ruggiero 1993).

Most riparian areas around Nelson Reservoir include silver sage (*Artemisia cana*) and western wheatgrass communities. Other vegetations also include cattail (*Typha latifolia*), and hardstem bulrush (*Schoenoplectus acutus*) (Jones 2003).

Depressional wetlands occur in the area stretching from Bowdoin National Wildlife Refuge to Nelson Reservoir. These wetlands are small glacially-formed potholes that originated as an oxbow of pre-glacial Missouri River. Prairie potholes occur in small, shallow glacial depressions and range in size from < 1 acre to about 2 acres in size (Jones 2003). Wetlands are inundated most of the year around Nelson Reservoir as a result of seepage through the dikes. These wetlands are dominated by

foxtail barley (*Hordeum jubatum*), and common spike rush (*Eleocharis palustris*) as well as broadleaf cattails and hardstem bulrush (Jones 2003).

The native upland vegetation around the reservoir is a mix of short- and mid-grass prairie communities intermixed with shrub steppe. Steppe vegetation is the result of a semi-arid continental climate with highly varied precipitation that favors shallow-rooted herbaceous perennial grasses and deep-rooted shrubs. Steppe vegetation is characterized by open stands of silver sage-brush or Wyoming big sagebrush (*Artemisia tridentate ssp. wyomingensis*) over an herbaceous layer dominated by western wheat-grass, blue grama (*Bouteloua gracilis*), or needleandthread (*Hesperostip comata*) (Figure 3.7).

Figure 3.7 - Native grass surrounding Nelson Reservoir

Recreation/Access

Most of the surrounding land around Nelson Reservoir is either owned or managed by Reclamation which provides easy access for recreationalists. Recreational opportunities include boating, swimming, camping, fishing, hunting, picnicking, water sports and winter sports. There are two boat ramps on Nelson Reservoir, one located at the campground and one located near the dikes. Many locals also launch boats directly from the shoreline when reservoir levels are low.

Currently 106 cabin sites are found around the reservoir. These are privately owned cabins, located on Reclamation land which primarily serve as a retreat. Due to a variety of factors, these cabins are seasonal. These cabins are taken care of and maintained by the owners.

Access to the recreation facilities, cabins, and lands around the reservoir is provided by county road 243. County road 243 parallels the reservoir on the east side of the reservoir where it crosses both Dikes C and DA.

Nelson Reservoir has been a heavily used fishery resource for the past several years. Below is a graph depicting the fishing days calculated by MTFWP and their ranking within the state (Table 3.6).

Year	Days Fished (1)	Trips (2)	State Rank (3)	Regional Rank (3)
2009	20,371	280	38	2
2007	9,543	145	58	4
2005	9,917	171	65	3
2003	12,558	214	49	3

[1] Estimated yearly fishing use in angler days (one angler fishing one body of water in one day for any amount of time).
[2] The number of times that a section of water was reported as having been fished (used to estimate the number of "Days Fished").
[3] How this section of water ranked among all surveyed sections in the state or region, based on "Days Fished" in a survey year.

Table 3.6 - Nelson Reservoir Visitor Days (http://fwp.mt.gov/fishing/guide/waterbodyDetail.html?llid=1075485484911)

Climate Change

There is a growing concern that the global temperature is increasing and variability of the Earth's climate is changing. It is documented that the global average surface temperature has increased since the late 19th century. Climate change has the potential to affect not only temperatures, but precipitation quantity, and runoff timing.

A recent study done by Reclamation and the Department of Natural Resources and Conservation concluded that due to climate change the overall water supply available for Milk River uses would be similar to past years but with an earlier shift in the runoff peak (Reclamation 2012). Changes in precipitation and temperature should produce modest stream flow increases in the basins, but with generally lower stream flow during the driest years. Snow melt is expected to peak 7 to 9 days earlier than historical records.

Noxious Weeds

The Soil and Moisture Conservation Act and the Federal Noxious Weed Act require Federal Agencies to develop a program to control undesirable plants on lands under its jurisdiction. Noxious weeds can potentially render lands unfit for beneficial uses.

Noxious weeds targeted for containment and suppression around Nelson Reservoir include: Russian knapweed (*Centaurea repens L.*), whitetop (*Cardaria draba*), diffuse knapweed (*Centaurea diffusa Lam.*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis L.*), gypsyflower (*Cynoglossum officinale L.*), leafy spurge (*Euphorbia esula L.*), Dalmatian toadflax (*Linaria dalmatica L.*), butter and eggs (*Linaria vulgaris Mill.*), and sulphur cinquefoil (*Potentilla recta L.*) (USDA 2013).

