US Army Corps
of Engineers
Omaha District

Draft

Fort Peck Dam/Fort Peck Lake Project
Montana

Surplus Water Report

Volume 1

Surplus Water Report
Appendix A – Environmental Assessment

August 2012

THIS PAGE INTENTIONALLY LEFT BLANK

FORT PECK DAM/FORT PECK LAKE PROJECT, MONTANA

SURPLUS WATER REPORT

Omaha District
U.S. Army Corps of Engineers

August 2012

THIS PAGE INTENTIONALLY LEFT BLANK

FORT PECK DAM/FORT PECK LAKE MONTANA SURPLUS WATER REPORT

August 2012

Prepared By:

The U.S. Army Corps of Engineers, Omaha District

Omaha, NE

Abstract: The Omaha District is proposing to temporarily make available 6,932 acre-feet/year of surplus water (equivalent to 17,816 acre-feet of storage) from the system-wide irrigation storage available at the Fort Peck Dam/Fort Peck Lake Project, Montana to meet municipal and industrial (M&I) water supply needs. Under Section 6 of the Flood Control Act of 1944 (Public Law 78-534), the Secretary of the Army is authorized to make agreements with states, municipalities, private concerns, or individuals for surplus water that may be available at any reservoir under the control of the Department. Terms of the agreements are normally for five (5) years, with an option for a five (5) year extension, subject to recalculation of reimbursement after the initial five (5) year period.

This proposed action will allow the Omaha District to enter into surplus water agreements with interested water purveyors and to issue easements for up to the total amount of surplus water to meet regional water needs. During the temporary period the Corps recommends that a comprehensive strategy to address long-term regional water needs be developed that may involve the Administration, Congress and stakeholders. The Proposed Action (temporary use of surplus water) will not impede the capability and function of Fort Peck Dam/Fort Peck Lake to serve its authorized purposes. An Environmental Assessment, which is attached to this Surplus Water Report, identifies the baseline environmental conditions and provides an analysis of potential impacts from the proposed use of surplus water. There are no significant environmental impacts associated with implementing the proposed action.

.

For more information contact:

Commander, U.S. Army Corps of Engineers

Attn: Ms. Kayla Eckert-Uptmor, Chief, Planning Branch, Omaha District

1616 Capitol Avenue, Omaha, NE 68102-4901

Phone: (402) 995-2693

Fax: (402) 995-2758

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

The Omaha District, U.S. Army Corps of Engineers (Corps) under the Operation & Maintenance Program has prepared this Fort Peck Dam/Fort Peck Lake, MT Surplus Water Report to identify and quantify whether surplus water is available in the Project, as defined in Section 6 of the 1944 Flood Control Act. Surplus water agreements with water use based on this process may be executed with existing and potential future applicants, pursuant to policy, upon approval of this Report by the Assistant Secretary of the Army (Civil Works) and completion of required NEPA analysis. The term of proposed temporary surplus water use is for a five (5) year period, renewable for an additional five (5) year period, subject to recalculation of reimbursement after the initial five (5) year period.

This Surplus Water Report and accompanying Environmental Assessment investigate the engineering and economic feasibility and environmental effects of temporary use of up to 6,932 acre-feet/year of surplus water (17,816 acre-feet of storage) from the Fort Peck Dam/Fort Peck Lake, MT Project. Surplus water, if available, may be used to meet existing and projected municipal and industrial (M&I) water supply needs in the region. The 6,932 acre-feet/year of yield (17,816 acre-feet of storage) evaluated for surplus water use in this report is an estimate that was selected to ensure that an adequate quantity of water was identified to meet the needs of both existing and future M&I water users. This Surplus Water Report will serve as the basis to enter into temporary surplus water agreements.

A 10-year study period has been established for this surplus water study. The length of the study period was selected for several reasons. First, surplus water agreements may be executed for a five (5) year period, renewable for an additional five (5) year period. Second, prior to the end of the 10-year study period, the Corps recommends that a comprehensive strategy to address long-term regional water needs be developed that may involve the Administration, Congress and stakeholders. The surplus water agreements executed upon the approval of this Report will serve as measures to address temporary water needs of the region during the 10-year study period.

The Fort Peck Dam/Fort Peck Lake Project is a unit of the comprehensive Pick-Sloan Plan for development in the Missouri River Basin. The operation of the upper Missouri River's six mainstem reservoirs and the lower Missouri River's levees and navigation channel provides for flood control, navigation, irrigation, hydropower, municipal and industrial water supply, fish and wildlife, water quality, and recreation. The temporary use of 6,932 acre-feet/year of surplus water in Fort Peck Lake would result in additional net annual depletions of 630 acre-feet from the system for the ten year period, beyond existing usage levels. The primary difference between with and without project conditions is that under without project conditions, the additional 630 acre-feet will come from groundwater sources and under with project conditions, withdrawal of the additional 630 acre-feet will come from the Fort Peck Dam/Fort Peck Lake Project. Both conditions assume continuation of existing use sourced from Fort Peck Lake.

The Daily Routing Model (DRM), developed during the 1990's as part of the Master Manual Review and Update Study (Master Manual), was used as an analytical tool in this study to estimate the hydrologic effects that an additional 630 acre-feet of depletions would have at Fort Peck Lake, the other system reservoirs, and free-flowing reaches of the Missouri River.

A comparison of DRM simulated water surface elevations, stream flows, and river stages between without project conditions and with project conditions resulting from an additional

depletion of 630 acre-feet from Fort Peck Lake was performed to assess the magnitude of changes resulting from the proposed temporary use of surplus water from the Project. Modeling results indicate that stage and flow reduction estimates throughout the system are extremely small because the projected net depletion is very small relative to total storage at Fort Peck Lake (18.5 million acre-feet). Because the Missouri River projects are operated as an integrated system taking into account system withdrawals both in and outside of the Federal projects, no changes to system operations will be required as a result of the temporary use of surplus water from the Fort Peck Dam/Fort Peck Lake Project.

Under current policy pricing, the annual payment for surplus water would be $38.59 per acre-foot of yield (equivalent to $15.02 per acre-foot of storage) at FY 2012 price levels. In a memorandum dated May 8, 2012, the Assistant Secretary of the Army for Civil Works (ASA CW) directed the Corps of Engineers to initiate action immediately to purse notice and comment rulemaking to establish a nationwide policy for surplus water uses under Section 6 (Attachment 1). Pending completion of rule-making to establish a nationwide policy for surplus water uses under Section 6, surplus water agreements would be entered into at no cost. The term of these agreements would be for a period not to exceed the time needed to conclude the rulemaking process. All users of surplus water would need to enter into new or revised agreements implementing the nationwide policy price once the rule becomes effective.

An alternatives analysis was conducted, which assessed non-structural measures (conservation, recycling, and temporary permits to convert irrigation water to industrial use) and structural measures (project modifications to increase storage capacity, temporary use of surplus water including associated infrastructure, groundwater withdrawals including associated infrastructure, and surface water withdrawals including associated infrastructure). The No Action – Next Least Costly Alternative is withdrawal from groundwater.

A test of financial feasibility was conducted, which demonstrated that entering into agreements for the use of surplus water from the Fort Peck Dam/Fort Peck Lake Project is a lower cost alternative than the most likely, least costly alternative for providing the needed water supply. An analysis of environmental impacts was conducted using the same DRM outputs that were used to assess impacts to project purposes. The analysis of environmental impacts identified no significant impacts from providing surplus water from the Fort Peck Dam/Fort Peck Lake Project.

The temporary use of surplus water assessed in this report is both economically and financially justified and will not affect the authorized purposes of Fort Peck Dam/Fort Peck Lake Project. It is recommended that 6,932 acre-feet/year of yield (equivalent to 17,816 acre-feet of storage) in the Fort Peck Dam/Fort Peck Lake Project be made available for temporary use for municipal and industrial water users. Pending completion of rule-making to establish a nationwide policy for surplus water uses under Section 6, surplus water agreements would be entered into at no cost.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

EXECUTIVE SUMMARY I

1. INTRODUCTION 1-1
   - 1.1 Study Purpose 1-1
   - 1.2 Study Authority 1-1
   - 1.3 Need for Surplus Water 1-3
   - 1.4 Report Organization 1-3

2. PROJECT BACKGROUND 2-4
   - 2.1 Project Location 2-4
   - 2.2 Project Authorization 2-4
   - 2.3 Project Description 2-5
     - 2.3.1 Fort Peck Dam 2-5
     - 2.3.2 Fort Peck Lake 2-5
   - 2.4 Authorized Project Purposes 2-8
   - 2.5 Missouri River System Reservoir Regulation 2-9
     - 2.5.1 Flood Control 2-12
     - 2.5.2 Navigation 2-12
     - 2.5.3 Irrigation 2-14
     - 2.5.4 Municipal and Industrial (M&I) Water Supply 2-15
     - 2.5.5 Hydropower 2-15
     - 2.5.6 Fish and Wildlife 2-16
     - 2.5.7 Recreation 2-17
     - 2.5.8 Water Quality 2-18
   - 2.6 Montana Water Permit Process 2-20
   - 2.7 Corps of Engineers Surplus Water Agreements, Easements, and Permits 2-21
     - 2.7.1 Surplus Water Agreements 2-21
     - 2.7.2 Easements 2-21
     - 2.7.3 Regulatory Permits 2-21
     - 2.7.4 Existing Agreements, Easements, and Permits 2-22
     - 2.7.5 Pending Agreements, Easement, and Permits 2-22
   - 2.8 Historic Water Use 2-22
   - 2.9 Corps Studies and Reports by Others 2-25

3. PLAN FORMULATION 3-1
3.1 Problems and Opportunities / Need for Surplus Water 3-1
3.2 Identification of Surplus Water 3-2
3.2.1 Storage for Mainstem System Irrigation 3-3
3.2.2 Impacts to Existing Lawful Uses of Water 3-3
3.2.3 System Storage 3-4
3.2.4 Storage and Sediment 3-4
3.3 Water Supply Demand Analysis 3-5
3.3.1 Water Supply Demand: Existing Fort Peck Lake Water Users 3-5
3.3.2 Total Water Supply Demand in the Study Area 3-7
3.4 Planning Goals, Objectives, and Constraints 3-8
3.4.1 Planning Goals and Objectives 3-8
3.4.2 Planning Constraints ..... **Error! Bookmark not defined.**
3.5 Management Measures 3-10
3.5.1 Identification of Management Measures 3-10
3.5.2 Screening of Management Measures 3-10
3.6 Most Likely Future Without-Project Condition 3-16
3.7 Alternatives Studied in Detail 3-16
3.7.1 No Action Alternative 3-16
3.7.2 Proposed Action – Use of Surplus Water 3-21
3.8 Alternative Evaluation – Economic Analysis 3-21
3.8.1 Impacts on Authorized Project Purposes 3-21
3.8.2 Derivation of User Cost 3-25
3.8.3 Test of Financial Feasibility 3-34
3.9 Environmental Considerations 3-35
3.10 Cumulative Impacts 3-36

4. PLAN IMPLEMENTATION 4-1
4.1 Parties to Surplus Water Agreements 4-1
4.2 Agency Coordination 4-1

5. CONCLUSIONS 5-1

6. RECOMMENDATIONS 6-1

APPENDICES

Appendix A Environmental Assessment

LIST OF TABLES

Table 2-1 Missouri River Mainstem Reservoirs 2-8
Table 2-2 Summary of Fort Peck Lake Pool Elevations and Releases by Month 2-11
Table 2-3 Relation of System Storage to Navigation Service Level 2-13
Table 2-4 Historic Study Area Population 2-22
Table 2-5 Historical Water Use in the Six-County Fort Peck Area (AF) 2-23
Table 3-1 Easements & Yield by Expiration & Use Type at Fort Peck Lake 3-2
Table 3-2 Montana Water Rights Permits Sourced from Fort Peck Lake by Use Type 3-5
Table 3-3 Montana Water Rights Permits Sourced from Fort Peck Lake by County 3-6
Table 3-4 Easements & Acre-Feet of Water Use at Fort Peck Lake by Type 3-6
Table 3-5 Water Use in the Six-County Fort Peck Area (AF) 3-7
Table 3-6 Water Rights in the Six-County Fort Peck Area (AF) 3-17
Table 3-7 Number of Water Rights by Source for Selected Use-Types in the Six County Ft. Peck Area 3-19
Table 3-8 Cost of the Next Least Costly Alternative 3-20
Table 3-9 All Sources of Water for No Action Alternative 3-21
Table 3-10 Sources of Water Withdrawals for No Action and Proposed Action Alternatives . 3-22
Table 3-11 Annual NED Benefits for the No Action and Proposed Action Alternatives 3-25
Table 3-12 Storage-Yield Ratios 3-27
Table 3-13 Usable Storage Calculations (acre-feet) 3-29
Table 3-14 Updated Cost of Construction 1935 – 1967 3-30
Table 3-15 Updated Cost of Construction 1967 – FY 2012 3-31
Table 3-16 Updated Costs of Lands and Damages 3-31
Table 3-17 Joint Use Operations and Maintenance Costs 3-33
Table 3-18 Annual Payment for Use of Surplus Water (FY 2012 price levels) 3-34
Table 3-19 Annual Cost of Storage Computation Methods 3-34
Table 3-20 Annual Cost Comparison 3-35
Table 3-21 System-Wide Surplus Water 3-36

LIST OF FIGURES

Figure 2-1 Omaha District Civil Works Boundary and Mainstem Projects 2-6
Figure 2-2 Fort Peck Dam/Fort Peck Lake Project 2-7
Figure 2-3 Missouri River System Storage Zones 2-10
Figure 2-4 Fort Peck Lake Study Area 2-24
Figure 2-5 Historical Water Use in Counties Contiguous to Fort Peck Lake 2-25
Figure 3-1 Fort Peck Lake Public Water Suppliers 3-18
Figure 3-2 Rippl Diagram for Missouri River Reservoir System 3-26

FORT PECK DAM/FORT PECK LAKE, MONTANA
SURPLUS WATER REPORT

1. INTRODUCTION

1.1 Study Purpose

The purpose of the Fort Peck Dam/Fort Peck Lake, MT Surplus Water Report is to identify whether there is a quantity of surplus water is available in the Project, as defined in Section 6 of the 1944 Flood Control Act that the Secretary of the Army can use to execute surplus water supply agreements with water users, and to determine whether use of surplus water is the most efficient method for meeting regional municipal and industrial (M&I) water needs.

This Surplus Water Report and attached Environmental Assessment investigate the engineering and economic feasibility and environmental effects of temporary use of up to 6,932 acre-feet/year of yield (17,816 acre-feet of storage) from the Fort Peck Dam/Fort Peck Lake Project to meet municipal and industrial (M&I) water supply needs in the region over the 10-year study period. This Report has been prepared by the Omaha District, U.S. Army Corps of Engineers (Corps) under the Operation & Maintenance Program. Surplus water agreements based on this process would be executed with potential easement applicants upon approval of this Report by the Assistant Secretary of the Army (Civil Works) and completion of required NEPA analysis. The term of surplus water agreement is for up to a five (5) year period, renewable for up to an additional five (5) year period, subject to recalculation of reimbursement after the initial five (5) year period.

A 10-year study period has been established for this surplus water study. The length of the study period was selected for two reasons. First, surplus water agreements may be executed for a five (5) year period, renewable for an additional five (5) year period. Second, prior to the end of the 10-year study period, the Corps recommends that a comprehensive strategy to address long-term regional water needs be developed that may involve the Administration, Congress, and stakeholders. The surplus water agreements executed upon the approval of this Report will serve as measures to address temporary water needs of the region during the 10-year study period.

The temporary use of a total of 6,932 acre-feet/year of yield (17,816 acre-feet of storage) being requested is in excess of existing use plus the total amount for which easements have currently been requested. The amount of surplus water assessed in this analysis is based on potential future demand over the 10-year study period. The amount in excess of intake easement requests received to date has been included for the purposes of efficiency and responsiveness, so that potential requests over the period of analysis can be evaluated and approved.

1.2 Study Authority

The Fort Peck Dam/Fort Peck Lake, MT, Surplus Water Report study is being conducted under the authority of Section 6 of Public Law 78-534, the 1944 Flood Control Act. Under Section 6, the Secretary of the Army is authorized to enter into agreements for surplus water with states, municipalities, private concerns, or individuals at any reservoir under the control of the Department of the Army. Specifically, Section 6 states that:

> *"[T]he Secretary of War is authorized to make contracts with <u>States, municipalities, private concerns, or individuals</u>, at such prices and on such terms as he may deem reasonable, for domestic and industrial uses for surplus water that may be available at any reservoir under the control of the War Department: Provided, That no contracts for such water shall adversely affect then existing lawful uses of such water."*

ER 1105-2-100, page 3-32, paragraph 3-8a states:

> *"The Secretary of the Army can also enter into agreements with states, municipalities, private entities or individuals for the use of surplus water as defined in, and under the conditions described in, Paragraph 3-8b(4). Surplus water can also be used to respond to droughts and other emergencies affecting municipal and industrial water supplies."*

ER 1105-2-100, paragraph 3-8b(4), entitled, "Surplus Water" states*:*

> *"Under Section 6 of the Flood Control Act of 1944, the Secretary of the Army is authorized to make agreements with states, municipalities, private concerns, or individuals for surplus water that may be available at any reservoir under the control of the Department. These agreements may be for domestic, municipal, and industrial uses, but not for crop irrigation.*

ER 1105-2-100, paragraph E-57b(2) states:

> *(2) Classification.*
>
> *(a) Surplus Water will be classified as either:*
>
> *(1) water stored in a Department of Army reservoir that is not required because the authorized use for the water never developed or the need was reduced by changes that occurred since authorization or construction; or*
>
> *(2) water that would be more beneficially used as a municipal and industrial water than for the authorized purpose and which, when withdrawn, would not significantly affect authorized purposes over some specified time period.*
>
> *(b) An Army General Counsel opinion of March 13, 1986, states that Section 6 of the 1944 Flood Control Act empowers the Secretary of the Army to make reasonable reallocations between different project purposes. Thus, water stored for purposes no longer necessary can be considered surplus. In addition, the Secretary may use his broad discretionary authority to reduce project outputs, envisioned at the time of authorization and construction, if it is believed that the municipal and industrial use of the water is a higher and more beneficial use….*
>
> *(3) Requirements and Restrictions. Surplus water declarations will only be made when related withdrawals would not significantly affect authorized purposes. Surplus water agreements shall be accompanied by a brief letter Report similar to reallocation Reports and shall include how and why the storage is determined surplus. Surplus water agreements will normally be for small amounts of water and/or for temporary use as opposed to storage reallocations and a permanent right to that storage. Normally, surplus water agreements will be limited to 5 year*

periods. Use of the Section 6 authorities should be encouraged only where non-Federal sponsors do not want to buy storage because the need of the water is short term or the use is temporary pending the development of the authorized use. The views of the affected state(s) will be obtained, as appropriate, prior to entering into any agreement under Section 6. The annual price deemed reasonable for this use of surplus water is determined by the same procedure used to determine the annual payment for an equivalent amount of reallocated storage plus an estimated annual cost for operation and maintenance, repair, replacement, and rehabilitation. The total annual price is to be limited to the annual costs of the least cost alternative, but never less than the benefits foregone (in the case of hydropower, revenues forgone).

1.3 Need for Surplus Water

Identification of surplus water within the Fort Peck Dam/Fort Peck Lake, MT Project would allow the Corps of Engineers to satisfy temporary M&I water supply demands within the region (including existing users and future demands should they develop). Approval of this Report is a necessary pre-condition to executing surplus water agreements with, and issuing easements to, applicants for withdrawal of surplus water from the Corps Project.

Temporary use of surplus water is not expected to cause significant adverse effects to existing authorized purposes and will not involve any structural changes to the project.

The Environmental Assessment (EA) is provided as Appendix A to this Report and further explains the needs, benefits and effects of this proposed use of surplus water in Fort Peck Lake. Descriptions of existing conditions are contained in the Environmental Assessment and incorporated into this Surplus Water Report by reference, in the interest of brevity.

1.4 Report Organization

The Water Surplus Report summarizes the results of the technical investigations in support of a request for use of surplus water from the Fort Peck Dam/Fort Peck Lake Project. Report sections include:

Executive Summary

Section 1 – Introduction

Section 2 – Project Background

Section 3 – Plan Formulation

Section 4 – Plan Implementation

Section 5 – Conclusions

Section 6 - Recommendations

Technical appendices, which present details of technical investigations and supporting documentation, are provided in separate volumes. Technical Appendices include:

Appendix A Environmental Assessment / FONSI

2. PROJECT BACKGROUND

2.1 Project Location

The Fort Peck Dam/Fort Peck Lake, MT Project is located in northeastern Montana in the Missouri River Valley in McCone, Valley, Garfield, Phillips, Petroleum, and Fergus Counties (Figure 2-1). It is the oldest and furthest upstream project in the Corps of Engineers' (Corps) Missouri River Mainstem Reservoir System. The dam is on the Missouri River approximately 1,771.5 miles upstream from its mouth and approximately 11 miles upstream from its confluence with the Milk River. The other five Missouri River mainstem projects are also shown in Figure 2-1, and include: Garrison Dam/Lake Sakakawea, Oahe Dam/Lake Oahe, Big Bend Dam/Lake Sharpe, Fort Randall Dam/Lake Francis Case, and Gavins Point Dam/Lewis & Clark Lake.

2.2 Project Authorization

The 1935 Rivers and Harbors Act was the original authorization for Fort Peck Dam/Fort Peck Lake. The Act provided for operations *"primarily for navigation, with such arrangements for future installation of power as will permit the maximum production of hydroelectric power consistent with the primary demands of navigation."* The authorization was in accordance with recommendations of the Chief of Engineers in House Document 238, 73rd Congress, 2d session (February 5, 1934). The subsequent Fort Peck Act, approved May 18, 1938 authorized completion, maintenance, and operation of Fort Peck Dam/Fort Peck Lake *"for the purpose of improving navigation on the Missouri River, and for other purposes incidental thereto, the dam and appurtenant works now under construction at Fort Peck, Montana, and a suitable power plant for the production of hydroelectric power shall be completed, maintained, and operated under the direction of the Secretary of War (now Army) and the supervision of the Corps of Engineers, subject to the provisions of this Act relating to the duties of the Bureau of Reclamation ... respecting the transmission and sale of electric energy generated at said project*" (Public Law 529, 75th Congress).

The Flood Control Act of 1944 authorized construction of the Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point Dams & associated reservoirs. The Corps modified the operation of Fort Peck Dam/Fort Peck Lake to incorporate it into the Missouri River Mainstem Reservoir System (Figure 2-1) operations, which are authorized for multiple purposes including flood control, irrigation, navigation, hydroelectric power, and other purposes. Congress was notified of the incorporation by the Chief of Engineers during Congressional hearings in 1957.

Under the Flood Control Act of 1944, the Corps was given the responsibility for development of projects on the main stem of the Missouri River. Tributary projects were made the responsibility of the Corps if the dominant purpose was flood control. The Department of the Interior was designated as the marketing agent for all power, beyond project requirements, produced at Corps projects.

The Department of the Interior subsequently designated the Bureau of Reclamation (BOR) as the marketing agent for power generated by the main stem projects. The Department of Energy Act (1977 Department of Interior Organization Act) established the Department of Energy and simultaneously withdrew the power marketing function from the Department of Interior and moved it to the new Department of Energy. In 1986, the Water Resources Development Act (Public Law 99-662) authorized recreation as a specific project purpose at Fort Peck.

2.3 Project Description

2.3.1 Fort Peck Dam

Fort Peck Dam, at river mile 1,771.5 (1960) near Glasgow, MT, is one of six multipurpose mainstem projects which operate as part of a system on the Missouri River. Construction of Fort Peck Dam commenced in October 1933 with funds provided by Congress for the relief of unemployment. Construction was completed in 1940. The project was funded as part of the National Industrial Recovery Act through the Public Works Administration. Hydropower was added later as an authorized purpose. The original intent of the dam was to improve downstream navigation. In addition, dam construction was intended to benefit the local and national economy. Over 10,000 people were employed during the peak construction period. To house the workers in the sparsely populated area, a new town, Fort Peck, was constructed. Several shanty towns also sprang up to house workers and families. Many of the Fort Peck town site buildings remain and are listed on the National Register of Historic Places (NRHP).

Fort Peck Dam is the largest hydraulically filled dam in the United States. The dam measures 21,026 feet in length with a maximum height of 250.5 feet. The total combined capacity of the five turbines generates 185,250 kilowatts of power.

2.3.2 Fort Peck Lake

Fort Peck Lake, which has a drainage area of 57,500 square miles, is the impoundment created by Fort Peck Dam. It is the fifth largest manmade reservoir in the United States based on storage capacity, which is 18.5 million acre-feet. The lake is typically 2 to 5 miles wide and backs up from the dam approximately 134 river miles to the west and south creating 1,520 miles of shoreline. At maximum operating pool (2250 feet mean sea level (msl)), the surface area of the lake covers approximately 246,000 acres (See Figure 2-2).

Figure 2-1
Omaha District Civil Works Boundary and Mainstem Projects

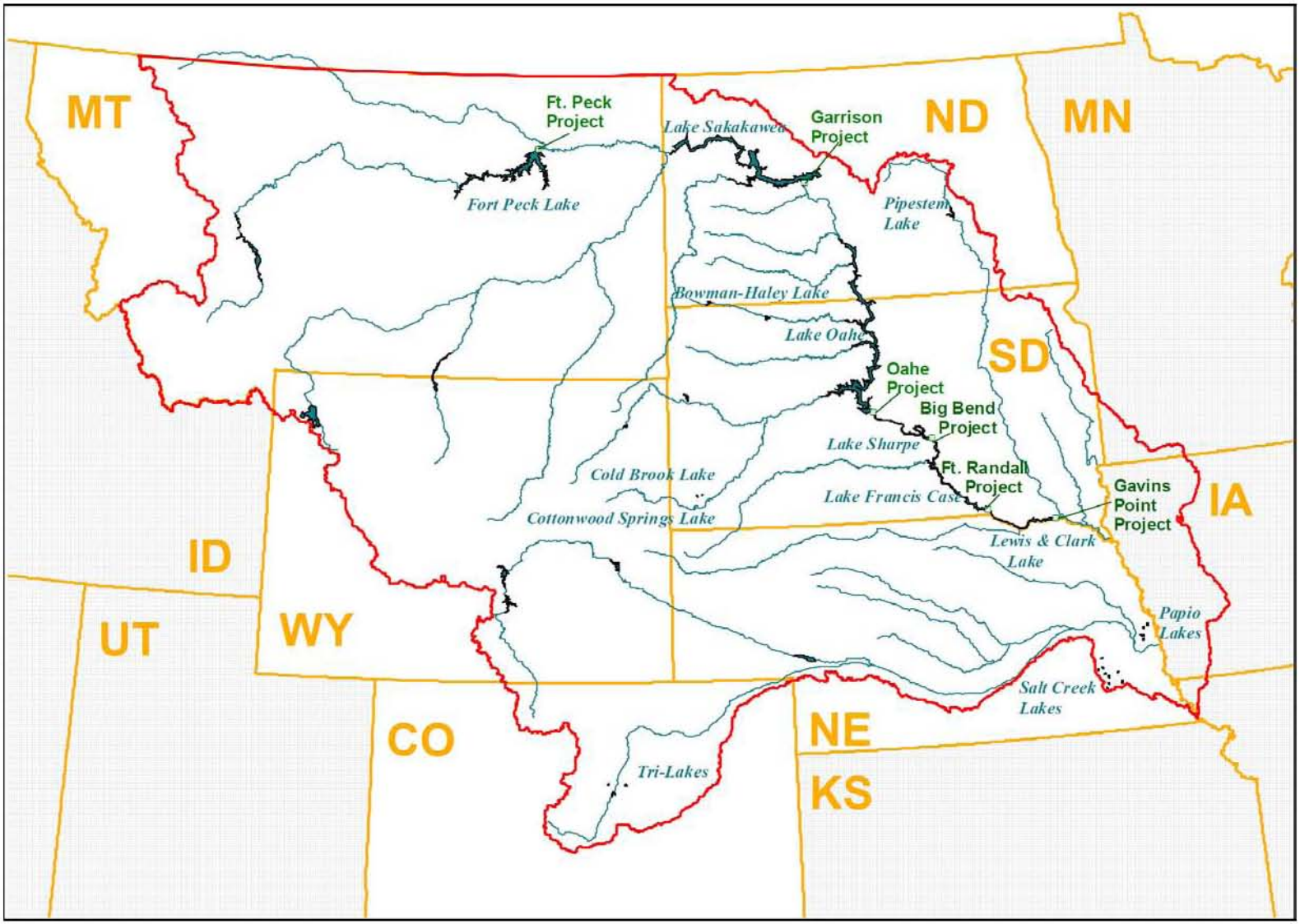
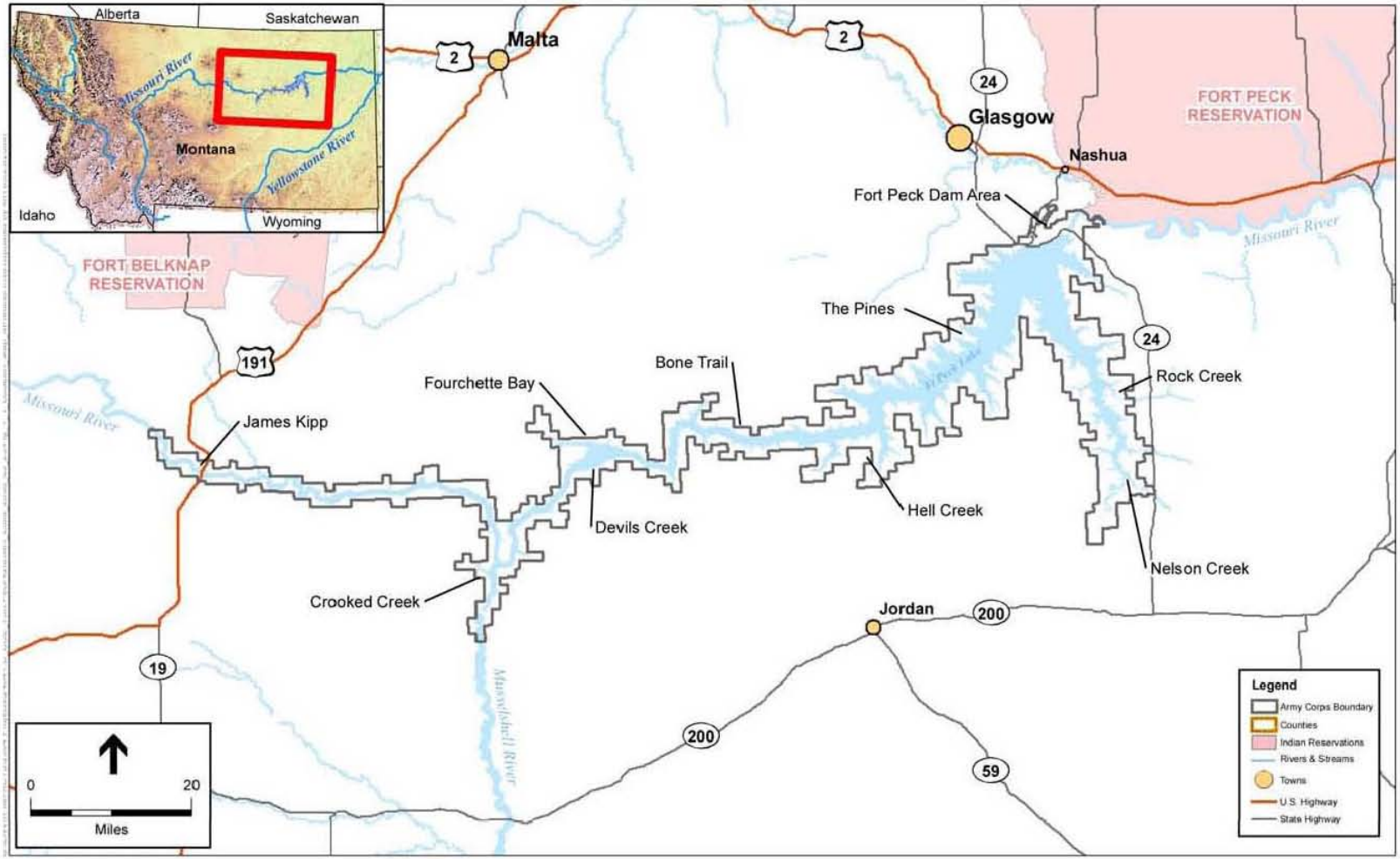


Figure 2-2
Fort Peck Dam/Fort Peck Lake Project



.

2.4 Authorized Project Purposes

The Missouri River begins at the confluence of the Jefferson, Madison, and Gallatin Rivers, near Three Forks in the Rocky Mountains of southwest Montana. The Fort Peck project was originally designed and intended for the primary purpose of improving navigation flows from Sioux City, Iowa to the confluence with the Mississippi River, with the incidental purposes of flood control and hydropower. After additional storage was built on the mainstem of the Missouri River, the Fort Peck project was incorporated into the operation with the five other mainstem reservoirs to create a system that is operated for flood control, navigation, hydropower, fish and wildlife, recreation, municipal and industrial water supply, water quality, and irrigation. Criteria described in the Missouri River Mainstem Reservoir System Master Water Control Manual are formulated to ensure water management in accordance with project purposes. To achieve full coordination within the entire Missouri River basin and to meet all of the authorized project purposes, operation of all six mainstem reservoirs is directed by the Missouri River Basin Water Management Division located in Omaha, Nebraska, part of the U.S. Army Corps of Engineers (Corps) Northwestern Division.

The six mainstem reservoirs operated by the Corps are listed in Table 2-1. Fort Peck Lake provides a significant storage contribution to the mainstem system of reservoirs. It is the third largest of the six reservoirs, with a storage capacity of approximately 18.5 million acre-feet (MAF), which comprises over one fourth (25 percent) of the total 73.1 MAF storage capacity in the mainstem system.

Table 2-1
Missouri River Mainstem Reservoirs

Project (Dam and Reservoir)	Incremental Drainage Area (Square Miles)	Year of Closure	Flood Control and Multiple Use Storage in Acre-Feet (AF)	Total Storage in Acre-Feet (AF)
Fort Peck Dam/ Fort Peck Lake	57,500	1937	2,704,000	18,463,000
Garrison Dam/ Lake Sakakawea	123,900	1953	4,222,000	23,821,000
Oahe Dam/ Lake Oahe	62,090	1958	3,201,000	23,137,000
Big Bend Dam/ Lake Sharpe	5,840	1963	117,000	1,798,000
Fort Randall Dam/ Lake Francis Case	14,150	1952	1,309,000	5,418,000
Gavins Point Dam/ Lewis & Clark Lake	16,000	1955	86,000	450,000

Source: Final Missouri River Mainstem System 2009-2010 Annual Operating Plan, Plate 2, Dec. 2009

2.5 Missouri River System Reservoir Regulation

The six Missouri River projects are operated as an integrated system by the U.S. Army Corps of Engineers, Missouri River Basin Water Management Division. Operations of the system are guided by the Missouri River Basin Mainstem Reservoir System Master Water Control Manual (Revised March 2006) (Master Manual). In order to achieve the multi-purpose benefits for which they were authorized and constructed, the six system reservoirs are operated as a hydraulically and electrically integrated system. The Master Manual describes the integrated operation of these six projects. The Master Manual serves as a guide to meeting the operational objectives of the System when regulating the six system reservoirs. The Master Manual also includes the integrated operation of both system and tributary reservoir water control plans so that an effective plan for flood control and conservation operations exists within the basin.

In general, the primary water management functions of the Fort Peck Dam/Fort Peck Lake Project are threefold[1]:

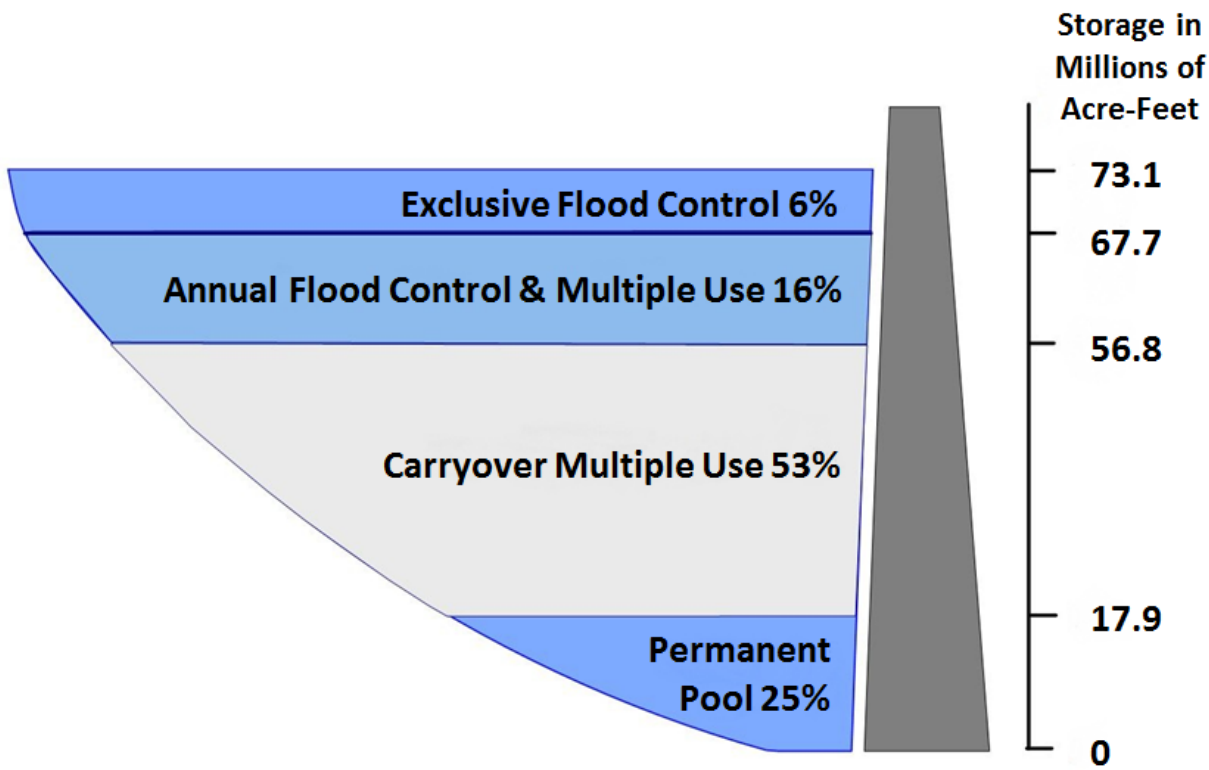
- to capture mountain and plains snowmelt and localized drainage area runoff, which are then metered out at controlled release rates to meet the system's authorized purposes while reducing flood damages in the downstream reach from the Fort Peck Dam to Lake Sakakawea;
- to serve as secondary storage for water accumulated in the system when releases from downstream dams are reduced for flood control regulation, thereby alleviating pool level increases at the Garrison, Oahe, and Fort Randall Projects; and
- to provide the extra water needed to meet all of the System's Congressionally authorized purposes during low water years.

Each of the six mainstem projects, including the Fort Peck Dam/Fort Peck Lake Project, has its own Water Control Manual. Annual water management plans (Annual Operating Plans, or AOPs) are prepared each year, based on the water control criteria contained in the Master Manual, in order to detail reservoir regulation of the system for the current operating year.

For the purpose of reservoir regulation, the storage capacity at Fort Peck Lake (and for the five other mainstem reservoirs) is divided into four zones. Figure 2-3 displays the four zones and shows total capacity in each zone for all system reservoirs combined. The text following Figure 2-3 describes the storage volumes in each zone just for the Fort Peck Dam/Fort Peck Lake Project.