Socioeconomics

Nelson Reservoir affects socioeconomics in three major ways: irrigation water supply, recreation, and fish and wildlife.

1. The reservoir holds a maximum of 78,950 acre-feet of project water for use by irrigators. Malta Irrigation District and Glasgow Irrigation district rely on water that is stored in Nelson Reservoir.

2. Nelson Reservoir serves as a major source of recreation in northern Montana. The recreation area encompasses approximately 288 acres that offers camping, swimming, fishing and boating. Recreation data for fishing was obtained from MTFWP showed that approximately 14,314 angler days were spent at Nelson Reservoir on average each year.

3. Nelson Reservoir provides habitat for the endangered piping plover. There is a Memorandum of Agreement with U.S. Fish and Wildlife Service under the Endangered Species Act that prohibits inundation of piping plover nests located along the shoreline. Also 3,500 acre-feet of water is fed through the Dodson South Canal for use on the Bowdoin Wildlife Refuge.

Cultural Resources

Cultural resources are the physical remains of a people's way of life that archeologists and historians study to try to interpret how those people lived. Federal historic preservation laws protect and promote scientific study of cultural resources, specifically historic properties. Historic properties are defined as "…any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior." Examples of historic properties that might be located in the area affected by the modification of Nelson Dikes include prehistoric archeological sites such as tipi rings, bison kills, or camp sites and historic period sites such as homesteads and irrigation facilities.

The Nelson Dikes and outlet structures, Nelson North Canal, and Nelson South Canal were originally constructed 1915 – 1918 by the U.S. Reclamation Service and the dikes were modified in 1921 – 1922 by the U.S. Reclamation Service (Simonds 1998, Dau 1996). Due to their age and historic significance of the area, the dikes and canals are eligible for inclusion in the NRHP (Aaberg 1997, Dau 1993, Dau 1996). Reclamation will comply with the National Historic Preservation Act and take into consideration the effects the proposed action has on historic properties.

Indian Trust Assets

The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Native American tribes or Native American individuals by treaties, statutes, and executive orders. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to protect trust assets. Reclamation's policy is to protect Indian Trust Assets from adverse impacts of Reclamation programs and activities. ITAs are legal interests in property held in trust by

the United States for Indian tribes or individuals. Indian Trust Assets include, but are not limited to lands, minerals, hunting and fishing rights, and water rights.

In 1993 Reclamation established a policy concerning the protection of ITA's. In compliance with this policy, Reclamation investigated potential ITA's within the Nelson Reservoir dam modification construction area to determine whether potential ITA's were present or affected. Based upon this investigation, Reclamation determined there are no ITA’s associated with Nelson Reservoir or the immediate area.

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

Water Quantity

No Action

Water would continue to be stored in Nelson Reservoir for irrigation purposes. This alternative does not prevent the risk of complete failure of Dikes C and DA. If a complete failure were to occur the ability to store and divert water for irrigation would be lost.

Proposed Action

Normal operations of the Milk River Project would take place through approximately July 1, 2015. The Reservoir would reach its high point of 2221.6 feet (78,950 acre-feet) by May 15, 2015. From this point the reservoir would slowly draw down to 2205.0 feet (27,157 acre-feet) on August 25, 2015.

Approximately 60,000 acre-feet would be the target amount of storage in Nelson Reservoir on July 1, 2015. This is approximately the 30 year average for storage on July 1. This would allow for adequate water for irrigation while reducing the amount of time the reservoir would be drawn down. To get to the elevation of 2205.0 feet, water would be released into the Nelson South Canal for irrigation of Malta Irrigation District acres and water would have to be released to the Nelson North Canal which returns water back to the Milk River. The maximum release to the Nelson South Canal is 300 cfs and the maximum release to the Nelson North Canal is 250 cfs. Once Nelson Reservoir hits 2205.0 feet on August 25 all diversions through the North and South Canals would be stopped. The reservoir must stay at or below this level until the construction project reaches a point where it is safe to start filling the reservoir.

After August 25, the Dodson South Canal would continue to deliver irrigation water to the Malta irrigation lands. Some operational water would reach Nelson Reservoir during this time but evaporation and seepage would keep the reservoir below elevation 2205.0 feet.

Sometime between mid-October and early November, construction on the dikes would be far enough along to allow water to be stored above elevation 2205.0 feet. Water could be released from Fresno Reservoir to begin refilling Nelson Reservoir. Filling would depend on the construction schedule, amount of storage in Fresno Reservoir, and the weather conditions. If all three conditions are favorable to moving water, Nelson Reservoir would be filled as much as possible until November 15. It is highly unlikely that any filling would take place after November 15 due to cold weather conditions. The weather impacts both the ice conditions on the Milk River and Dodson South Canal.

If water was moved in the fall, between 4,000 to 15,000 acre-feet of water could be moved to Nelson Reservoir which is very dependent on the start date of refilling and water availability. This would raise the water surface to somewhere between elevation 2207.0 feet and 2211.5 feet on November 15.

However, if one of the three conditions (construction schedule, water supply, weather) was not met, water would not be transferred to Nelson Reservoir until approximately mid-March, 2016. If this is the case, Nelson Reservoir may get down to elevation 2202.5 feet (22,391 acre-feet) due to evaporation and seepage.

Even if water was moved in the fall 2015, additional water would be moved to Nelson Reservoir in the spring 2016. Water could be moved to Nelson Reservoir once weather and ice conditions on the Milk River and Dodson South Canal allow for it. Water moved to Nelson Reservoir in the spring is a combination of water released from Fresno Reservoir and natural runoff of the tributaries to the Milk River below Fresno Reservoir.

Each spring, the Milk River Joint Board of Control sets the irrigation allotment based on the available and forecasted water supply. The amount of water moved to Nelson Reservoir is based on this allotment. The volume of water moved in the spring along with the amount of releasable storage (storage above elevation 2203.9 feet) should be adequate to satisfy the irrigation allotment for Malta Irrigation District water users on the Nelson South Canal and half the allotment for Glasgow Irrigation District. The peak storage in Nelson Reservoir should occur before May 15 due to nesting of piping plover. If no plover nesting is identified through field surveys, Nelson Reservoir could continue to fill.

There is a risk that if the Milk River system has a below average water year in 2016 Nelson Reservoir would not be filled. This would be similar to the event that happen in 2001. In the fall 2000, the reservoir was drawn down below 2205.0 feet for head gate maintenance, which was then followed by a below average water year in 2001. It took two years to refill the reservoir and return to normal operations. If this were to happen, water allotment rationing may need to take place.

All impacts are considered to be short-term in nature.

* *Note that operations vary from year to year depending on the water supply for a given year. The previous was based on an average water year in the Milk River Basin.*

Water Quality

No Action

Since the No Action Alternative has no construction activities or operational changes to the reservoir there would be no short or long term impacts to water quality.

Proposed Action

The Proposed Action Alternative would require the placement of two berms 6 feet high by 42 feet long in the reservoir. These berms would be located approximately 50 feet in front of the north and south outlets. Material from the adjacent borrow area would be used to reduce the amount of disturbance within the reservoir. These berms are required to keep the conduit areas dry from seepage during construction. Once construction has been complete and the reservoir can start to be refilled the berms will be removed. Once the berms are removed the area would be recontoured and compacted to reduce the amount of sediment released into the reservoir as it is filled. Best

Management Practices (BMP) (Appendix A) would be used to minimize impacts of erosion and sedimentation from the construction area from entering the reservoir. Any erosion and sedimentation impacts are anticipated to be minor and short in duration.

For construction to start the reservoir must be drawn down to elevation 2205.0 feet which may have some impacts on the water quality within the reservoir. Since Nelson Reservoir is a eutrophic water body there is a chance that low oxygen levels could develop in the shallower parts of the reservoir. This should be a short-term impact as the reservoir would reach its lowest levels in the fall of the year when the day time temperatures begin to be cooler. Reclamation would be operating the reservoir to keep the draw down duration as short as possible to lessen the possibility of water quality impacts.

There is a risk that if the Milk River system has a below average water year in 2016 Nelson Reservoir would not be filled. This would be similar to the event that happen in 2001. If this were to happen, the chances of a toxic algal bloom increase which could have impacts to the fishery.

Fisheries

No Action

There would be no impacts to the fishery under the No Action Alternative. A draw down would not be needed and operations of the reservoir would remain the same. Nelson Reservoir would still provide a sustainable walleye fishery.

If a complete failure were to occur, Nelson Reservoir would not have the capacity to store water or the ability to maintain the current fish population.