[1] Missouri River Mainstem Reservoir System Master Water Control Manual, Revised March 2006

Figure 2-3
Missouri River System Storage Zones



For the Fort Peck Dam/Fort Peck Lake Project, starting at the bottom, there is the 4.1 MAF permanent pool between elevations 2030.0 and 2160.0 feet msl. This storage provides a minimum pool for fisheries, minimum hydropower storage, and sedimentation, and is not available for regulation purposes. Above the permanent pool there is the 10.7 MAF carry-over multiple-use zone between elevations 2160.0 and 2234.0 feet msl. This intermediate zone provides a storage reserve for navigation, power production, irrigation, and other beneficial conservation uses. This zone also provides carry-over storage for maintaining downstream flows through a succession of years in which runoff is below normal. The next zone is the 2.7 MAF annual flood control and multiple use zone between elevations 2234.0 and 2246.0 feet msl. This is the desired operating zone. Water stored in this zone is normally evacuated by March 1 of each year to provide adequate storage capacity for the flood season. During the flood period, water is impounded in this space as required. Finally, the upper zone, or exclusive flood control zone, consists of 0.97 MAF of storage between elevations 2246.0 and 2250.0 feet msl. This zone is used only during periods of extreme high water and is evacuated as soon as downstream conditions permit.

Regulating the Missouri River Mainstem Reservoir System is essentially a repetitive annual cycle. Unless water conservation measures are being implemented, the reservoirs are evacuated to the bottom of the annual flood control and multiple use zone (2234.0 msl for Fort Peck Lake) by March 1. Because the major portion of the annual runoff enters the reservoirs between March and July, storage accumulates and usually reaches a peak during early July. Releases from Fort Peck Lake are scheduled throughout the remainder of the year to provide support for hydropower

production and other authorized purposes. Releases during the summer and winter are generally higher than those in the spring and fall because of increased demand for hydropower.

During periods of normal to above normal runoff, these releases evacuate the water stored in the annual flood control and multiple use zone, drawing the reservoir down to the top of the carryover multiple-use zone (elevation 2234.0 feet msl for Fort Peck Lake) by the following March 1, when the cycle begins once more. During a period of extended drought, water is drafted from the large carryover multiple-use zone. The conservation storage provided in the carry-over multiple-use zones of the six mainstem reservoirs was designed to serve all authorized project purposes through a drought like that of the 1930s, though at reduced levels.

Table 2-2 shows the monthly average maximum and minimum and the annual average Fort Peck Lake elevations and releases for the period since the mainstem reservoir system first filled to normal operating levels in June 1967 through March 2011. This actual 44-year period of record is comprised of 26 years of near normal or above normal annual runoffs and 18 years of drought (1977, 1980-81, 1987-92, and 2000-2008). As of early 2011, the reservoir level reached its all-time high of 2251.6 feet msl in July 1975 and its all-time low of 2196.2 msl in March 2007.

In 2011 the mainstem Missouri River Reservoir System experienced the largest volume of flood waters since the initiation of record-keeping in the nineteenth century[2]. The unprecedented runoff occurred because of record rainfall over portions of the upper basin, well above average plains and mountain snowmelt, historically high inflow into the system, and record peak releases from the System dams: 65,000 ft3/s at Fort Peck, 150,000 ft^3/s at Garrison, 160,000 ft^3/s at Oahe, 166,000 ft^3/s at Big Bend, 160,000 ft^3/s at Fort Randall, and 160,000 ft^3/s at Gavins Point[3].

Table 2-2
Summary of Fort Peck Lake Pool Elevations and Releases by Month
(**June 1967 –March 2011)**

Month	Pool Elevation (feet msl)			Daily Release (1000 cfs)		
	Average Max	Average Min	Average Mean	Average Max	Average Min	Average Mean
Jan	2228.2	2227.0	2227.6	11.8	9.1	10.6
Feb	2227.1	2226.2	2226.6	11.8	9.5	10.9
Mar	2227.6	2226.0	2226.8	10.6	5.4	7.9
Apr	2228.3	2227.4	2227.9	9.4	5.4	7.4
May	2230.0	2228.0	2228.9	10.8	6.9	9.0

[2] Missouri River Independent Review Panel (MRIRP). 2012. Review of the Regulation of the Missouri River Mainstem Reservoir System During the Flood of 2011. On Line at: www.nwd-mr.usace.army.mil/rcc/MRFTF/default.html
[3] Ibid.

Jun	2232.5	2229.9	2231.2	11.1	7.9	9.6
Jul	2233.3	2231.9	2232.7	11.0	8.5	9.9
Aug	2232.6	2231.4	2232.0	11.1	8.6	9.9
Sep	2231.6	2230.5	2231.0	10.2	7.3	8.7
Oct	2230.9	2230.0	2230.4	9.1	6.8	7.9
Nov	2230.3	2229.4	2229.9	10.1	6.5	8.3
Dec	2229.5	2228.3	2228.9	10.8	7.9	9.4
Annual	2230.0	2228.7	2229.4	10.6	7.5	9.1

Source: U.S. Army Corps of Engineers, Northwest Division, Missouri River Basin Water Management Division, Monthly Project Statistics http://www.nwd-mr.usace.army.mil/rcc/information.html

2.5.1 Flood Control

Fort Peck Lake, the upper most upstream project in the mainstem system, is operated as part of the system to assist in the control of downstream flooding along the Missouri River. As described above, the system is operated to draw down the pool to the base of the flood control and multiple use zone (2234 feet msl for Fort Peck Lake) by March 1 of every year in order to prepare for the spring and summer flood seasons. Reservoir levels are lowered to provide maximum flood control storage levels during the high flood risk period, which is comprised of the plains snowmelt season (late February – April) and the mountain snowmelt period (May through July). Table 2-2 above shows that this operational target has been achieved at Fort Peck Lake over the 40-year period of record, with mean March monthly pool levels of 2226.8. A review of the minimum, maximum and mean daily releases during the months leading up to and including March is indicative of the wide range of flexibility in managing outflows to reach the target pool levels. Based on yearly Corps calculations of flood damages prevented, the main stem system has prevented $44.3 billion in damages (2010 dollars) through September of 2010, of which $10.5 billion was credited to the Fort Peck project.

2.5.2 Navigation

The Missouri River Reservoir System is operated in part to meet the needs of downstream navigation interests. The normal 8-month navigation season extends from April 1 through November 30. During this period, System releases are scheduled, in combination with downstream tributary flows, to meet downstream target flows. Daily releases from Gavins Point, commonly referred to as the System releases, fall into two classes. Open-water releases, generally in the range of 21,000 to 35,000 cfs, are made in support of Missouri River navigation and other downstream uses. Winter releases after the close of navigation season are much lower, and vary depending on the need to conserve or evacuate System storage while managing downstream river stages for water supply given ice conditions. In years with adequate water supply, System releases are scheduled to provide adequate flows for navigation at the target locations of Sioux City, Omaha, Nebraska City, and Kansas City (if navigation is occurring on the reaches associated with those targets). As described in the Master Manual, flow support for navigation and other downstream purposes is defined based on service level. A “full-service” level of 35,000 cfs results in target flows of 31,000 cfs at Sioux City and Omaha, 37,000 cfs at

Nebraska City and 41,000 cfs at Kansas City. Similarly, a "minimum-service" level of 29,000 cfs results in target flow values of 6,000 cfs less than the full service levels.

The relation of System storage to navigation service level is presented in Table 2-3. Selection of the appropriate service level is based on the actual volume of System storage on March 15 and July 1st of each year. With the present level of streamflow depletions, inflows to the System are sufficient to support the minimum-service flow levels or higher for the full 8-month navigation season in 78 years of the 100-year record period (inflows from 1898 to 1997) and full-service flows or higher for the 8-month navigation season in 55 years of the 100-year period.

Table 2-3
Relation of System Storage to Navigation Service Level

Date	System Storage	Navigation Service Level
March 15	54.5 MAF or more	35,000 cfs (full-service)
March 15	49.0 to 31 MAF	29,000 cfs (minimum-service)
March 15	31.0 MAF or less	No navigation service
July 1	57.0 MAF or more	35,000 cfs (full-service)
July 1	50.5 MAF or less	29,000 cfs (minimum-service)

Fort Peck was initially planned to improve navigation along the lower Missouri River between St. Louis, Missouri, and Sioux City, Iowa. In the "308 Report[4]" to the Secretary of War dated 30 September 1933, the Chief of Engineers recommended that *"the reservoir at the site of Fort Peck be built to the maximum practicable capacity; and be operated primarily for navigation, with such arrangements for future installation of power as will permit the maximum production of hydroelectric power consistent with the primary demands of navigation ..."* Incorporated as part of House Document 238, navigation was legislated as a project purpose through the River and Harbor Act of 1935 and was provided for in the Fort Peck Act of 1938.

Although navigation on the Missouri River originally opened up settlement of this area of Montana, there is no commercial navigation through this reach of the river today. Releases from mainstem reservoirs serve navigation downstream from Gavins Point Dam in the lower reaches of the Missouri River, to its confluence with the Mississippi River.

[4] "308 Report" refers to a report made under the provisions of House Document No 308, Sixty-ninth Congress, first session, which was enacted into law with modifications, in section 1 of the River and Harbor Act approved January 21, 1927. As defined in the document and in the River and Harbor Act of March 3, 1925, the primary purpose of this report is "the formulation of general plans for the most effective improvement of the river for the purposes of navigation, and the prosecution of such improvement in combination with the most efficient development of the potential water power, the control of floods, and the needs of irrigation."

2.5.3 Irrigation

The original planning studies carried out by both the Bureau of Reclamation (Senate Document 78-191) and the Corps (House Document 78-475) anticipated that Federal irrigation projects would be supported for the Missouri River Basin Mainstem System. The Corps plans allowed for an irrigation withdrawal from the Garrison Project to provide for water supply into the Dakotas. The Bureau's plans provided for over ninety new projects that would provide irrigation service to over 4,700,000 additional acres of land in the basin. Over half of these additional acres, or approximately 2,300,000 acres would be served by the existing Fort Peck project in Montana and three new mainstem projects. A key component of the Bureau's plan was the proposed Oahe project which would hold almost 7 million more acre-feet of water than the total of two projects that were planned by the Corps in the same area. Irrigation was also a primary component of the Corps cost allocations for the Mainstem System Projects. As an example, the Corps 1958 cost allocation report anticipated an average annual depletion from the mainstem system for irrigation of 6,387,000 acre-feet of which 2,534,000 acre-feet would be for irrigation from tributaries above Sioux City and 3,853,000 acre-feet of depletion related to irrigation from main stem projects.

The Corps and Bureau's combined plan for the mainstem system (Senate document 78-247), was incorporated by Congress into the 1944 Flood Control Act. The combined plan for the mainstem system provided for the Corps' Garrison Project, the larger Oahe project that had been proposed by the Bureau, along with three smaller downstream projects, and the already constructed Ft. Peck Project in Montana. Thus, the mainstem projects as approved by Congress in the 1944 Flood Control Act included substantial capacity in the mainstem system which would be able to provide for the irrigation of 2,300,000 acres of land when fully developed.

Between 1944 and 1965, the Bureau of Reclamation carried out studies to assess the feasibility of irrigating lands planned for North Dakota by diversions from the Ft. Peck project. The studies indicated that the soil was not suitable for irrigation primarily because of glacial subsoil. The Bureau of Reclamation revised the diversion plan proposing to take water from the Garrison Dam to irrigate other lands to the east. With the new name "Garrison Diversion," the Bureau of Reclamation 1957 feasibility study on the redesigned project recommended irrigation of 1,007,000 acres and other water development in central and eastern North Dakota.

Because of changes to the Bureau's original irrigation plans for the upper basin and language in a 1964 appropriations act requiring specific reauthorization for all units of the Bureau's Pick-Sloan Missouri Basin Program, legislation was sought by the Bureau for the revised project plan. In 1965 Congress authorized the revised plan in the Garrison Diversion Unit Act and construction began in 1967. The GDU project was designed to divert Missouri River water to central and eastern North Dakota for municipal and industrial water, fish and wildlife development, recreation and flood control along with irrigation of 250,000 acres. The Snake Creek Pumping Plant, McClusky Canal, and New Rockford Canal are largely constructed components of the authorized Principal Supply Works of the GDU, however these features are not yet considered plant in service. The 1986 Garrison Diversion Unit Reformulation Act reduced irrigation emphasis of the GDU and increased the emphasis on meeting municipal, rural, and industrial Garrison Dam / Lake Sakakawea, North Dakota (MR&I) water needs throughout North Dakota. The Act authorized a Sheyenne River water supply and release feature and water treatment plant.

Appraisal level studies were conducted from 1994 to 2000. The Dakota Water Resources Act of 2000 (P.L. 89-108) authorized the Secretary of the Interior to develop irrigation for 13,700 acres in the Turtle Lake service area, 10,000 acres in the McClusky Canal service area, 1,200 acres in the New Rockford Canal service area, 15,200 acres within the boundaries of the Fort Berthold Indian Reservation, and 2,380 acres within the Standing Rock Indian Reservation. In addition to the above projects, 31 agricultural irrigation water systems have intakes for withdrawing water directly from Lake Sakakawea, although the Army does not have authority to enter into agreements with irrigators.

Although the Bureau's originally envisioned Federal mainstem irrigation projects have not developed as initially planned, numerous irrigators withdraw water directly from the reservoirs and downstream river reaches. Demand for this irrigation use is relatively small and minimum releases established for water quality control and other uses are usually ample to meet the needs of irrigators. However, low reservoir levels and low river stages can at times make access to the available water supply difficult or inconvenient to obtain for these users. When reasonably possible, the system is regulated to serve this authorized project purpose. However present use for irrigation is relatively minor and the full mainstem system capacity originally planned for irrigation has not yet developed. There are currently nine easements with irrigation allocations totaling 2,948 acre-feet per year (Table 3-4) at Fort Peck Lake.

2.5.4 Municipal and Industrial (M&I) Water Supply

Fort Peck Lake currently provides minimal municipal water supply, primarily to cabins along the lake, the town of Fort Peck, and the Fort Peck Rural Water District. The towns of Glasgow and Saint Marie have a shared intake that withdraws water from the Missouri River at Nelson Dredge, downstream of Fort Peck Dam. The intake is located on Corps property.

Overall, 109 water supply intakes and intake facilities are located on Fort Peck Lake. These include 1 municipal water supply facility, 5 irrigation intakes, 101 domestic intakes, and 2 public intakes. The municipal water supply facility serves a population of approximately 580 persons. Cabin owners own the majority of the domestic intakes, which are generally used in lawn watering, car washing, and fire protection. Domestic intakes along this reach are not generally used to provide drinking water, which is obtained from neighboring towns.[5]

2.5.5 Hydropower

Hydropower was authorized as a project purpose in the Fort Peck Act of 1938 (Public Law 529, 75th Congress). This and subsequent legislation established the strategy for marketing power through the Bureau of Reclamation (later transferred to the Department of Energy, Western Area Power Administration (WAPA)). Construction of one powerhouse was started in 1940; another was started in 1959. Generators were placed in operation in 1943 and 1961.

The six System dams support 36 hydropower units with a combined plant capacity of 2,501 megawatts (MW) of potential power generation. These units provide an average of 10 million megawatt-hours (MWh) of energy per year. The Fort Peck power plant has a total generating capacity of 185,250 kilowatts (kW), with an average annual output of 1 billion kilowatt-hours.

[5] Missouri River Mainstem Reservoir System Master Water Control Manual, USACE, 2006, page E-1

The main preference for hydroelectric power is given to customers in the Montana area rural electric cooperatives. Power generated at Fort Peck is integrated with the generation provided from other mainstem projects, as well as that generated from other public and private facilities throughout the WAPA power marketing area. All power generated is marketed by the WAPA.

Firm energy is marketed on both an annual and a seasonal basis, recognizing the seasonal pattern of releases made for navigation and required for flood control. During the navigation season, releases from the four uppermost reservoirs are varied in an effort to generate the greatest amount of energy at the times the power loads are the greatest. During the winter period, the most critical with respect to maintaining load requirements, releases from Fort Peck and Garrison are scheduled at relatively high rates to compensate for reduced power production at the downstream powerplants. The fall drawdown at Fort Randall makes available space for recapture of winter power releases from upstream reservoirs. In years of low energy generation due to downstream ice problems or low water availability, energy from other sources is obtained in the winter to help serve firm loads. Generally, the navigation season energy generation is adequate to meet firm load requirements; however, during periods of reduced system releases for downstream flood control or during extended drought periods, WAPA must also purchase large amounts of energy in the summer to serve firm loads.

The highest average power generation period extends from mid-April to mid-October, with high peaking loads during the winter heating season (mid-December to mid-February) and the summer air conditioning season (mid-June to mid-August). The major maintenance periods for the system hydropower facilities extend from March through mid-May and September through November, which normally are the lower demand and off-peak energy periods.

During the summer, releases at all projects other than Gavins Point are normally within the powerplant discharge capacity, the river channel downstream usually being more than adequate to carry such releases. Discharges from all projects will usually be made through the powerplant. At all projects except Gavins Point, hourly release rates may vary widely as necessary to meet fluctuating power loads. Unusually large inflows during any particular year may require significant releases that bypass the powerplants at any or all projects to evacuate flood waters and thereby maintain the future flood control capability of the system.

2.5.6 Fish and Wildlife

The protection of fish and wildlife and their habitat as a Fort Peck project purpose has evolved since the original conception of the project and its purposes[6]. Executive Order 7509 dated 11 December 1936 created the Fort Peck Game Range (now known as the Charles M. Russell National Wildlife Refuge [CMR]). Approximately 1.1 million acres were withdrawn from public domain lands for the CMR, which encompasses and includes virtually all Fort Peck project lands.

The Secretary of the Interior was ultimately tasked with management of the wildlife and forage resources on the withdrawn lands comprising the CMR. By issuing these overlapping land withdrawals, it was apparently intended that the respective agencies apply their expertise in managing the array of resources in a manner that would not interfere with the mandate of the

[6] Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment Missouri River, Montana, August 2008, U.S. Army Corps of Engineers Omaha District

other agency. In the "General Plan for Use of Project Land and Water Areas for Fish and Wildlife Conservation and Management, Fort Peck Dam and Reservoir Project," drafted by the Department of the Interior, the Department of the Army, and the State of Montana, it was agreed that *"all or any portion of the fee-owned lands of the project area, determined by the Secretary of the Army to be available for administration for wildlife purposes, will be made available by the Secretary of the Army to the Secretary of the Interior in accordance with a cooperative agreement between the two agencies."*

In 2001, the Corps and the USFWS signed a Memorandum of Agreement (MOA) (DACW45-9-01-6027) related to the use and administration of Fort Peck lands. This agreement makes the Corps the lead agency for recreation management and the USFWS the lead agency for wildlife management. It grants the authority for issuing grazing leases on the CMR to the USFWS. This MOA expired in December 2005 and was replaced by a new MOA (DACW45-9-07-8054) in 2007[7].

Although the primary responsibility for wildlife management clearly rests with the Department of the Interior, the Corps has routine authority to manage the project in a manner that will benefit wildlife resources.

Construction of the system has been one of the most important contributions to sport fishing in the Missouri River basin. The large, popular reservoirs attract fishermen from many states to fish for trophy size northern pike, walleye, sauger, lake trout, and chinook salmon. The construction and regulation of the system has, however, altered the natural streamflow of the Missouri River. An early spring rise and a late spring-summer rise characterized the natural hydrograph. High flows resulted from the plains snowmelt, from spring and summer rains, and from the mountain snowmelt. Low flows typically occurred in late summer and fall. Regulation of flows by the system has reduced spring flows and has increased late summer, fall, and winter flows to varying degrees, depending on how far downstream from Gavins Point the reach is located, thus altering the habitat of native riverine fish species. River reaches between the reservoirs are now characterized by cooler water temperatures with widely fluctuating daily stages. In addition, the system is regulated to provide protection for the three ESA listed species: the endangered interior least tern, the threatened piping plover, and the endangered pallid sturgeon. A detailed discussion of the effects of system operations on fish and wildlife is provided in the attached Environmental Assessment.

2.5.7 Recreation

The generic recreation authority in Section 4 of the 1944 Flood Control Act provided an opportunity for recreation at Fort Peck. Section 861 of the Water Resources Development Act of 1986 provided for recreation as a Fort Peck project purpose. Recreational use of project lands is encouraged through public parks and recreation facilities. Mainstem projects are managed to provide a high quality outdoor-recreation experience and as much diversity as is practicable. Recreational planning and improvements are supportive of and compatible with the Montana Statewide Comprehensive Outdoor Recreation Plan (SCORP). The Corps and its partners manage 22 public recreation areas around the project. Four of those are managed in cooperation

[7] Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment, Update of Design Memorandum MFP-105D, August 2008, page 1-10

with the State of Montana or the Bureau of Land Management (BLM). In addition, the Corps, USFWS, and Fort Peck Paleontological Institute (FPPI) jointly manage the Fort Peck Interpretive Center. Recreation facilities at the Fort Peck Lake include three marinas, 231 camping sites, and three swimming areas.[8]

Water levels are a key factor in recreational use of the reservoirs and river reaches. Pool levels at the upper three reservoirs, including Fort Peck Lake, vary widely in response to drought conditions. Although recreation may be affected by high reservoir levels and releases, periods of extended drought that result in significant lowering of reservoir levels and releases have a greater impact. At low reservoir levels, some boat ramps and recreational areas do not provide access to the reservoirs. Low releases may impact boat access and maneuverability between and below system dams. During the two major droughts since the system first filled, many boat ramps have been extended or relocated to maintain access. Shortening of the navigation season during droughts also has the effect of shortening the recreation season below the system due to the greatly reduced flows, and the shortening also results in an earlier drawdown for Fort Randall, impacting recreation access on that reservoir.

2.5.8 Water Quality

Water quality was added as an authorized purpose of the Fort Peck project when it was incorporated into the Missouri River Mainstem Reservoir System. Water quality was authorized as a project purpose in the 1944 Flood Control Act in terms of silt control; soil erosion prevention; pollution abatement; adequate and safe municipal water supplies; improving water quality for irrigation; provision of water suitable for domestic, sanitary, and industrial purposes; and improving the clarity of water for recreation and for fish and wildlife. Silt control was also intended to aid the navigation channel downstream.

Water quality in Fort Peck Lake must comply with the State of Montana's standards for B-3 waters. The standards require that the Lake be *"maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, recreation; and agricultural and industrial water supply"* (Montana Code Annotated 17.30.624-625). In addition, Fort Peck Lake must be maintained for growth and propagation of non-salmonid fishes. The Corps water quality monitoring program and Fort Peck Lake's water quality characteristics are described in Chapter 2 of the Fort Peck Dam/Fort Peck Lake Master Plan[9].

The State of Montana has placed the Missouri River, from Bullwhacker Creek to Fort Peck Lake on the 303(d) list. The Missouri River in this area has been assessed as partially supporting of aquatic life and warm water fishery use, and was found not to be supporting of drinking water use[10].

---

[8] Missouri River Mainstem Reservoir System Master Water Control Manual, Revised March 2006

[9] Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment Missouri River, Montana, August 2008, S Army Corps of Engineers Omaha District

[10] Montana Department of Environmental Quality (MTDEQ). 2010. Water Quality Standards Attainment Record, Fort Peck Reservoir. On-line at: http://cwaic.mt.gov/wqrep/2010/assmtrec/MT40E004_010.pdf (accessed January 2011)

The Missouri River downstream of Fort Peck Dam to the Milk River is classified as B-2 by the State of Montana and was found to be fully supporting of agricultural, drinking water, industrial, and primary contact recreation uses. B-2 waters are to maintain growth and marginal propagation of salmonid fishes and associated aquatic life. In addition, it was found to be partially supporting of aquatic life and cold water fishery uses[11]. The Missouri River, from the Milk River to the Poplar River and from the Poplar River to North Dakota (all downstream of the Fort Peck Dam), has been listed on the 303(d) list. The River in this area has been assessed as partially supporting of aquatic life and warm water fishery.

Fort Peck Lake has also been listed on the 303(d) list. Impairment to the uses of drinking water supply and primary contact recreation are attributed to the presence of: lead, mercury, and metals. Lead and mercury levels in the reservoir exceed human health standards and the State of Montana has also issued a fish consumption advisory for Fort Peck Lake because of mercury concerns[12].

Agriculture, impacts from abandoned mine lands, livestock (grazing or feeding operations), and resource extraction have been listed as the primary probable sources contributing to the impairment of rivers, streams and creeks in the Fort Peck Lake Watershed[13]. Agriculture, atmospheric deposition, historic bottom deposits, impacts from abandoned mine lands, and resource extraction have been listed as the primary probable sources contributing to impairment of Fort Peck Lake itself[14].

Fort Peck Lake maintains habitat for warmwater and coldwater species. This is possible because of the reservoir's thermal stratification in the summer, which results in a colder bottom region (hypolimnion) and a warmer surface region (epilimnion). The coldwater species present in the Fort Peck Lake are Chinook salmon, which are maintained through regular stocking, lake trout, and cisco[15]. Water temperature and dissolved oxygen levels are the primary water quality factors that determine the suitability of a waterbody for coldwater aquatic life. Coldwater habitat is defined by Montana Water Quality Standards as water having a temperature $\leq$ 19.4° C and a 7-day mean dissolved oxygen concentration $\geq$ 5.0 mg/l.

Water quality conditions were monitored in Fort Peck Lake from May through September during a 5-year period from 2002 through 2006[16]. The water quality surveys were conducted at six reservoir sites in the deepwater areas on the Missouri River and Dry Creek Arms of the reservoir; three inflow sites on the Missouri River, Musselshell River, and Big Dry Creek; and one outflow site. The three inflow sites were chosen to represent water quality conditions of water flowing

[11] Ibid.

[12] Montana Department of Environmental Quality (MTDEQ). 2010. Water Quality Standards Attainment Record, Fort Peck Reservoir. On-line at: http://cwaic.mt.gov/wqrep/2010/assmtrec/MT40E004_010.pdf (accessed January 2011)

[13] Ibid.

[14] Ibid.

[15] U.S. Army Corps of Engineers (USACE). 2008. Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment, Missouri River, Montana. Update of Design Memorandum MFP-105D. Northwest Division, Omaha District.

[16] Ibid.

into the Fort Peck Lake[17]. Samples were taken monthly at the reservoir and inflow sites, from June through September. On a few occasions measured dissolved oxygen concentrations were below the state water quality standards criterion of 5 mg/l. The measured low dissolved oxygen concentrations occurred in the hypolimnion near the reservoir bottom during the late summer/early fall thermal stratification period[18]. During the 3-year period between 2004 and 2006, coldwater habitat ranged from the entire reservoir volume to 2.7 MAF on the low end during August 2006[19].

Water temperatures have been monitored in the Missouri River downstream of Fort Peck Dam over the past several years as part of a larger effort to study the federally endangered pallid sturgeon population in the Missouri and Yellowstone Rivers. A late spring/early summer water temperature of 18° C or more in the Missouri River at Frazier Rapids, approximately 25 miles downstream of the Fort Peck Dam, is critical for pallid sturgeon spawning and recruitment within that reach of the river[20]. The temperature of the discharged water was found to be below the pallid sturgeon requirement: the temperature of the water discharge in late spring/early summer stayed below 14° C, and water temperatures only rose to near 18° C during the late summer/early fall[21].

2.6 Montana Water Permit Process

Because Montana waters belong to the state or to the Tribe, water rights holders do not own the water itself. Instead, they possess a right to use the water, within state guidelines. Water rights in Montana are guided by the prior appropriation doctrine, that is, first in time is first in right. A person's right to use a specific quantity of water depends on when the use of water began. The first person to use water from a source established the first right; the second person could establish a right to the water that was left, and so on. During dry years, the person with the first right has the first chance to use the available water to fulfill that right. The holder of the second right has the next chance. Water users are limited to the amount of water that can be beneficially used. In Montana, the term "beneficial use" means, generally, a use of water for the benefit of the appropriator, other persons, or the public, including but not limited to agricultural (including

[17] U.S. Army Corps of Engineers (USACE). 2007c. Water Quality Special Study Report: Water Quality Conditions Monitored at the Corps' Fort Peck Project in Montana during the 3-Year Period 2004 through 2006. Report Number: CENWO-ED-HA/WQSS/Fort Peck/2007. Water Quality Unit, Water Control and Water Quality Section, Hydrologic Engineering Branch, Engineering Division, Omaha District, USACE, Omaha, NE.

[18] Ibid.

[19] Ibid.

[20] U.S. Army Corps of Engineers (USACE). 2008. Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment, Missouri River, Montana. Update of Design Memorandum MFP-105D. Northwest Division, Omaha District.

[21] U.S. Army Corps of Engineers (USACE). 2007c. Water Quality Special Study Report: Water Quality Conditions Monitored at the Corps' Fort Peck Project in Montana during the 3-Year Period 2004 through 2006. Report Number: CENWO-ED-HA/WQSS/Fort Peck/2007. Water Quality Unit, Water Control and Water Quality Section, Hydrologic Engineering Branch, Engineering Division, Omaha District, USACE, Omaha, NE.

stock water), domestic, commercial, fish and wildlife, industrial, irrigation and spraying, mining, municipal, power, and recreational uses.

A beneficial water use permit is used to apply for appropriations of groundwater of more than 35 gallons per minute or 10 acre-feet per year and all surface water. Submission of this application must include applicable addendums and is filed with the Water Resources Division of the Montana Department of Natural Resources and Conservation. Montana has closed some of its river basins to certain types of new appropriations because of water availability problems, over-appropriation, and a concern for existing water rights. Applicants to appropriate ground water in "closed basins" must submit a hydrological assessment, which predicts that the appropriation would have no net depletion of surface water. Closed basins within the Fort Peck Project study area include the Milk River Basin (Valley County) and Musselshell River Basin (Petroleum and Garfield Counties) [22].

2.7 Corps of Engineers Surplus Water Agreements, Easements, and Permits

Surplus water agreements, easements, and any necessary permits will be required for any non-Federal entity requesting surplus water from the Fort Peck Dam/Fort Peck Lake Project. These are separate legal / regulatory instruments and are described individually below. As stated previously, the Corps of Engineers will not issue a surplus water agreement, water pipeline or water intake structure easement, or an accompanying permit with any non-Federal entity without their already having obtained a water allocation permit from the State of Montana.

2.7.1 Surplus Water Agreements

Surplus water agreements are negotiated agreements between the Army Corps of Engineers and a non-Federal entity for the authorized use of surplus water in a Corps project or facility. These agreements are executed under authority of Section 6 of the Flood Control Act of 1944 (33 U.S.C. 708). Execution of a Surplus Water Agreement may be required from any entity requesting water from the Fort Peck Dam/Fort Peck Lake Project.

2.7.2 Easements

Easements are required for water pipelines and water intake structures on Corps project lands. No easement that supports a water supply agreement will be issued prior to the water supply agreement being executed by all parties (Corps of Engineers Real Estate Policy, as of 2008). All future easements will contain an explicit reference to the surplus water agreement or water storage agreement and provide an explicit provision for termination of the easement for noncompliance with any of the terms and conditions of the surplus water agreement.

2.7.3 Regulatory Permits

Regulatory permits are required from the Corps of Engineers under Section 10 of the Rivers and Harbors Act for work or structures in, on, over or under navigable waters, and under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the United States. The Missouri River is a navigable waterway subject to regulation under these statutory authorities. Any party intending to divert water from the Missouri River, and any action in or

[22] Water Rights in Montana, Montana University System Water Center, MSU-Bozeman, November 2009

affecting the Missouri River, whether free flowing or impounded, may also require a regulatory permit from the U.S. Army Corps of Engineers.

2.7.4 Existing Agreements, Easements, and Permits

There is not a one-to-one correlation between existing agreements, easements and permits. As of October 2007, there were 59 easements on the Fort Peck project for rights-of-way for waterlines, roads, electric power lines, gas pipelines, and miscellaneous uses. In 2011, there were 73 water withdrawal related easements at the Fort Peck Project (Table 3-1).

2.7.5 Pending Agreements, Easement, and Permits

As of June 2011, there are two pending withdrawal related easements for the Fort Peck Project. Both applications are for domestic irrigation. One pending easement is a renewal (0.25 acre-feet) and one is a new request for waterline access and 0.8 acre-feet of withdrawal per year.

2.8 Historic Water Use

The six-county study area includes the first tier counties at the Fort Peck Dam/Fort Peck Lake project, which are the counties that border Fort Peck Lake. These first tier counties include Fergus, Garfield, McCone, Petroleum, Phillips, and Valley counties (Figure 2-4). In 2010 these counties had an estimated population of 26,642 (Table 2-4).

Table 2-4
Historic Study Area Population

Historic Population in the Counties Surrounding Fort Peck Lake

County, ST	1930	1940	1950	1960	1970	1980	1990	2000	2010
Fergus, MT	16,531	14,040	14,015	14,018	12,611	13,076	12,083	11,893	11,586
Garfield, MT	4,252	2,641	2,172	1,981	1,796	1,656	1,589	1,279	1,206
McCone, MT	4,790	3,798	3,258	3,321	2,875	2,702	2,276	1,977	1,734
Petroleum, MT	2,045	1,083	1,026	894	675	655	519	493	494
Phillips, MT	8,208	7,892	6,334	6,027	5,386	5,367	5,163	4,601	4,253
Valley, MT	11,181	15,181	11,353	17,080	11,471	10,250	8,239	7,675	7,369
Total	47,007	44,635	38,158	43,321	34,814	33,706	29,869	27,918	26,642

The US Geological Survey (USGS) estimates water use by county in five year cycles. The most recent data available is the 2005 estimate. The estimates for 2010 are projected to be available in 2014[23]. In 2005, and in previous years, agricultural use (irrigation and livestock) have been the dominant water use in the study area (Table 2-5 and Figure 2-5). Evaluating trends in this data can be problematic as the USGS has changed their methodology more than once since 1985, though some trends do persist. Recently there has been a slight upward trend in public use and a slight downward trend in domestic use. These trends likely represent large numbers of previously self-supplied domestic users converting to public & rural water supply systems, as those systems expand farther into rural areas. There are also recent and significant variations in

[23] http://water.usgs.gov/watuse/ accessed 21Jun12

Irrigation and Livestock water use. These changes are cyclical, due to weather conditions affecting irrigation. The increase in Aquaculture (fish farms raising species such as tilapia and rainbow trout) water use represents a true increase in water use, though this relatively small increase is more than offset by gradual declines in other use-types. Also note that here were severe drought conditions experienced in the region between 1995 and 2005.

Table 2-5
Historical Water Use in the Six-County Fort Peck Area (AF)

Use-Type	1985	1990	1995	2000	2005
Public*	5,593	4,304	4,517	3,721	4,069
Domestic	1,087	986	986	1,087	807
Industrial	157	179	191	168	482
Power	-	-	-	-	-
Mining	415	549	583	420	258
Livestock	7,992	8,609	8,440	7,432	6,423
Aquaculture	-	78	78	426	773
Subtotal	15,244	14,706	14,796	13,255	12,812
Irrigation	578,278	578,883	570,174	594,061	613,677
Total	593,523	593,590	584,970	607,315	626,489

Source: US Geological Survey, Estimated Use of Water in the US, County-Level Data

*Public = Municipal + Rural Water Supply

Figure 2-4
Fort Peck Lake Study Area

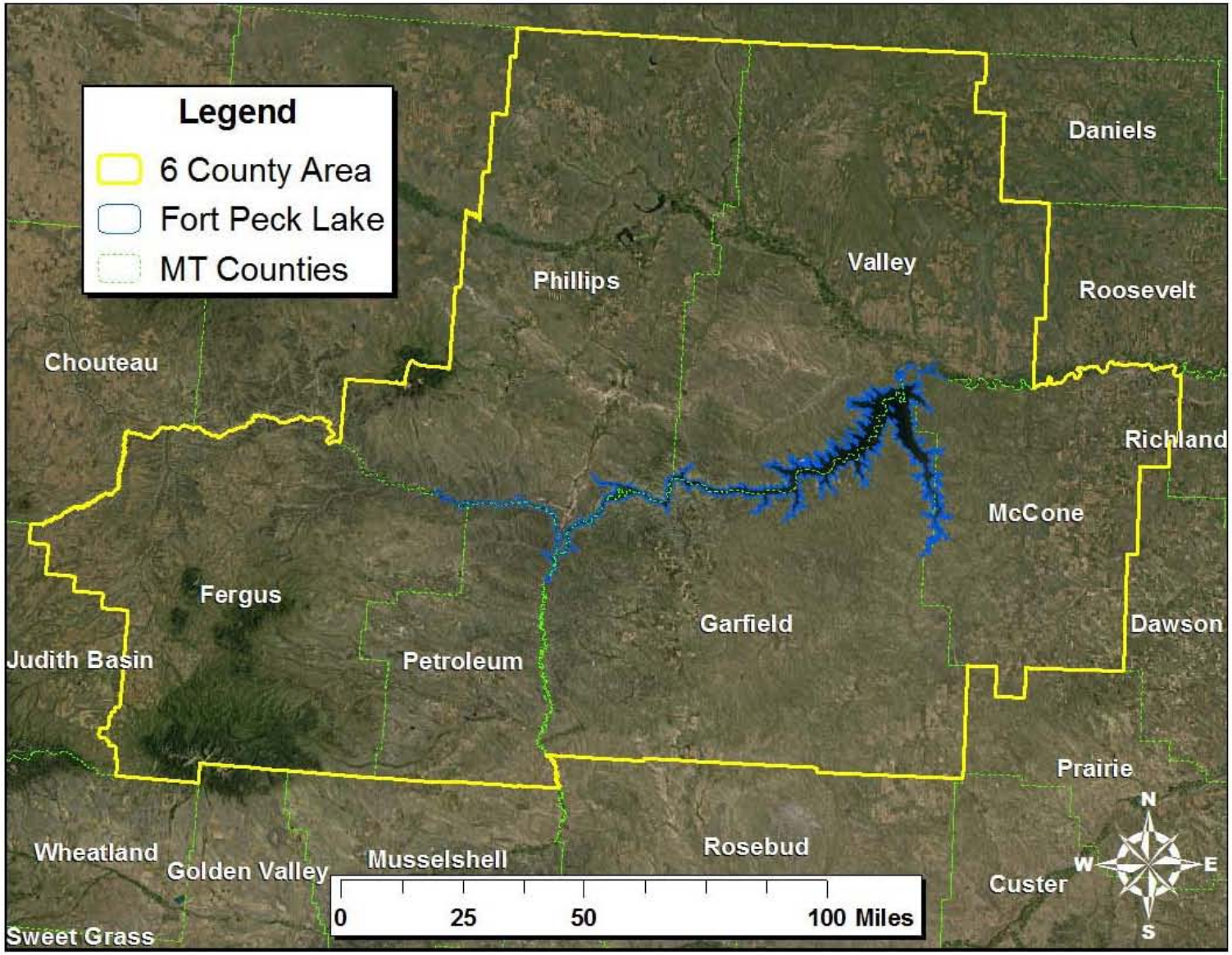
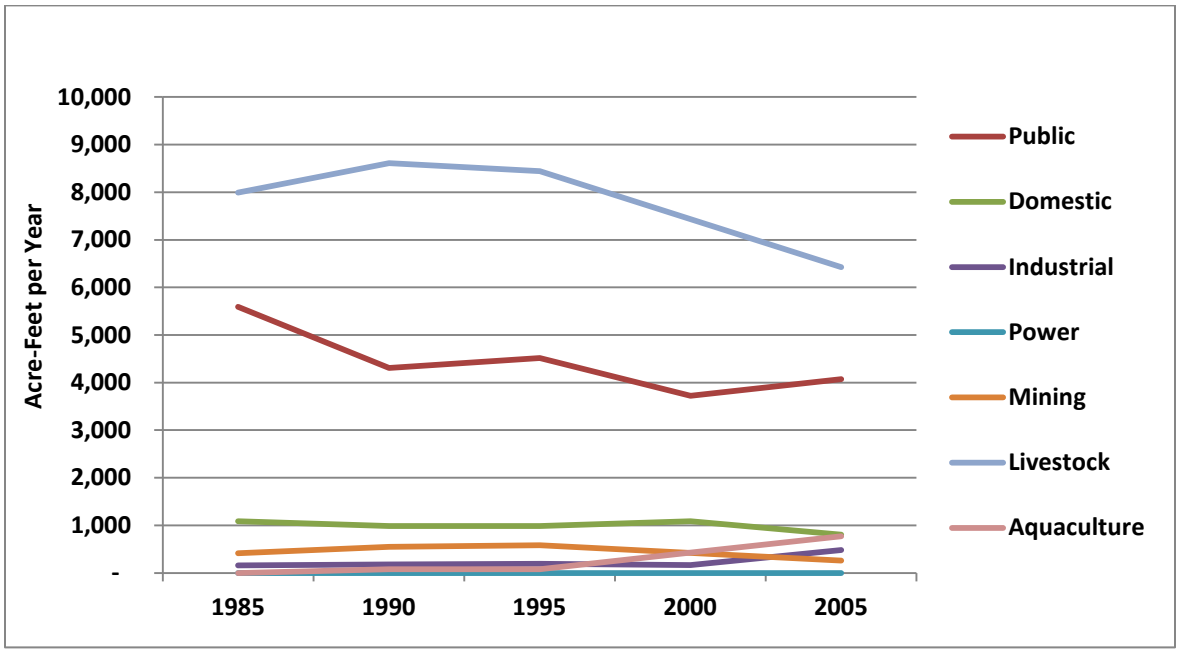


Figure 2-5
Historical Water Use in Counties Contiguous to Fort Peck Lake



2.9 Corps Studies and Reports by Others

Numerous documents and reports have been prepared describing the Fort Peck Dam/Fort Peck Lake Project, project operations, operations of the Missouri River system, and water resources within the study area. A more comprehensive listing of past reports is contained in the Environmental Assessment (Appendix A). Principal source documents for this analysis included the following Corps of Engineers reports:

- Missouri River Mainstem Reservoir System Master Water Control Manual Missouri River Basin, Reservoir Control Center U. S. Army Corps of Engineers Northwestern Division - Missouri River Basin Omaha, Nebraska, Revised March 2006; and
- Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment Missouri River, Montana Update of Design Memorandum MFP-105D, August 2008.

3. PLAN FORMULATION

Plan formulation for the Fort Peck Dam/Fort Peck Lake Surplus Water Study has been conducted in accordance with the six-step planning process described in *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (1983) and the *Planning Guidance Notebook* (ER 1105-2-100, dated April 2000). The six steps in the iterative plan formulation process are:

1. Specify water and related land resources problems and opportunities;
2. Inventory and forecast existing conditions;
3. Formulate alternative plans;
4. Evaluate alternative plans;
5. Compare alternative plans; and
6. Select the recommended plan.

The basis for selection of the recommended plan for the study is fully documented below, including the rationale used in plan formulation and plan selection. Should requests for additional temporary surplus water in amounts greater than those identified in this analysis materialize, then further study would be required. An analysis of long-term pool usage would determine if permanent changes are needed through development of a long-term strategy.

3.1 Problems and Opportunities / Need for Surplus Water

As stated in Section 1.1, the purpose of this study is to identify whether there is a quantity of surplus water is available in the Project, as defined in Section 6 of the 1944 Flood Control Act that the Secretary of the Army can use to execute surplus water supply agreements with water users, and to determine whether use of surplus water is the most efficient method for meeting regional municipal and industrial (M&I) water needs. The Omaha District, U.S. Army Corps of Engineers anticipates future requests for new water supply easements, which will require separate NEPA actions because they were not ripe for action when this study was initiated. Based on Corps policy, easement requests cannot be processed until a determination is made by the Secretary of the Army that surplus water is available in the Fort Peck Dam/Fort Peck Lake Project and that use of the surplus water will not significantly affect existing lawful uses of Fort Peck Lake water.

Fort Peck Lake currently has a total of 73 easements with a total estimated water use of 6,302 acre-feet of yield (Table 3-1). It is assumed that easement holders will use their entire yield allotment. Out of the 73 total easements, 40 easements with a total estimated water use of 1,508 acre-feet of yield will expire within ten years. There are 19 existing easements with a total estimated water use of 972 acre-feet of yield, which have already expired. It is assumed that all current water use will continue at existing rates (including water use via currently expired easements).

Temporary use of 6,932 acre-feet/year of yield (equivalent to 17,816 acre-feet of storage) is being evaluated in this analysis. The 6,932 acre-feet/year of surplus water yield was selected by the Omaha District based on an estimated potential 10% growth in future M&I water demand from the existing total estimated use of 6,302 acre-feet over the 10-year planning period. Since the State of Montana does not foresee an appreciable increase in future M&I demand at Fort

Peck Lake, there is little risk that the future demand will be more than 10% of the existing use. There is also little risk if the 10% demand does not develop as that simply means that water that has been determined temporarily available as surplus would not be utilized. This surplus water determination has been evaluated for the purposes of efficiency and responsiveness, so that storage volume associated with all reasonably foreseeable future surplus water needs over the period of analysis could be evaluated and approved in one single action by the Assistant Secretary. Should resource impacts from the temporary use of 6,932 acre-feet/year of surplus water (equivalent to 17,816 acre-feet of storage) prove significant, then lesser amounts could be evaluated.

Table 3-1
Easements & Yield by Expiration & Use Type at Fort Peck Lake

	Easements and Acre-feet of Yield									
Use-Type	**Expired**		**Within 10 Years**		**After 10 Years**		**Perpetual**		**Total**	
Irrigation	1	195.0	4	1,409.8	1	330.0	3	1,013.0	9	2,947.8
Domestic	15	613.9	36	98.5	6	129.3			57	841.7
Municipal					2	750.0	2	1,600.0	4	2,350.0
Unknown	3	162.7							3	162.7
Total	19	971.6	40	1,508.3	9	1,209.3	5	2,613.0	73	6,302.2

The problem of how best to provide cost effective municipal and industrial (M&I) water supply to support potential future water needs in Montana, and the need for surplus water from the Fort Peck Dam/Fort Peck Lake project to meet future potential demand, is quantified in the following demand analysis.

3.2 Identification of Surplus Water

An agreement for "surplus water" conveys the right to use water from a Corps Project. The authority to enter into agreements for the use of surplus water was granted to the Secretary of the Army by Section 6 of the 1944 Flood Control Act, as amended. Section 6, states in relevant part as follows:

> *"That the Secretary of War [now Army] is authorized to make contracts with States, municipalities, private concerns, or individuals, at such prices and on such terms as he may deem reasonable, for domestic and industrial uses for surplus water that may be available at any reservoir under the control of the War Department: Provided, That no contracts for such water shall adversely affect the existing lawful uses of such water. …"*

These agreements may be for domestic, municipal and industrial uses, but not for crop irrigation. The Corps' implementation guidance for Section 6 of the FCA, set forth in Section E-57 b., Appendix E, ER 1105-2-100, provides that surplus water can be, "*water stored in a Department of the Army reservoir that is not required because the authorized use for the water never*

developed or the need was reduced by changes that occurred since authorization or construction…". Thus, water can be identified as surplus because an authorized project purpose has not developed as anticipated. Corps guidance further provides that surplus water agreements will be accompanied by a brief report covering topics similar to those of storage reallocation reports and shall include how and why the storage is determined to be surplus.

This section is intended to answer the question of how and why water stored in a Corps' reservoir is determined to be surplus. In summary, in evaluating Fort Peck Lake individually and the Missouri River Main Stem System as a whole it appears clear that 6,932 acre-feet/year of water (equivalent to 17,816 acre-feet of storage) can be identified as temporary surplus water, the use of which over the next 10 years would not significantly affect project purposes (see Section 3.8.1.1 and Table 3-11). The following paragraphs provide justification for this conclusion.

3.2.1 Storage for Mainstem System Irrigation

As stated at the beginning of this section the Corps' implementation guidance for Section 6 of the FCA, set forth in Section E-57 b., Appendix E, ER 1105-2-100, provides that surplus water can be identified as surplus if an authorized project purpose has not developed as anticipated.

The planning documents for the mainstem system anticipated that approximately 2.3 million acres of land in the upper basin from Fort Peck to Sioux City would be irrigated out of the mainstem system[24]. The plan originally developed by the Department of the Army for the mainstem system was increased in the final joint plan by over 6 million acre-feet of storage to accommodate this projected irrigation need[25]. However, only a small fraction (approximately 15%) of the water in the mainstem system that was intended to be used for irrigation has been applied to that purpose to date. Furthermore, over 95% of irrigation water in the six county Fort Peck area is not sourced from the lake – so Fort Peck Lake is clearly not the preferred source of water for the majority of the irrigators in the area (see Tables 2-5 and 3-1).

Because the mainstem system projects are operated as a system, the undeveloped irrigation needs would have been supplied directly by the Fort Peck project, or coordinated through intra-system operations. Accordingly, utilizing only a small portion of the water in the mainstem reservoirs, including Fort Peck, that was originally anticipated to be used for irrigation and is now not anticipated to be fully used for that purpose for the next 5 to 10 years, to serve municipal and industrial needs within the next 5-10 years is considered appropriate as that water is deemed surplus in accordance with current Corps guidance.

3.2.2 Impacts to Existing Lawful Uses of Water

In addition to determining that water stored in an Army reservoir is surplus because the authorized use for the water never developed or the need was reduced by changes that occurred since authorization or construction, Section 6 of the FCA also provides that "*no contracts for such water shall adversely affect then existing lawful uses of such water*." This condition is fulfilled in two ways. First, a condition of surplus water agreements is that the recipients of such agreements hold the necessary State water rights, or in applicable cases, a water right issued by

[24] Reference Section 2.5.3 Irrigation
[25] Senate Document 78-247

the appropriate Tribal government. By requiring such rights, the Corps ensures that agreements for use of surplus water will not adversely affect any other preexisting lawful use of the water to be contracted and that use of the water is consistent with water right priorities established by State or Tribal laws. A condition of Corps agreements for the use of surplus water requires that the recipient demonstrate an appropriate State or Tribal water right.

Second, in addition to requiring a State or Tribal water right to withdraw water, the Corps ensures that lawful downstream uses will not be adversely affected by ensuring that the use of the water will not significantly affect operations for authorized purposes. This report documents that the use of a projected 6,932 acre-feet/year of surplus water at Fort Peck Lake would not significantly affect operations for authorized purposes. Fort Peck Lake is formed by the waters of the Missouri River stored behind the Fort Peck Dam. Fort Peck Dam is one of six mainstem dams operated as a coordinated unit providing flood control protection, storage for navigation, hydropower and other authorized uses. As described in this report, the use of 6,932 acre-feet/year of water (equivalent to 17,816 acre-feet of storage) in a project with a total capacity of 18.5 million acre-feet of storage, and a system with a capacity of 73.1 million acre-feet of storage will have a very minimal effect on mainstem system and project operational needs. The impacts associated with the use of 630 acre-feet of water (potential water use in addition to existing use) on authorized project purposes as described in this report are summarized in Section 3.8.

3.2.3 System Storage

The six mainstem system projects are operated in a hydraulically and electrically integrated system in order to achieve the multi-purpose benefits for which they were constructed[26]. The six mainstem projects together hold a combined storage of approximately 73.1 MAF. This storage is divided into as many as four zones per project: the exclusive flood control zone, which is used only for flood storage, the annual flood control and multiple use zone, which the projects normally operate under a wide range of runoff conditions, the carry over multiple use zone and the permanent pool zone. Zones are explained further in the Master Manual, Chapter VII. As indicated in the Master Manual the carry over multiple use zone provides a storage reserve for irrigation, navigation, power production, water supply, recreation, and fish and wildlife. The storage in this zone at Fort Peck, Garrison, and Oahe is designed to maintain downstream flows through a succession of well-below-normal runoff years. Serving the authorized purposes during an extended drought is an important regulation objective of the System and the primary reason the upper three System reservoirs are so large compared to other Federal water resource projects (see Section 6-02.3, Master Manual). Because federal irrigation projects have not developed as planned, the system-wide capacity to serve other authorized purposes during drought conditions has been greatly extended. The Permanent Pool Zone is an inactive zone and provides for a minimum power head, sediment storage capacity and other purposes.

3.2.4 Storage and Sediment

In its natural state, the Missouri River transported a sediment load averaging 25 million tons per year in the vicinity of Fort Peck, Montana; 150 million tons per year at Yankton, South Dakota;

[26] Missouri River Mainstem Reservoir System Master Water Control Manual Revised March 2006 (para. 1-02).

175 million tons per year at Omaha, Nebraska; and approximately 250 million tons per year at Hermann, Missouri, near its confluence with the Mississippi River[27]. With the construction of each of the System and tributary dams, the reservoirs have acted as catchments for the tremendous load of sediment carried by the Missouri River and its tributaries.

During the design phase of each of the main stem projects, sedimentation was acknowledged, sediment yield was estimated, and was a consideration in the project design. The Fort Peck Master Plan, Appendix C Pertinent Data identifies an average annual inflow of 17,700 acre-feet of sediment into the lake.

3.3 Water Supply Demand Analysis

For this study, water supply demand is assessed in two categories. The first is the existing water use by easement holders at Fort Peck Lake; the second is water use in the six-county study area, which is inclusive of easement holders at Fort Peck Lake. These two sources of demand are described separately in the sections below.

3.3.1 Water Supply Demand: Existing Fort Peck Lake Water Users

One hundred and nine (109) water supply intakes and intake facilities are located on Fort Peck Lake. These intakes service 138 Fort Peck Lake water rights holders, some of whom may share intakes, infrastructure, and easements[28]. Irrigation and Municipal use are the largest uses of Fort Peck Lake water (Table 3-2). Cabin owners own the majority of the domestic intakes, which are generally used in lawn watering, car washing, and fire protection. Domestic intakes along this reach are not generally used to provide drinking water, which is obtained from neighboring towns.[29]

Table 3-2
Montana Water Rights Permits Sourced from Fort Peck Lake by Use Type

Use-Type	Count	Average (AF/Yr)	Sum (AF/Yr)
Irrigation	12	332.3	3,988
Municipal	2	1,125.0	2,250
Stock	50	6.8	342
Other	11	20.9	230
Domestic	55	1.4	77
Lawn And Garden	8	3.4	27
Total	138	50.1	6,913

Source: MT DNRC, Water Rights Bureau, 2011 AF = Acre-Feet

[27] Missouri River Mainstem Reservoir System Master Water Control Manual Revised March 2006 (para. 3-04).
[28] The number of Fort Peck Lake water rights holders was estimated from state water permit data by identifying all water rights sourced from either Fort Peck Lake or the Missouri River
[29] Missouri River Master Manual, Appendix E, page E-1

Table 3-3
Montana Water Rights Permits Sourced from Fort Peck Lake by County

Use-Type	Count	Average (AF/Yr)	Sum (AF/Yr)
Valley	**68**	44.8	3,046
McCone	10	167.2	1,672
Fergus	7	208.6	1,460
Garfield	8	50.6	405
Phillips	16	14.7	235
Petroleum	29	3.3	95
Total	138	50.1	6,913

Source: MT DNRC, Water Rights Bureau,2011

AF = Acre-Feet

In order to accommodate these water right holders and their intakes the Corps has issued a total of 73 water intake easements around Ft. Peck Lake. Of these 73 water intake easements, approximately 81% (59) have either already expired or will expire within the next 10 years (Table 3-1). According to Corps policy, holders of these expired / expiring easements may be required to execute water supply agreements with the Corps of Engineers as a pre-condition to re-issuance of their current easements.

The quantities of water being withdrawn through these easements are difficult to determine from the available data. The Corps keeps records on easement allocations, but does not collect data on actual water usage. Tables 3-2 and 3-3 are derived from the Montana State Water Rights database. Water *rights* are available from that database, but not actual water *use*. The Corps has developed its own estimate of actual water use at Fort Peck Lake based on the assumption that the entire water right is equivalent to use. Table 3-4 presents this estimate in acre-feet/year by use type. Type of use is estimated from permit information, which may not be complete. There is no data set that allows direct correlation of State water use permits with Corps easements.

Table 3-4
Easements & Acre-Feet of Water Use at Fort Peck Lake by Type

Use-Type	Easements		Acre-Feet per Year	
Irrigation	9	12.3%	2,948	46.8%
Domestic	57	78.1%	842	13.4%
Municipal	4	5.5%	2,350	37.3%
Rural Water	-	0.0%	-	0.0%
Industrial	-	0.0%	-	0.0%
Other*	-	0.0%	-	0.0%

Unknown	3	4.1%	163	2.6%
Total	73	100.0%	6,302	100.0%

*Other Includes Livestock, Multipurpose, Sewer, Storm Sewer…
Source: USACE 2011

3.3.2 Total Water Supply Demand in the Study Area

The United States Geologic Survey estimates of general water use for the six-county area surrounding Fort Peck Lake identify a total use of 626,000 acre-feet in 2005. The six-county study area consists of Fergus, Garfield, McCone, Petroleum, Phillips, and Valley counties. The study area is shown in Figure 2-4.

Table 3-5 displays average water use by type for the six-county area. Irrigation is the major water use in the study area, accounting for 98% of all water use. Nearly all (97%) water use in the study area is supplied from surface water, of which approximately 1%, or 6,302 acre-feet, comes from the Fort Peck project. The other 99% of surface water use comes from a wide variety of rivers, lakes, tributaries, streams, springs, dry draws, et cetera. Most of these alternative surface water sources provide ample water to satisfy local demands. This abundance of locally available surface water sources means that Fort Peck Lake is not the primary water source for the vast majority of the study area. The lake does however provide a significant portion of the non-irrigation water use within the area. Excluding irrigation from the six-county water use data indicates that 45% of non-irrigation water use (5,728 acre-feet) is supplied from groundwater and 55% (7,084 acre-feet) is supplied from surface water, 47% of which comes from Fort Peck Lake.

Table 3-5
Water Use in the Six-County Fort Peck Area (AF)

Use-Type	Ground	Surface	Total
Public*	2,948.0	1,120.9	4,068.9
Domestic	784.6	22.4	807.1
Industrial	482.0	-	482.0
Irrigation	10,940.1	602,736.3	613,676.4
Stock	1,446.0	4,976.8	6,422.8
Aquaculture	56.0	717.4	773.4
Mining	11.2	246.6	257.8
Total	16,667.9	609,820.5	626,488.4

*USGS' "Public" use-type most closely approximates municipal use, 2010

Includes records for the 6 counties surrounding the Reservoir

As the 6-county study area is predominantly rural with a 2010 estimated population of 26,642, and population has declined from a high of 47,007 in 1930 (see Table 2-4), future growth in demand for non-irrigation water from Fort Peck Lake is expected to be minimal. For planning

purposes, it is anticipated that a quantity of additional surplus water equivalent to 10 percent of existing water use from Fort Peck Lake (or 630 acre-feet) will be more than sufficient to meet any likely future growth in demand over the next 5-10 years. This percentage was determined using best professional judgment and accounts for a variety of risk and uncertainty factors relevant to potential future water demand. These factors include potential changes in population, climate, industry, law, regulation, and consumption patterns – all of which could significantly affect demand for water over the next 5-10 years. Overall, it is estimated that 6,932 acre-feet/year of water would meet current (6,302 acre-feet) and potential future (630 acre-feet) water needs of the study area.

3.4 Planning Goals, Objectives, and Constraints

The following discussions identify the planning goals, objectives, and constraints used to formulate and evaluate the Federal interest in entering into agreements for the use of surplus water from the Fort Peck Dam/Fort Peck Lake Project to meet future water supply needs in the planning area over the next 10 years.

3.4.1 Planning Goals and Objectives

The goal of the Surplus Water Report is to determine whether there is surplus water available in the Fort Peck Dam/Fort Peck Lake Project and to evaluate whether entering into agreements for the use of surplus water from the Project is the most cost effective means of meeting the near-term (10-year) water needs of the study area. The study area is defined as the 6-county area surrounding Fort Peck Lake in Eastern Montana.

National water policy states that the primary responsibility for water supply rests with states and local entities, not the Federal government. However, the Corps can participate and cooperate with state and local entities in developing water supplies in connection with the construction, operation, or modification of Federal navigation, flood damage reduction, or multipurpose projects. Specifically, the Corps is authorized to provide storage in new or existing multipurpose reservoirs for municipal and industrial water supply. However, since water supply is a state and local responsibility, the cost of water supply storage and associated facilities in a Corps project must be paid for entirely by a non-Federal entity.

The Secretary of the Army is authorized to make agreements with states, municipalities and other non-Federal entities for the rights to utilize water supply storage in Corps reservoirs. The Secretary of the Army can enter into agreements with states, municipalities, private entities or individuals for the use of ‘surplus water’. Under Section 6 of the Flood Control Act of 1944, the Secretary of the Army is authorized to make agreements with states, municipalities, private concerns, or individuals for surplus water that may be available at any Corps reservoir. Surplus water agreements may be for domestic, municipal, and industrial uses, but not for irrigation.

Planning objectives for this study were developed to be consistent with Federal, State and local laws and policies, and technical, economic, environmental, regional, social, and institutional considerations. The planning objectives were used to help formulate and evaluate plans to avoid, minimize, and mitigate (if necessary), any adverse project impacts to the environment. Planning objectives also provide a decision framework to identify the least cost water supply alternative, avoid adverse social impacts, and meet local preferences to the fullest extent possible.

In pursuit of the project goal, the following Federal planning objectives were established:

- Determine if surplus water is available at the Fort Peck Dam/Fort Peck Lake Project and determine the storage amount to be evaluated for potential impacts, over the next 10 years;
- Anticipate demand and requests for surplus water agreements at the Project over the 10-year study period, including requests identified within this report and a forecast of additional requests;
- Determine repayment unit costs to apply to surplus water agreements.

Also in pursuit of the project goal, the following regional planning objectives were established:

- Provide sufficient water to meet the needs of existing and prospective applicants for new surplus water agreements at Fort Peck Dam/Fort Peck Lake for the next 10 years by the most efficient means;
- Provide sufficient water to meet the needs of current Fort Peck Dam/Fort Peck Lake water supply users whose existing easements will expire within the next 10 years.

This study develops and evaluates alternatives to determine how best to meet potential easement applicants' water needs within the constraints described below. The impacts of entering into agreements for the use of surplus water on other project purposes are assessed so that an optimal alternative that provides needed water supply and does not significantly impact other project purposes may be identified. The impacts assessed in this analysis include effects on: flood control, navigation, irrigation, hydropower, municipal and industrial water supply, fish and wildlife, recreation, water quality, and any associated environmental and economic effects.

3.4.2 Policy Guidance Considerations

Policy guidance considerations related to reservoir operations include maintenance of the project's ability to support currently authorized project purposes and to support other incidental uses. Currently authorized project purposes are: flood control, navigation, irrigation, hydropower, municipal and industrial (M&I) water supply, fish and wildlife, recreation, and water quality.

A second planning constraint relates to the requirements of Section 6 of the Flood Control Act of 1944. Under Section 6, the Secretary of the Army is authorized to make agreements with states, municipalities, private concerns, or individuals for surplus water that may be available at any Corps reservoir. The formulation and evaluation of alternative plans is constrained by the limitations imposed by Congress and Corps policy for temporary use of surplus water. These constraints/limitations include, but are not limited to:

- No agreement for surplus water may significantly adversely affect existing lawful uses of such water;
- Surplus water agreements can only be granted if the Secretary can classify surplus water as either: 1) water stored that is not required because the authorized use for the water was never developed or if the need for the authorized use was reduced or eliminated by changes in water demand that occurred since authorization or construction of the project; or 2) water that would be more beneficially used as municipal and industrial water than for the authorized project purposes and which, when withdrawn, would not significantly affect authorized purposes over some specified period of time; and

- Agreements for temporary use of surplus water are time limited and can only be granted for a period of up to 5 years, with a 5-year renewal option (for a total period of 10 years).

3.5 Management Measures

A management measure is a feature (i.e., a structural element that requires construction or assembly on-site), or an activity (i.e., a nonstructural action) that can either work alone or be combined with other management measures to form alternative plans. Management measures were developed to address study area problems and to capitalize upon study area opportunities. Management measures for this study were derived from a variety of sources including prior studies, agency and public input, and the project delivery team (PDT).

3.5.1 Identification of Management Measures

The following management measures were identified for initial consideration:

Structural Measures (Features)

- Structural modifications to the project to increase storage capacity
- Provision of surplus water from system-wide storage for undeveloped irrigation to M&I water supply for up to 10 years, including associated infrastructure (i.e., intakes, pipelines, storage and distribution facilities)
- Groundwater withdrawals, including associated infrastructure
- Surface water withdrawals from the Missouri River upstream or downstream of Fort Peck Lake, including associated infrastructure

Non-Structural Measures (Activities)

- Conservation / incentive programs / regulations / public education / drought contingency planning
- Water reuse / recycling
- Sale or lease of existing non-M&I use water right to an M&I use.

3.5.2 Screening of Management Measures

The following sub-sections evaluate and screen each of the structural and non-structural measures identified above to determine which measures should be carried forward in the planning process and included in the formulation of alternatives. The Water Resources Council's Principles and Guidelines[30] identify four criteria to be used in the formulation and evaluation of alternative plans: completeness, effectiveness, efficiency, and acceptability. At this phase of the planning process, management measures are screened, using these four criteria, to determine whether they have the potential to make meaningful contributions to achieving the goals and objectives of the project. While none of these criteria are absolute, it is clearly

30 Economic and Environmental Principles for Water and Related Land Resources Implementation Studies and The Economic and Environmental Guidelines for Water and Related Land Resources Implementation Studies, U.S. Water Resources Council, February 1983

reasonable to screen out from further consideration any management measure that: 1) does not contribute to meeting study goals and objectives to any significant extent (completeness), 2) is not effective in resolving study area problems and needs (effectiveness), 3) is not an efficient means of solving the problem when compared to other potential measures (efficiency), or 4) is not an acceptable solution to other Federal and non-Federal agencies and affected publics (acceptability).

This is not to imply that some management measures that are screened out from further consideration may not be beneficial public policies or effective solutions to other legitimate problems of the study area. Rather, management measures are screened out from further consideration when it can be reasonably determined that they will not meaningfully contribute to meeting study goals and objectives or resolving the problems and needs that the study was initiated to address.

3.5.2.1 Structural Measures

Four structural measures are considered below. Two structural measures are screened out from further consideration (i.e., structural modifications to the project and surface water withdrawals from free-flowing reaches of the Missouri River). Two structural measures are carried forward into formulation of alternative plans: groundwater withdrawals and temporary provision of surplus water from Fort Peck Lake.

Structural Modifications to the Project to Increase Storage Capacity

Corps of Engineers guidance[31] states that existing Corps projects may be modified to add storage for municipal and industrial water supply. Structural measures to increase the storage capacity of an existing dam typically include: auxiliary spillways, lined overflow sections, raising the dam, modifications to the existing spillway, and combinations of these measures. Environmental criteria that must be assessed when considering structural measures to increase storage capacity include: avoiding adverse impacts to the environment, mitigating any unavoidable environmental impacts, maintaining water quality and ecosystem functions during and after the modification, and achieving no net loss in environmental values and functions.[32]

The advantages of structural measures to increase storage capacity is that the needs of municipal and industrial water supply can be met without the negative effects on project users associated with taking water storage away from other authorized project purposes. The disadvantages of structural measures to increase storage capacity is that the studies necessary to design such modifications are lengthy and costly; and construction activities are similarly costly, time consuming, and can have significant impacts on the physical and natural environment. As a result, structural modifications to increase storage capacity are typically only considered when municipal and industrial water needs are so significant relative to total existing storage capacity that the effects of providing surplus water from existing storage would render the project unable to meet its authorized project purposes, and where the environmental effects of surplus M&I water use would exceed the environmental effects of structural modifications.

[31] ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, Paragraph 3-8.a.
[32] EM 1110-2-2300, General Design and Construction Considerations for Earth and Rock-Fill Dams, 30 July 2004

These considerations indicate that structural modifications would not be efficient and would likely be an unacceptable measure for the Fort Peck Dam/Fort Peck Lake Project. The amount of water being requested, 6,932 acre-feet/year, is only 0.045 percent of the net system yield of 15.2 million acre-feet, and the 1,620 acre-feet of storage required for a net additional depletion of 630 acre-feet would be less than 0.01 percent of total usable storage in Fort Peck Lake. As described in Section 3.7.1, use of this small portion of total system yield will have negligible impacts on current authorized purposes and on environmental conditions at the project, or in upstream or downstream reaches of the Missouri River. Structural modifications to the project would require a far greater use of resources and cause far greater environmental impacts than would be reasonable for such a small change in system yield.

Structural measures to add additional storage at the Fort Peck Dam/Fort Peck Lake Project are also not efficient given that surplus water may only be made available for up to 10 years. In order to meet Corps design criteria, structural measures would need to be designed and built to last for the remaining life of the project, which is well in excess of the 10-year maximum term for surplus water.

Based on this assessment, structural measures involving modifications to the Fort Peck Dam/Fort Peck Lake Project to increase storage capacity have been eliminated from further consideration (screened out) for reasons of efficiency, effectiveness and considerations of adverse effects on the environment.

Surface Water Withdrawals from Free-Flowing Reaches of the Missouri River

A beneficial use permit from the State of Montana is required for withdrawals from free-flowing reaches of the Missouri River within Montana. If channel alterations are necessary, then a regulatory permit must also be obtained from the Corps of Engineers. However, no surplus water agreement or easement is required from the Corps of Engineers for water obtained from river reaches not contained within a Corps reservoir or on Corps project lands. Water allocation decisions for free-flowing river reaches, depending on the scope of such a withdrawal, are generally under the purview of the State.

As a general matter the water supply users with active permits, expired or expiring permits, pending permits, or who might request permits for water withdrawals from Fort Peck Lake in the future are located adjacent to Fort Peck Lake and withdrawal from remote locations upstream or downstream of Fort Peck Lake would require extensive pipeline systems to transport the water from the point of withdrawal to the point of use. Based on the distance water would need to be transported, this alternative would be inefficient. In addition, municipal surface water users in the counties surrounding Fort Peck Lake, which do not get their water from Fort Peck Lake, tend to be large entities with water rights that are substantially larger than the projected future additional demand of 630 acre-feet. There are currently four municipal surface water rights holders with a total water right of 4,821 acre-feet and an average water right of 1,205 acre-feet, which indicates that surface water is better suited as a source for a large municipal user. Municipal groundwater rights holders in the study area are more numerous and are far smaller in size, as discussed in the next section.

Surface water withdrawals from the free flowing reaches of the Missouri River are not carried forward as an alternative solution because surface water withdrawals are inefficient and mis-matched to the size of projected increases in future demand.

Groundwater Withdrawals

A beneficial water use permit from the State of Montana is used to apply for appropriations of groundwater of more than 35 gallons per minute or 10 acre-feet per year and all surface water. In a controlled groundwater area a permit may be required to appropriate any amount of water. The reasons for ordering a controlled groundwater area include:

- Groundwater withdrawals in the area are greater than recharge of the aquifer,
- Excessive groundwater withdrawals are likely to occur in the near future,
- There are significant disputes regarding groundwater rights in the area,
- Groundwater levels or pressures in the area have been or are declining excessively,
- Excessive groundwater withdrawals would cause contaminant migration,
- Groundwater withdrawals are or will adversely affect groundwater quality, and
- Water quality in the groundwater area is not suited for a specific beneficial use.

However there are no controlled groundwater areas within the six-county study area. Submission of this application must include applicable addendums and is filed with the Water Resources Division of the Montana Department of Natural Resources and Conservation. In executing its permit decision making process, the State closely monitors water usage and impacts on aquifers to protect groundwater resources and avoid damage to critical aquifers. Municipal groundwater users' water rights in the counties surrounding Fort Peck Lake tend to be substantially smaller than surface water municipal users' water rights. There are currently 55 municipal groundwater users with an average water right of 252 acre-feet, and groundwater sources are currently meeting over 5,700 acre-feet of non-irrigation water needs within the 6-county area. The potential increase in future demand of 630 acre-feet being evaluated in this surplus water investigation can conceivably be met through new groundwater appropriations within the study area. Groundwater withdrawal, through the construction of withdrawal wells, is a viable alternative and is therefore retained for further analysis.

Temporary Use of Surplus Water

Temporary use of surplus water in the Fort Peck Dam/Fort Peck Lake Project is considered a structural measure. In order to meet the completeness criterion, this measure includes the necessary investments by non-Federal entities to construct water intakes, pipelines, and water depots which may be necessary to deliver the purchased water to the end user.

The four reservoir zones, as described in Section 2.5 and displayed in Figure 2-3, are: the permanent pool, the carryover multiple use pool, the annual flood control and multiple use zone, and the exclusive flood control zone.

At Fort Peck Lake the permanent pool provides 4.1 million acre-feet (MAF) of storage. Storage within this zone is the minimum necessary to maintain project operations and to meet minimum head requirements needed to support hydropower operations.

Above the permanent pool is the 10.7 MAF carryover multiple use zone. This intermediate zone provides a storage reserve for irrigation, navigation, power production, and other beneficial conservation uses. This zone also provides carryover storage for maintaining downstream flows

through a succession of years in which runoff is below normal. Similar to Garrison and Oahe Projects, storage originally planned for the irrigation purpose has not been fully utilized since the project was placed in operation, which has enabled the mainstem system to provide additional benefits to other authorized project purposes in extended droughts. As shown in this report, the mainstem system will continue to provide substantially for this additional benefit even with a water surplus determination of 17,816 acre-feet of storage.

The third zone is the 2.7 MAF annual flood control and multiple use zone. This is the desired operating zone. Water stored in this zone is normally evacuated by March 1 of each year to provide adequate storage capacity for the flood season. During the flood period, water is impounded in this zone as required. Because of the annual operational fluctuations of water levels in this zone it is not considered a reliable source of water to meet M&I water needs on a consistent basis throughout the year, however this zone, together with the other operational zones of the reservoir, have the capability to provide 6,932 acre-feet/year of surplus water for Municipal and Industrial purposes on a temporary basis without unreasonably impairing the efficiency of the reservoirs other purposes.

Finally, the fourth zone, or exclusive flood control zone, consists of 0.97 MAF of storage between elevations 2246.0 and 2250.0 feet msl. This zone is used only during periods of extreme floods and is evacuated as soon as downstream conditions permit. For this reason, water is very infrequently stored in this zone and so does not contain surplus water except under the most extreme and infrequent, conditions. However, to the extent surplus water withdrawals are made during the evacuation period from this zone for municipal and industrial needs it does represent a source of surplus water during that time period.

The temporary use of 17,816 acre-feet of storage as surplus water in the foregoing zones can be scaled to meet the entire identified water needs, and so fully meets the effectiveness criterion.

The costs of surplus water will include the prorated share of updated project costs, plus the full cost of all necessary infrastructure investments on and off project lands. These costs, when compared to the costs of purchasing water from multiple locations that are more distant from the water supply users, may prove to be the most cost effective means of achieving project objectives, and is therefore tentatively considered to meet the efficiency criterion, subject to more detailed analysis in the comparison of alternative plans.

Consistent with the criteria of completeness, effectiveness, efficiency, and acceptability, the structural measure of temporary use of surplus water in the Fort Peck Dam/Fort Peck Lake Project is carried forward for further consideration into the formulation of alternative plans.

3.5.2.2 Non-Structural Measures (Activities)

Three non-structural measures are considered below: conservation / incentive programs, water reuse / recycling, and transfer of water rights from non-M&I use to M&I use. All three non-structural measures are screened out from further consideration based on discussions below.

Conservation / Incentive Programs / Regulations / Public Education / Drought Contingency Planning

Conservation is a viable alternative for dealing with short-term water supply shortages and temporary drought conditions but does not provide a complete solution to the water supply needs for existing water supply users with expiring easements and for potential new water supply users.

Montana has an extensive drought preparedness program and the Montana Department of Natural Resources and Conservation is required by Montana statute to develop a state water plan. The Montana State University at Bozeman is the home of the Montana Water Center, which was established in 1964 by an act of Congress to advance water research, education, and problem-solving partnerships throughout the state. Future without-project conditions assume that future state water plans will continue to address conservation, water use efficiency, drought management and water quality management. It is unlikely that additional efforts in these areas would sufficiently reduce the future needs of existing easement holders, or eliminate the needs of future water users. Conservation and related activities would therefore not be complete or effective non-structural solutions and are not carried forward for further consideration.

Water Reuse / Recycling

Water reuse / recycling may be a viable alternative for reducing the water supply needs for existing water supply users with expiring easements and for potential new water supply users but does not provide a complete solution for these users. Reused or recycled water is not suitable for M&I use without extensive treatment, however it may be suitable for landscape, but not crop, irrigation. Similarly, reused or recycled water has limited applications in domestic use.

For reasons of lack of completeness and effectiveness water reuse and recycling are eliminated (screened out) from further consideration in the formulation of alternative plans.

Conversion of Non- M&I Water Rights to M&I Water Rights

In some states, under certain circumstances, existing water rights for uses such as irrigation, fish and wildlife, and recreation may be converted to M&I use through the sale or lease of water rights. Water rights conversions are subject to regulations and limitations that protect the supply source and existing users. For example, conversions of water rights from irrigation to M&I use are typically at a lower acre-foot allocation for the M&I use because of the lost recharge to groundwater when the use is no longer irrigation. Conversion of water rights to M&I use does not occur very often.

Within the study area, within the past 25 years, there have been no conversions to municipal use. There was one conversion from an irrigation water right to an industrial water right. This permit totaled 52 Acre-Feet. These types of conversions are extremely rare. MT state law does allow for changes of use-type, but it does not allow for an increase in water use for the converted permit. State law considers year-round use as an increase in use, even if the total volumes used are the same or less. Irrigation permits are only approved for seasonal use. Thus, permits converted from irrigation to industrial use can only be used during the crop irrigation season. This severely limits their value, usefulness and desirability. It also severely limits the effectiveness of converting irrigation permits to industrial permits as an alternative means to meet potential future M&I demand.

Furthermore, in this largely agricultural study area, adequate irrigation water rights and irrigation water use are important inputs into agricultural production. It is unlikely that irrigation water rights would be available for conversion to M&I use in quantities that would meet the projected increase in demand. This alternative is not carried forward to further analysis because it would be ineffective in meeting the projected increase in demand.

3.6 Most Likely Future Without-Project Condition

Under the most likely future without-project condition, the potential increase in demand (630 acre-feet) would most likely be met through groundwater withdrawals (current demand of 6,302 acre-feet would continue to be sourced from the reservoir). Future M & I water providers are projected to choose the least costly water source that will provide them the required volume and quality of water they need to meet the projected demand of their clients, so long as the water can be delivered reliably (i.e., in the quantities needed, when needed). Therefore, the most likely future without project condition is defined as the least costly feasible measure for providing the quantity of water sufficient to meet the demands of M & I users from the multiple water sources currently available, excluding Fort Peck Lake. The projected cost of groundwater withdrawals to meet the projected increase in demand is presented in the next section.

3.7 Alternatives Studied in Detail

The alternatives studied in detail include the No Action – Next Least Costly Alternative and the Proposed Action. For comparison purposes, both alternatives describe the most likely means of providing 6,932 acre-feet/year of water to meet current (6,302 acre-feet) and potential future increase in water needs of the study area (630 acre-feet). The No Action – Next Least Costly Alternative is development of new, non-Project water groundwater sources in a manner similar to existing M & I groundwater use in the study area. The Proposed Action includes temporary use of 6,932 acre-feet/year of surplus water in the Fort Peck Dam/Fort Peck Lake Project.