Proposed Action

Short-term fishery impacts are expected with the Proposed Action Alternative. The reservoir would be drawn down to elevation 2205.0 feet or just slightly below depending on seepage and evaporation during construction. This would be a reduction from 55,450 acre-feet (average fall storage on September 30) to 27,157 acre-feet during the fall of 2014. This reduction in water would limit food availability for some species, over wintering habitat for all species, potentially increase entrainment into the canals and reduce rearing habitat for young of the year fish. Also with limited resources due to the reduced elevation of the reservoir, predation is expected to increase. To help reduce impacts from overcrowding and predation, it is likely that MTFWP would not be stocking walleye fingerlings in 2015. This will result in a missing age class within the walleye community structure and overall would have a short-term effect on the walleye population. Missing age classes within a population can be normal within reservoir systems as water variability can be detrimental to spawning on any given year. This would be similar to a weak spawning year in a more natural system. Stocking would likely take place again in 2016 when the reservoir is refilled. If refilling does not take place in 2016, stocking may not take place until water levels have been fully returned to normal.

Reclamation hopes to partially fill Nelson Reservoir after construction in the fall of 2015 but if construction, weather or water availability prohibits partial filling, the reservoir could be drawn

down till the spring of 2016. In order to fill Nelson Reservoir water must be brought in from Fresno Reservoir which may have a short term impact on its fishery by drawing water levels down below critical habitat/spawning levels. To make sure both fishery resources are not affected Reclamation has committed to meeting with Montana Fish, Wildlife & Parks, Milk River Joint Board of Control and the Malta Irrigation District during the fall of 2015 and spring of 2016 to discuss operations of the two reservoirs. Operations would be managed in a way that Fresno Reservoir was not drawn down past critical levels that would significantly impact the fishery to make up for storage in Nelson. Both irrigation and fishery needs would be taken into account when determining how much water to move.

Guidelines from MTFWP suggest that fishery impacts in Fresno Reservoir occur when it is drawn down in the spring during spawning. Fishery resources in Fresno Reservoir are affected when reservoir levels get below 2555.0 feet. MTFWP recommends that Fresno Reservoir be greater than 2,565.0 feet during April and May and rising for maximum production. Reclamation will take these criteria into careful consideration when determining how much water to move out of Fresno Reservoir to Nelson Reservoir for refilling.

This would not be the first time the reservoir has reached these levels. Since 1983 Nelson Reservoir has been down to elevation 2205.0 feet or below four times, 1984, 1986, 1989, and 2001. A slight reduction in the fishery was noticed but rebounded to normal levels in the following years with the refilling of the reservoir.

Impacts to the fishery are expected to be short term in nature and expected to be limited to Nelson Reservoir.

Wildlife

No Action

Under the No Action Alternative wildlife would not be affected in any way.

Proposed Action

During construction of the Proposed Action Alternative there is expected to be some short-term impacts to wildlife in the immediate area. Noise from construction machinery would likely affect the wildlife that is found in the immediate construction areas. Once construction is complete wildlife habits should return to normal.

Nelson would still provide habitat for shorebirds and waterfowl during the fall migration season even with the lower reservoir elevation.

Threatened and Endangered Species

No Action

The No Action Alternative would result in no effects to threatened or endangered species. However if the dam failed piping plover would lose shoreline habitat that is needed for breeding and nesting. This would likely have an adverse impact to piping plovers that migrate to the area occasionally.

Proposed Action

There would be no effect to the pallid sturgeon, black footed ferret, whooping crane, greater sage-grouse and Sprague's pipit under the Propose Action Alternative as they are not known to inhabit the immediate area surrounding the construction area.

However, the piping plover has been known to inhabit the shorelines and island habitats around Nelson Reservoir. Nesting has been documented around the reservoir when water surface elevations are at or below 2216.0 feet. Every spring, Reclamation attempts to fill the reservoir to maximum elevation to minimize nesting habitat (Memorandum of Understanding, 1995). Under the Proposed Action Alternative, Reclamation anticipates to fill a portion of Nelson Reservoir in the fall of the year minimizing the amount of time needed to fill it the following spring. If water can be transferred to Nelson in the fall it would limit the nesting opportunities around the reservoir to higher elevations. If the reservoir cannot be filled until spring there would be a greater chance of piping plovers nesting lower in the reservoir, which would restrict the amount of water that could be moved for storage and irrigation purposes.

Every year during the spring fill Reclamation coordinates nesting surveys with the Bureau of Land Management. If a nest is found, filling of the reservoir must be stopped immediately. Until the nest is relocated, abandoned, or the young have hatched Nelson Reservoir must be maintained below the nest elevation. This same reservoir filling protocol would be followed in the spring of 2016 following construction completion.

The potential impacts to piping plover are consistent with the Biological Opinion dated November 2, 1990. Under the 1990 Biological Opinion, Reclamation is required to follow four Reasonable and Prudent Measures while operating Nelson Reservoir.

- **Reasonable and Prudent Measure #1:** Reclamation will meet with the Service to discuss operational possibilities available to minimize impacts to piping plovers.

- **Reasonable and Prudent Measure #2:** Reclamation will monitor piping plover nesting habitat at Nelson Reservoir starting no later than May 15 and continuing through July 30. Survey information will include: (1) total number of nests; (2) total number of birds; and (3) elevation of nests above water level and distance to water's edge.

  In addition to information required by Reasonable and Prudent Measure 2 through 4, Reclamation will include the following in the report:

1. Any taking, including loss of eggs, chicks, adults, and habitat that occurred, including reasons for take and actions to avoid take; and
2. Evaluation of operational efforts to avoid take (habitat and birds).

- **Reasonable and Prudent Measure #3:** All incidences of take must be documented and immediately reported to the FWS.

- **Reasonable and Prudent Measure #4:** If Reclamation develops new operation scenarios that were not considered during this consultation, then the consultation for these new actions will need to be reinitiated.

In addition to the aforementioned Biological Opinion, a Memorandum of Understanding (MOU), finalized July 31, 1995, was signed by Reclamation, the Service, Malta Irrigation District, and Glasgow Irrigation District. This MOU provides guidance on Nelson Reservoir operations to prevent inadvertent taking of piping plover by inundation. All attempts are made to fill Nelson Reservoir to a maximum elevation by May 15. Further, the MOU allows the moving of piping plover nests if beneficial to both irrigation and piping plover. Prior to any nests being moved, Reclamation will consult with the Service. The drafting and refilling of Nelson Reservoir for the construction to occur is consistent with operations scenarios identified in 1990 Biological Opinion. Therefore, the Proposed Action Alternative may affect, not likely to adversely affect the piping plover.

The red knot has also been known to use the area during its long migration to and from breeding grounds in the Canadian Arctic. Observations have been very sporadic over the last 20 years in Phillips County with the majority of observations taking place near the Canadian border. With the red knot using the area only occasionally and only for resting and foraging, the Proposed Action Alternative will have no effect to the red knot.

Lands/Vegetation

No Action

No impacts to land and vegetation are expected as a result of the No Action Alternative, because no new ground disturbing activities have been identified with this alternative.

Proposed Action

The Proposed Action Alternative is not expected to have long term impacts on land and vegetation. Short term impacts would include removing vegetation from the borrow area and dikes as well as removing material from the borrow pit for construction purposes. It is estimated that 7,500 cubic yards of fill material would be excavated from the borrow area. Once the borrow area is no longer needed it would be re-contoured to the surrounding landscape and reseeded to grasses native to the area. When construction is complete on the Dikes C and DA they would be reseeded to native grasses as well.

Wetlands would not be impacted as the amount of seepage occurring below Dikes C and DA would not change. The proposed Action Alternative would not alter the amount of water seeping through

the dikes but instead would control the movement of dike material within the seepage. Wetlands would continue to persist in the immediate areas around Dike C and DA.

Disturbance to soil and vegetation is expected to be only temporary in nature. BMP (Appendix A) such as reseeding, mulching, and fertilizing the disturbed areas to reduce weeds and prevent erosion would be implemented.

Recreation/Access

No Action

The No Action Alternative would not have any impact to recreation. If a complete failure of the dam were to occur, Nelson Reservoir would lose many of its recreational benefits such as boating, fishing, ice fishing, bird watching and swimming.

Proposed Action

Only short-term impacts to recreation would occur with the Proposed Action Alternative. The drawdown of the reservoir would leave one boat ramp dry and unusable. It is anticipated that fishing and boating access would still be available by launching boats from the shoreline or the main boat ramp at the campground. Camping and day use areas would still be available to the public. In discussions with MTFWP, no fish restrictions are anticipated with the lower reservoir levels.

Restricted vehicle access around the reservoir would be limited to Dikes C and DA during the months of construction. During construction at Dike C, the lower road would be closed and the turn going North across Cree Crossing would be restricted (Figure 2.5). Due to the restricted turning radius at the north end of Dike C; truck traffic would likely be detoured through Saco. The local access road though the proposed borrow area and material staging area would also be closed. Signage would be posted around the reservoir to notify traffic of any closures or restrictions. Detoured traffic on the local access road is not expected to cause any disturbance and can be routed about 4 miles to the East.