3.7.1 No Action Alternative

Under the without-project condition, the no action alternative for providing an additional 630 acre-feet of water (beyond existing use) for M&I use is based on the characteristics of existing M&I use and users in the study area (Table 3-6 and Figure 3-1). Existing M&I use includes four surface water rights holders with large acre-feet allotments (average = 1,205 ac-ft) and 55 groundwater rights holders with much smaller acre-feet allotments (average = 252 act-ft). The average non-project surface water rights holder has an M&I allotment that is nearly twice as large (1,205 ac-ft) as the projected increase in demand (630 acre-feet), and therefore is not a good representation of projected future M&I user characteristics. The average groundwater rights holder, on the other hand, has an M&I allocation which is the equivalent of 40% of the projected increase in demand. The characteristics of existing M&I users indicate that future M&I users are more likely to be groundwater-sourced M&I users. The increase in demand included in the No Action Alternative can be reasonably represented by three groundwater-sourced M&I users with 210 acre-feet allocations each. The no action alternative also includes the continuation of existing use of 6,302 acre-feet, which is assumed to continue to be sourced from the lake.

Table 3-6
Water Rights in the Six-County Fort Peck Area (AF)

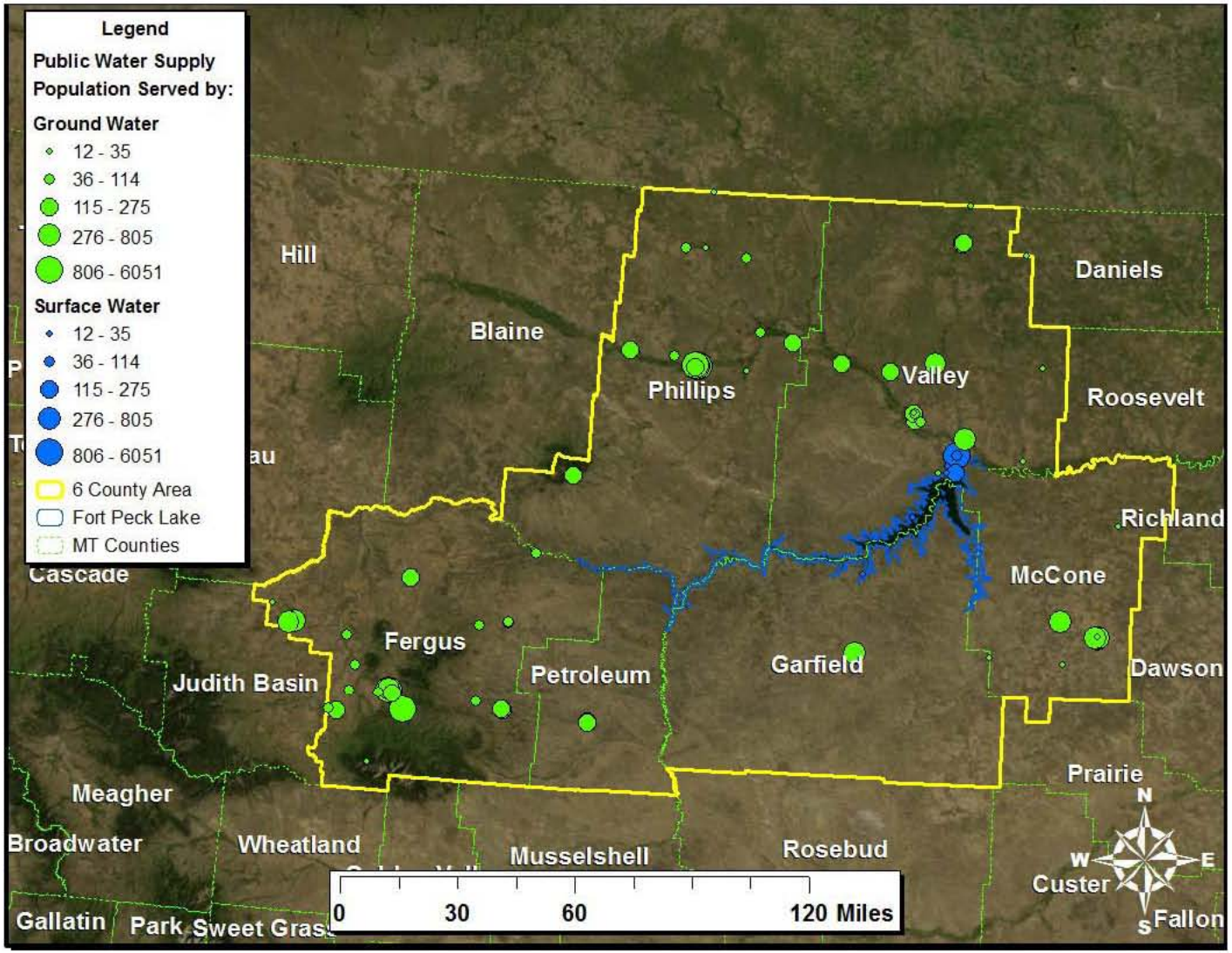
	GROUNDWATER			SURFACE			TOTAL		
PURPOSE	**Count**	**Average (AF)**	**Sum (AF)**	**Count**	**Average (AF)**	**Sum (AF)**	**Count**	**Average (AF)**	**Sum (AF)**
IRRIGATION	169	255.2	43,127	2,565	364.5	935,012	2,734	357.8	978,139
MUNICIPAL	55	252.0	13,863	4	1,205.3	4,821	59	316.7	18,684
STOCK	2,425	3.6	8,617	6,282	5.9	37,330	8,707	5.3	45,948
DOMESTIC	1,877	2.2	4,092	59	23.3	1,376	1,936	2.8	5,468
LAWN AND GARDEN	118	2.2	265	33	4.6	152	151	2.8	417
OTHER	395	48.9	19,306	3,356	85.8	287,838	3,751	81.9	307,144
Grand Total	5,039	17.7	89,271	12,299	103.0	1,266,529	17,338	78.2	1,355,800
Non-Irrigation Total	4,870	309	46,144	9,734	1,325	331,516	14,604	409	377,660

*This table excludes surface water in the 40E basin (i.e. the basin immediately surrounding Ft. Peck Lake); Note that Industrial is included in Other

AF = Acre-Feet

Source: MT Dept. of Natural Resources and Conservation, Water Resources Division, Water Rights Bureau, Water Rights Database, 2011

Figure 3-1
Fort Peck Lake Public Water Suppliers



3.7.1.1 Groundwater Withdrawal – Projected Costs

Within the study area, both groundwater and surface water sources are available. However, M&I users are much more likely to be groundwater users. Table 3-7 below shows how the preponderance of M&I water uses in the study area are sourced from groundwater. In total, for the M&I uses selected, 95% of water rights holders in the study area are sourced from groundwater. Thus, for the purposes of this analysis it is assumed that the future water users demanding the additional 630 acre-feet of yield will also source their water from ground water.

Table 3-7
Number of Water Rights by Source for Selected Use-Types in the Six County Ft. Peck Area

	Ground	%	Surface	%	Total	%
Domestic	1,877	97%	59	3%	1,936	100%
Lawn & Garden	118	78%	33	22%	151	100%
Commercial	90	89%	11	11%	101	100%
Municipal	55	93%	4	7%	59	100%
Industrial	27	93%	2	7%	29	100%
Institutional	12	92%	1	8%	13	100%
Total	2,179	95%	110	5%	2,289	100%

Projected non-irrigation groundwater sources consist of a combination of rural water & municipal systems (i.e. public) and individual private wells (i.e. domestic). Water from each of these sources combines to meet the required yield. Recent and relevant cost data were available for two public water systems (Williston and Lewis & Clark) and for domestic private wells. The data from the Williston system are from a proposed 50,441 acre-feet expansion that would be sourced from groundwater. The Lewis & Clark system is a newly constructed water system sourced entirely from groundwater. To best compare to water from the reservoir, data for each system include only the costs of raw water, not the cost of treated and delivered water. Table 3-8 displays the estimated cost per acre-foot yield for each of these systems. The most likely, least costly water supply alternative to meet projected water supply needs in the absence of the Federal action is assumed to be a combination of water systems similar to these and continued use of the reservoir to meet continuing existing demand. To provide an equivalent yield of 6,932 acre-feet per year this analysis assumes that existing demand would be sourced from the reservoirs and the potential future demand would be sourced similarly to existing patterns of use among public and domestic water users in the study area. Using the most recent USGS estimates[33] of water use in the study area a ratio of public to domestic use can be calculated (79% & 21%, respectively). Applying this ratio to the required yield and the available cost data produces an estimate of 498 acre-feet from public sources at an average cost of $50.92 and 133 acre-feet from domestic sources at an average cost of $601.70 per acre-foot. The overall weighted average per acre-foot of yield is $166.32.

[33] 2005 (see Table 3-5)

Table 3-8
Cost of the Next Least Costly Alternative

	Public Systems		Domestic
	Lewis & Clark System	**Williston Expansion**	**Private Wells**
Total Cost	$26,013,000	$15,000,000	$7,000
Annual Cost	$1,466,746	$845,777	$395
O&M Costs	$769,000	$443,432	$207
Total Annual Cost	$2,235,746	$1,289,209	$602
Annual AF Yield	50,441	22,418	1
Cost/Acre-Foot	$44.32	$57.51	$601.70
Average Cost/AF		$50.92	$601.70
Ratio of Current Use		79%	21%
Projected Use (AF)		498	132
Total Cost		$25,356	$79,424
Total Average Weighted Cost Per Acre-Foot			**$166.32**

Note: Annual costs calculated at 4.125% for 30 years with payments made at the beginning of each period

3.7.1.2 Summary of Water Sources for the No Action Alternative

Table 3-9 indicates that the reservoir will provide for the continued existing use portion of the No action alternative (6,302 acre-feet) and that groundwater sources will be used to meet the additional 630 acre-feet of water yield for the No Action Alternative.

Table 3-9
All Sources of Water for No Action Alternative

Water Source	Acre-Feet
From Fort Peck Lake (current existing use)	6,302
From Ground Water (future additional use)	630
Total All Sources	**6,932**

3.7.2 Proposed Action – Use of Surplus Water

The proposed action for the Army Corps of Engineers would be to identify surplus water, as defined in Section 6 of the 1944 Flood Control Act, which the Secretary of the Army can make available to execute surplus water supply agreements with existing and prospective M&I water users, for up to 6,932 acre-feet/year of surplus water (equivalent to 17,816 acre-feet of storage) from Fort Peck Lake.

3.8 Alternative Evaluation – Economic Analysis

The no action / least costly alternative plan (CC2010) and temporary use of surplus water plan (Proposed Action, or CC10FP) are evaluated and compared in this section of the Report. Specifically, this section provides discussions on project economic effects, calculates the cost of storage, and concludes with the identification of the least cost method of meeting the water supply needs of the project area.

3.8.1 Impacts on Authorized Project Purposes

The Fort Peck Dam/Fort Peck Lake Project provides benefits to the Nation as a component of the comprehensive Pick-Sloan Plan for development in the Missouri River Basin. The authorized purposes of the upper Missouri River's six mainstem reservoirs and the lower Missouri River's levees and navigation channel are flood control, navigation, irrigation, hydropower, municipal and industrial water supply, fish and wildlife, water quality, and recreation. In order to evaluate the effects of temporary use of surplus water in Fort Peck Lake it is necessary to determine whether the depletions associated with the proposed use of surplus water would impact authorized project purposes through effects on reservoir water surface elevations and outflows.

Table 3-10 provides a comparison of the sources of water used to provide the 6,932 acre-feet/year of water under the no action alternative and the proposed action. The proposed action will result in a reduction in groundwater withdrawals of 630 acre-feet per year. The no action plan requires withdrawals of an additional 630 acre-feet from groundwater sources in the six-county study area surrounding Fort Peck Lake. Both the proposed action and the no action plans assume continuation of withdrawals from existing users in the amount of 6,302 acre-feet. The proposed action includes 630 acre-feet of surplus water yield from the Fort Peck Dam/Fort Peck Lake Project. As described in Section 2.5, the six Missouri River mainstem reservoirs are operated as an integrated system to achieve the authorized project purposes. Therefore, the net impact on the Missouri River System from the use of surplus storage in the Fort Peck Dam/Fort Peck Lake Project is an increase in depletions of 630 acre-feet per year.

The allocation of surplus storage may potentially affect project purposes in numerous ways. For example if pool elevations are reduced due to increased depletions, then additional storage space may be available for flood control purposes (increase benefits) or recreational facilities may not have sufficient water during some drought conditions (reduce benefits). Increased depletions due to an allocation to surplus storage may reduce the volume of water available for downstream uses such as navigation (reduce benefits), water supply (reduce benefits), and hydropower. It is important to consider the scale of the proposed surplus water allocations and associated depletions in relation to the size of the overall Missouri River system. All effects to project purposes are extremely small (Table 3-11), even when considered cumulatively (Table 3-22).

Table 3-10
Sources of Water Withdrawals for No Action and Proposed Action Alternatives

Water Source	No Action (Acre-Feet)	Proposed Action (Acre-Feet)
From Fort Peck Lake (existing)	6,302	6,302
From Ground Water	630	0
From Fort Peck Lake (additional)	0	630
Total All Sources	**6,932**	**6,932**

3.8.1.1 Use of the Daily Routing Model (DRM) to Predict Hydrologic Impacts

The Daily Routing Model (DRM) was used as an analytical tool in this study to estimate the hydrologic and economic effects that additional depletions would have at Fort Peck Lake, the other system reservoirs, and free-flowing reaches of the Missouri River. The DRM has undergone appropriate model review in compliance with EC-1105-2-412 and has been approved for regional use by the Engineering Community of Practice. Modeling of the movement of the water through the entire Missouri River Reservoir System was accomplished using the DRM, which was developed during the 1990's as part of the Master Manual Review and Update Study. An 80-year period was selected as the period of record for each of the alternatives because this is the period that daily data are available on Missouri River inflows and flows. Daily records are available for the six dams since their respective dates of closure, and daily flow data are available for the majority of gaging stations since 1930 (USACE, 1998). The depletion and capacity curve data (computed using the sedimentation rate data) were the input files that were used to project elevation and flow for without and with project conditions.

The DRM was developed to simulate and evaluate alternative System regulation for all authorized purposes under a widely varying, long-term hydrologic record. The DRM is a water accounting model that consists of 20 nodes, including the six System dams and 14 gaging stations. In the DRM, each of the six System reservoirs was modeled, and the DRM provides output at locations (nodes) along river reaches between System projects: Wolf Point and Culbertson, Montana, and Williston and Bismarck, North Dakota; and ten locations along river reaches below the System: Sioux City, Iowa; Omaha, Nebraska City and Rulo, Nebraska; St. Joseph, Kansas City, Waverly, Boonville, and Hermann, Missouri on the Missouri River and St. Louis, Missouri on the Mississippi River.

The DRM performs a time-series analysis that simulates hydrologic output on a daily basis for each of the 80 years modeled from 1930 through 2009, assuming that the entire System was in place and fully operational for the full 80-year period. Using the full 80-year period of record for the simulation modeling allows the maximum amount of information, such as the occurrence and effects of wet years, dry years, and droughts, to be included in the estimate of average annual effects. As the depletion and capacity curve data are varied between the evaluation years for this analysis (i.e., 2010 and 2020), the DRM computes System storage, reservoir elevation, reservoir release, reservoir evaporation, and river flow data for each day of the modeling period. Hydraulic impacts (changes to water surface elevations (WSE) in riverine reaches of the Missouri River) were estimated externally to the DRM model by combining DRM hydrologic output on streamflow with stage-discharge relationships provided at the DRM-modeled riverine nodes by the Omaha District.

Each DRM run provides 29,220 simulated values (80 years of daily values) for each parameter (i.e., water surface elevation, reservoir volume, and streamflow) at the 20 locations/model nodes in the system. These data should not be considered as estimates of actual calendar day values, but rather as simulation output values under the full range of climatological conditions existing over the 80-year period. To evaluate differences between two alternatives, the differences between each of the 29,220 daily values were determined and then sorted to establish a frequency distribution of modeled values. The distributions of the differences from the current conditions (without the additional depletions) for various DRM outputs (water surface elevation, reservoir volume, and streamflow) were then examined. Comparing the data distributions in this manner provides insight as to how the increased depletion scenario impacts the likelihood of occurrence of a given water surface elevation, reservoir volume, and streamflow over the entire 80-year period. Similarly, it can provide an estimate of the likelihood of a given magnitude of change in each parameter between No Action and with project conditions. It should be noted that the x axis on all of the distribution plots are percent of the days, where 10 percent represents 2,922 days of the full 29,220 days of the 80-year period of analysis.

To examine the effects of just the additional depletions directly from System reservoirs, the simulations for one study year (2010) were completed under two separate planning scenarios: 1) baseline depletions (without project current condition), 2) 630 acre-feet of depletions at Fort Peck Lake (with project condition). The model assumes that the historic System inflow data, adjusted assuming the depletions associated with current development in the basin, occurred over the 80-year modeling period.

The source of the actual System inflow data is the U.S. Geological Survey, which began acquiring daily data beginning in late 1929. The DRM adjusts these inflow data by the difference for depletions that have been estimated to occur between each year and 2002. The Bureau of Reclamation provided the monthly depletions, and these monthly data were further separated to daily values for use in the DRM. Inflow and depletion data are available for each of the DRM modeling reaches. The 2002 depletion data are assumed to remain constant through 2010 (assumes no change in system depletions from 2002 to 2010).

The proposed temporary use of an additional 630 acre-feet of water from Fort Peck Lake would be a total depletion allowance that the easement holders would be allowed to remove over the span of a year. Daily (and yearly) withdrawals from the various intakes would be small relative to the total storage in the reservoir. To put 630 acre-feet of yield per year into a daily context, a withdrawal of 0.9 (less than one) cubic foot per second, every day for an entire year, would yield

630 acre-feet of water. So, if water withdrawals were uniformly removed from Fort Peck Lake throughout the year, there would be less than one fewer cubic feet per second of water available for discharge at any given moment from the Fort Peck Dam as a result of the proposed action.

From 1937 through 2006, annual release duration relationships from the Fort Peck Dam/Fort Peck Lake Master Plan recorded a maximum mean annual discharge of 15,700 cfs and a minimum mean annual of 2,663 cfs from the Fort Peck Dam (USACE, 2008). If the depletions from the proposed action resulted in 0.9 cfs less being available for discharge, the potential change in the release would be effectively unchanged.

This simple illustration[34] assumes that no changes would be made in reservoir operations to adjust for the 630 acre-foot depletion. In fact, adjustments would not need to be made in the vast majority of cases, because the 630 acre-foot net depletion (equivalent to 1,620 acre-feet of storage) represents approximately 0.01-percent of total storage in a reservoir that holds approximately 18,688,000 acre-feet. As the proposed 630 acre-feet in depletions represent a small change relative to the scale of the normal operations of the Fort Peck Dam and the entire reservoir system, where actual operational changes in release rates are typically made in hundreds and thousands of cubic feet per second, the effects on pool levels and reservoir outflow would be very small.

In addition to estimating hydraulic effects, the DRM is also able to estimate economic effects to five authorized purposes of the project: flood control, navigation, hydropower, water supply and recreation. For each of these project purposes the DRM uses daily elevation, volume and streamflow outputs generated by the hydraulic portion of the model as inputs to the economic portion of the model. By using a series of algorithms customized for each project purpose, the DRM is able to determine economic benefits for each project purpose. The economic portions of the model were reviewed for adequacy consistent with model review criteria contained in EC 1105-2-412. Due to the small difference between the without and with-project conditions and the temporary nature of a surplus water agreement, the model was determined to be adequate for measuring the significance of impacts to other project purposes. While it is recognized that the model does need to be updated, the DRM and the economic modules provide the closest simulation available at this time.

Table 3-11 presents the National Economic Development (NED) benefits for the No Action and Proposed Action alternatives. This table shows that the removal of 630 acre-feet of water from Fort Peck Lake will result in an average annual net loss of $6,727 of NED benefits, which is a decrease of 0.0004 percent in average annual NED benefits (based on the 80-year period of analysis). This small a change in average annual benefits is effectively no change. The breakdown of the impact on NED benefits among the individual project purposes is also presented.

[34] Appendix A: Draft Environmental Assessment contains the resulting model plots showing the impacts of depletions

Table 3-11
Annual NED Benefits for the No Action and Proposed Action Alternatives

Authorized Purpose	No Action CC2010 ($ millions)	Proposed Action CC10FP ($ millions)	Change ($ millions)	Change (percent)
Flood Control	$402.796	$402.844	$0.048	0.0119
Navigation	$6.716	$6.714	-$0.002	-0.0353
Hydropower	$632.513	$632.471	-$0.042	-0.0066
Water Supply	$607.254	$607.248	-$0.005	-0.0009
Recreation	$84.002	$83.966	-$0.005	-0.0063
Total	**$1,733.280**	**$1,733.273**	**-$0.007**	**-0.0004**

Note: Impacts to Irrigation are included in the Water Supply category;

3.8.2 Water Storage-Yield Analysis

The updated cost of storage and any associated operations and maintenance costs are based on the proportion of the project's usable storage required to provide an additional yield of 630 acre-feet of water. The relationship between reservoir storage and yield is described in this Water Storage-Yield Analysis.

The sequential reservoir routing method was used to calculate the storage-yield ratio used in the computation of updated costs of storage. This is the same method that was used to calculate the storage-yield ratio for the Basin Electric water supply agreement in January 2005 at the Garrison/Lake Sakakawea Project. The storage-yield ratio was determined for the Basin Electric analysis and for this analysis from simulations conducted using the Daily Routing Model (DRM), which applied the reservoir system operational rules as described in the Missouri River Master Water Control Manual (Revised March 2006). Depletion (water demand or use) analyses in the upper Missouri River basin were conducted for this study and used in the DRM. These analyses determined that the ultimate depletion level would be approximately 8.1 million acre-feet. The 1930 to 1941 drought was the limiting drought in these analyses. As determined in these analyses, 39 million acre-feet of carryover multiple use storage in the Missouri River Mainstem Reservoir system would be required to support a depletion level of 8.1 million acre-feet per year, and a minimum annual flow of 8.8 million acre-feet per year at Sioux City, Iowa. The total yield in the analysis is 16.9 million acre-feet per year (8.1 + 8.8 million acre-feet). Dividing the carry over multiple use storage (39 million acre-feet) by the total yield (16.9 million acre-feet) results in a storage-yield ratio of 2.31.

This ratio is lower than the value of 2.59 computed for the Basin Electric water supply agreement. The difference is due to a slight increase in basin depletions since the previous studies were completed and changes to the Master Manual water control plan (a change in the system storage level at which navigation is not supported that year and increased seasonal non-navigation period releases). The navigation support change increased the simulated number of non-navigation years during the 1930s drought from 1 year under the former Master Manual to 3

years under the current Master Manual. Because of the effect of the navigation support change, another method for computing the storage-yield ratio was used to calculate an alternative value and confirm the results of the sequential reservoir routing.

This second method utilized a Rippl diagram to determine the yield that could be expected with a system carryover storage capacity of 39 million acre-feet. A Rippl diagram is a mass curve of accumulated system inflows. Tangents are drawn to the high points of the mass curve in such a manner that the maximum departure does not exceed the system storage capacity. The slope of the resulting line indicates the annual yield or demands that can be attained with the specified storage capacity. The critical drawdown period begins at the tangent and ends with the maximum departure between the inflow and demand curve. The point at which the demand curve intersects the inflow curve indicates that the system storage has refilled. System inflows for 2002 development conditions were accumulated over the period of 1930-2009 and used to determine the yield that could be supplied during the critical period, which extended from December 1930 to February 1942, as shown on Figure 3-2.

Results of this analysis indicate that the system yield is 17.0 million acre-feet per year. Based on results of the DRM simulations, average annual evaporation during the critical period is 1.8 million acre-feet per year. Subtracting evaporation from the system yield results in a net yield of 15.2 million acre-feet per year. Dividing the carryover multiple use storage (39 million acre-feet) by the net yield (15.2 million acre-feet) results in a storage-yield ratio of 2.57. A comparison of the storage-yield computations is shown in Table 3-12. It is recommended that a value of 2.57 be used for this analysis since it is close to what was previously used for the Basin Electric water supply agreement and can be supported by the Rippl diagram.

Figure 3-2
Rippl Diagram for Missouri River Reservoir System

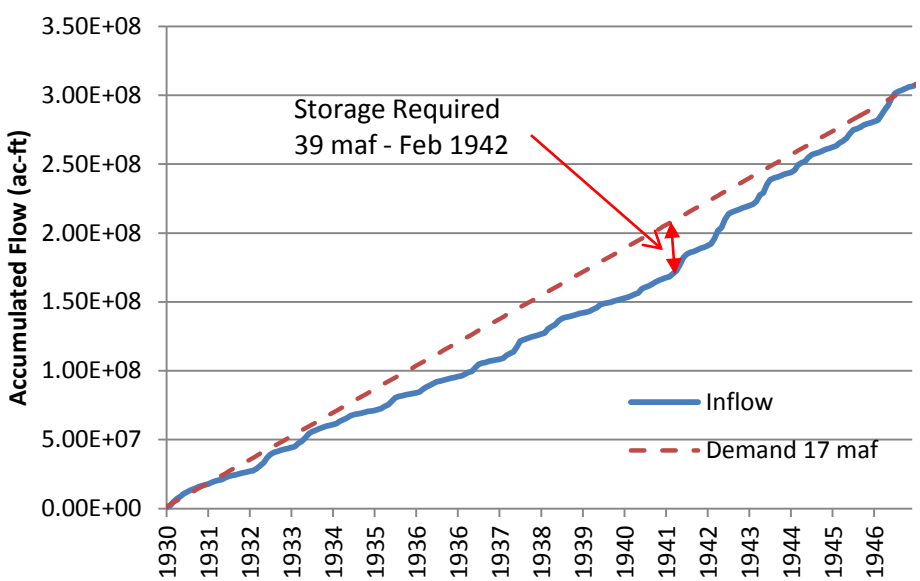


Table 3-12
Storage-Yield Ratios

Method	System Carryover Multiple Use Storage (maf)	Yield (maf/yr)	Storage-Yield Ratio
Sequential Reservoir Routing (Basin Electric)	39	15.1	2.59
Sequential Reservoir Routing (DRM revised)	39	16.9	2.31
Rippl Diagram (Recommended)	39	15.2	2.57

3.8.3 Derivation of User Cost

The cost to entities executing surplus water agreements for the capital investment of storage in a Corps of Engineers' reservoir is calculated as the highest of:

- benefits foregone by the use of surplus water;
- revenues foregone by the use of surplus water;
- replacement cost of the storage necessary to provide the surplus water; or
- updated cost of storage in the Federal project.

3.8.3.1 Benefits Foregone

The Fort Peck Dam/Fort Peck Lake Project provides benefits to the Nation as a component of the comprehensive Pick-Sloan Plan for development in the Missouri River Basin. The authorized purposes of the upper Missouri River's six mainstem reservoirs and the lower Missouri River's levees and navigation channel are flood control, navigation, irrigation, hydropower, municipal and industrial water supply, fish and wildlife, and recreation. The Fort Peck Dam/Fort Peck Lake Project's beneficial contributions to authorized project purposes are identified in Chapter 2.4 Authorized Project Purposes.

The temporary use of 6,932 acre feet/ per year of surplus water is being evaluated in this report. All but 630 acre-feet of that is existing use and is already calculated in existing benefits and revenues, therefore the affect of implementing the surplus water only comes from the net additional use. Chapter 3.8.1 Impacts to Other Project Purposes identifies that an additional 630 acre-feet of depletions from undeveloped system-wide irrigation storage would result in a slight NED impact to authorized project purposes of $6,727 per year.

Based on the 630 acre-feet of additional depletions due to potential surplus water agreements and the yield ratio of 2.57, an additional 1,620 acre-feet of storage would be required for the proposed action. Because there is a slight net loss of NED benefits for the proposed action, the benefits foregone per acre-foot of storage would be $4.15 ($6,727/1,620 = $4.15).

3.8.3.2 Revenues Foregone

Revenues foregone are defined as the reduction in revenues accruing to the U.S. Treasury based upon any existing payment agreements related to the project. Revenues foregone to hydropower would be based upon the projected reduction in hydropower output due to depletions associated with the use of surplus water or modified release schedule. Hydropower generated at Fork Peck Dam is marketed through the Western Area Power Administration (Western), which is a Federal agency under the Department of Energy. Revenues from the sale of hydropower generated at the Fork Peck Dam are paid to the U.S. Treasury to recover the Federal investment in the power generating facilities (with interest) and other costs assigned to power for repayment, such as aid to irrigation development (Western Area Power Administration, Annual Report, 2009).

Western provided a spreadsheet for this analysis with its most recent economic values for what it pays on an average monthly basis for power it purchases to meet its firm commitments to its customers, and a corresponding value for the revenue it receives for the power marketed in excess of its firm commitments. The temporary use of 6,932 acre feet/ per year of surplus water is being evaluated in this report. All but 630 acre-feet of that is existing use and is already calculated in existing benefits and revenues, therefore the affect of implementing the surplus water only comes from the net additional use. The net difference in annual energy revenues for the additional 630 acre-feet of water to be removed on a temporary basis from Fort Peck Lake is $1,670. Using the 1,620 acre-feet of required storage for the 630 acre-feet of additional depletions, the corresponding value per acre-foot of storage is $1,670 divided by 1,620 acre-feet, or $1.03 for the proposed action.

3.8.3.3 Replacement Costs

Since there is system-wide storage space available due to undeveloped irrigation use, there is no need to provide replacement storage for the 17,816 acre-feet of storage space that will be needed. Therefore, there are no replacement costs required for the proposed action.

3.8.3.4 Updated Cost of Storage

Surplus water is available at the Fort Peck Dam/Fort Peck Lake Project because the originally envisioned irrigation use of the Missouri River Mainstem System (capacity for irrigation of 2,300,000 acres) was never developed. The updated cost of storage is calculated based on available capacity within all four system zones: permanent pool, carryover multiple use, annual flood control & multiple use, and exclusive flood control. In a permanent reallocation, the portion of the permanent pool assigned to sediment storage would be excluded from the available capacity in computing the updated cost of storage. However, for a surplus water study, it is appropriate to include this capacity because sediment surveys[35] indicate that the portion of the zone assigned to sediment storage will not be full during the 10-year study period.

3.8.3.5 Assistant Secretary of the Army for Civil Works - Direction on Pricing

Surplus water is available at the Fort Peck Dam/Fort Peck Lake Project because the originally envisioned irrigation use of the Missouri River Mainstem System (capacity for irrigation of 2,300,000 acres) was never developed. In a memorandum dated May 8, 2012, the Assistant

[35] See note 6 of Plate 2, AOP

Secretary of the Army for Civil Works (ASA CW) directed the Corps of Engineers to initiate action immediately to purse notice and comment rulemaking to establish a nationwide policy for surplus water uses under Section 6 (Attachment 1). Pricing for use of surplus water at the Fort Peck Dam/Fort Peck Lake Project would be at no charge pending the completion of this nationwide rulemaking.

Usable Storage Calculations

The 2009 – 2010 Annual Operating Plan (AOP) presents the storage allocations and capacities based on the latest available storage data[36]. Usable storage includes the exclusive flood control pool, the flood control and multiple use zone, the carryover multiple use zone, and the permanent pool (Table 3-13). Total usable storage is 18,463,000 acre-feet. The surplus water needs of an additional 6,932 acre-feet of yield requires 17,816 acre-feet of storage, which is 0.096% of total usable storage (17,816/18,463,000 = 0.096%).

Table 3-13
Usable Storage Calculations (acre-feet)

Exclusive Flood Control	971,000
Flood Control & Multiple Use	2,704,000
Carryover Multiple Use	10,700,000
Permanent	4,088,000
Total	18,463,000
Required Storage to Provide Surplus Water Yield of 6,932 additional acre-feet	17,816
Proportion of Usable Storage	0.096%

Updated Construction Cost Calculations

Construction costs were updated using the Engineering News Record (ENR) construction cost index and the Corps of Engineers Civil Works Construction Cost Index System (CWCCIS) as identified in EM 1110-2-1304, revised 31 March 2010. The value of lands is updated by the weighted average update of all other project features, as per the Water Supply Handbook, revised IWR Report 96-PS-4, December 1998. Since the CWCCIS dates back only to 1967, the ENR construction cost index was used to update project costs to 1967. The ENR construction cost index values are presented in the Water Supply Handbook.

The costs to be assigned to surplus M&I water use include joint use costs and are exclusive of specific costs. Examples of specific costs excluded from the updated cost of storage include the specific construction costs of:

- Recreation facilities;
- Flood control outlet works;

[36] Ibid.

- Power intake works;
- Powerhouse;
- Turbines; and
- Generators.

The period of expenditure for each project feature is 1933 – 1937 (mid-point 1935) as identified in the 2009 – 2010 AOP. Table 3-14 shows the cost update calculations from the mid-point of expenditures (1935) to 1967, using the ENR construction cost index. Note that interest during construction is not included in this updating procedure. Table 3-15 shows the cost update calculations from 1967 to the first quarter of Fiscal year 2012 using the CWCCIS, revised 31 March 2010. Note that the cost of lands and damages (Table 3-16) are updated based on the ratio of total FY12 updated costs (excluding lands and damages) to the total original 1935 costs (excluding lands and damages), as per the Water Supply Handbook (page 4-10).

Table 3-14
Updated Cost of Construction 1935 – 1967

Joint Use Cost Category	Original Cost ($)	Original Cost without IDC ($)	ENR Index 1935	ENR Index 1967	Update Factor	1967 Cost ($)
Main Dam	82,900,699	$75,596,590	196	1074	5.480	414,238,455
Outlet Works	35,063,100	$31,973,805	196	1074	5.480	175,203,400
Reservoirs	495,600	$451,934	196	1074	5.480	2,476,416
Power Intake Works	-	-	196	1074	5.480	-
Fish & Wildlife	-	-	196	1074	5.480	-
Levees & Floodwalls	-	-	196	1074	5.480	-
Pumping Plant	-	-	196	1074	5.480	-
Roads & Bridges	1,958,799	$1,786,216	196	1074	5.480	9,787,733
Buildings & Grounds	5,381,500	$4,907,354	196	1074	5.480	26,890,295
Perm Operating Equip	1,371,800	$1,250,935	196	1074	5.480	6,854,614
Relocations	-	-	196	1074	5.480	-

Table 3-15
Updated Cost of Construction 1967 – FY 2012

Joint Use Cost Category	1967 Cost ($)	1967 CWCCIS	FY12 CWCCIS	Update Factor	FY12 Cost ($)
Main Dam	414,238,455	100	747.12	7.471	3,094,858,343
Outlet Works	175,203,400	100	736.16	7.362	1,289,777,353
Reservoirs	2,476,416	100	821.93	8.219	20,354,402
Power Intake Works	-	100	755.03	7.550	-
Fish & Wildlife	-	100	736.16	7.362	-
Levees & Floodwalls	-	100	771.38	7.714	-
Pumping Plant	-	100	755.03	7.550	-
Roads & Bridges	9,787,733	100	759.26	7.593	74,314,338
Buildings & Grounds	26,890,295	100	755.03	7.550	203,029,794
Perm Operating Equip	6,854,614	100	755.03	7.550	51,754,394
Relocations	-	100	759.26	7.593	-
Lands and Damages	2,386,881*			40.8228	97,439,105
Total					4,831,527,729

*Original 1935 cost without interest during construction

Table 3-16
Updated Costs of Lands and Damages

Total 1935 Cost Exclusive of Lands and Damages	$115,966,833
Total FY12 Cost Exclusive of Lands and Damages	$4,734,088,624
Ratio of Total FY12 Cost to Total 1935 Cost	40.82
1935 Cost of Lands and Damages	$2,386,881
Updated FY12 Cost of Lands and Damages	$97,439,105

The updated FY 2012 total cost of construction is $4,831,527,729 (excluding interest during construction). The proportion of usable storage for the 17,816 additional acre-feet recommended for surplus water use is 0.09649%. At FY 2012 price levels, the updated cost of storage for the

17,816 acre-feet is $4,662,017 ($4,831,527,729 * 0.09649% = $4,662,017). This equates to a total cost per acre-foot of storage of $261.69.

The total annual cost of surplus M&I water use to water users is calculated as the sum of annual payments to the Federal Government for the surplus water plus the proportional annual operation and maintenance costs. Annual payments are based on a 30-year payment schedule and the repayment rate identified in EGM 11-01 Federal Interest Rates for Corps of Engineers Projects for Fiscal year 2012. The appropriate interest rate is the Water Supply Interest Rate based on PL 85-500, which is the interest rate used for water supply storage space in projects completed or under construction prior to enactment of PL 99-662 (17 Nov 1986). The FY12 interest rate is 4.125%. The annual payment for the updated cost of storage $4,662,017) over a 30-year period at an interest rate of 4.125% is $262,868.

3.8.3.6 Annual Operations and Maintenance Costs

The updated cost of storage will be used as the cost to the surplus water users for the capital investment of surplus water use, as it is the highest cost out of the four cost calculation methods. The surplus water users are also responsible for a proportional share of operation and maintenance costs, the cost of updating the project's water management plan, and any costs specific to the provision of surplus water, such as environmental mitigation costs. As the provision of surplus water does not require an update to the project's management plan and does not require environmental mitigation, the surplus water users will be responsible for the proportional share of joint use operations and maintenance costs.

The operation and maintenance costs to be assigned to the provision of surplus water are based on the most recent 10-year average of joint use operation and maintenance costs at Fort Peck Dam/Fort Peck Lake updated to FY12 dollars using CWCCIS (Table 3-17).

Table 3-17
Joint Use Operations and Maintenance Costs

Year	Joint Use O&M Costs ($)	FY CWCCIS	Update Factor	FY12 Cost ($)
FY01	3,816,242	503.32	1.504	5,740,588
FY02	3,712,019	517.46	1.463	5,431,229
FY03	4,266,430	529.95	1.429	6,095,291
FY04	3,913,223	571.29	1.325	5,186,121
FY05	3,558,426	608.36	1.245	4,428,555
FY06	2,385,957	641.91	1.179	2,814,189
FY07	3,201,133	673.52	1.124	3,598,470
FY08	3,499,788	716.54	1.057	3,697,992
FY09	4,135,178	703.00	1.077	4,453,522
FY10	6,498,349	716.68	1.056	6,865,030
4QFY12		757.12	average	4,831,099

The average joint use operations and maintenance costs for the most recent ten-year period are $4,831,099 in FY 2012 dollars (Table 3-17). The proposed proportion of usable storage for an additional 17,816 acre-feet is 0.09649% (Table 3-13). For 2012, the annual operations and maintenance for the 17,816 acre-feet of storage is $4,662 ($4,831,099 * 0.09649% = $4,662).

3.8.3.7 Annual Payment for Use of Surplus Water

The total annual cost of surplus water for 17,816 additional acre-feet of storage is $267,530 based on FY 2012 price levels ($262,868 + $$4,662 = $267,530). Payment required from each user will be calculated proportionate to the amount of required storage needed to support the requested yield, using an annual cost of $38.59 per acre-foot of yield (equivalent to $15.02 per acre-foot of storage) at FY 2012 price levels (Table 3-18).

Table 3-18
Annual Payment for Use of Surplus Water
(FY 2012 price levels)

Updated Cost of Storage	$ 4,662,017
Repayment Period	30 years
Repayment Rate	4.125%
Annual Payment	$ 262,868
Annual O&M Cost	$4,662
Total Annual Payment	$ 267,530
Acre-Feet of Additional Storage	17,816
Annual Cost per Acre-foot of Additional Storage	$ 15.02
Acre-Feet of Additional Yield	6,932
Annual Cost per Acre-foot of Additional Yield	$ 38.59

3.8.3.8 Summary of the User Cost of Storage Calculations

The four methods of determining the cost of storage in Fort Peck Lake have been discussed in the previous subsections. Table 3-19 presents these results. The updated cost of storage is the highest value at $15.02 per acre-foot of storage (FY 2012 price levels).