Climate Change

No Action

There would be no additional carbon dioxide emissions into the atmosphere with this No Action Alternative.

Proposed Action

The Proposed Action Alternative would release carbon dioxide emissions into the atmosphere. However, the duration of the construction period is short (3-4 months) and the impacts would be negligible.

Noxious Weeds

No Action

The No Action Alternative would not promote the spread of noxious weeds as there would be no ground disturbing activities associated with this alternative.

Proposed Action

The Proposed Action Alternative would follow BMPs (Appendix A) to minimize weed infestations in disturbed areas. Construction equipment would be inspected for weed seed and cleaned appropriately. Reclaimed areas would be inspected for noxious weeds following establishment of vegetation. If noxious weeds are found, appropriate weed management treatments would be applied to the affected areas.

Socioeconomics

No Action

Under the No Action Alternative, there would be no impacts to socioeconomics. Failure of Nelson Reservoir would place approximately 742 people at risk. Property and infrastructure damages could exceed $801.8 Million (Table 4.1) depending upon the reservoir level at the time (Reclamation 2013).

Property Category	Nelson Dike DA failure damages	Nelson Dike C failure damages
Building-Related Losses	$10.1	$8.8
Transportation	$270.6	$160.6
Essential Facilities	$2.1	$0
Utilities and Other Infrastructure	$84.3	$77.1
Vehicles	$1.2	$0.8
Agriculture	$42.2	$144.0
Total	**$410.5**	**$391.3**

Table 4.1 – Estimated Damages Summary (Millions)

Proposed Action

The Proposed Action Alternative would result in no impacts to the overall socioeconomics of the region. Recreation, fish and wildlife, as well as irrigation water supply would return to normal conditions and benefits.

Recreation – Construction would be scheduled to minimize the amount of time needed for a reservoir draw down.

Fish and Wildlife – Nelson Reservoir would return to normal operations and would continue to provide adequate nesting habitat for piping plover. Also 3,500 acre-feet of water would continue to flow to Bowdoin Wildlife Refuge.

Irrigation Water Supply – Nelson Reservoir would continue to store approximately 78,950 acre-feet of water for irrigation purposes.

The Proposed Action Alternative would sustain the local economy because it would make the Nelson Reservoir safe and reliable for future generations to enjoy.

Cultural Resources

No Action

No historic properties will be affected with the No Action Alternative.
Proposed Action

In September, 2013 the Reclamation Montana Area Office Archaeologist conducted a Class III intensive cultural resource survey of the Area of Potential Affect and also assessed the effects of the project on the modification of the dikes, north and south outlet works at Nelson Reservoir, and the Nelson North Canal and Nelson South Canal at the outlets. No NRHP eligible cultural resources were located during the survey other than the dikes and canals. Additionally, in October 2012, a report was submitted to the SHPO regarding test locations for the borrow extraction areas as preliminary work to the repair undertaking (Hanson 2012).

Reclamation and the Montana SHPO have agreed to a Conditional No Adverse Effect to historic properties regarding the Proposed Action Alternative. Initially, Reclamation will provide the SHPO with a Class III intensive cultural resource survey report and consultation letter. Reclamation, in the winter of 2013 – 2014 will provide site form updates for the dikes and canals including: additional historical research, additional historical photos (if available), and a description/photographs of current conditions.

The Proposed Action Alternative will have No Adverse Effect to historic properties provided Reclamation meets the conditions agreed to with the Montana SHPO.

Indian Trust Assets

No Action

The No Action Alternative would have no impact on tribal water rights or other Indian trust assets

Proposed Action

Reclamation investigated potential Indian trust assets (ITA) within the Nelson Reservoir modification construction area to determine whether potential ITA's were present or affected. Based upon this investigation, Reclamation determined that there are no ITA's in, or affecting the Nelson Reservoir construction area under the proposed action alternative.

Executive Orders

Executive Order 11990 – Protection of Wetlands

Federal agencies shall avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.

The amount of seepage occurring below Dikes C and DA would not be changed. The proposed Action Alternative would not alter the amount of water seeping through the dikes but instead would control the movement of dike material within the seepage. Wetlands would continue to persist in the immediate areas around Dike C and DA. During construction wetlands and riparian areas would be avoided by controlling points of access.

These actions are in compliance with this Executive Order and was determined to have no effect on wetlands.

Executive Order 11988 – Floodplain Management

Federal agencies shall avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out the agency's responsibilities.

The proposed action is in compliance with this Executive Order and was determined to have no effect on floodplains or floodplain management.

Executive Order 13186 – Protection of Migratory Birds

The United States has ratified international, bilateral conventions for the conservation of migratory birds. These international migratory bird conventions impose substantive obligations on the Unities States for the conservation of migratory birds and their habitats, and through the Migratory Bird Treaty Act (16 U.S.C. 703-711) (Act) will implement these conventions. This Executive Order directs Federal agencies to take certain actions to further implement the Act.

The proposed action is in compliance with this Executive Order and determined to have no negative effects on migratory birds.

Executive Order 13007 – Indian Sacred Sites

Federal agencies shall, to the extent practicable, and not clearly inconsistent with essential agency function; accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.

The proposed action is in compliance with this Executive Order and was determined to have no effect on Indian Sacred Sites.

Executive Order 12898 – Environmental Justice

Federal agencies need to ensure their actions do not disproportionately impact minority and disadvantaged populations or communities.

This action is in compliance with this Executive Order and was determined to have no negative effect on minority or low income populations.

COMMITMENTS

- Best Management Practices (BMP) (Appendix A) would be used to minimize impacts of erosion and sedimentation around construction areas.
- Coordinate with Montana Fish, Wildlife & Parks, Milk River Joint Board of Control and Malta Irrigation District to talk about refilling operations of Nelson Reservoir. This would help minimize fishery impacts to Fresno Reservoir.
- Borrow area will be re-contoured and reclaimed using native weed-free seed at the end of construction.
- Dikes C and DA need to be reclaimed and erosion control measures will need to be in place to reduce the chances of erosion and water quality impacts.
- BMP will be used to minimize weed infestation in disturbed areas.
- Consult with the Service if piping plover nests are found and need to be relocated.

CONSULTATION AND COORDINATION

This environmental assessment was prepared in consultation and coordination with the following agencies:

Montana State Historic Preservation Office
United States Fish and Wildlife Service
State of Montana Department of Fish, Wildlife and Parks
Malta Irrigation District
Milk River Joint Board of Control
Glasgow Irrigation District

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APPENDIX A

Best Management Practices

BMPs are measures that have been developed by agency, industry, scientific, and/or working groups as voluntary methods for reducing environmental impacts associated with certain classes of activity. Reclamation typically uses these measures as guidelines or "project design features" during implementation planning at the activity and/or project-specific levels.

The list included in this appendix is not limiting but reference the most frequently used methods.

Soil Disturbance

1. Surface runoff will be adequately controlled using mitigations such as: water bars, fiber mats, contour felling, and vegetative filters.
2. All surface disturbances are to be reseeded/re-vegetated with native plant species common to the site's natural plant community.
3. Require a temporary protection surface treatment such as mulch, matting and netting for the reclamation of all mechanically-disturbed areas.
4. Erosion control and site restoration measures will be initiated as soon as a particular area is no longer needed for exploration, production, staging, or access. Disturbed areas will be recontoured to provide proper drainage.

Vegetation

1. Where seeding is required, use appropriate seed mixture and seeding techniques approved by Reclamation.
2. Keep removal and disturbance of vegetation to a minimum through construction site management (e.g. using previously disturbed areas and existing easements, limiting equipment/materials storage and staging sites, etc.).
3. Generally conduct reclamation with native seeds that are representative of the indigenous species present in the adjacent habitat. In all cases, ensure seed mixtures are approved by the Reclamation prior to planting.
4. Certify that all interim and final seed mixes, hay, straw, and hay/straw products are free of plant species listed on the Montana noxious weed list.
5. An area is considered to be satisfactorily reclaimed when all disturbed areas have been recontoured to blend with the natural topography, erosion has been stabilized, and an acceptable vegetative cover has been established.

Noxious Weeds

1. To reduce the potential for the introduction of noxious weeds, clean off all equipment with pressure washing prior to operating. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts is required and may be accomplished with a pressure hose.