Table 3-19
Annual Cost of Storage Computation Methods

Cost Calculation Method	Annual Cost per Acre foot of Storage
Benefits foregone	-$0.38
Revenues forgone	-$0.09
Replacement costs	$0.00
Updated cost of storage	$15.02

3.8.4 Test of Financial Feasibility

The test of financial feasibility compares the annual cost to surplus water user(s) under the proposed action to the annual cost of the most likely, least costly water supply alternative to meet projected water supply needs in the absence of the Federal action. The no action - next least costly alternative must be able to provide an equivalent quality and quantity of water which non-Federal interests could obtain in the absence of utilizing surplus water from the Federal project. The purpose of the test of financial feasibility is to demonstrate that provision of surplus water from the Federal project is the most efficient water supply alternative.

The most likely, least costly water supply alternative to meet projected water supply needs in the absence of the Federal action is groundwater withdrawal. As discussed in Section 3.7.1.1 the average annual cost for groundwater withdrawal is $166.32 per acre per year. As discussed in Section 3.8.2.5 the average annual cost of surplus water from the 18,463,000 acre-feet of storage in the Fort Peck Dam/Fort Peck Lake Project (required to provide 17,816 acre-feet of additional yield) is based on the updated cost of storage method and is $267,530, which is $38.59 per acre-foot of yield (equivalent to $15.02 per acre-foot of storage) (FY 2012 price levels). The test of financial feasibility, comparing the cost of the next least costly alternative ($166.32 per acre-foot of yield) to the cost of the proposed action ($38.59 per acre-foot of yield), clearly demonstrates that temporary provision of surplus water from the Fort Peck Dam/Fort Peck Lake Project is the most efficient water supply alternative (Table 3-20).

Table 3-20
Annual Cost Comparison

Water Source	Acre-Feet/Yr	Cost Per Acre-Foot	Total Cost
Ground Water	6,932	$166.32	$1,152,912
Surplus Water from Fort Peck Lake	6,932	$38.59	$267,530
Annual Savings from using Surplus Water	-	$127.72	$885,382

Note: Totals may be affected by rounding

3.9 Environmental Considerations

Because of the small magnitude of the predicted changes to discharges and water surface elevations of Fort Peck Lake, the remaining five System reservoirs, and the riverine reaches of the Upper Missouri River as a result of the Proposed Action, the following environmental resources (as discussed in Section 5.3 of the accompanying Environmental Assessment) would not be expected to have any measurable change over the existing condition: soils, groundwater, water quality (including cold water habitat), air quality, demographics, socioeconomics, environmental justice, recreation, aesthetics, noise, cultural resources, vegetation and protected plants, fish and wildlife and protected animals. In addition, there would be no effects to project purposes anticipated (Section 3.7.1 Impacts on Project Purposes).

The expected environmental consequences of providing 6,932 acre-feet/year of surplus water from 17,816 acre-feet of storage (the Proposed Action) would not be expected to be significant and would not require the preparation of an Environmental Impact Statement. Note that additional environmental analyses will be conducted to evaluate specific easement and surplus water requests.

3.10 Cumulative Impacts

Surplus Water studies were conducted for each of the six mainstem reservoirs on the upper Missouri River system. Collectively, the six studies conclude that a total of 282,917 acre-feet/year of surplus water (equivalent to 727,097 acre-feet of storage) from the system-wide irrigation storage is temporarily available. The temporary use of up to 282,917 acre-feet/year of surplus water would result in additional net depletions of 17,156 acre-feet from the system for the ten year period, beyond existing usage levels, as shown in Table 3-21

Table 3-21
System-Wide Surplus Water

Project Dam and Reservoir	Proposed Surplus Water Action (Acre-Feet/Yr)	Associated Surplus Water Storage (Acre-Feet)	Additional Net Annual Depletion (Acre-Feet)
Fort Peck Dam/Fort Peck Lake	6,932	17,816	630
Garrison Dam/Lake Sakakawea	100,000	257,000	527
Oahe Dam/Lake Oahe	57,317	147,305	5,211
Big Bend Dam/Lake Sharpe	62,268	160,028	5,661
Fort Randall Dam/Lake Francis Case	27,973	71,890	2,543
Gavins Point Dam/Lewis & Clark Lake	28,427	73,058	2,584
Total System	282,917	727,097	17,156

The cumulative effects investigation of the temporary use of up to 282,917 acre-feet/year of yield (727,097 acre-feet of storage) from the six mainstem reservoirs to meet M&I water supply needs in the region over the 10-year study period shows that there are no significant adverse impacts. Details of the cumulative effects investigation are shown in the Environmental Assessment, Appendix A. Cumulative effects on the NED benefits of project purposes are slightly positive (Table 3-22) with the beneficial impact on flood control benefits offsetting the negative impacts to the benefits of other project purposes. Overall, the cumulative effect on system-wide NED benefits is an annual increase of $99,000, which is equivalent to an increase of less than one one-thousandth of total system benefits.

Table 3-22
Cumulative Annual NED Benefit Impacts

Authorized Purpose	No Action CC2010 ($ millions)	Proposed Action CC10FP ($ millions)	Change ($ millions)	Change (percent)
Flood Control	$402.796	$403.407	$0.611	0.1517
Navigation	$6.716	$6.693	-$0.023	-0.3385
Hydropower	$632.513	$632.179	-$0.334	-0.0528
Water Supply	$607.254	$607.223	-$0.030	-0.0050
Recreation	$84.002	$83.877	-$0.125	-0.1485
Total	**$1,733.280**	**$1,733.379**	**$0.099**	**0.0057**

Note: Impacts to Irrigation are included in the Water Supply category;

The goal of the cumulative benefits assessment is to show differences between alternatives, even if they are very slight. The numbers computed by the DRM were carried out to a thousandth of a percent in an effort to show these very small differences. The DRM and the economic modules are very complicated and rarely can results be simplified into an easy explanation. Brief clarifications of the numbers computed by the model in table 3-22 are shown below.

Flood Control - Either downstream flow was reduced very, very slightly, which caused a reduction of flood damages or the lake level was reduced just enough to result in lower damages to one or more recreation sites during a high reservoir pool condition.

Navigation - A season length was likely reduced a day or two in one or more years to cause the navigation benefits to be reduced in that year or several years (in only drought periods).

Hydropower - One would expect minor reductions in one or more years, overall the reduction in hydropower benefits is one half of one-tenth of a percent.

Water supply - Water supply benefits decrease very very slightly (one half of one hundredth of a percent). Irrigation benefits are computed as part of the water supply module of the Economic Impacts Model.

Recreation - Benefits decreased very slightly in one or more years due to a very small lowering of reservoir levels in a drought year.

Plan formulation for each of the six reservoirs was accomplished in accordance with the six-step planning process defined in ER 1105-2-100. The six recommended Surplus Water actions collectively provide a cost effective temporary solution to address the regional multi-state M&I water supply needs of users adjacent to the mainstem reservoirs for the next 10 years.

4. PLAN IMPLEMENTATION

4.1 Parties to Surplus Water Agreements

In accordance with ER 1105-2-100 (22 April 2000), the cost allocated to the surplus water user, i.e., the price to be charged for the capital investment for the storage required to provide the surplus water, will normally be established as the highest of the benefits or revenues foregone, the replacement cost, or the updated cost of storage in the federal project. As identified in Table 3-19 above, the costs to be assigned to M&I water supply storage are calculated as the updated cost of storage.

The repayment rate used to calculate annual payment for storage is the yield rate defined in Section 932 of the Water Resources Development Act of 1986. EGM 11-01 Federal Interest Rates for Corps of Engineers Projects for Fiscal year 2012 identifies the appropriate interest rate as 4.125%. Payment amounts are recalculated based upon appropriate interest rate for the year an agreement or renewal is signed. The annual payment for the updated cost of storage is calculated over a 30-year period. The duration of the surplus water agreement shall be for a period not to exceed five (5) years. Upon expiration, the agreement may be extended for an additional period not to exceed five (5) years. Extensions shall be subject to recalculation of reimbursement. A surplus water agreement does not imply a permanent right to utilize the storage space.

4.2 Agency Coordination

In early September 2010, a letter was sent to Governors, state and federal agencies, and Tribes formally notifying them of the intent to undertake the surplus water studies and Environmental Assessment for the six Missouri River Projects[37] and inviting their representation at an informational meeting on 29 September 2010 in Bismarck, ND. Governors included in the correspondence were: Honorable Dave Heineman, Governor of Nebraska; Honorable Brian Schweitzer, Governor of Montana; Honorable Mike Rounds, Governor of South Dakota; Honorable John Hoeven, Governor of North Dakota; Honorable Chet Culver, Governor of Iowa; Honorable Jay Nixon, Governor of Missouri; and Honorable Mark Parkinson, Governor of Kansas. An example copy of one of these letters is attached in Appendix A of the Environmental Assessment.

In late April 2011, the Corps of Engineers formally invited the respective Tribes, federal, and state agencies to attend any of three informational meetings on the surplus water studies. The first was held on 10 May 2011 at the Fort Peck Interpretive Center, Fort Peck, Montana; the second was held on 11 May 2011 at the South Dakota Cultural Heritage Center, Pierre, South Dakota; and the third was held 23 May 2011 at the Zorinsky Federal Building, Omaha, Nebraska. The purpose of the meetings was to provide information to the attendees on the surplus water studies as well as give the agencies an opportunity to ask questions and provide initial feedback. Example copies of letters sent to both the Tribes and agencies are also attached

[37] Fort Peck Dam /Fort Peck Lake, Garrison Dam/Lake Sakakawea, Oahe Dam/Lake Oahe, Big Bend Dam/Lake Sharpe, Fort Randall Dam/Lake Francis Case, and Gavins Point Dam/Lewis & Clark Lake

in Appendix A of the Environmental Assessment. The distribution list of Tribes and agencies invited to participate in these meetings is provided below.

Tribes

Assiniboine and Sioux Tribes of Fort Peck, Poplar, Montana 59255

Chairman, A.T. Stafne

Vice Chairperson, Ms. Roxann Bighorn

Blackfeet Nation, Browning, Montana 59417

Chairman, Willie A. Sharp, Jr.

Vice Chairman, Peter "Rusty" Tatsey

Cheyenne River Sioux Tribe, Eagle Butte, South Dakota 57625

Chairman, Kevin Keckler

Vice Chairman, Ted Knife, Jr.

Chippewa Cree Tribe of the Rocky Boy Reservation, Box Elder, Montana 59521-9724

Chairman, Jake Parker

Vice Chairman, Bruce Sunchild

Confederated Salish and Kootenai Tribes of the Flathead Reservation

Chairman, E.T. Bud Morgan

Vice Chairman, Joe Durglo

Crow Creek Sioux Tribe, Fort Thompson, South Dakota 57339-0050

Chairman, Duane Big Eagle Sr.

Vice Chairman, Wilfred Keeble

Crow Nations, Crow Reservation, Montana 59022

Chairman Cedric Black Eagle

Vice Chairman, Coolidge Jefferson

Eastern Shoshone Tribe, Wind River Reservation, Wyoming 82514

Chairman, Mike LaJeunesse

Vice Chairman, Wes Martel

Flandreau Santee Sioux Tribe, Flandreau, South Dakota 57028

President, Anthony Reider

Vice President, Cynthia Allen-Weddell

Gros Ventre and Assiniboine Tribes, Harlem, Montana 59526-9705

Chairman, Tracey King

Vice Chairperson, Ms. Mel L. Adams Doney

Iowa Tribe of Kansas and Nebraska, White Cloud, KS 66094

Chairman, Tim Rhodd

Kaw Nation, Kaw City, OK 74641

Chairman, Guy Munroe

Vice Chairman, Bill Kekahbah

Kickapoo Tribe of Kansas, Horton, KS 66439-9537

Chairman, Russell Bradley

Vice Chairman, Ms. Laura Razo

Lower Brule Sioux Tribe, Lower Brule, South Dakota 57548-0187

Chairman, Michael Jandreau

Vice Chairman, Floyd Gourneau

Northern Arapaho Tribe, Fort Washakie, Wyoming 82514

Chairperson, Mrs. Kim Harjo

Co-Chairman, Keith Spoonhunter

Northern Cheyenne Tribe, Lame Deer, Montana 59043

President, Leroy Spang

Vice President, Joe Fox, Jr.

Oglala Sioux Tribe, Pine Ridge, South Dakota 57770

Chairman, John Yellow Bird Steele

Vice Chairman, Tom Poor Bear

Omaha Tribe of Nebraska, Macy, Nebraska 68039-0368

Chairman, Amen Sheridan

Vice Chairman, Forrest Aldrich

Osage Nation, Pawhuska, Oklahoma 74056

Principal Chief, John D. Red Eagle

Assistant Chief, Scott Bighorse

Pawnee Tribe of Oklahoma, Pawnee, OK 74058

President, George E. Howell

Vice President, Charles Lone Chief

Ponca Tribe of Nebraska, Niobrara, Nebraska 68760

Chairperson, Ms. Rebecca White

Vice Chairman, James LaPointe

Prairie Band Potawatomi Nation, Mayetta KS 66509-8970

Chairman, Steve Ortiz

Vice Chairperson, Mrs. Joyce Guerrero

Rosebud Sioux Tribe, Rosebud, South Dakota 57570-0430

President, Rodney M. Bordeaux

Vice President, William Kindle

Sac and Fox of the Mississippi in Iowa/Meskwaki, Tama, IA 52339

Chairman, Adrian Pushetonequa

Vice Chairman, Jon Papakee

Sac and Fox Nation of Missouri in Kansas and Nebraska, Reserve, Kansas 66434

Chairperson, Ms. Twen Barton

Vice Chairperson, Mrs. Carey Wahwahsuck

Santee Sioux Nation, Santee, Nebraska 68760

Chairman, Roger Trudell

Vice Chairman, David Henry

Sisseton-Wahpeton Sioux Tribe, Agency Village, South Dakota 57262-0509

Chairman, Robert Shepherd

Vice Chairman, Gerald Rousseau

Spirit Lake Sioux Tribe, Fort Totten, North Dakota 58335

Chairperson, Ms. Myra Pearson

Vice Chairman, Darwin Brown

Standing Rock Sioux Tribe, Fort Yates, North Dakota 58538

Chairman, Charlie Murphy

Vice Chairman, Mike Faith

Three Affiliated Tribes, Fort Berthold Reservation, New Town, ND 58763

Chairman, Tex Hall

Vice Chairman, Scott Eagle

Turtle Mountain Band of Chippewa, Turtle Mountain Reservation Belcourt, North Dakota 58316

Chairman, Merle St. Claire

Vice Chairman, Curtis Poitra

Wichita and Affiliated Tribes, Anadarko, OK 73005

President, Stratford Williams

Winnebago Tribe of Nebraska, Winnebago, Nebraska 68071-0687

Chairman, John Blackhawk

Vice Chairman, Brian Chamberlain

Yankton Sioux Tribe, Marty, South Dakota 57361

Chairman, Robert Cournoyer

Vice Chairman, Ms. Karen Archambeau
Sac and Fox Nation of Oklahoma, Stroud, Oklahoma 74079
Ms. Sandra Massey

Region-Wide Contacts

Larry Svoboda, US Environmental Protection Agency Region 8, Denver CO 80202

Joe Cothern, US Environmental Protection Agency Region 7, Kansas City, KS 66101

Robin Johnson, Western Area Power Administration, Billings, MT 59107

Mike Ryan, Bureau of Reclamation Great Plains Regional Office, Billings, MT 59107

Dana Darlington, Missouri River Conservation Districts Council, Great Falls, MT 59401

USACE Regulatory Offices

Todd Tillinger, USACE Montana Regulatory Field Office, Helena, MT 59626

John Moeschen, Nebraska Regulatory Field Office, Omaha, NE 68138

Dan Cimarosti, USACE North Dakota Regulatory Field Office, Bismarck, ND 58504

Steven Naylor, USACE South Dakota Regulatory Field Office, Pierre, SD 57501

North Dakota

Dennis Breitzman, Bureau of Reclamation, Dakotas Area Office, Bismarck, ND 5850

Jeff Towner, US Fish and Wildlife Service, North Dakota Field Office, Bismarck, ND 58501

Terry Steinwand, North Dakota Game and Fish, Bismarck, ND 58501-5095

Dr. Terry Dwelle, North Dakota Department of Health, Bismarck, ND 58501-

Wayne Stenehjem, North Dakota Attorney General, Bismarck ND 58505

Doug Goehring, North Dakota Department of Agriculture, Bismarck, ND 58595

Todd Sando, PE, North Dakota State Engineer, Bismarck, ND 58505-0850

Paul Sweeney, North Dakota Natural Resource Conservation Service, Bismarck, ND 58505

Merlan E. Paaverud, Jr., North Dakota State Historical Society, Bismarck, ND 58505

Scott J. Davis, North Dakota Indian Affairs Commission, Bismarck, ND 58505

Mark Zimmerman, North Dakota Parks & Recreation Department, Bismarck, ND 58503

South Dakota

Pete Gober, US Fish and Wildlife Service, South Dakota Field Office, Pierre, SD 57501

Marty J. Jackley, SD Attorney General, Pierre, SD 57501

Walt Bones, SD Department of Agriculture, Pierre, SD 57501

Steven M. Pirner, P.E., SD Department of Environment and Natural Resources, Pierre, SD 57501

Jeff Vonk, SD Game Fish and Parks, Pierre, SD 57501

Doreen Hollingworth, SD Department of Health, Pierre, SD 57501

Leroy LaPlante, SD Department of Tribal Relations, Pierre, SD 57501

Jay Vogt, SD State Historical Society, Pierre, SD 57501

Janet Oertly, SD Natural Resources Conservation Service, Huron, SD 57350

Montana

Mark Wilson, US Fish and Wildlife Service, Montana Field Office, Helena, MT 59601

Dan Jewell, Montana Area Office, Bureau of Reclamation, Billings, MT 59107

Richard Opper, Montana Department of Environmental Quality, Helena, MT 59620

Mary Sexton, Montana Department of Natural Resources and Conservation, Helena, MT 59620

Joe Maurier, Montana Department of Fish, Wildlife, and Parks, Helena, MT 59601

Joyce Swartzendruber, Montana State Conservationist, Bozeman, MT 59715

Ron de Yong, Montana Department of Agriculture, Helena, MT 59601

Steve Bullock, Montana Attorney General, Helena, MT 59620

Mark Baumler, Montana Historical Society, Helena, MT 59620

Nebraska

Michael George, US Fish and Wildlife Service, Nebraska Field Office, Grand Island, NE 68801

Aaron Thompson, Bureau of Reclamation, Grand Island, NE 68802

Greg Ibach, NE Department of Agriculture, Lincoln, NE 68509

Jon Bruning, Nebraska Attorney General, Lincoln, NE 68509

Mike Linder, Nebraska Department of Environmental Quality, Lincoln, NE 68509

Rex Amack, Nebraska Game and Parks Commission, Lincoln, NE 68503

Michael Smith, Nebraska State Historical Society, Lincoln, NE 68501

Judi M. Gaiashkibos, Nebraska Commission on Indian Affairs, Lincoln, NE 68509

Brian Dunnigan, Nebraska Department of Natural Resources, Lincoln, NE 68509

Iowa

Bill Northey, Iowa Department of Agriculture, Des Moines, IA 50319

Roger Lande, Iowa Department of Natural Resources, Des Moines, IA 50319

Tom Miller, Iowa Attorney General, Des Moines, IA 50319

Missouri

Sara Parker Pauley, Missouri Department of Natural Resources, Jefferson City, MO 65102

Chris Koster, Missouri Attorney General, Jefferson City, MO 65102

Summary of Agency Meetings

The three agency coordination meetings were held in the respective states (MT/SD/NE) for the proposed projects. Surplus Water Reports are being completed for Ft. Peck Lake (Ft. Peck Project), Montana; Lake Oahe (Oahe Project), North and South Dakota; Lake Sharpe (Big Bend Project), South Dakota; Lake Francis Case (Ft. Randall Project), South Dakota and Lewis and Clark Lake (Gavins Point Project), South Dakota. Agencies and individuals that were in attendance at the meetings are listed below.

Affiliation	Individual
U.S. Department of the Interior – Bureau of Reclamation	Neil McPhillips
U.S. Department of the Interior – Bureau of Reclamation	Greg Gere
U.S. Fish and Wildlife Service – Biologist	Terry Quesinberry
U.S. Fish and Wildlife Service – Field Supervisor	Scott Larson
U.S. Fish and Wildlife Service – NE Field Supervisor	Mike George
U.S. Army Corps of Engineers – SD Regulatory Office	Steve Naylor
U.S. Army Corps of Engineers – Omaha District	Tiffany Vanosdall
U.S. Army Corps of Engineers – Omaha District	Eric Laux
U.S. Army Corps of Engineers – Lake Fort Peck Lake Manager	Darin McMurry
U.S. Army Corps of Engineers – Regulatory	Mary Hoffman
U.S. Army Corps of Engineers – Regulatory	John Moeschen
U.S. Army Corps of Engineers – Water Supply Manager	Larry Janis
U.S. Bureau of Reclamation	Kelly Titensor
U.S. Bureau of Reclamation	Dan Fritz
U.S. Bureau of Reclamation	Nell McPhillips
Crow Creek Sioux	Wanda Wells
MT Department of Natural Resources and Conservation	Tim Bryggman
MT Department of Agriculture	Robyn Cassel
SD Department of Environment and Natural Resources	Mark Rath
SD Game Fish and Parks - Aquatics Chief	John Lott
SD Department of Natural Resources - Chief Engineer	Garland Erbele
ND Attorney General's Office - Assistant AG	Jennifer Verleger
ND State Water Commission	Kelly Casteel
ND State Water Commission	Bob Shaver

NE Game and Parks Commission	Gene Zuerlein
NE Historical Society	Terry Steinacher
NE Department of Natural Resources	Susan France
NE Department of Natural Resources	Steve Gaul
NE Department of Environmental Quality	John Bender
KS Water Office	Nathan Westrup
IA Department of Natural Resources	Michael Anderson
IA Department of Agriculture	Harold Hommes

Tiffany Vanosdall and Eric Laux (USACE, Omaha District) presented an overview of the proposed actions and information regarding:

- General information about Missouri River system, authorized purposes, storage;
- USACE water supply authorities and policies;
- Challenges of completing the study on the Missouri River;
- An Outline of a Surplus Water Report;
- Details of Demand, Storage Yield Analysis, Alternatives, Policy Pricing, Compensation to Others;
- The Requirements of the National Environmental Policy Act and Public Participation; and
- Data Gaps, Informational Needs, and Methods for Information Sharing.

Throughout the presentation, discussion occurred. The following summarizes the main points of the comments/questions received.

Natural Flows

Mark Rath (SDDENR) reiterated that the State's positions are similar to the State of North Dakota relative to surplus water determination at Lake Sakakawea (i.e., the Missouri River natural flow, now impounded by Missouri River System reservoirs, remains subject to the exclusive authority and jurisdiction of the individual states and that natural flow would be sufficient to meet water supply needs of the states).

USDOI, Bureau of Reclamation Projects

Bureau of Reclamation stated that they had recently sent a letter to Colonel Ruch (Omaha District Commander) seeking to work with the Corps of Engineers on a comprehensive review of Reclamation's authorized projects with withdrawals from Lakes Oahe and Sakakawea. Coming to consensus on all projects that are congressionally-authorized should prevent future delays regarding the Corps' issuance of construction easements for Reclamation projects, and clarify that those projects would be exempt from Corps water supply agreements.

Storage Yield Analysis

The North Dakota State Water Commission (ND SWC) was interested in the methodologies employed to figure system yield in the Lake Sakakawea Report. The Corps of Engineers agreed to have our hydrologist provide a thorough explanation via phone or email.

Kansas Water asked if there was a yield report available regarding the Corps' computation of system yield. They would like to see the details of how that was computed. The Omaha District responded that they would provide the Lake Sakakawea Surplus Water Report and refer to sections that have that information. The Corps also offered to make their hydrologist available if there were any questions.

Water Supply Demand Analysis

While total demand appears to be sufficient to address demand that may be reasonable and foreseeable, some of the numbers within the demand analysis table appeared to be off. For example, the Corps' reported 16,000 AF of domestic use at Gavins Point was questioned. As a response, the Corps of Engineers would re-check the demand calculations as well as cross check the demand figures with data from SD DENR.

NGPC informed the Corps that they may have water intakes that are not covered under existing recreation leases. The Corps responded that the NGPC does currently have leases to use/manage recreational areas at Lewis and Clark Lake. The Omaha District agreed to look to ensure water withdrawal is covered under those leases. NE DNR mentioned that water rights information for existing users can be obtained online, and that the data are in terms of the PLSS system.

Alternatives for Meeting Water Demand

Based on input from several individuals in attendance, water hauling for water distribution in rural South Dakota is still a common practice. Much of the reasoning behind the legislation for creating Rural Water Systems in South Dakota appears to be twofold: the transporting of water for rural domestic use is very expensive and Rural Water Distribution Systems offset those costs. Because of water quality concerns, ground water is not an option in many cases in both states. Thus, surface water is the main source for domestic use. SD DENR specifically stated that there are "not a lot of options" [outside of surface water] in South Dakota. The following were provided as potential points of contact for information regarding water hauling option: SD - Denny Davis, Association of Rural Water Systems, MT - Ron Miller - Ft. Peck Rural County Water District, and MT – Bobby Kirkland – Water Hauling - 406.526.3220

Based on their review of the Lake Sakakawea Surplus Water Report, NE DNR asked if existing users would need alternative sources of water, require new pipelines, etc. The Omaha District indicated that existing users would not be forced to utilize other sources under the no action alternative. It is assumed that if no federal action were to take place (to identify surplus water in the respective reservoirs), that existing water users would continue to withdraw water from the reservoirs.

Charging for Water

There was considerable discussion regarding the issue of charging for using water. Much of the discussion was captured in previous comments received by states on Lake Sakakawea Report.

Of particular interest was the idea of what happens when Native Americans perfect their water right as many Tribes are currently undertaking such efforts. The Corps of Engineers' position (and the policy taken in the Lake Sakakawea Study) was that water rights are a pre-condition of entering into contract with Corps for use of surplus water (tribal or state water rights). Tribes are not considered differently in this respect than a state or private entity. Legally the Corps can only enter into agreements with an individual or entity having that has a valid state or tribal water right.

Bureau of Reclamation discussed that they were beginning to move toward "market based" pricing for Municipal and Industrial water, and thought the Corps should look into this as well. The Corps indicated that eventually there would be discussions between Corps and Bureau regarding federal water supply policies, etc. But that this will most likely take place during the process of developing the long-term comprehensive strategy for the basin.

Future Water Use/Sources of M&I Demand

None of the representatives from SD or NE were aware of any large-scale users of water (i.e., ethanol or power plants) that were reasonably foreseeable within the next 10 years. As a result, the assumed 10% increase in demand--with no specifically designated future uses--was agreed to as a reasonable approach. The Bureau of Reclamation indicated that there could be fairly large BOR MR&I projects in next 10 years, but they wouldn't require water contract with Corps, as they will be specifically authorized by Congress to use Missouri River water.

5. CONCLUSIONS

The purpose of the Fort Peck Dam/Fort Peck Lake, MT, Surplus Water Report is to identify and quantify whether surplus water is available in the Project, as defined in Section 6 of the 1944 Flood Control Act, that the Secretary of the Army can use to execute surplus water supply agreements with water users, and to determine whether use of surplus water is the most efficient method for meeting regional municipal and industrial (M&I) water needs

This Surplus Water Report and attached Environmental Assessment investigate the engineering and economic feasibility and environmental effects of entering into agreements for the use of surplus water from 6,932 acre-feet/year of yield (equivalent to 17,816 acre-feet of storage) from system-wide irrigation storage available at the Fort Peck Dam/Fort Peck Lake Project to meet potential near-term municipal and industrial (M&I) water supply needs in the region.

This report:

- identifies temporary surplus water in the Fort Peck Dam/Fort Peck Lake Project associated with storage originally planned for mainstem system irrigation that has not developed to its originally projected capacity;
- establishes the need for additional water supply in eastern Montana based on existing use, expired and expiring water supply easements, and potential future requests for water supply easements at Fort Peck Lake.
- assesses structural and non-structural alternative water supply measures;
- assesses potential impacts to project purposes using the DRM developed as part of the Master Manual Review and Update Study;
- assesses potential environmental impacts also using the DRM developed as part of the Master Manual Review and Update Study;
- uses the updated cost of storage method to calculate user costs; and
- conducts a test of financial feasibility indicating that provision of surplus water is the least cost water supply alternative.

The engineering and environmental analyses contained in this report indicate that there are no impacts to project purposes and no significant impacts to environmental resources due to the proposed action. The economic analysis of alternatives identifies the proposed action as the least cost water supply alternative.

6. RECOMMENDATIONS

I have carefully reviewed the water supply problems of the study area and the proposed solution documented in this report. There is a current and future need for additional municipal and industrial water supply in eastern Montana. Furthermore, it is evident through the analysis conducted for this surplus water report that surplus water is available in the Fort Peck Dam/Fort Peck Lake Project that can meet these M&I water demands and increase the benefits provided by the Federal project. Should requests for additional temporary surplus water in amounts greater than those identified in this analysis materialize, then further study would be required. An analysis of long-term pool usage would determine if permanent changes are needed through development of a long-term strategy.

Based on the findings of this study and the appended Environmental Assessment, it is recommended that surplus water associated with 6,932 acre-feet/year of yield (equivalent to 17,816 acre-feet of storage) in the Fort Peck Dam/Fort Peck Lake Project be made available for temporary use for municipal and industrial water supply and that authority be granted to execute surplus water agreements with easement applicants for a period of five (5) years, with an option to renew for an additional five (5) years.

The use of surplus water discussed in this report is economically justified and will not affect the authorized purposes of Fort Peck Dam/Fort Peck Lake Project.

Therefore, the Omaha District recommends that:

1. Use of surplus water from 6,932 acre-feet/year of yield (17,816 acre-feet of yield) by municipal and industrial water supply be approved for implementation; and
2. Under current policy pricing, the annual payment for surplus water would be $38.59 per acre-foot of yield (equivalent to $15.02 per acre-foot of storage) at FY 2012 price levels. However, pending completion of rule-making to establish a nationwide policy for surplus water uses under Section 6, surplus water agreements would be entered into at no cost. The term of these agreements would be for a period not to exceed the time needed to conclude the rulemaking process. All users of surplus water would need to enter into new or revised agreements implementing the nationwide policy price once the rule becomes effective.

All cost figures are calculated using the FY 2012 Water Supply Interest Rate of 4.125% based on PL 99-662. According to PL 99-622 these cost figures will need to be recalculated at appropriate times relative to future agreements.

When a request for water supply does materialize, the applicant would work directly with the local Project Office (e.g., Fort Peck Lake Project Office) receiving the necessary instruction that has been established to evaluate water supply requests and their associated real estate outgrant requests[38]. Following the guidelines in the Real Estate Policy Guidance, the applicant would complete and submit the necessary request (typically including a request letter, maps/locations,

[38] U.S. Army Corps of Engineers (USACE). 2011. Operations Division Real Estate Policy. Omaha District, Northwest Division.

area of disturbance, development plan, regulatory permit application, and a preliminary environmental effects analysis). Once in receipt of a complete application, the District would complete the NEPA process, provide notification to the real estate office for issuance of an easement, and obtain the necessary permits prior to construction. Each Project Office has a set of conditions of consideration for evaluating requests for water intake site selection. These conditions of consideration have been developed to avoid important environmental resources and minimize the environmental consequences of intake construction and operation.

The recommendation contained herein reflects the information available at this time and current Departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendation may be modified before it is transmitted to higher authority for approval.

Robert J. Ruch
Colonel, Corps of Engineers
District Engineer

US Army Corps
of Engineers
Omaha District

Appendix A

Fort Peck Dam/Fort Peck Lake Project
Montana

Surplus Water Report

Environmental Assessment

August 2012

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

1 Introduction 1

1.1 Purpose of the Surplus Water Report and Environmental Assessment 1

1.2 Authority for the Proposed Action 2

1.3 Fort Peck Project Location, Background, and Overview 3

1.3.1 Project Authorization 4

1.3.2 Authorized Project Purposes 8

1.4 Prior Reports and NEPA Documents 8

2 Purpose and Need for the USACE Action 11

2.1 Purpose and Need for the Surplus Water 11

2.1.1 Existing Fort Peck Lake Water Users 11

2.1.2 Total Water Supply Demand 13

3 Alternatives Formulation 14

3.1 Planning Goals and Objectives 14

3.2 Management Measures 16

3.2.1 Identification of Management Measures 16

3.2.2 Screening of Management Measures 16

3.2.2.1 Structural Measures 17

3.2.2.2 Non-Structural Measures (Activities) 20

4 Alternatives Including the Proposed Action 22

4.1 Most Likely Future Without Project Condition - No Action Alternative 22

4.2 Proposed Action-Use of Surplus Water 23

5 Scope of Analysis and Missouri System Overview 23

5.1 Scope of the Analysis 23

5.1.1 Context and Intensity 23

5.1.2 Direct, Indirect, and Cumulative, Effects 23

5.1.3 Scope of the Analysis 24

5.1.4 630 Acre-Feet/Year of Additional Depletions in Context 25

5.2 Missouri River System Description and Operation 26

5.2.1 Intrasystem Regulation 29

5.2.1.1 Seasonal Intrasystem Regulation Patterns 29

5.2.1.2 Winter Release Patterns 29

5.2.1.3 Balancing/Unbalancing the Upper Three Reservoirs 30

5.2.1.4 Short Term Intrasystem Adjustments 30

5.2.1.5 Hourly Fluctuation of Release Rates 30
6 Affected Environment and Environmental Consequences 32
6.2 Resources Considered but Not Carried Forward for Analysis 40
6.3 Groundwater 40
6.3.1 Existing Condition 40
6.3.2 Environmental Consequences 43
6.4 Water Quality 43
6.4.1 Existing Condition 43
6.4.2 Environmental Consequences 44
6.5 Air Quality 46
6.5.1 Existing Condition 46
6.5.2 Environmental Consequences 47
6.6 Land Use 47
6.6.1 Existing Condition 47
6.6.2 Environmental Consequences 48
6.7 Demographics 48
6.7.1 Existing Condition 48
6.7.2 Environmental Consequences 49
6.8 Employment/Income 50
6.8.1 Existing Condition 50
6.8.2 Environmental Consequences 50
6.9 Environmental Justice 51
6.9.1 Existing Condition 51
6.9.2 Environmental Consequences 53
6.10 Recreation 53
6.10.1 Existing Condition 53
6.10.2 Environmental Consequences 55
6.11 Aesthetics and Visual Resources 55
6.11.1 Existing Condition 55
6.11.2 Environmental Consequences 55
6.12 Noise 56
6.12.1 Existing Condition 56
6.12.2 Environmental Consequences 56
6.13 Cultural Resources 57
6.13.1 Existing Condition 57
6.13.2 Environmental Consequences 57

6.14 Vegetation and Listed Species ... 57
6.14.1 Existing Condition ... 57
6.14.2 Environmental Consequences ... 58
6.15 Fish and Wildlife and Listed Species ... 59
6.15.1 Existing Conditions ... 59
6.15.2 Environmental Consequences ... 67
7 Cumulative Effects of the Proposed Action ... 70
7.1 Effects of Depletions ... 70
8 Compliance with Environmental Laws and Regulations ... 74
9 Summary of Environmental Effects ... 79
10 Coordination, Consultation, and List of Preparers ... 81
10.1 List of Tribes, Agencies, and Persons Consulted ... 81
10.2 Summary of Agency Meetings ... 85
10.3 Public Participation ... 89
10.4 List of Preparers ... 90
11 References ... 91
Appendices ... 96
Appendix A– Gubernatorial, Tribal, and Agency Correspondence ... 96
Example Letter to the Governors ... 96
Example Letter to the Tribes ... 98
Example Letter to State and Federal Agencies ... 103

List of Tables

Table 1 Missouri River Mainstem Flood Control Reservoirs ... 8
Table 2 Water Rights Permits Sourced from Fort Peck Lake by Use Type ... 12
Table 3 Water Rights Permits Sourced from Fort Peck Lake by County ... 12
Table 4 Easements and Allocations (AF/YR) at Fort Peck Lake ... 13
Table 5 Water Use in the Six-County Fort Peck Area (AF) ... 14
Table 6 Sources of Water Withdrawals for No Action and Proposed Action Alternatives ... 22
Table 7 Reservoir Storage Zones ... 27
Table 8 Standard Error Estimation for Modeled Effects ... 46

Table 9 Historical and Projected Population for Six Montana Counties 48

Table 10 Seasonal Population of 2000..... 49

Table 11 Income Data for the Fort Peck Area of Influence and Montana (1999) 50

Table 12 Percent Race by County..... 52

Table 13 2009 Percent of Population Below Poverty Level..... 52

Table 14 Fort Peck Lake Boat Ramp Elevations 54

Table 15 Federally Threatened and Endangered Fish and Wildlife on Fort Peck Project Lands . 61

List of Figures

Figure 1 Omaha District Civil Works Boundary and Mainstem Projects 5
Figure 2 Fort Peck Dam/Fort Peck Lake Project, Montana 6
Figure 3 Fort Peck Lake Study Area 7
Figure 4 Missouri River System Storage Zones 27
Figure 5 Daily Stage Variation for a 31-Day Period Downstream of Garrison Dam 31
Figure 6 Model Node Locations for the Daily Routing Model 33
Figure 7 Fort Peck: Release-Difference Distribution - Proposed Action Minus No Action 35
Figure 8 Garrison: Release-Difference Distribution - Proposed Action Minus No Action 36
Figure 9 Oahe: Release-Difference Distribution - Proposed Action Minus No Action 36
Figure 10 Fort Peck: WSE Difference Distribution - Proposed Action Minus No Action 37
Figure 11 Lake Sakakawea: WSE Difference Distribution-Proposed Action Minus No Action . 38
Figure 12 Oahe: WSE Difference Distribution-Proposed Action Minus No Action 38
Figure 13 Gavins Point: Release Difference Distribution-Proposed Action Minus No Action ... 39
Figure 14 Surficial Aquifers and Distribution of Wells in Eastern Montana 41
Figure 15 Montana Bedrock Aquifer Water Quality 42
Figure 16 Cumulative Fort Peck Lake WSE Difference Distribution 71
Figure 17 Cumulative Lake Sakakawea WSE Difference Distribution 72
Figure 18 Cumulative Lake Oahe WSE Difference Distribution 72
Figure 19 Cumulative Gavins Point Dam Release Difference Distribution 73

THIS PAGE INTENTIONALLY LEFT BLANK

1 Introduction

1.1 Purpose of the Surplus Water Report and Environmental Assessment

The purpose of the Fort Peck Dam/Fort Peck Lake, MT, Surplus Water Report is to identify and quantify whether surplus water is available in the Project, as defined in Section 6 of the 1944 Flood Control Act, that the Secretary of the Army can use to execute surplus water supply agreements with water users, and to determine whether use of surplus water is the most efficient method for meeting regional municipal and industrial (M&I) water needs. This Draft Environmental Assessment (EA) presents and provides an evaluation of the direct, indirect, and cumulative environmental effects of the proposed action and the "no action" alternative pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) as implemented by the President's Council on Environmental Quality NEPA-Implementing Regulations (40 CFR 1500-1508).

This Surplus Water Report (Report) and this Draft Environmental Assessment investigate the engineering and economic feasibility and environmental effects of temporary use of up to 17,816 acre-feet/year of storage (6,932 acre-feet of yield per year) from the Fort Peck Dam/Fort Peck Lake to meet municipal and industrial (M&I) water supply needs in the region over the 10-year study period. This Report has been prepared by the Omaha District, U.S. Army Corps of Engineers (Corps) under the Operation & Maintenance Program. The water supply agreements derived from this process would be executed with potential easement applicants upon approval of this Report by the Assistant Secretary of the Army (Civil Works) and completion of required NEPA analysis. The term of surplus water agreement is for a five (5) year period, renewable for an additional five (5) year period, subject to recalculation of reimbursement after the initial five (5) year period.

A 10-year study period has been established for the surplus water study and EA. The length of the study period was selected for two reasons. First, surplus water agreements may be executed for a five (5) year period, renewable for an additional five (5) year period. Second, prior to the end of the 10-year study period, the Corps recommends that a comprehensive strategy to address long-term regional water needs be developed that may involve the Administration, Congress and stakeholders. The surplus water agreements executed upon the approval of the Report and EA serve as measures to address temporary water needs of the region during the 10-year study period.

The 6,932 acre-feet/year of yield (17,816 acre-feet/year of storage) evaluated for surplus water use in this EA is an estimate that was selected based on an estimated potential 10-percent growth in future M&I water demand from the existing total allocation of 6,302 acre-feet/year over the 10-year planning period. This amount should ensure that an adequate quantity of water was identified to meet the needs of existing and future M&I water users. The amount has been chosen for the purposes of efficiency and responsiveness and so that potential requests over the period of record could be evaluated and approved.

1.2 Authority for the Proposed Action

The Fort Peck Dam/Fort Peck Lake, MT, Surplus Water Report study is being conducted under the authority of Section 6 of Public Law 78-534, the 1944 Flood Control Act. Under Section 6, the Secretary of the Army is authorized to enter into agreements for surplus water with states, municipalities, private concerns, or individuals at any reservoir under the control of the Department of the Army. Specifically, Section 6 states that:

> *"[T]he Secretary of War is authorized to make contracts with States, municipalities, private concerns, or individuals, at such prices and on such terms as he may deem reasonable, for domestic and industrial uses for surplus water that may be available at any reservoir under the control of the War Department: Provided, That no contracts for such water shall adversely affect then existing lawful uses of such water."*

The Corps of Engineers' Planning Guidance Notebook, ER 1105-2-100 (USACE, 2000), page 3-32, paragraph 3-8a states:

> *"The Secretary of the Army can also enter into agreements with states, municipalities, private entities or individuals for the use of surplus water as defined in, and under the conditions described in, Paragraph 3-8b(4). Surplus water can also be used to respond to droughts and other emergencies affecting municipal and industrial water supplies."*

ER 1105-2-100, paragraph 3-8b(4), entitled, "Surplus Water" states*:*

> *"Under Section 6 of the Flood Control Act of 1944, the Secretary of the Army is authorized to make agreements with states, municipalities, private concerns, or individuals for surplus water that may be available at any reservoir under the control of the Department. These agreements may be for domestic, municipal, and industrial uses, but not for crop irrigation.*

ER 1105-2-100, paragraph E-57b(2) states:

> *(2) Classification.*
>
> *(a) Surplus Water will be classified as either:*
>
> *(1) water stored in a Department of Army reservoir that is not required because the authorized use for the water never developed or the need was reduced by changes that occurred since authorization or construction; or*
>
> *(2) water that would be more beneficially used as a municipal and industrial water than for the authorized purpose and which, when withdrawn, would not significantly affect authorized purposes over some specified time period.*
>
> *(b) An Army General Counsel opinion of March 13, 1986, states that Section 6 of the 1944 Flood Control Act empowers the Secretary of the Army to make*

> *reasonable reallocations between different project purposes. Thus, water stored for purposes no longer necessary can be considered surplus. In addition, the Secretary may use his broad discretionary authority to reduce project outputs, envisioned at the time of authorization and construction, if it is believed that the municipal and industrial use of the water is a higher and more beneficial use….*

(3) Requirements and Restrictions. Surplus water declarations will only be made when related withdrawals would not significantly affect authorized purposes. Surplus water agreements shall be accompanied by a brief letter Report similar to reallocation Reports and shall include how and why the storage is determined surplus. Surplus water agreements will normally be for small amounts of water and/or for temporary use as opposed to storage reallocations and a permanent right to that storage. Normally, surplus water agreements will be limited to 5 year periods. Use of the Section 6 authorities should be encouraged only where non-Federal sponsors do not want to buy storage because the need of the water is short term or the use is temporary pending the development of the authorized use. The views of the affected state(s) will be obtained, as appropriate, prior to entering into any agreement under Section 6. The annual price deemed reasonable for this use of surplus water is determined by the same procedure used to determine the annual payment for an equivalent amount of reallocated storage plus an estimated annual cost for operation and maintenance, repair, replacement, and rehabilitation. The total annual price is to be limited to the annual costs of the least cost alternative, but never less than the benefits foregone (in the case of hydropower, revenues forgone).

1.3 Fort Peck Project Location, Background, and Overview

The Missouri River begins at the junction of the Jefferson, Madison, and Gallatin Rivers, near Three Forks in the Rocky Mountains of southwest Montana. Figure 1 illustrates the Upper Missouri River Basin. Fort Peck Dam and Fort Peck Lake (the impoundment created by Fort Peck Dam) is one of six multipurpose mainstem projects which operate as part of a system on the Missouri River. It is the oldest and furthest upstream project in the Corps of Engineers Missouri River Mainstem Reservoir System. The dam is located 19 miles southeast of Glasgow, Montana on the Missouri River approximately 1,771.5 river miles upstream from the mouth (see Figures 1, 2, and 3). The dam measures over 21,000 feet in length, has a maximum height of 250.5 feet, a crest width of 50 feet, and a base width of 4,900 feet (USACE, 2008). Fort Peck Dam is the largest hydraulically filled dam in the world and the 2nd largest dam in the United States.

The impounded Fort Peck Lake is approximately 134-miles long, up to 16-miles wide, up to 220 feet deep, with a water surface of approximately 249,000 acres, and more than 1,500 miles of shoreline (USACE, 2008) making it the 5th-largest man-made reservoir in the United States. Six Montana counties have shoreline on Fort Peck Lake; Fergus, Garfield, McCone, Petroleum, Phillips, and Valley. The reservoir holds approximately 18.5 million acre-feet of water storage at full pool, which is approximately one quarter of the 73.1 million acre-feet storage capacity of the Missouri River reservoir system (USACE, 2008).

As part of the Fort Peck Project, the Corps manages approximately 390,000 acres of lands immediately adjacent to the dam and surrounding the reservoir (USACE, 2008). Surrounding

the Fort Peck Project (lake and lands) is the approximately 1.1 million-acre Charles M. Russell National Wildlife Refuge (CMR), managed by the U.S. Fish and Wildlife Service.

1.3.1 Project Authorization

The 1935 Rivers and Harbors Act was the original authorization for Fort Peck Lake. The Act provided for operations *"primarily for navigation, with such arrangements for future installation of power as will permit the maximum production of hydroelectric power consistent with the primary demands of navigation."* The authorization was in accordance with recommendations of the Chief of Engineers in House Document 238, 73rd Congress, 2d session (February 5, 1934). The subsequent Fort Peck Act, approved May 18, 1938 authorized completion, maintenance, and operation of Fort Peck Lake *"for the purpose of improving navigation on the Missouri River, and for other purposes incidental thereto, the dam and appurtenant works now under construction at Fort Peck, Montana, and a suitable power plant for the production of hydroelectric power shall be completed, maintained, and operated under the direction of the Secretary of War (now Army) and the supervision of the Corps of Engineers, subject to the provisions of this Act relating to the duties of the Bureau of Reclamation ... respecting the transmission and sale of electric energy generated at said project*" (Public Law 529, 75th Congress).

The Flood Control Act of 1944 authorized construction of the Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point Reservoirs. The Corps modified the operation of Fort Peck Lake to incorporate it into the Missouri River Mainstem Reservoir System (Figure 2-1) operations, which are authorized for multiple purposes including flood control, irrigation, navigation, hydroelectric power, and other purposes. Congress was notified of the incorporation by the Chief of Engineers during Congressional hearings in 1957.

Under the Flood Control Act of 1944, the Corps was given the responsibility for development of projects on the main stem of the Missouri River. Tributary projects were made the responsibility of the Corps if the dominant purpose was flood control. The Department of the Interior was designated as the marketing agent for all power, beyond project requirements, produced at Corps projects.

The Department of the Interior subsequently designated the Bureau of Reclamation (BOR) as the marketing agent for power generated by the main stem projects. The Department of Energy Act (1977 Department of Interior Organization Act) established the Department of Energy and simultaneously withdrew the power marketing function from the Department of Interior and moved it to the new Department of Energy. In 1986, the Water Resources Development Act (Public Law 99-662) authorized recreation as a specific project purpose at Fort Peck.

Figure 1
Omaha District Civil Works Boundary and Mainstem Projects

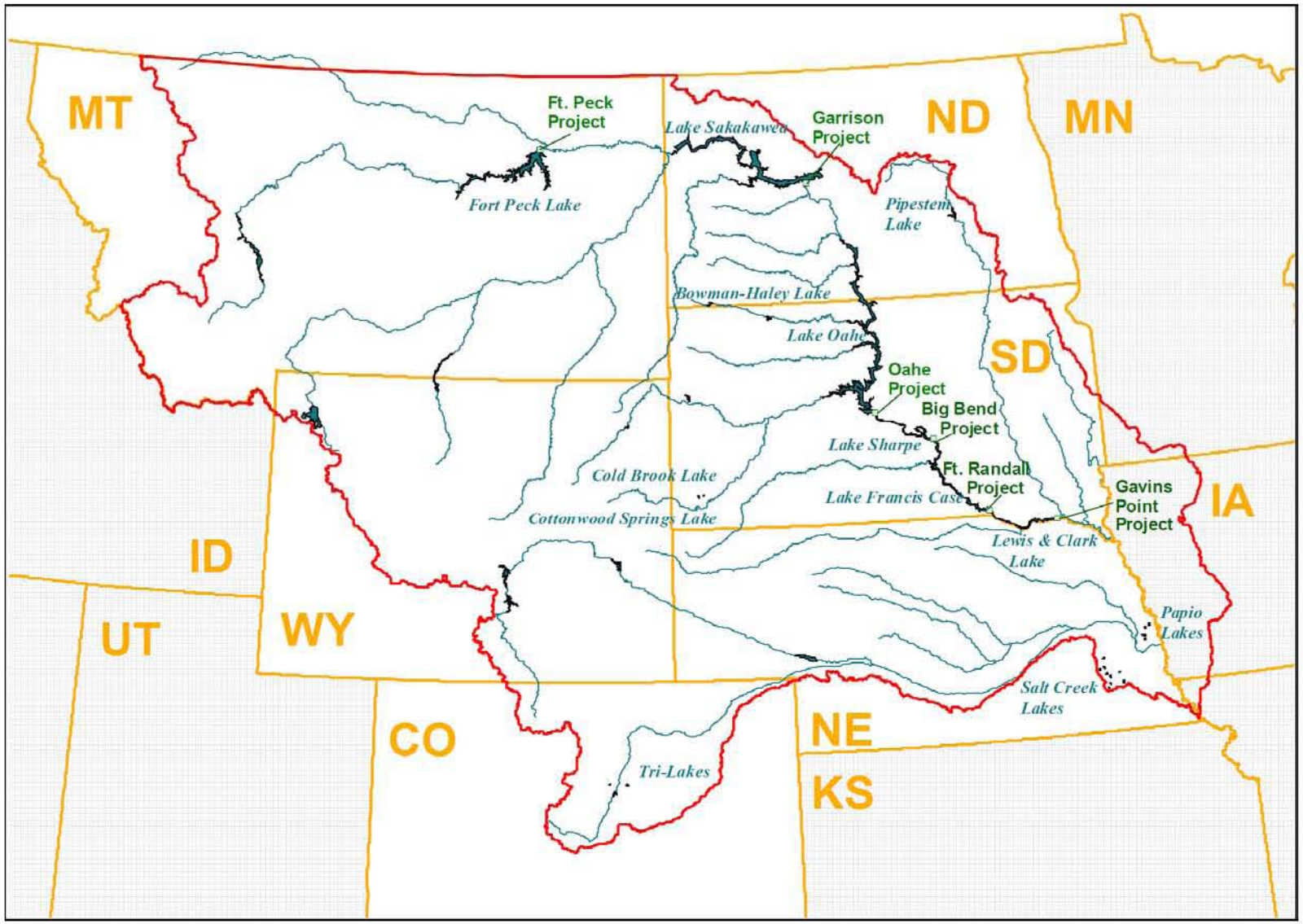


Figure 2
Fort Peck Dam/Fort Peck Lake Project, Montana

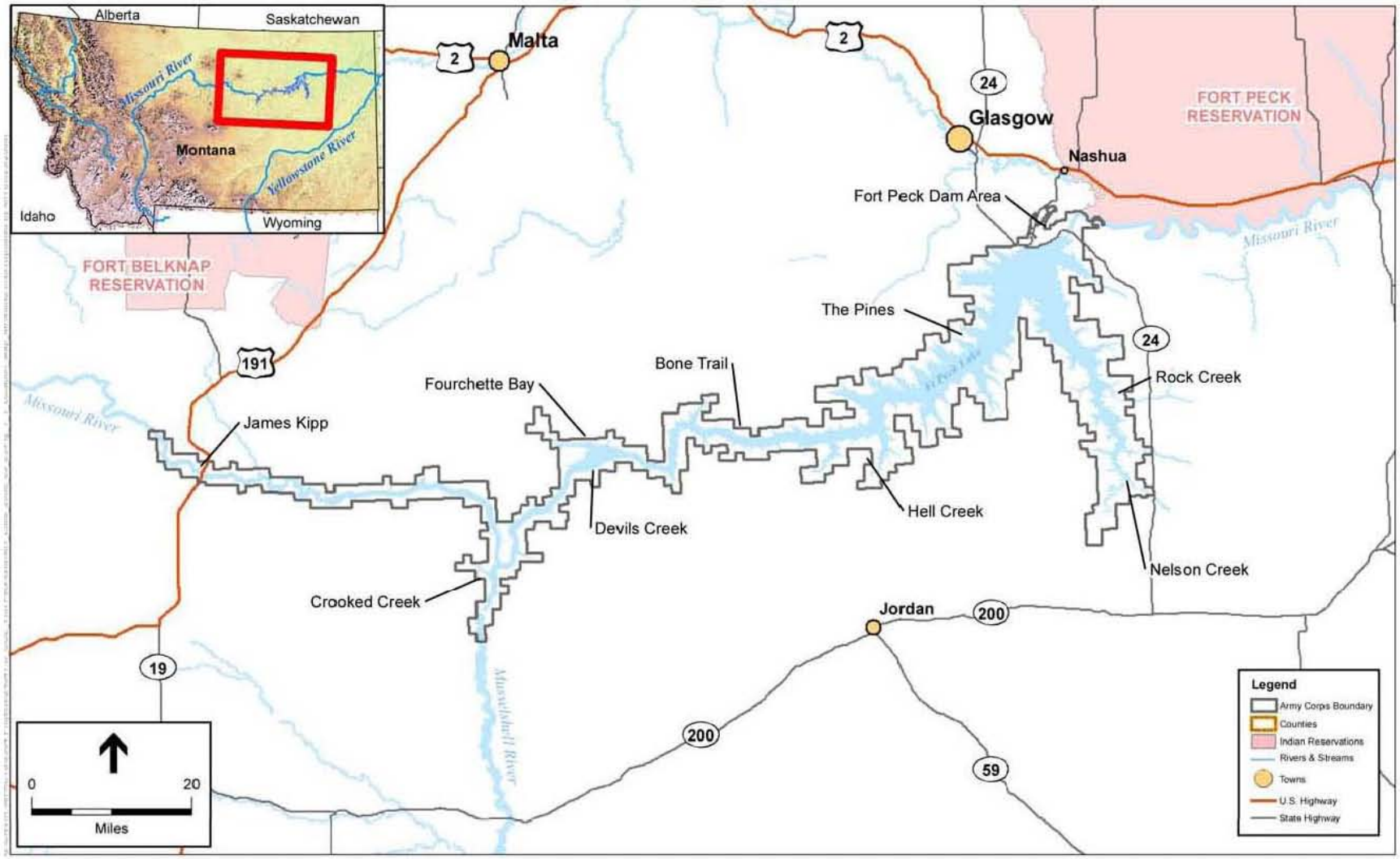
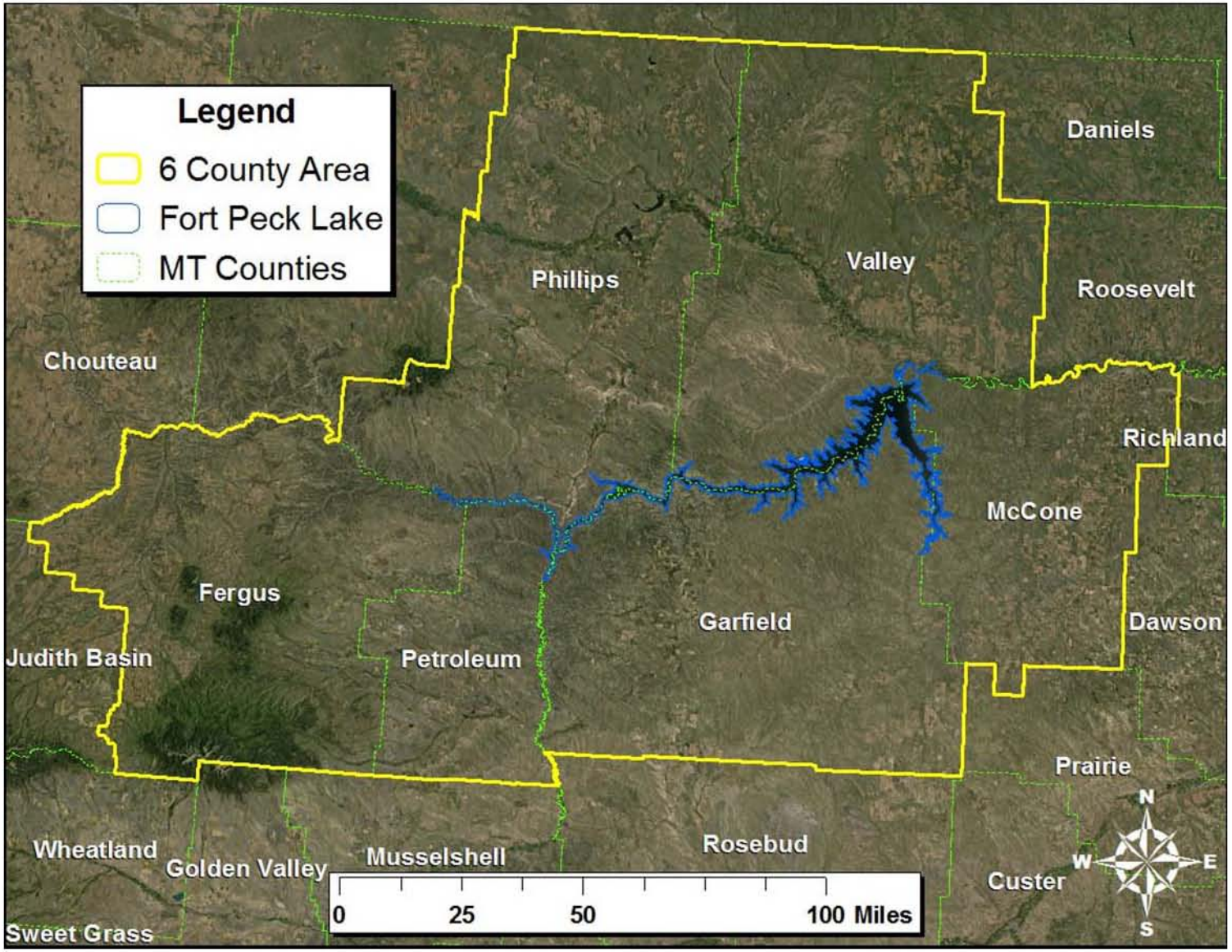


Figure 3
Fort Peck Lake Study Area



1.3.2 Authorized Project Purposes

The Fort Peck project was originally designed and intended for the primary purpose of improving navigation flows from Sioux City, Iowa to the confluence with the Mississippi River, with the incidental purposes of flood control and hydropower. After additional storage was built on the mainstem of the Missouri River, the Fort Peck project was incorporated into the operation with the five other mainstem reservoirs to create a system that is operated for flood control, navigation, hydropower, fish and wildlife, recreation, municipal and industrial water supply, water quality, and irrigation. Criteria described in the Missouri River Mainstem Reservoir System Master Water Control Manual are formulated to ensure water management in accordance with project purposes. To achieve full coordination within the entire Missouri River basin and to meet all of the authorized project purposes, operation of all six mainstem reservoirs is directed by the Missouri River Basin Water Management Division located in Omaha, Nebraska, part of the U.S. Army Corps of Engineers (Corps) Northwestern Division.

The six mainstem reservoirs operated by the Corps are listed in Table 1. Fort Peck Lake provides a significant storage contribution to the mainstem system of reservoirs. It is the third largest of the six reservoirs, with a storage capacity of approximately 18.5 million acre-feet (MAF) which is 25-percent of the total 73.1 MAF storage capacity in the mainstem system.

Table 1
Missouri River Mainstem Flood Control Reservoirs

Project (Dam and Reservoir)	Incremental Drainage Area (Square Miles)	Year of Closure	Flood Control and Multiple Use Storage in Acre-Feet (AF)	Total Storage in Acre-Feet (AF)
Fort Peck Dam/ Fort Peck Lake	57,500	1937	2,704,000	18,463,000
Garrison Dam/ Lake Sakakawea	123,900	1953	4,222,000	23,821,000
Oahe Dam/ Lake Oahe	62,090	1958	3,201,000	23,137,000
Big Bend Dam/ Lake Sharpe	5,840	1963	117,000	1,798,000
Fort Randall Dam/ Lake Francis Case	14,150	1952	1,309,000	5,418,000
Gavins Point Dam/ Lewis & Clark Lake	16,000	1955	86,000	450,000

Source: USACE, 2009a.

1.4 Prior Reports and NEPA Documents

The Army Corps of Engineers and other federal and non-federal entities have prepared a number of documents on the upper Missouri River system. The previous federal and non-federal studies

have established an extensive database on the environment in the upper Missouri River system. These references are listed below, and are hereby incorporated-by-reference (40 CFR 1502.21).

- In March 2003, the Kansas City District and the Omaha District published a Final Environmental Impact Statement entitled, "Final Supplemental Environmental Impact Statement for the Missouri River Fish and Wildlife Mitigation Project." The project study area is located along 735 miles of the Missouri River from Sioux City, Iowa to the mouth of the river near St. Louis, Missouri. The purpose of this program was to restore fish and wildlife habitat losses resulting from construction, operation, and maintenance of the Missouri River Bank Stabilization and Navigation Project that provided a navigation channel from Sioux City to the mouth (USACE, 2003).

- In October 2003, the Omaha District published a Master Plan entitled, "Big Bend Dam/Lake Sharpe Master Plan with Integrated Programmatic Environmental Assessment Missouri River, South Dakota Update of Design Memorandum MB-90." The document was prepared to describe the operational plan and existing environmental conditions for the Big Bend Project in South Dakota (USACE, 2003a).

- In October 2003, the Omaha District published a Master Plan entitled, "Gavins Point Dam/Lewis and Clark Lake Master Plan Missouri River, Nebraska and South Dakota, Update of Design Memorandum MG-123." The document was prepared to describe the operational plan and existing environmental conditions for the Gavins Point Dam/Lewis and Clark Lake in Nebraska and South Dakota (USACE, 2003b).

- In December 2003, the U.S. Fish and Wildlife Service published an amendment to their 2000 Biological Opinion entitled "U.S. Fish and Wildlife Service Amendment to the 2000 Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System" (USFWS, 2003).

- In March 2004, the Northwestern Division of the Army Corps of Engineers published the Final Environmental Impact Statement for the Missouri River Master Water Control Manual entitled, "Missouri River Final Environmental Impact Statement, Master Water Control Manual Review and Update" (USACE, 2004).

- In February 2006, the Northwestern Division of the Army Corps of Engineers published an Environmental Assessment entitled, "Environmental Assessment for the Inclusion of Technical Criteria for Spring Pulse Releases from Gavins Point Dam" (USACE, 2006). The analysis in the document compares the impacts of the bimodal spring pulse technical criteria with the impacts of the spring pulse alternatives evaluated in the Master Water Control Manual FEIS (USACE, 2004).

- In December 2007, the Omaha District published the Master Plan and integrated Finding of No Significant Impact entitled, "Garrison Dam/Lake Sakakawea Master Plan with Integrated Programmatic Environmental Assessment Missouri River, North Dakota Update of Design Memorandum MGR-107D." The document was prepared to evaluate

the environmental impacts associated with management of the Garrison Project in North Dakota (USACE, 2007).

- In August 2008, the Omaha District published the Master Plan and integrated Finding of No Significant Impact entitled, "Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment Missouri River, Montana Update of Design Memorandum MFP-105D." The document was prepared to evaluate the environmental impacts associated with management of the Fort Peck Project in Montana (USACE, 2008).

- In April 2010, the Omaha District published an Environmental Assessment entitled, "Missouri River Recovery Program, Emergent Sandbar Habitat Complexes in the Missouri River, Nebraska and South Dakota, Draft Project Implementation Report (PIR) With Integrated Environmental Assessment." These actions are being undertaken to address endangered species needs and mitigate for the loss of habitat that resulted from construction, operation, and maintenance of the Missouri River Bank Stabilization and Navigation Project (BSNP) (USACE, 2010a).

- In September 2010, the Omaha District published a document entitled, Missouri River Mainstem System, 2010-2011 Draft Annual Operating Plan. The Annual Operating Plan (AOP) presents pertinent information and plans for regulating the Missouri River Mainstem Reservoir System (System) through December 2011 under widely varying water supply conditions. It provides a framework for the development of detailed monthly, weekly, and daily regulation schedules for the System's six individual dams during the coming year to serve the Congressionally-authorized project purposes (USACE, 2010).

- In September 2010, the Omaha District published the Final Master Plan and integrated Finding of No Significant Impact entitled, "Final Oahe Dam/Lake Oahe Master Plan Missouri River, South Dakota and North Dakota Design Memorandum MO-224." The document was prepared to evaluate the environmental impacts associated with management of the Lake Oahe Project in North and South Dakota (USACE, 2010b).

- In October 2010, the Omaha District published an Environmental Impact Statement entitled, "Draft Programmatic Environmental Impact Statement for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat in the Riverine Segments of the Upper Missouri River." This Draft Programmatic Environmental Impact Statement (PEIS) evaluates the potential environmental consequences of implementing the Emergent Sandbar Habitat (ESH) program on the upper Missouri River (USACE, 2010c).

2 Purpose and Need for the USACE Action

2.1 Purpose and Need for the Surplus Water

As stated in Section 1, the purpose of this study is to identify whether there is a quantity of surplus water, as defined in Section 6 of the 1944 Flood Control Act that the Secretary of the Army can use to execute surplus water supply agreements with water users, and to determine whether the use of surplus water is the most efficient method for meeting regional municipal and industrial (M&I) needs. Based on Corps policy, easement requests cannot be processed until a determination is made by the Secretary of the Army that surplus water is available in the Fort Peck Dam/Fort Peck Lake Project and that use of the surplus water will not significantly affect existing lawful uses of Fort Peck Lake water. In addition to a single new applicant for 0.8 acre-feet/year of yield, 19 of the existing easements (totaling 972 acre-feet/year of yield) have expired and 40 of the existing easements (totaling 1,508 acre-feet/year of yield) for water intakes at Fort Peck Dam/Fort Peck Lake will expire over the 10-year planning period.[1] All of these (new or renewed easements) may require surplus water agreements prior to renewal. Corps guidance[2] states "*no easement that supports any type of water supply agreement will be executed prior to the water supply agreement being executed by all parties*."

Temporary use of 6,932 acre-feet/year of yield (equivalent to 17,816 acre-feet/year of storage) is being evaluated in this analysis. The 6,932 acre-feet/year of surplus water yield was selected by the Omaha District based on an estimated potential 10-percent growth in future M&I water demand from the existing total allocation of 6,302 acre-feet/year over the 10-year planning period. It is assumed that all current water use will continue at existing rates (including water use via currently expired easements). This surplus water determination has been evaluated for the purposes of efficiency and responsiveness, so that storage volume associated with future surplus water needs over the period of analysis could be evaluated and approved by the Assistant Secretary. Should resource impacts from the temporary use of 6,932 acre-feet/year of surplus water (equivalent to 17,816 acre-feet/year of storage) prove significant, then lesser amounts could be evaluated.

2.1.1 Existing Fort Peck Lake Water Users

One hundred and nine (109) water supply intakes and intake facilities are located on Fort Peck Lake. As shown in Table 2, these intakes service 138 Fort Peck Lake water rights holders, some of whom may share intakes, infrastructure, and easements.[3] Irrigation and Municipal use are the largest uses of Fort Peck Lake water. Cabin owners own the majority of the domestic intakes, which are generally used in lawn watering, car washing, and fire protection. Domestic intakes along this reach are not generally used to provide drinking water, which is obtained in

[1] The Fort Peck Lake has a total of 73 easements for water supply intakes across Corps lands.

[2] Real Estate Policy Guidance Letter No. 26, Easements to Support Water Supply Storage Agreements and Surplus Water Agreements, 10 June 2008.

[3] The number of Fort Peck Lake water rights holders was estimated from state water permit data by identifying all water rights sourced from either Fort Peck Lake or the Missouri River within a one mile area around the lake.

neighboring towns (USACE, 2004). Table 3 shows the water rights permits that are sourced from Fort Peck Lake, segregated by county.

Table 2
Water Rights Permits Sourced from Fort Peck Lake by Use Type

Use-Type	Count	Average (AF)	Sum (AF)
Irrigation	12	332.3	3,988
Municipal	2	1,125.0	2,250
Stock	50	6.8	342
Other	11	20.9	230
Domestic	55	1.4	77
Lawn and Garden	8	3.4	27
TOTAL	138	50.1	6,913

Source: MT DNRC, Water Rights Bureau.

Table 3
Water Rights Permits Sourced from Fort Peck Lake by County

Use-Type	Count	Average (AF)	Sum (AF)
Valley	68	44.8	3,046
McCone	10	167.2	1,672
Fergus	7	208.6	1,460
Garfield	8	50.6	405
Phillips	16	14.7	235
Petroleum	29	3.3	95
TOTAL	138	50.1	6,913

Source: MT DNRC, Water Rights Bureau.

The Corps has issued 73 water intake easements around Fort Peck Lake (Table 4). Of these 73 water intake easements, approximately 81-percent (59) have either already expired or will expire within the next 10 years. The quantity of water being withdrawn through these easements is difficult to determine from the available data. The Corps keeps records on easement allocations, but does not collect data on actual water usage. Table 4 presents the easement allocations (acre-feet/year) by use type. However, there is no data set that allows direct correlation of State water use permits with Corps easements.

Table 4
Easements and Allocations (AF/YR) at Fort Peck Lake

Use-Type	Easements		Acre-Feet	
Irrigation	9	12.3%	2,948	46.8%
Domestic	57	78.1%	842	13.4%
Municipal	4	5.5%	2,350	37.3%
Rural Water	-	0.0%	-	0.0%
Industrial	-	0.0%	-	0.0%
Other*	-	0.0%	-	0.0%
Unknown	3	4.1%	163	2.6%
Total	73	100.0%	6,302	100.0%

*Other Includes Livestock, Multipurpose, Sewer, Storm Sewer.

2.1.2 Total Water Supply Demand

The United States Geologic Survey estimates of general water use for the six-county area surrounding Fort Peck Lake identify a total use of 626,000 acre-feet in 2005. As shown in Figure 3, the six-county study area consists of Fergus, Garfield, McCone, Petroleum, Phillips, and Valley counties.

Table 5 displays average water use by type for the six-county area. Irrigation is the major water use in the study area, accounting for 98-percent of all water use. Nearly all (97-percent) water use in the study area is supplied from surface water, of which approximately 1-percent, or 6,302 acre-feet/year comes from the Fort Peck Project. The other 99-percent of surface water use comes from a wide variety of rivers, lakes, tributaries, streams, springs, dry draws, and etcetera. Most of these alternative surface water sources provide ample water to satisfy local demands. This abundance of locally available surface water sources means that Fort Peck Lake is not the primary water source for the vast majority of the study area. The lake does however provide a significant portion of the non-irrigation water use within the area. Excluding irrigation from the six-county water use data indicates that 45-percent of non-irrigation water use (5,728 acre-feet/year) is supplied from groundwater and 55-percent (7,084 acre-feet/year) is supplied from surface water, 47-percent of which comes from Fort Peck Lake.

Table 5
Water Use in the Six-County Fort Peck Area (AF)

Use-Type	Ground	Surface	Total
Public[4]	2,948.0	1,120.9	4,068.9
Domestic	784.6	22.4	807.1
Industrial	482.0	-	482.0
Irrigation	10,940.1	602,736.3	613,676.4
Stock	1,446.0	4,976.8	6,422.8
Aquaculture[5]	56.0	717.4	773.4
Mining	11.2	246.6	257.8
Total	16,667.9	609,820.5	626,488.4

Source: USGS, 2005. County Level Water Use Data

As the 6-county study area is predominantly rural with a declining population since the in 1930s, future growth in demand for non-irrigation water from Fort Peck Lake is expected to be minimal. For planning purposes, it is anticipated that a quantity of surplus water equivalent to an additional 10-percent of existing water use from Fort Peck Lake (or 630 acre-feet/year) would be more than sufficient to meet any likely future growth in demand over the next 5-10 years.

This percentage was determined using best professional judgment and accounts for a variety of risk and uncertainty factors relevant to potential future water demand. These factors include potential changes in population, climate, industry, law, regulation, and consumption patterns – all of which could affect demand for water over the next 5-10 years. Overall, it is estimated that 6,932 acre-feet/year of water would meet current (6,302 acre-feet) and potential future (630 acre-feet) water needs of the study area.

3 Alternatives Formulation

3.1 Planning Goals and Objectives

The goal of the Surplus Water Report is to determine whether there is surplus water available in the Fort Peck Dam/Fort Peck Lake Project and to evaluate whether entering into agreements for the use of surplus water from the Project is the most cost effective means of meeting the near-term (10-year) water needs of the study area. The study area is defined as the six-county area surrounding Fort Peck Lake in Eastern Montana.

National water policy states that the primary responsibility for water supply rests with states and local entities, not the Federal government. However, the Corps can participate and cooperate

[4] USGS' "Public" use-type most closely approximates municipal use and includes records for the six counties surrounding Fort Peck Lake.

[5] The cultivation or farming of fish (e.g., salmon) under controlled conditions for the production of food.

with state and local entities in developing water supplies in connection with the construction, operation, or modification of Federal navigation, flood damage reduction, or multipurpose projects. Specifically, the Corps is authorized to provide storage in new or existing multipurpose reservoirs for municipal and industrial water supply. However, since water supply is a state and local responsibility, the cost of water supply storage and associated facilities in a Corps project must be paid for entirely by a non-Federal entity.

The Secretary of the Army is authorized to make agreements with states, municipalities and other non-Federal entities for the rights to utilize water supply storage in Corps reservoirs. The Secretary of the Army can enter into agreements with states, municipalities, private entities or individuals for the use of 'surplus water'. Under Section 6 of the Flood Control Act of 1944, the Secretary of the Army is authorized to make agreements with states, municipalities, private concerns, or individuals for surplus water that may be available at any Corps reservoir. Surplus water agreements may be for domestic, municipal, and industrial uses, but not for irrigation.

Planning objectives for this study were developed to be consistent with federal, state and local laws and policies, and technical, economic, environmental, regional, social, and institutional considerations. The planning objectives were used to help formulate and evaluate plans to avoid, minimize, and mitigate (if necessary), any adverse project impacts to the environment. Planning objectives also provide a decision framework to identify the least cost water supply alternative, avoid adverse social impacts, and meet local preferences to the fullest extent possible.

In pursuit of the project goal, the following Federal planning objectives were established:

- Determine if surplus water is available at the Fort Peck Dam/Fort Peck Lake Project and determine the storage amount to be evaluated for potential impacts, over the next 10 years;
- Anticipate demand and requests for surplus water agreements at the Project over the 10-year study period, including requests identified within this report and a forecast of additional requests; and
- Determine repayment unit costs to apply to surplus water agreements.

Also in pursuit of the project goal, the following regional planning objectives were established:

- Provide sufficient water to meet the needs of existing and prospective applicants for new surplus water agreements at Fort Peck Dam/Fort Peck Lake for the next 10 years by the most efficient means,
- Provide sufficient water to meet the needs of current Fort Peck Dam/Fort Peck Lake water supply users whose existing easements will expire within the next 10 years.

This study develops and evaluates alternatives to determine how best to meet potential easement applicants' water needs within the constraints described below. The impacts of entering into agreements for the use of surplus water on other project purposes are assessed so that an optimal alternative that provides needed water supply and does not significantly impact other project purposes may be identified. The impacts assessed in this analysis include effects on: flood control, navigation, irrigation, hydropower, municipal and industrial water supply, fish and wildlife, recreation, water quality, and any associated environmental and economic effects.

•

3.2 Management Measures

A management measure is a feature (i.e., a structural element that requires construction or assembly on-site), or an activity (i.e., a nonstructural action) that can either work alone or be combined with other management measures to form alternative plans. Management measures were developed to address study area problems and to capitalize upon study area opportunities. Management measures for this study were derived from a variety of sources including prior studies, agency and public input, and the project delivery team (PDT).

3.2.1 Identification of Management Measures

The following management measures were identified for initial consideration:

Structural Measures (Features)

- Structural modifications to the project to increase storage capacity;
- Provision of surplus water from undeveloped irrigation needs system-wide to M&I water supply for up to 10 years, including associated infrastructure (i.e., intakes, pipelines, storage and distribution facilities);
- Groundwater withdrawals, including associated infrastructure;
- Surface water withdrawals from the Missouri River upstream or downstream of Fort Peck Lake, including associated infrastructure;

Non-Structural Measures (Activities)

- Conservation / incentive programs/regulations/public education/drought contingency planning;
- Water reuse/recycling; and
- Sale or lease of existing non-M&I use water right to an M&I use.

3.2.2 Screening of Management Measures

The following sub-sections evaluate and screen each of the structural and non-structural measures identified above to determine which measures should be carried forward in the planning process and included in the formulation of alternatives. The Water Resource Council's Principles and Guidelines[6] identify four criteria to be used in the formulation and evaluation of alternative plans: completeness, effectiveness, efficiency, and acceptability. At this phase of the planning process, management measures are screened, using these four criteria, to determine whether they have the potential to make meaningful contributions to achieving the goals and objectives of the project. While none of these criteria are absolute, it is clearly reasonable to screen out from further consideration any management measure that: 1) does not contribute to

[6] Economic and Environmental Principles for Water and Related Land Resources Implementation Studies and The Economic and Environmental Guidelines for Water and Related Land Resources Implementation Studies, U.S. Water Resources Council (1983)

meeting study goals and objectives to any significant extent (completeness), 2) is not effective in resolving study area problems and needs (effectiveness), 3) is not an efficient means of solving the problem when compared to other potential measures (efficiency), or 4) is not an acceptable solution to other Federal and non-Federal agencies and affected publics (acceptability).

This is not to imply that some management measures that are screened out from further consideration may not be beneficial public policies or effective solutions to other legitimate problems of the study area. Rather, management measures are screened out from further consideration when it can be reasonably determined that they will not meaningfully contribute to meeting study goals and objectives or resolving the problems and needs that the study was initiated to address.

3.2.2.1 Structural Measures

Four structural measures are considered below. Two structural measures were screened out from further consideration (i.e., structural modifications to the project and surface water withdrawals from free-flowing reaches of the Missouri River). Two structural measures are carried forward into formulation of alternative plans: groundwater withdrawals and temporary provision of surplus water from Fort Peck Lake.