2. Ensure all seed, hay, straw, mulch, or other vegetation material transported and used on public land for site stability, rehabilitation, or project facilitation is free of noxious weeds and noxious weed seed as certified by a qualified federal, state, or county officer.
3. Operators will monitor noxious weed occurrence on all project areas and implement a noxious weed control program to ensure noxious weed invasion does not become a problem. Reclamation /stabilization and maintenance materials used would be from weed seed free source to the extent practicable.
4. The operator, grantee, or lessee will be responsible for the control of all noxious weed infestations on surface disturbances.
5. When managing weeds in areas of special status species, carefully consider the impacts of the treatment on such species. Whenever possible, hand spraying of herbicides is preferred over other methods.

APPENDIX B - COMMENTS

#	Comment	Disposition
	Glasgow Irrigation District	
1	The Glasgow Irrigation District relies heavily on water obtained from Nelson Reservoir. Refilling of the reservoir after repairs have been completed is imperative to the 2015 irrigation season. Failure in refilling the reservoir could result in damaging losses to irrigators already impacted from the flood of 2011. There is concern repairs may not be completed in time to fully refill Nelson Reservoir before the end of 2014.	Reclamation has delayed construction of Nelson Dikes one year to reduce the risk of this happening. Factors, other than construction, such as water supply and weather could prevent the reservoir from filling by the end of 2015.
2	Glasgow Irrigation District and its irrigators would like to express the importance of addressing the Piping Plover nesting issues and the necessary measures needed to continue the refilling of Nelson Reservoir uninterrupted. The understanding is that, if needed, nests built below the high water level of the reservoir that may be in danger can be moved to higher ground. Glasgow Irrigation District requests a preclusive plan be in place prior to construction addressing measures to be taken to ensure filling of the reservoir is not stopped	Reclamation understands the need to refill Nelson Reservoir in the spring of 2016 while at the same time we need to follow the requirements in the 1990 piping plover Biological Opinion. The reasonable and prudent measures to reduce "take" have been provided in this EA. The possibility of moving nests will have to be a determination made by the USFWS in consultations with Reclamation.
	Malta Irrigation District	
1	In regards to piping plover, as stated in the Draft Environmental Assessment, page 27, BOR states "If a nest is found, filling of the reservoir must be stopped immediately. Until the nest is abandoned or the young have hatched Nelson Reservoir must be maintained below the nest elevation." Malta Irrigation District would like to see if a	Reclamation understands the need to refill Nelson Reservoir in the spring of 2016 while at the same time we need to follow the requirements in the 1990 piping plover Biological Opinion. The reasonable and prudent measures to reduce "take" have been provided in this EA. The possibility of moving nests will have to be

	temporary agreement between BOR and USFWS can be formed. This agreement should state that if any nests occur they should be moved to Bowdoin Wildlife Refuge immediately. If relocating the nest to Bowdoin Wildlife Refuge is not feasible, MID would recommend moving any nests up the shore a short distance every day or two to keep them out of the water. Any of these plans would ensure that the Plover are allowed to thrive as well as ensuring reduced negative impacts to irrigation.	a determination made by the USFWS in consultations with Reclamation.
2	Regarding recreation and access, page 29 of the Assessment states that MTFWP expects no fish restrictions with the lower reservoir levels. If MTFWP does at some point see concerns, they should minimize fishing access while levels are low.	Comment will be passed on to Montana Fish, Wildlife & Parks.
3	Any alternatives to minimize entrainment of fish into the Nelson North and South canals during drawdown should be done at the expense of MTFWP; water users should not have to pay for any fish entrainment. Nelson Reservoir is an irrigation facility first; any other benefits associated with Nelson Reservoir are only available due to an irrigation need.	At this time, there are no proposals to screen the canal intakes. The impacts to the Nelson fishery are minor in nature there for screening is not warranted.
4	Water supply throughout the Fall of 2015 and Spring of 2016 are important. If water supply allows, as much water as possible should be kept in Fresno Reservoir throughout the *2015/2016* winter. If the water storage can be kept as high as the reservoir will allow, even if it means carrying additional water above the preferred elevation, more water can be diverted to Nelson from Fresno during the Spring of 2016. Years reflect the recently changed dates of the Nelson Dikes construction from 2014 to 2015.)	Reclamation will continue to coordinate reservoir and river operations with the Milk River Joint Board of Control. The expected carryover of storage in Fresno Reservoir will be updated in the monthly Milk River Project operating plans.
5	In regards to statutory credits, the contract between BOR and any contractor will not be signed until 2014 or 2015. The statutory credits generated prior to and during construction should be applied to the water users' portion even if it is done so as a credit after the project is complete. The statutory credits are very important to those paying into the project and utilizing as much of it as possible will reduce the economic impact on the water users.	If Statutory credits are available they will be applied to the project.