<u>Structural Modifications to the Project to Increase Storage Capacity</u>

Corps of Engineers guidance[7] states that existing Corps projects may be modified to add storage for municipal and industrial water supply. Structural measures to increase the storage capacity of an existing dam typically include: auxiliary spillways, lined overflow sections, raising the dam, modifications to the existing spillway, and combinations of these measures. Environmental criteria that must be assessed when considering structural measures to increase storage capacity include: avoiding adverse impacts to the environment, mitigating any unavoidable environmental impacts, maintaining water quality and ecosystem functions during and after the modification, and achieving no net loss in environmental values and functions.[8]

The advantages of structural measures to increase storage capacity is that the needs of municipal and industrial water supply can be met without the negative effects on project users associated with taking water storage away from other authorized project purposes. The disadvantages of structural measures to increase storage capacity is that the studies necessary to design such modifications are lengthy and costly; and construction activities are similarly costly, time consuming, and can have significant impacts on the physical and natural environment. As a result, structural modifications to increase storage capacity are typically only considered when municipal and industrial water needs are so significant relative to total existing storage capacity that the effects of providing surplus water from existing storage would render the project unable to meet its authorized project purposes, and where the environmental effects of surplus M&I water use would exceed the environmental effects of structural modifications.

[7] ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, Paragraph 3-8.a.
[8] EM 1110-2-2300, General Design and Construction Considerations for Earth and Rock-Fill Dams, 30 July 2004.

These considerations indicate that structural modifications would not be efficient and would likely be an unacceptable measure for the Fort Peck Dam/Fort Peck Lake Project. The amount of water being requested, 6,932 acre-feet/year, is only 0.045 percent of the net system yield of 15.2 million acre-feet/year, and the 1,620 acre-feet/year of storage required for a net additional depletion of 630 acre-feet/year would be less than 0.01 percent of total usable storage in Fort Peck Lake. Use of this small portion of total system yield would have negligible impacts on current authorized purposes and on environmental conditions at the project, or in upstream or downstream reaches of the Missouri River. Structural modifications to the project would require a far greater use of resources and cause far greater environmental impacts than would be reasonable for such a small change in system yield.

Structural measures to add additional storage at Fort Peck Dam/Fort Peck Lake Project are also not efficient given that surplus water may only be made available for up to 10 years. In order to meet Corps design criteria, structural measures would need to be designed and built to last for the remaining life of the project, which is well in excess of the 10-year maximum term for surplus water.

Based on this assessment, structural measures involving modifications to the Fort Peck Dam/Fort Peck Lake Project to increase storage capacity have been eliminated from further consideration (screened out) for reasons of efficiency and acceptability.

Surface Water Withdrawals from Free-Flowing Reaches of the Missouri River

A beneficial use permit from the State of Montana is required for withdrawals from free-flowing reaches of the Missouri River within Montana. If channel alterations were necessary, then a regulatory permit would also be required from the Corps of Engineers. However, no surplus water agreement or easement is required from the Corps of Engineers for water obtained from river reaches not contained within a Corps reservoir or on Corps project lands. Water allocation decisions for free-flowing river reaches, depending on the scope of such a withdrawal, are generally under the purview of the State.

As a general matter the water supply users with active permits, expired or expiring permits, pending permits, or who might request permits for water withdrawals from Fort Peck Lake in the future are located adjacent to Fort Peck Lake and withdrawal from remote locations upstream or downstream of Fort Peck Lake would require extensive pipeline systems to transport the water from the point of withdrawal to the point of use. Based on the distance water would need to be transported, this alternative would be inefficient. In addition, municipal surface water users in the counties surrounding Fort Peck Lake, which do not get their water from Fort Peck Lake, tend to be large entities with water rights that are substantially larger than the projected future additional demand of 6,932 acre-feet/year. There are currently four municipal surface water rights holders with a total water right of 4,821 acre-feet/year and an average water right of 1,205 acre-feet/year, indicating that surface water is better suited as a source for a large municipal user. Municipal groundwater rights holders in the study area are more numerous and are far smaller in size, as discussed in the next section.

Surface water withdrawals from the free flowing reaches of the Missouri River are not carried forward as a viable alternative because surface water withdrawals are inefficient and mis-matched to the relatively small size of projected increases in future demand.

Groundwater Withdrawals

A beneficial water use permit from the State of Montana is used to apply for appropriations of groundwater of more than 35 gallons per minute or 10 acre-feet per year and all surface water. In a controlled groundwater area, a permit may be required to appropriate any amount of water. The reasons for ordering a controlled groundwater area include:

- Groundwater withdrawals in the area are greater than recharge of the aquifer,
- Excessive groundwater withdrawals are likely to occur in the near future,
- There are significant disputes regarding groundwater rights in the area,
- Groundwater levels or pressures in the area have been or are declining excessively,
- Excessive groundwater withdrawals would cause contaminant migration,
- Groundwater withdrawals are or will adversely affect groundwater quality, and
- Water quality in the groundwater area is not suited for a specific beneficial use.

However, there are no controlled groundwater areas within the six-county study area. Submission of this application must include applicable addenda and is filed with the Water Resources Division of the Montana Department of Natural Resources and Conservation. In executing their permit decision making process, the State closely monitors water usage and impacts on aquifers to protect groundwater resources and avoid damage to critical aquifers. Municipal groundwater users' water rights in the counties surrounding Fort Peck Lake tend to be substantially smaller than surface water municipal users. There are currently 55 municipal groundwater users with an average water right of 252 acre-feet/year, and groundwater sources are currently meeting over 5,700 acre-feet/year of non-irrigation water needs within the 6-county area. The projected increase in future demand of 6,932 acre-feet/year being evaluated in this surplus water investigation could conceivably be met through new groundwater appropriations within the study area. Groundwater withdrawal, through the construction of withdrawal wells, is a viable alternative and is therefore retained for further analysis.

Temporary Use of Surplus Water

Temporary use of surplus water in the Fort Peck Dam/Fort Peck Lake Project is considered a structural measure. In order to meet the completeness criterion, this measure includes the necessary investments by non-Federal entities to construct water intakes and pipelines which may be necessary to deliver the purchased water to the end user.

The four reservoir zones, of the Fort Peck Lake are: the permanent pool, the carryover multiple use pool, the annual flood control and multiple use zone, and the exclusive flood control zone. The permanent pool provides 4.2 million acre-foot (MAF) of storage. Storage within this zone is the minimum necessary to maintain project operations and to meet minimum head requirements needed to support hydropower operations.

Above the permanent pool is the 10.8 MAF carryover multiple use zone. This intermediate zone provides a storage reserve for irrigation, navigation, power production, and other beneficial conservation uses. This zone also provides carryover storage for maintaining downstream flows through a succession of years in which runoff is below normal. Similar to Garrison and Oahe Projects, storage originally planned for the irrigation purpose has not been fully utilized since the project was placed in operation, which has enabled the mainstem system to provide additional benefits to other authorized project purposes in extended droughts. The mainstem system will continue to provide substantially for this additional benefit even with a surplus water determination of 17,816 acre-feet/year of storage.

The third zone is the 2.7 MAF annual flood control and multiple use zone. This is the desired operating zone. Water stored in this zone is normally evacuated by March 1 of each year to provide adequate storage capacity for the flood season. During the flood period, water is impounded in this zone (i.e., re-filled), as required. Because of the annual operational fluctuations of water levels in this zone it is not considered a reliable source of water to meet M&I water needs on a consistent basis throughout the year, however this zone, together with the other operational zones of the reservoir, have the capability to provide 6,932 acre-feet/year of surplus water for Municipal and Industrial purposes on a temporary basis without unreasonably impairing the efficiency of the reservoirs other purposes.

Finally, the fourth zone, or exclusive flood control zone, consists of 0.98 MAF of storage between elevations 2246.0 and 2250.0 feet msl. This zone is used only during periods of extreme floods and is evacuated as soon as downstream conditions permit. For this reason, water is very infrequently stored in this zone and so does not contain surplus water except under the most extreme and infrequent conditions. However, to the extent surplus water withdrawals are made during the evacuation period from this zone for municipal and industrial needs, it does represent a source of surplus water during that time period. The temporary use of surplus water from surplus irrigation storage in the carryover multiple use zone alone can sufficiently meet the entire identified water needs, and so fully meets the effectiveness criterion.

The costs of surplus water would include the prorated share of updated project costs, plus the full cost of all necessary infrastructure investments on and off project lands. These costs, when compared to the costs of purchasing water from multiple locations that are more distant from the water supply users, may prove to be the most cost effective means of achieving project objectives, and is therefore tentatively considered to meet the efficiency criterion, subject to more detailed analysis in the comparison of alternative plans.

Consistent with the criteria of completeness, effectiveness, efficiency, and acceptability, the structural measure of temporary use of surplus water in the Fort Peck Dam/Fort Peck Lake Project is carried forward for further consideration into the formulation of alternative plans.

3.2.2.2 Non-Structural Measures (Activities)

Three non-structural measures are considered below: conservation/incentive programs, water reuse/recycling, and transfer of water rights from non-M&I use to M&I use). All three non-structural measures were screened out from further detailed consideration as described below.

<u>Conservation/Incentive Programs/Regulations/Public Education/Drought Contingency Planning</u>

Conservation is a viable alternative for dealing with short-term water supply shortages and temporary drought conditions, but does not provide a complete solution to the water supply needs for existing water supply users with expiring easements and for potential new water supply users. Montana has an extensive drought preparedness program and the Montana Department of Natural Resources and Conservation is required by Montana statute to develop a state water plan. The Montana State University at Bozeman is the home of the Montana Water Center, which was established in 1964 by an act of Congress to advance water research, education, and problem-solving partnerships throughout the state. Future without-project conditions assume that future state water plans would continue to address conservation, water use efficiency, drought management and water quality management. It is unlikely that additional efforts in these areas would sufficiently reduce the future needs of existing easement holders, or eliminate the needs of future water users. Conservation and related activities would therefore be neither complete, nor effective non-structural solutions and are not carried forward for further consideration.

Water Reuse/Recycling

Water reuse/recycling may be a viable alternative for reducing the water supply needs for existing water supply users with expiring easements and for potential new water supply users but does not provide a complete solution for these users. Reused or recycled water is not suitable for M&I use without extensive treatment; however it may be suitable for landscape, but not crop, irrigation. Similarly, reused or recycled water has limited applications in domestic use. For reasons of lack of completeness and effectiveness water reuse and recycling were eliminated (screened out) from further consideration in the formulation of alternative plans.

Conversion of Non- M&I Water Rights to M&I Water Rights

In some states, under certain circumstances, existing water rights for uses such as irrigation, fish and wildlife, and recreation may be converted to M&I use through the sale or lease of water rights. Water rights conversions are subject to regulations and limitations that protect the supply source and existing users. For example, conversions of water rights from irrigation to M&I use are typically at a lower acre-foot allocation for the M&I use because of the lost recharge to groundwater when the use is no longer irrigation. Conversion of water rights to M&I use does not occur very often.

Within the study area, within the past 25 years, there have been no conversions to municipal use. There was one conversion from an irrigation water right to an industrial water right. This permit totaled 52 acre-feet/year. These types of conversions are extremely rare. MT state law does allow for changes of use-type, but it does not allow for an increase in water use for the converted permit. State law considers year-round use as an increase in use, even if the total volumes used are the same or less. Irrigation permits are only approved for seasonal use. Thus, permits converted from irrigation to industrial use can only be used during the crop irrigation season. This severely limits their value, usefulness and desirability. It also severely limits the effectiveness of converting irrigation permits to industrial permits as an alternative means to meet potential future M&I demand.

Furthermore, in this largely agricultural study area, adequate irrigation water rights and irrigation water use are important inputs into agricultural production. It is unlikely that irrigation water

rights would be available for conversion to M&I use in quantities that would meet the projected increase in demand. This alternative is not carried forward to further analysis because it would be ineffective in meeting the projected increase in demand.

4 Alternatives Including the Proposed Action

Based on the alternatives and measures screening, the alternatives to be evaluated in detail within this EA include the No Action – Next Least Costly Alternative and the Proposed Action. For comparison purposes, both alternatives describe the most likely means of providing 6,932 acre-feet/year of water to meet current (6,302 acre-feet/year) and potential future increase in water needs of the study area (630 acre-feet/year). Table 6 summarizes the sources of demand for both No Action and the Proposed Action. The remainder of Section 4 provides additional detail on the No Action and Proposed Action alternatives.

Table 6
Sources of Water Withdrawals for No Action and Proposed Action Alternatives

Water Source	No Action (Acre-Feet/YR)	Proposed Action (Acre-Feet/YR)	Difference (Proposed Action minus No Action)
From Ground Water	6,932	0	-6,932
From Fort Peck Lake	0	6,932	6,932
Total All Sources	**6,932**	**6,932**	**0**

4.1 Most Likely Future Without Project Condition - No Action Alternative

The No Action alternative would assume development of new, non-Project water, groundwater sources in a manner similar to existing M&I groundwater use in the study area for providing an additional 630 acre-feet/year of water (beyond existing use). The number of new groundwater wells necessary to provide the additional 630 acre-feet/year of water for M&I use is assumed based on replicating the characteristics of existing M&I use and users in the study area. Existing M&I use includes four surface water rights holders with large acre-feet allotments (averaging 1,205 acre-feet/year) and 55 groundwater rights holders with much smaller acre-feet allotments (averaging 252 acre-feet/year).

The average non-project surface water rights holder has an M&I allotment that is nearly twice as large (1,205 acre-feet/year) as the projected increase in demand (360 acre-feet/year), and therefore is not a good representation of projected future M&I user characteristics. Conversely, the average groundwater rights holder has an M&I allocation which is the equivalent of 40-percent of the projected increase in demand. The characteristics of existing M&I users indicate that future M&I users are more likely to be groundwater-sourced M&I users. The No Action Alternative is assumed to be the continuation of existing use of 6,302 acre-feet/year, which is assumed to continue to be sourced from the lake and the construction and operation of three new

groundwater-sourced M&I users with 210 acre-feet/year allocations each, at undefined locations in the six-county area.

4.2 Proposed Action-Use of Surplus Water

The proposed action for the Army Corps of Engineers would be to identify surplus water, as defined in Section 6 of the 1944 Flood Control Act, which the Secretary of the Army can make available to execute surplus water supply agreements with prospective M&I water users, of up to 6,932 acre-feet/year of surplus water (equivalent to 17,816 acre-feet/year of storage) from Fort Peck Lake.

All future easements and water supply agreements require review by the Corps of Engineers prior to allowing placement of infrastructure. In this process, the Corps would complete NEPA evaluations on water intake and distribution infrastructure installation and operation. In addition, connected actions related to the water's intended use would be considered if the future use differed from existing usage. Within the environmental review process, the Corps would comply with the appropriate environmental laws and regulations.

5 Scope of Analysis and Missouri System Overview

5.1 Scope of the Analysis

5.1.1 Context and Intensity

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality's Implementing Regulations require that an Environmental Assessment identify the likely environmental effects of a proposed project and that the agency determine whether those impacts may be significant. The determination of whether an impact significantly affects the quality of the human environment must consider the *context* of an action and the *intensity* of the impacts (40 CFR 1508.27).

The term *context* refers to the affected environment in which the proposed action would take place and is based on the specific location of the proposed action, taking into account the entire affected region, the affected interests, and the locality. The term *intensity* refers to the magnitude of change that would result if the proposed action were implemented.

Determining whether an effect significantly affects the quality of the human environment also requires an examination of the relationship between *context* and *intensity*. In general, the more sensitive the context (i.e., the specific resource in the proposed action's affected area), the less intense an impact needs to be in order for the action to be considered significant. Conversely, the less intense of an impact, the less scrutiny even sensitive resources need because of the overt inability of an action to effect change to the physical environment. The consideration of context and intensity also must account for the indirect and cumulative effects from a proposed action.

5.1.2 Direct, Indirect, and Cumulative, Effects

Direct effects are caused by the action and occur at the same time and place (40 CFR 1508.8) and would include effects to the environment within the footprint of disturbance for construction and operation of new water supply intakes at Fort Peck Lake. Indirect effects are caused by the

action, but typically occur later in time or are farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8). For example, the indirect effect of the determination of surplus water in Fort Peck Lake could include the granting of future easements for intake construction and the construction and use of water intakes and distribution. Indirect effects could also include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or the growth of industry.

A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR§1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. These actions include on-site or off-site projects conducted by government agencies, businesses, or individuals that are affecting or would affect the same environmental resources as would be affected by the proposed action.

5.1.3 Scope of the Analysis

As of May 2011, there was a single pending domestic request for new M&I water supply easements at Fort Peck Lake for less than one acre-foot/year of water (0.8 acre-feet/year). In the absence of other applications for new easements, construction and operation of new intake infrastructure is not reasonably foreseeable at this time. Evaluating the environmental consequences of theoretical new intakes, without any applicants requesting easements, would be too speculative to be meaningful. Therefore, the scope of analysis in the EA does not assess direct effects of new water supply intakes or water distribution systems, because they are not currently planned or reasonably foreseeable.

In addition, meetings with representatives of Montana confirmed that there are neither pending applications for easements, nor any known demand for industrial uses of surface water (e.g., ethanol processing plant, coal plant) from the Fort Peck Lake. Therefore, there is no reasonably foreseeable future industrial or municipal use for which, the environmental consequences of these connected actions could be reasonably evaluated in this EA.

Without easement applications for new water intakes and no plans for M&I usage for surface water from Fort Peck Lake, the scope of the analysis is limited to the environmental effects of the depletions. Only effects that are reasonably foreseeable need be addressed in a NEPA analysis; impacts that are speculative and that depend on actions that are remote or hypothetical need not be considered. As such, the scope of the environmental analysis in this EA evaluates the indirect and cumulative effects of the depletions of the surplus water. For the proposed action, the area of potential influence for the analysis of effects consists of:

- Where depletions from Fort Peck Lake would result in changes to the water surface elevation;
- Where depletions from Fort Peck Lake would result in changes to the releases from the Fort Peck Dam;

- Where depletions from Fort Peck Lake would result in changes to the releases from, and water surface elevations in the other Missouri River System reservoirs (Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point); and
- Where the depletions from Fort Peck Lake and the other Missouri River System reservoirs (Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point) would result in changes to flow and water surface elevations downstream in the Missouri River (cumulative effects).

The proposed action being evaluated in this EA is the identification of surplus water in the Fort Peck Lake/Fort Peck Dam Project in order to provide surplus water to M&I users in the vicinity. Because there is only a single applicant for less than an acre-foot/year of storage currently before the Corps of Engineers for intakes and there are no known industrial users identified or reasonably foreseeable at Fort Peck Lake, there are no induced effects evaluated or identified in this EA.

The decision to identify surplus water in Fort Peck Lake would not result in direct environmental effects. However, USACE decision making to implement the proposed action could be *connected* (40 CFR 1508.25(a)(1)) to potential increased depletions from the reservoir and those depletions are the focus of the environmental analysis.

5.1.4 630 Acre-Feet/Year of Additional Depletions in Context

The Proposed Action for this EA is the temporary use of up to 17,816 acre-feet/year of storage (6,932 acre-feet/year of yield) from the Fort Peck Lake/Fort Peck Dam Project to meet existing and future municipal and industrial (M&I) water supply needs in the region over a 5-10 year period. The temporary use of 6,932 acre-feet/year of surplus water in Fort Peck Lake would result in additional net annual depletions of 630 acre-feet/year from the system for the ten year period, beyond existing usage levels. The primary difference between with and without project conditions is that under without project conditions, the additional 630 acre-feet/year would come from groundwater sources and under with-project conditions, withdrawal of the additional 630 acre-feet/year would come from the Fort Peck Dam/Fort Peck Lake Project. This section is included to provide the reader with a context within which to understand the relative magnitude of the changes in the Missouri River and the Fort Peck Lake/Fort Peck Dam Project that are being proposed.

The proposed temporary use of the additional 630 acre-feet/year of water from Fort Peck Lake would be a total depletion allowance that the easement holders would be allowed to remove over the span of a year. Daily (and yearly) withdrawals from the various intakes would be small relative to the total storage in the reservoir. To put 630 acre-feet/year per year into a daily context, a withdrawal of 0.9 (less than one) cubic foot per second (CFS), every day for an entire year, would yield 630 acre-feet/year of water. So, if water withdrawals were uniformly removed from Fort Peck Lake throughout the year, there would be less than one fewer CFS of water available for discharge at any given moment from the Fort Peck Dam as a result of the proposed action.

From 1937 through 2006, annual release duration relationships from the Fort Peck Dam/Fort Peck Lake Master Plan recorded a maximum mean annual discharge of 15,700 CFS and a minimum mean annual discharge of 2,663 CFS from the Fort Peck Dam (USACE, 2008). If the

depletions from the proposed action resulted in 0.9 CFS less being available for discharge, the potential change in the release would be effectively unchanged.

This is the most conservative case in that it assumes that no changes would be made in reservoir operations to adjust for the additional 6,932 acre-foot/year depletion. In fact, adjustments would not need to be made in the vast majority of cases, because the 6,932 acre-foot/year depletion (17,816 acre-feet/year of storage) represents less than 0.01-percent of total storage in a reservoir that holds approximately 18,463,000 acre-feet. As the proposed 630 acre-feet/year in additional depletions represent a small change relative to the scale of the normal operations of the Fort Peck Dam and the entire reservoir system, where actual operational changes in release rates are typically made in hundreds and thousands of cubic feet per second, the effects on pool levels and reservoir outflow would be very small.

5.2 Missouri River System Description and Operation

The Missouri River System, including Fort Peck Lake, is operated such that depletions could result in changes to all reservoirs and riverine sections. In other words, because of how the system is managed, water withdrawn from Fort Peck Lake results in changes throughout the system. Understanding the routine aspects of System operation is important in order to better understand the predicted effects from the removal of water from Fort Peck Lake. The rest of this section contains detailed information on the entire System and System operations. It has been included in order to provide a basis for understanding how the system is operated so that the consequence assessment, where depletions from Fort Peck Lake have system-wide consequences, can be understood.

As shown in Figure 1, the six Corps dams spanning the Missouri River control runoff from approximately half of the basin. Those six dams, from the upper three giants of Fort Peck in eastern Montana, Garrison in central North Dakota and Oahe in central South Dakota, to the lower three smaller reservoirs of Big Bend and Fort Randall in South Dakota, and Gavins Point along the Nebraska-South Dakota border, comprise the largest system of reservoirs in the United States (USACE, 2007a).

As shown in Table 7, the storage capacity of the six reservoirs ranges from over 23 MAF at Garrison and Oahe, to less than 0.5 MAF at Gavins Point. The System is also unique in the fact that 88-percent of the combined storage capacity is in the upper three reservoirs of Fort Peck, Garrison, and Oahe (USACE, 2007b). The lower three projects, Big Bend, Fort Randall, and Gavins Point, are regulated in much the same manner year after year regardless of the runoff conditions (USACE, 2007b).

As shown in Figure 4, the entire System's storage capacity is divided into four unique storage zones for regulation purposes; information on the unique storage zones for each of the six individual reservoirs is provided on Table 7. The bottom 25-percent of the total System storage capacity comprises the permanent pool designed for sediment storage, minimum fisheries, and minimum hydropower heads (USACE, 2007b). The largest zone, comprising 53-percent of the total storage capacity, is the carryover-multiple use zone which is designed to serve all project purposes, though at reduced levels, through a severe drought like that of the 1930's (USACE, 2007b).

Figure 4
Missouri River System Storage Zones

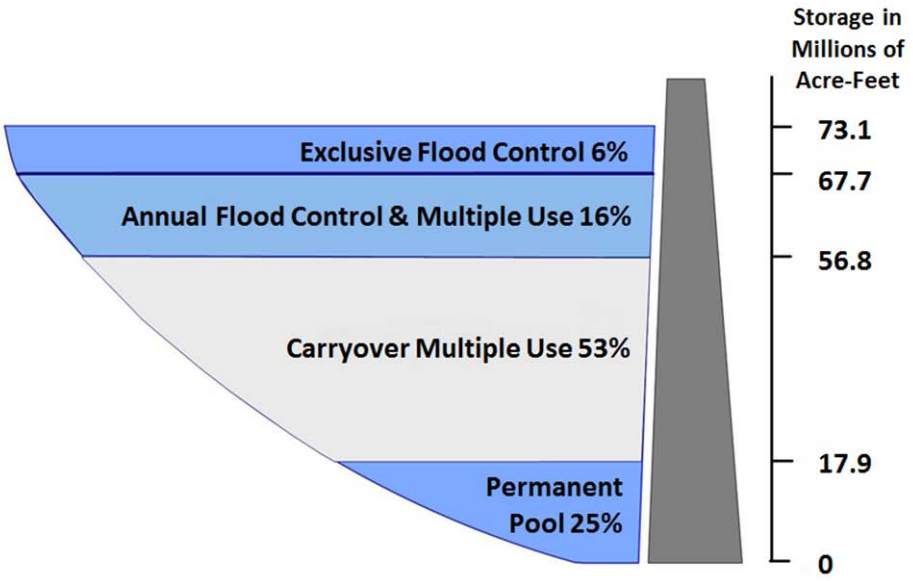


Table 7
Reservoir Storage Zones

Project	Top of Permanent		Top of Carryover Multiple Use		Top of Flood Control & Multiple Use		Top of Exclusive Flood Control	
	Cumul Storage (MAF)	Elev (ft MSL)	Cumul Storage (MAF)	Elev (ft MSL)	Cumul Storage (MAF)	Elev (ft MSL)	Cumul Storage (MAF)	Elev (ft MSL)
Fort Peck	4.2	2160.0	15.0	2234.0	17.7	2246	18.5	2250
Garrison	5.0	1775.0	18.1	1837.5	22.3	1850	23.8	1854
Oahe	5.4	1540.0	18.8	1607.5	22.0	1617	23.1	1620
Big Bend	1.6	1420.0	1.6	1420.0	1.7	1422	1.8	1423
Randall	1.5	1320.0	3.1	1350.0	4.4	1365	5.4	1375
Gavins Point	0.3	1204.5	0.3	1204.5	0.4	1208	0.5	1210
Total System	18.0		56.9		68.7		73.1	

The annual flood control and multiple use zone, occupying 16-percent of the total storage capacity, is the desired operating zone of the System (USACE, 2007b). Ideally the System is at

the base of this zone at the start of the spring runoff season (March 1st of each year). Spring and summer runoff is captured in this zone and then metered out throughout the remainder of the year to serve the other project purposes, returning the reservoirs to the base of this zone by the start of the next runoff season (USACE, 2007b). The top 6-percent of the System storage capacity is the exclusive flood control zone. This zone is used only during extreme floods, and evacuation of this zone is initiated as soon as downstream conditions permit (USACE, 2007b).

Overall System regulation follows the "water control plan" presented in the Master Water Control Manual (USACE, 2007a). Each of the six System dams also has an individual water control manual that presents more detailed information on its regulation. System regulation is in many ways a repetitive annual cycle; most of the year's water supply is produced by runoff from winter snows and spring and summer rains which increase System storage. After reaching a peak, usually during July, System storage declines until late in the winter when the cycle begins anew. A similar pattern may be found in releases from the System, with the higher releases from mid-March to late-November, followed by low rates of winter discharge from late-November until mid-March, after which the cycle repeats (USACE, 2007b).

The water control plan is designed to achieve the multipurpose objectives of the System given these cyclical events. The two primary high-risk flood seasons are the plains snowmelt season, (late February through April) and the mountain snowmelt period (May through July). Runoff during both of these periods may be augmented by rainfall. The winter ice-jam flood period extends from mid-December through February. The highest average power generation period extends from mid-April to mid-October, with high peaking loads during the winter heating season (mid-December to mid-February) and the summer air conditioning season (mid-June to mid-August).

The major maintenance periods for the System hydropower facilities extend from March through mid-May and September through November, which normally are the lower demand and off-peak energy periods. The normal 8-month navigation season extends from April 1st through November 30th during which time System releases are scheduled, in combination with downstream tributary flows, to meet downstream target flows. Winter releases after the close of navigation season are much lower, and vary depending on the need to conserve or evacuate System storage while managing downstream river stages for water supply given ice conditions (USACE, 2007b). Minimum release restrictions and pool fluctuations for fish spawning management generally occur from April through June. Gavins Point spring pulses, which are designed to cue spawning of the endangered pallid sturgeon, are provided in March and May with the flow magnitude, duration, and timing based on System storage, runoff forecast, and other criteria (USACE, 2007b). Nesting of the two federally protected bird species, the endangered interior least tern and the threatened piping plover, occurs from early May through mid-August.

Other factors may vary widely from year to year, such as the amount of water in storage and the magnitude and distribution of inflow received during the coming year. All of these factors affect the timing and magnitude of releases throughout the System. The gain or loss in the water stored at each reservoir must also be considered in scheduling the amount of water transferred between reservoirs to achieve the desired storage levels and to generate power. These items are

continually reviewed as they occur and are appraised with respect to the expected range of operations (USACE, 2007b).

5.2.1 Intrasystem Regulation

Intrasystem regulation is an important tool in the management of water in the System to meet the authorized purposes. It is used to regulate individual reservoir levels in the System to balance or unbalance the water in storage at each project, to smooth the annual System regulation by anticipating unusual snowmelt runoff, to maintain the seasonal capability of the hydropower system, and to improve conditions for the reservoir fish spawn and recruitment. It also can be used to maintain stages on the open river reaches between projects at desirable levels. Intrasystem adjustments may also be used to meet emergencies, including the protection of human health and safety, protection of significant historic and cultural properties, or to meet the provisions of applicable laws including the Endangered Species Act (USACE, 2007b). These adjustments are made to the extent reasonably possible after evaluating impacts to other System uses, are generally short term in nature, and continue only until the issue is resolved (USACE, 2007b).

The presence of large reservoirs in the System increases intrasystem regulation flexibility. A small reservoir such as Big Bend or Gavins Point with storage of less than one-half million acre-feet can only tolerate a large difference between inflow and release for less than a day. To a lesser extent, Fort Randall operates similarly, although its carryover-multiple use and annual flood control and multiple use storage of nearly 3 MAF make possible significant storage transfers and flow differentials extending a month or more (USACE, 2007b). But it is the upper three large reservoirs of Fort Peck, Garrison, and Oahe, with their combined 37.4 MAF of carryover multiple-use storage plus an additional 10.1 MAF of annual flood control multiple-use storage, that provide the flexibility to adjust intrasystem regulation to better serve authorized purposes (USACE, 2007b).

5.2.1.1 Seasonal Intrasystem Regulation Patterns

Intrasystem regulation to meet the needs of power generation follows a regular seasonal cycle. Releases from Gavins Point are generally at their highest during the navigation season when downstream flow requirements are highest. Since Gavins Point reservoir is small, these releases must be backed up with similar magnitude releases from Fort Randall, and Fort Randall, in turn, requires similar support flows from Oahe via Big Bend. Here the chain can be interrupted; Oahe is large enough to support high releases for extended periods without high inflows. Power generation at Fort Peck and Garrison are held to lower levels during the summer to allow more winter hydropower production unless the evacuation of water accumulated in the flood control zones or the desire to balance or unbalance storage among the upper three projects becomes an overriding consideration (USACE, 2007b).

5.2.1.2 Winter Release Patterns

With the onset of the non-navigation season, conditions are reversed. Gavins Point releases drop to about one-third to slightly greater than half of summer levels and the chain reaction proceeds upstream, curtailing daily average discharges from Fort Randall, Big Bend, and Oahe (USACE, 2007b). During the winter release pattern, Fort Peck and Fort Peck daily releases are usually maintained at relatively high levels (within the limits imposed by downstream ice cover) to

partially compensate for the reduction of generation downstream where high winter releases could result in significant flood damages in urban areas when the formation of ice impedes the flow (USACE, 2007b).

5.2.1.3 Balancing/Unbalancing the Upper Three Reservoirs

In the past, the volume of water stored in each of the upper three reservoirs was balanced by the first of March of every year (USACE, 2007b). However, intentionally unbalancing the water stored in the upper three reservoirs can benefit the reservoir fisheries and increase tern and plover habitat. All Annual Operating Plans since the 2000-2001 report have stated that unbalancing would be pursued during years when the reservoirs were at or near the base of their annual flood control pools on March 1st and when runoff forecasts were for median or greater annual runoff. However, drought conditions have prevented implementation of reservoir unbalancing to date (USACE, 2007b).

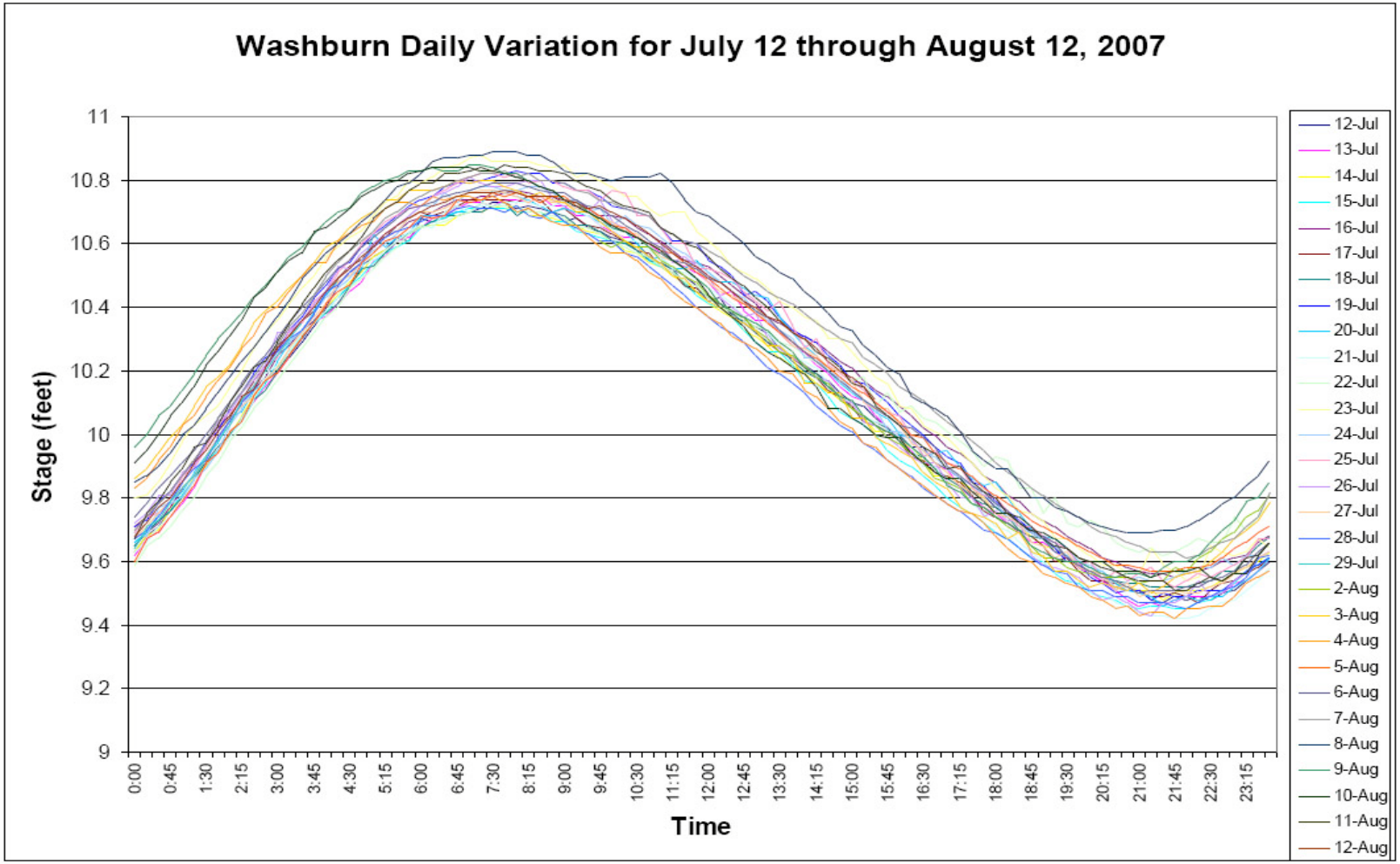
5.2.1.4 Short Term Intrasystem Adjustments

The interaction among projects described above, repeated as it is year after year, might make intrasystem regulation appear to be a routine and rigid procedure. However, routine regulation is often disrupted by the short-term extremes of nature. For example, heavy rains may raise river stages near the flood level, necessitating a release reduction at one project and a corresponding increase at others. Very hot or very cold weather may create sharp increases in the demand for power. Inflows for a week or for a season may concentrate disproportionately in one segment of the System, causing abrupt shifts in regulating objectives. In addition, short-term intrasystem adjustments are occasionally required to meet emergencies, including the protection of human health and safety, protection of significant historic and cultural properties, or to meet the provisions of applicable laws, including the Endangered Species Act. These adjustments are made to the extent possible after evaluating impacts to other System uses, are generally short term in nature, and continue only until the issue is resolved (USACE, 2007b). However, meeting the needs for short-term intrasystem adjustments lead to great variability in releases and pool elevations year-to-year.

5.2.1.5 Hourly Fluctuation of Release Rates

With the exception of the Gavins Point Project, hourly release rates may vary widely as necessary to meet fluctuating power loads (USACE, 2007b) at all of the other projects (Fort Peck, Garrison, Oahe, Big Bend, and Fort Randall). Known as “power pulsing,” this daily practice for the upstream System reservoirs produces predictable, daily, and distinct changes to releases and the associated water surface elevations in the riverine reaches between power pulsed reservoirs. Figure 5 shows the daily stage variation at the Washburn, ND river gage, downstream of the Garrison, for a one-month period between July 12 and August 12, 2007 (USACE, 2010). This figure is provided as an example to show the daily fluctuation in water surface elevation at the Washburn gage with daily highs around 10.7 feet and daily lows of approximately 9.5 feet. The daily effect to river stage of power pulsing at this gage shows a 1.2-foot up-and-down differential in the water surface elevation due to the changes to releases from Garrison Dam. The amplitude of these changes varies by reach, but power pulsing results in substantial daily variation in both flow and water surface elevation in the riverine reaches upstream from the Gavins Point Dam.

Figure 5
Daily Stage Variation for a 31-Day Period Downstream of Garrison Dam



Source: USACE, 2010.

6 Affected Environment and Environmental Consequences

Use of the Daily Routing Model (DRM) to Predict Hydrologic Changes

The Daily Routing Model (DRM) (USACE, 1998) was used as an analytical tool in this assessment to estimate the hydrologic effects that an additional 630 acre-feet/year of depletions would have at Fort Peck Lake, the other system reservoirs, and free-flowing reaches of the Missouri River. Modeling of the movement of the water through the entire Missouri River Reservoir System was accomplished using the DRM, which was developed during the 1990s as part of the Master Manual Review and Update Study. An 80-year period was selected as the period of record because this is the period that daily data are available on Missouri River inflows and flows. Daily records are available for the six dams since their respective dates of closure, and daily flow data are available for the majority of gaging stations since 1930 (USACE, 1998). The depletion and capacity curve data (computed using the sedimentation rate data) were the input files that were used to project elevation and flow for without and with project conditions.

The DRM was developed to simulate and evaluate alternative System regulation for all authorized purposes under a widely varying, long-term hydrologic record. The DRM is a water accounting model that consists of 20 nodes, including the six System dams and 14 gaging stations as shown in Figure 6. In the DRM, each of the six System reservoirs was modeled and the DRM provides output at locations (nodes) along river reaches between System projects: Wolf Point and Culbertson, Montana, and Williston and Bismarck, North Dakota; and ten locations along river reaches below the System: Sioux City, Iowa; Omaha, Nebraska City and Rulo, Nebraska; St. Joseph, Kansas City, Waverly, Boonville, and Hermann, Missouri on the Missouri River and St. Louis, Missouri on the Mississippi River.

The DRM is a time-series analysis that simulates hydrologic output on a daily basis for each of the 80 years modeled from 1930 through 2009, assuming that the entire System was in place and fully operational for the full 80-year period. As the depletion and capacity curve data are varied between the evaluation years for this analysis, the DRM computes system storage, reservoir elevation, reservoir release, reservoir evaporation, and river flow data for each day of the modeling period. Hydraulic impacts (changes to water surface elevations (WSE) in riverine reaches of the Missouri River) were estimated externally to the DRM model by combining DRM hydrologic output on streamflow with stage-discharge relationships provided at the DRM-modeled riverine nodes by the Omaha District.

Each DRM run provides 29,220 simulated values (80 years of daily values) for each parameter (i.e., water surface elevation, reservoir volume, and streamflow) at the 20 locations/model nodes in the system. These data should not be considered as estimates of actual calendar day values, but rather as simulation output values under the full range of climatological conditions existing over the 80-year period.

Figure 6
Model Node Locations for the Daily Routing Model

To evaluate differences between two alternatives, the differences between each of the 29,220 daily values were determined and then sorted to establish a frequency distribution of modeled values. The distributions of the differences from the current conditions (without the additional depletions) for various DRM outputs (water surface elevation, reservoir volume, and streamflow) were then examined. Comparing the data distributions in this manner provides insight as to how the increased depletion scenario impacts the likelihood of occurrence of a given water surface elevation, reservoir volume, and streamflow over the entire 80-year period. Similarly, it can provide an estimate of the likelihood of a given magnitude of change in each parameter between No Action and with project conditions. It should be noted that the x axis on all of the distribution plots are percent of the days, where 10 percent represents 2,922 days of the full 29,220 days of the 80-year period of record.

To examine the effects of just the additional depletions directly from System reservoirs, the simulations for one study year (2010) were completed under three separate planning scenarios: 1) baseline depletions (without project current condition), 2) 630 acre-feet/year of additional depletions at Fort Peck Lake (with project condition), and 3) 17,156 acre-feet/year of depletions (including 630 acre-feet/year at Fort Peck Lake and varying amounts totaling 16,526 acre-feet/year from the other five system reservoirs) to evaluate the cumulative effects of removing the total of 17,156 acre-feet/year of water from the six reservoir System.[9] The model assumes that the historic System inflow data, adjusted assuming the depletions associated with current development in the basin, occurred over the 80-year modeling period.

The source of the actual System inflow data is the U.S. Geological Survey, which began acquiring daily data beginning in late 1929. The DRM adjusts these inflow data by the difference for depletions that have been estimated to occur between each year and 2002. The Bureau of Reclamation provided the monthly depletions, and these monthly data were further separated to daily values for use in the DRM. Inflow and depletion data are available for each of the DRM modeling reaches. The 2002 depletion data are assumed to remain constant through 2010 (assumes no change from 2002 to 2010). The depletion data are adjusted upwards to 2020 by including other forecasted depletions (basin projects, population/M&I growth, and the Northwest Area Water Supply (NAWS) project). Simulations including these projected additional system depletions for 2020 were used in the assessment of cumulative effects analysis.

The Daily Routing Model (DRM) has been evaluated and approved under the Science and Engineering Technology (SET) initiative managed by the Engineering and Construction Community of Practice.

Modeled Differences: Depletions from Fort Peck Lake

Because the Missouri River reservoirs are operated as an integrated system, the additional 630 acre-feet/year of yield from Fort Peck Lake could conceivably reduce outflows and water surface elevations not just in Fort Peck Lake, but also in the other five System reservoirs. Changes in

[9] The cumulative system depletion of 17,156 acre-feet/year is based on the sum of the individual depletions from each of the five reservoirs for which the surplus water determinations have been developed. The method used to establish these annual depletions are identified in Section 2.1 of each of the respective Environmental Assessments.

water surface elevations have the potential to affect environmental resources throughout the system and the magnitude of predicted environmental consequences is proportional to the predicted changes. However, as stated in Section 5.1.1, the determination of whether an impact significantly affects the quality of the human environment must consider the *context* of an action and the *intensity* of the impacts (40 CFR 1508.27). The less intense of an impact, the less scrutiny even sensitive resources need because of the overt inability of an action to effect change to the physical environment.

Figures 7, 8, and 9, present the distributions (daily differences redistributed from minimum to maximum over the 29,220 daily values) of the differences in releases (KCFS, thousands of cubic feet per second) between No Action and the Proposed Action (additional 630 acre-foot/year depletion from Fort Peck Lake) for Fort Peck, Garrison, and Oahe Dams, respectively. The acronym "FPWP" is an abbreviation for "Fort Peck with Project" or the Proposed Action. DRM simulated discharge differences appear to be essentially unaffected from these three dams for more than 95 percent of the days. The differences at each end of the distribution are larger; however, they are for a very few days of the 80-year period of record. Many of those for Fort Peck Lake are due to the DRM selecting a release change at a slightly different time, resulting in a large difference of a day or two, or due to the selection of a different release for a short period because there is less or more water to move to balance the amount of water in storage among these three reservoirs. The difference at the ends of the distribution of the Oahe Dam figure are for only a few days, indicating that releases to the three lower reservoirs and the lower Missouri River are relatively unaffected by the removal of the additional 630 acre-feet/year of water from Fort Peck Lake on an annual basis.

Figure 7
Fort Peck: Release-Difference Distribution - Proposed Action Minus No Action

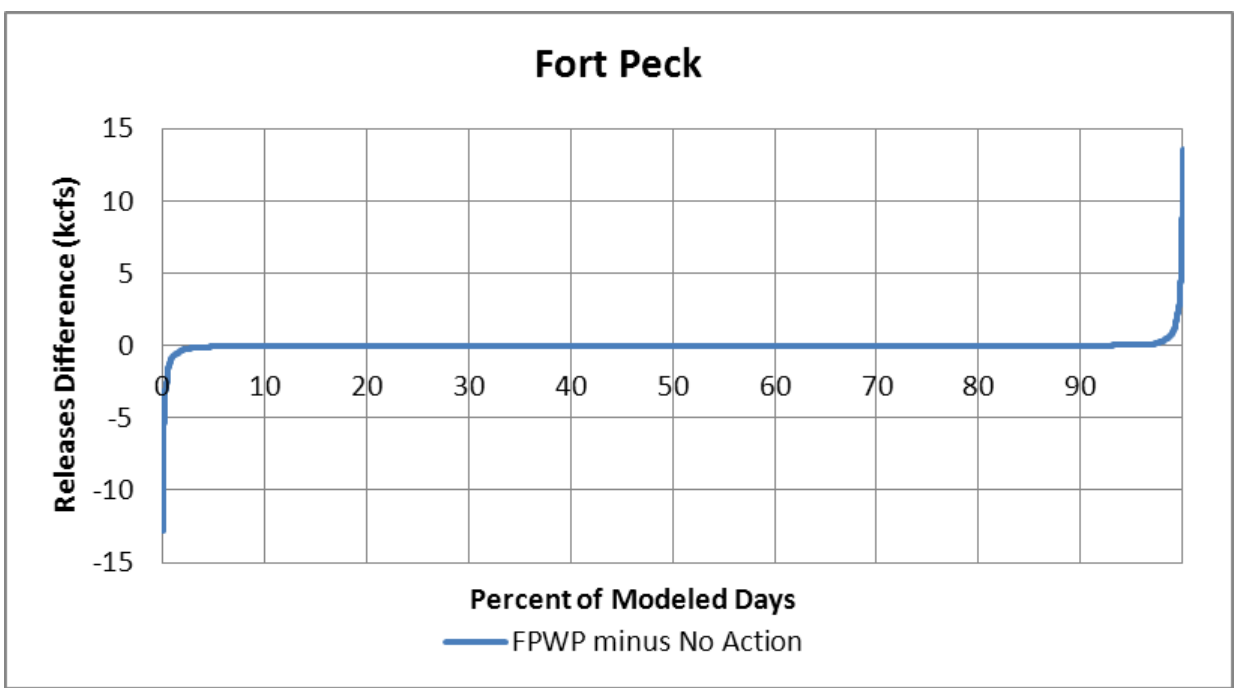


Figure 8
Garrison: Release-Difference Distribution - Proposed Action Minus No Action

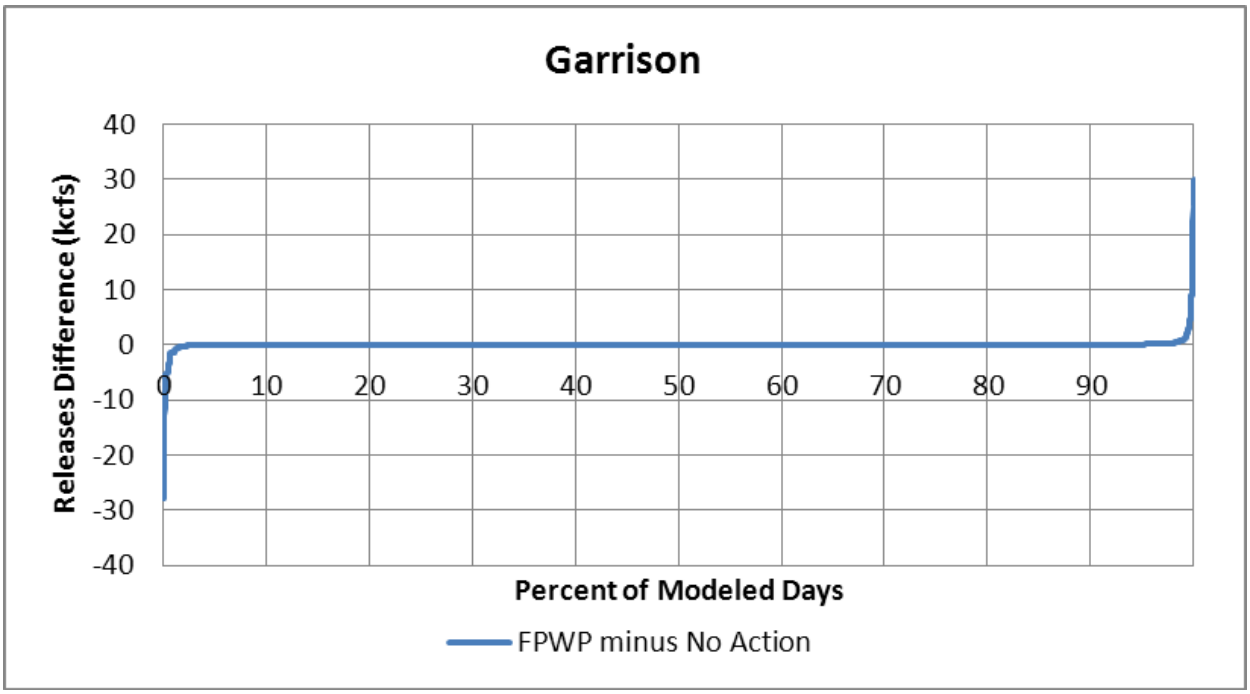
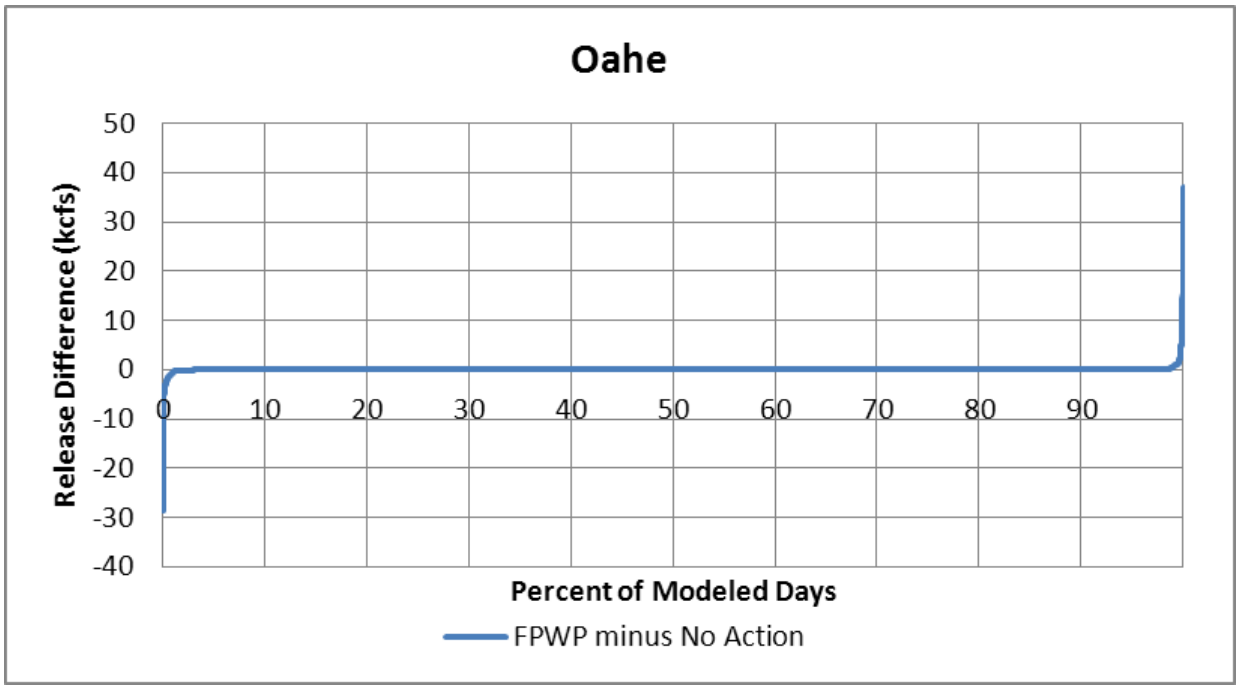


Figure 9
Oahe: Release-Difference Distribution - Proposed Action Minus No Action



Figures 10, 11, and 12 present the reservoir stage distributions for the differences in the reservoir water surface elevations (WSE) between the No Action and the Proposed Action alternatives for the three upper reservoirs of Fort Peck, Garrison, and Oahe, respectively. The differences in the three lower reservoirs, Big Bend, Fort Randall, and Gavins Point are essentially unaffected by changes at the upper three reservoirs; therefore, no figures are presented for these three lower reservoirs. All three figures show that the levels for the three larger reservoirs are unaffected about 90 to 95 percent of the time. The larger differences are at each end of the distribution plot, and these differences are for relatively short periods in several of the years of the 80-year period of record.

Figure 10
Fort Peck: WSE Difference Distribution - Proposed Action Minus No Action

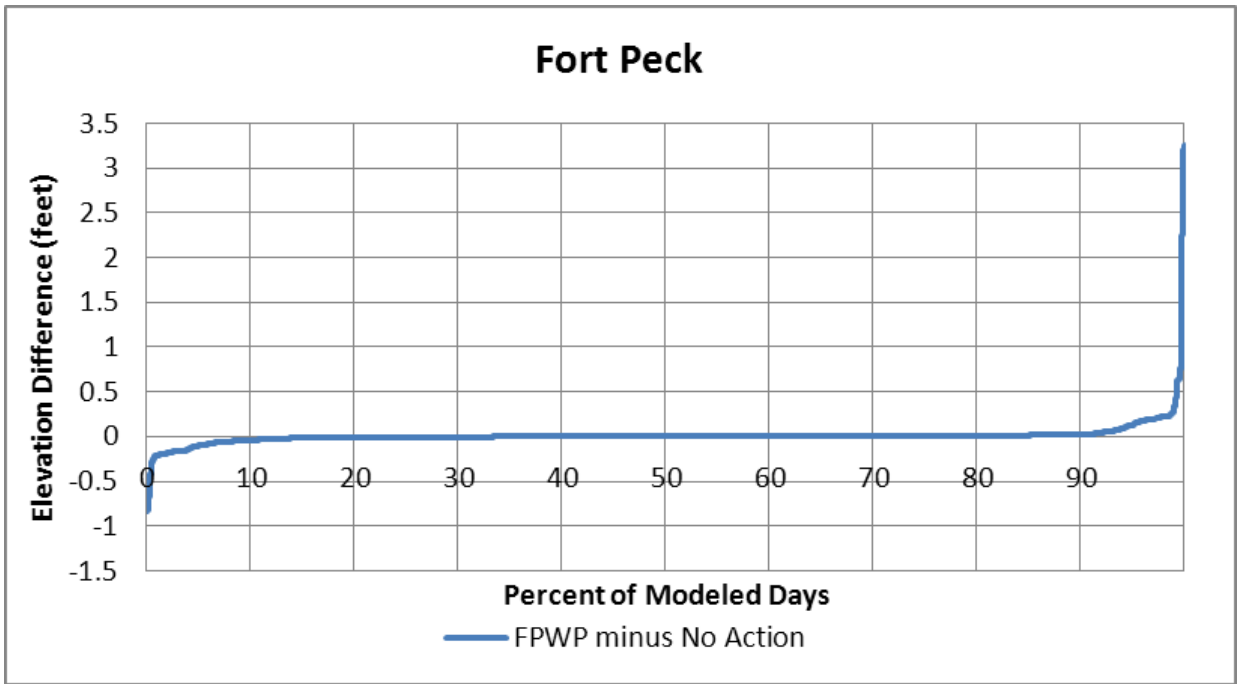


Figure 11
Lake Sakakawea: WSE Difference Distribution-Proposed Action Minus No Action

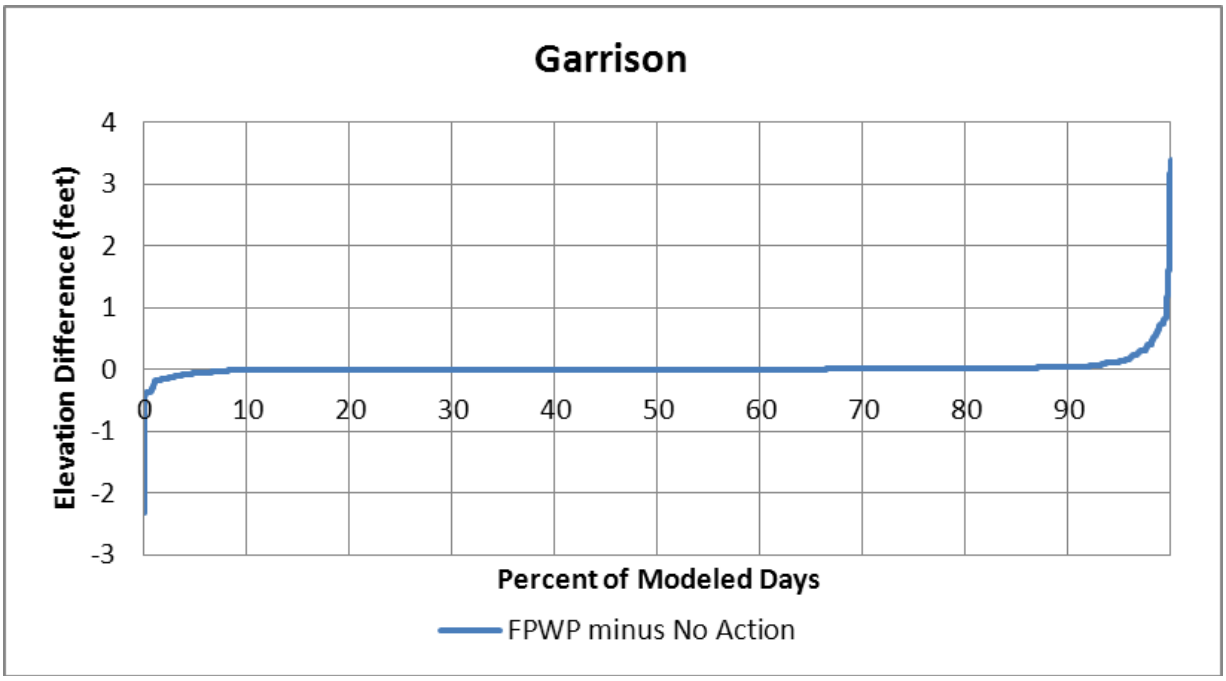
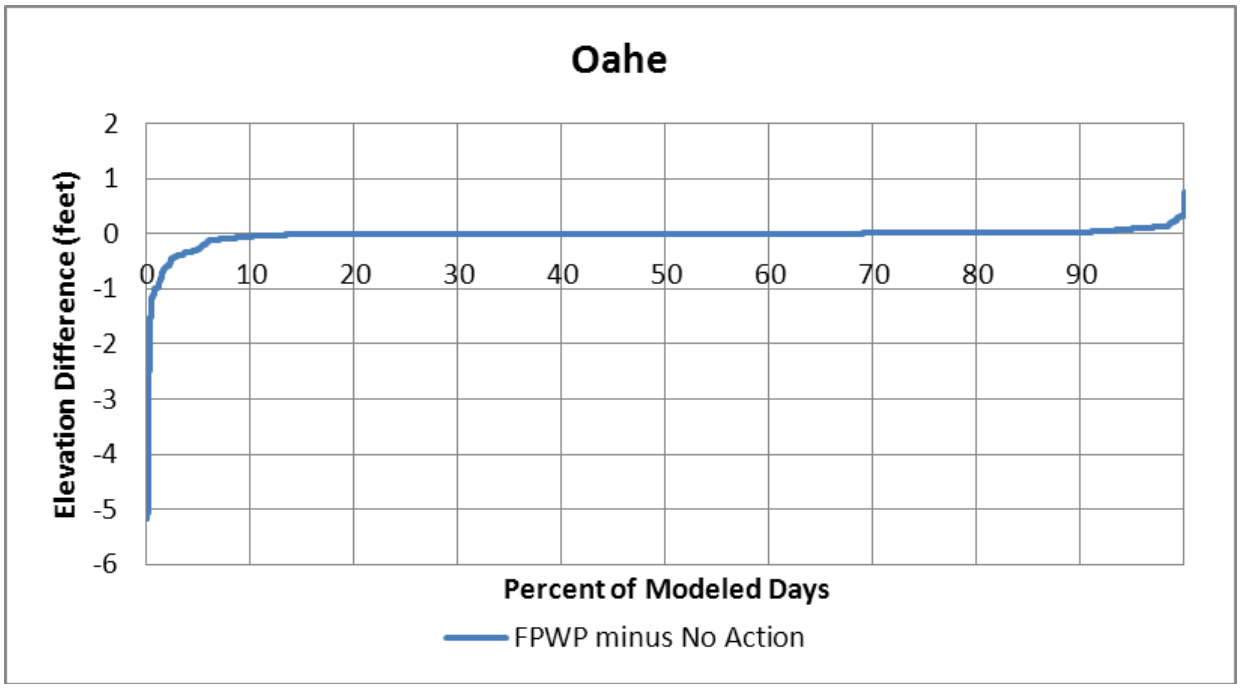
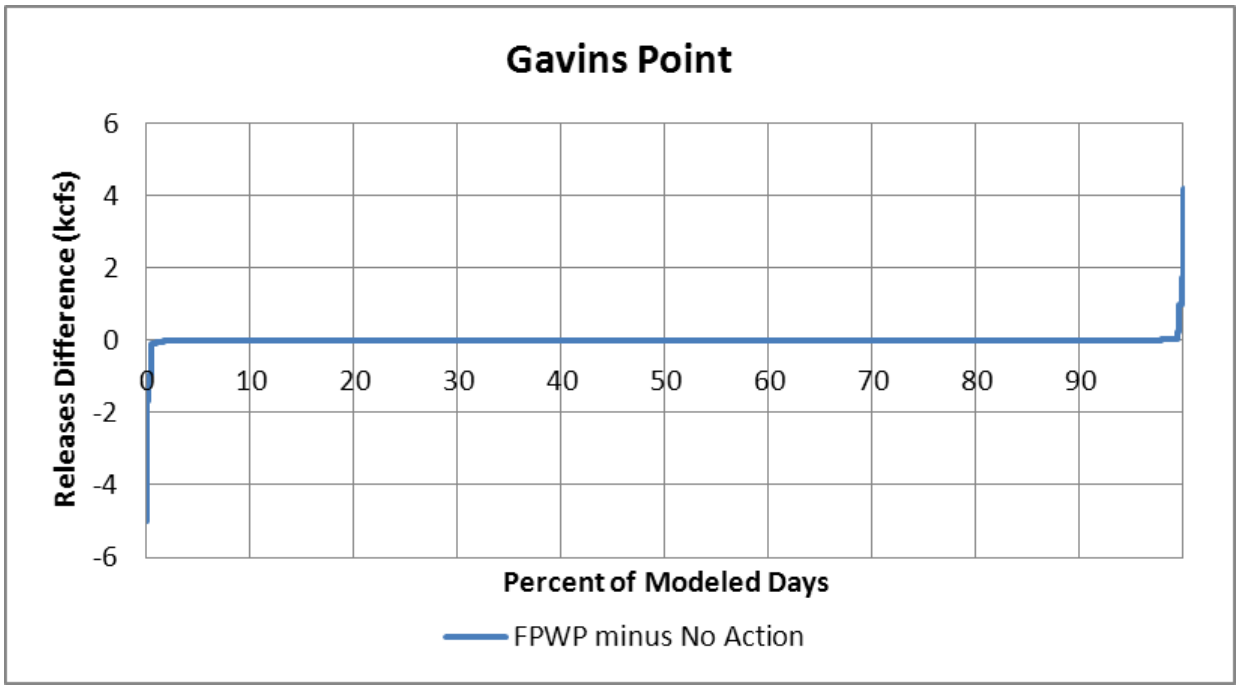


Figure 12
Oahe: WSE Difference Distribution-Proposed Action Minus No Action



Releases from Gavins Point Dam were plotted to examine any potential differences between the No Action and Proposed Action alternatives. Figure 13 is the release distribution plot for Gavins Point Dam releases to the lower Missouri River. This figure shows that there are essentially no differences between these two alternatives for nearly all of the days. In other words, the figures show that the water level for each of these three reservoirs, on a single day, is the same as it would be without the additional 630 acre-feet/year of depletions, for most of the 80-year modeling period from 1930 through 2009. The differences at each end of the distribution plot are likely due to small changes in navigation service levels and season lengths on the lower Missouri River.

Figure 13
Gavins Point: Release Difference Distribution-Proposed Action Minus No Action



6.2 Resources Considered but Not Carried Forward for Analysis

Section 102.2 of the National Environmental Policy Act instructs that federal agency NEPA documents "shall be analytic rather than encyclopedic." In an effort to eliminate resources from discussion that do not influence decision making, the following resources were considered, but not carried forward for analysis: topography, geology, stratigraphy, seismology, soils, and noise. These resources are not expected to be affected by implementing the proposed action nor would the selection of alternatives be influenced by these resources.

6.3 Groundwater

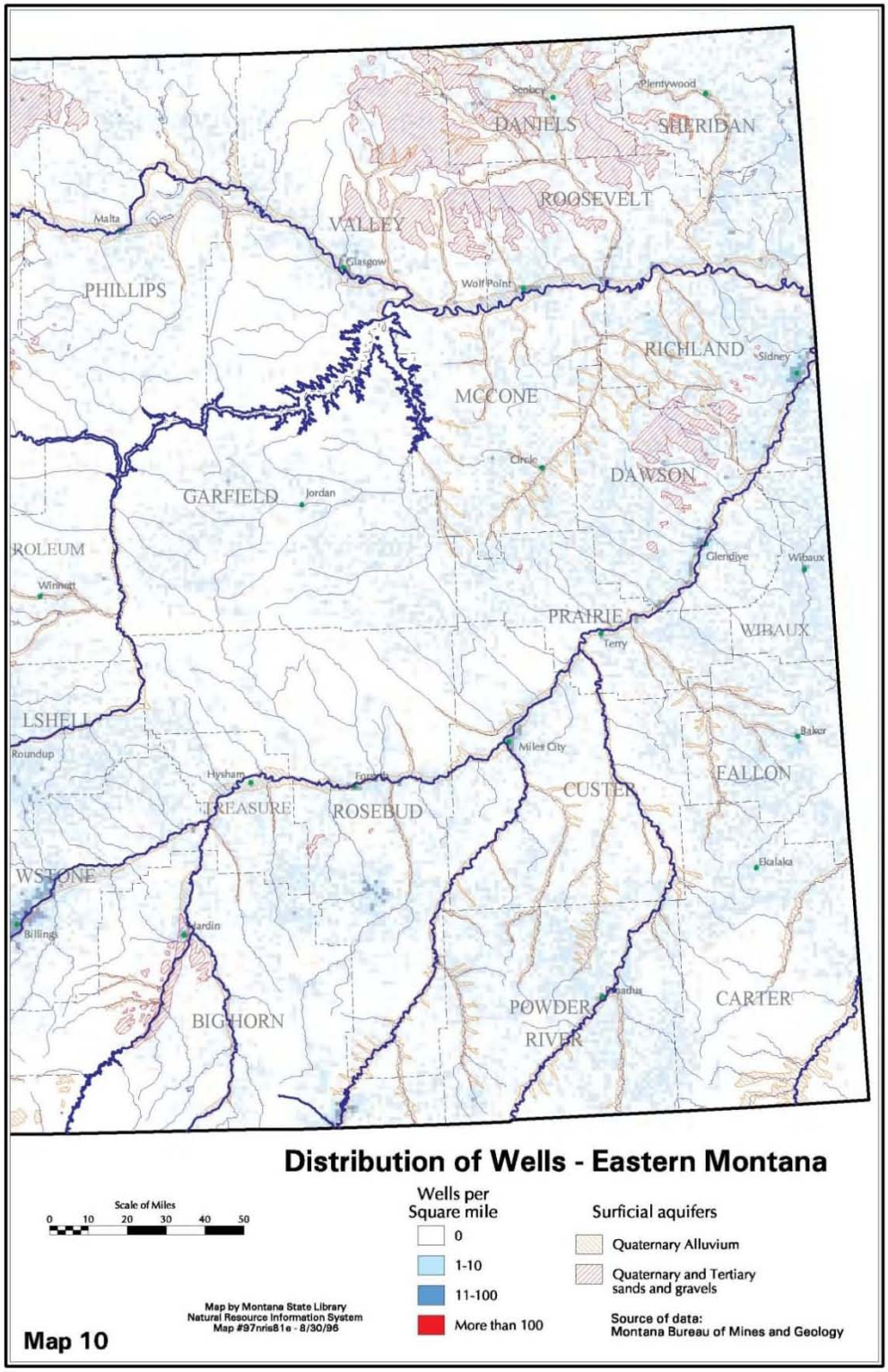
6.3.1 Existing Condition

Groundwater occurs in two major geological strata: unconsolidated surficial (glacial or alluvial) deposits and bedrock. Groundwater provides 94-percent of Montana's rural domestic-water supply and 39-percent of the public-water supply (MTNRIS, 1996). The most accessible and highest quality water is from alluvial aquifers and glacial outwash deposits. Alluvial aquifers are found in river valleys and are typically shallow, unconfined or semi-confined, sand and gravel deposits. Glacial outwash deposits generally consist of gravel, cobbles, and boulders and are usually unconfined or semi-confined. Though highly transmissive, these limited formations are too small to store large volumes of water and are therefore not a reliable water source for large-scale (i.e., industrial) water supply. Figure 14 shows mapped surficial groundwater sources and the number of wells per square mile in eastern Montana. Most surficial aquifers in the region are located along stream valleys and tributaries. The most productive groundwater source in the Fort Peck region is the alluvial aquifer along the Missouri River Valley. However, a large number wells in this region are located away from the surficial aquifers. This is because bedrock aquifers are the only reliable source of water away from the alluvial valleys (MTNRIS, 1996). Besides alluvial and bedrock aquifers, upper Tertiary and lower Quaternary unconsolidated deposits are used to supply water north of the Missouri River (MTNRIS, 1996).

Groundwater in bedrock aquifers in eastern Montana occur in fractured rock formations and sandstones. Water can also be found in the bedrock formation of the Fox Hills-Hell Creek aquifer in Garfield and McCone Counties, and on Harper Ridge (USACE, 2008). Groundwater is relatively deep in the Missouri River Breaks Area to the west, where domestic wells vary in depth from 300 to 1,200 feet. There are two sandstone aquifers (Upper Cretaceous and the Lower Tertiary) located south-southeast of Fort Peck Lake in McCone and Garfield Counties. Water that occurs in most of the bedrock aquifers in eastern Montana contain high levels of total dissolved solids and as a result have high specific conductance[10] (Figure 15). While the national secondary drinking water standard for dissolved solids (TDS) is 500 mg/L; TDS in some of eastern Montana's bedrock aquifers exceeds 5,000 mg/L resulting in diminished water quality (Figure 13).

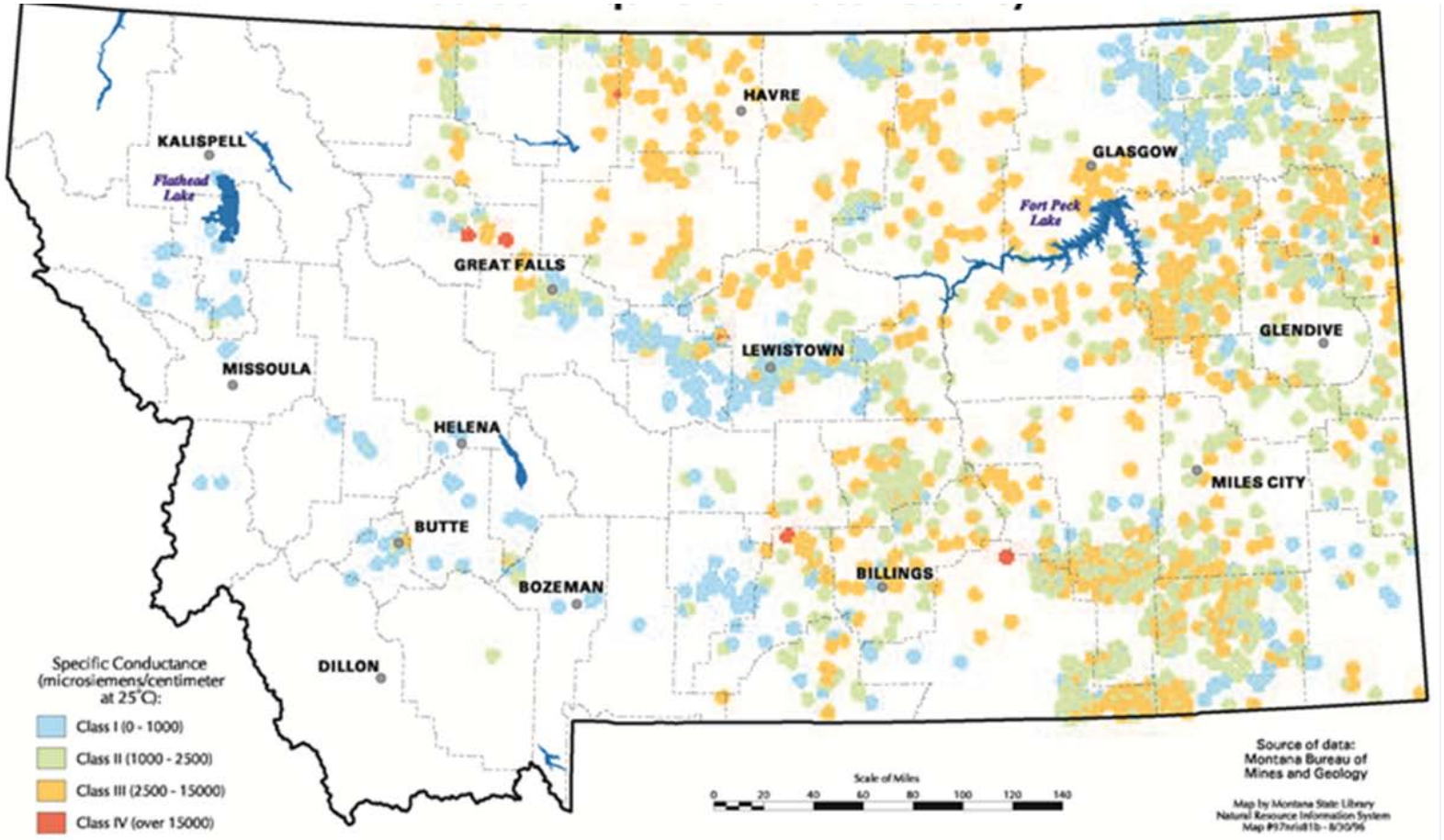
[10] Specific conductance is a measurement of the ability of water to conduct electrical current and is a general measure of the total dissolved solids (salts and minerals) in the water. In general, the higher the specific conductance, the worse the water quality.

Figure 14
Surficial Aquifers and Distribution of Wells in Eastern Montana



Source: Montana Natural Resource Information System, 1996

Figure 15
Montana Bedrock Aquifer Water Quality



Source: Montana Natural Resource Information System, 1996

6.3.2 Environmental Consequences

No Action

Under the no action alternative, there would be no change to the water supply from Fort Peck Lake and there would be no new depletions from Fort Peck Lake within the Fort Peck Project lands. However, because surface water was not made available from Fort Peck Lake, new M&I water supply would be met by new groundwater sources. Based on the region's existing groundwater supply and the current lack of demand for M&I water, taking no action would be expected to have little effect on existing groundwater resources in proximity to Fort Peck Lake.

Proposed Action

Implementing the Proposed Action would lessen the demand for groundwater resources by utilizing surface water from Fort Peck Lake, but because there is so little demand, utilizing surface water instead of groundwater would not be expected to have any discernible effects on groundwater near the Fort Peck Project, Fort Peck Lake, or within the region.

6.4 Water Quality

6.4.1 Existing Condition

The Clean Water Act (CWA) requires states to report on the quality of their waters including Section 305(b) (State Water Quality Assessment Report) and Section 303(d) identifying a list of a state's water quality-limited waters needing total maximum daily loads (TMDLs). The primary purpose of the Section 305(b) State Water Quality Assessment Report is to assess and report on the extent to which beneficial uses of the state's rivers, streams, lakes, reservoirs and wetlands are met. The State of Montana has assigned Fort Peck Reservoir a B-3 classification in the State's water quality standards. As such, the reservoir is to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply (USACE, 2007c).

The State of Montana has placed the Missouri River, from Bullwhacker Creek to Fort Peck Lake on the 303(d) list. The Missouri River in this area has been assessed as partially supporting of aquatic life and warm water fishery use, and was found not to be supporting of drinking water use (MTDEQ, 2010).

The Missouri River downstream of Fort Peck Dam to the Milk River is classified as B-2 by the State of Montana and was found to be fully supporting of agricultural, drinking water, industrial, and primary contact recreation uses. B-2 waters are to maintain growth and marginal propagation of salmonid fishes and associated aquatic life. In addition, it was found to be partially supporting of aquatic life and cold water fishery uses (MTDEQ, 2010). The Missouri River, from the Milk River to the Poplar River and from the Poplar River to North Dakota (all downstream of the Fort Peck Dam), has been listed on the 303(d) list. The River in this area has been assessed as partially supporting of aquatic life and warm water fishery.

Fort Peck Lake has also been listed on the 303(d) list. Impairment to the uses of drinking water supply and primary contact recreation are attributed to the presence of: lead, mercury, and

metals. Lead and mercury levels in the reservoir exceed human health standards and the State of Montana has also issued a fish consumption advisory for Fort Peck Lake because of mercury concerns (MTDEQ, 2010).

Agriculture, impacts from abandoned mine lands, livestock (grazing or feeding operations), and resource extraction have been listed as the primary probable sources contributing to the impairment of rivers, streams and creeks in the Fort Peck Lake Watershed (MTDEQ, 2010). Agriculture, atmospheric deposition, historic bottom deposits, impacts from abandoned mine lands, and resource extraction have been listed as the primary probable sources contributing to impairment of Fort Peck Lake itself (MTDEQ, 2010).

Fort Peck Lake maintains habitat for warmwater and coldwater species. This is possible because of the reservoir's thermal stratification in the summer, which results in a colder bottom region (hypolimnion) and a warmer surface region (epilimnion). The coldwater species present in the Fort Peck Lake are Chinook salmon, which are maintained through regular stocking, lake trout, and cisco (USACE, 2008). Water temperature and dissolved oxygen levels are the primary water quality factors that determine the suitability of a waterbody for coldwater aquatic life. Coldwater habitat is defined by Montana Water Quality Standards as water having a temperature$\leq$ 19.4° C and a 7-day mean dissolved oxygen concentration $\geq$ 5.0 mg/l.

Water quality conditions were monitored in Fort Peck Lake from May through September during a 5-year period from 2002 through 2006 (USACE, 2008). The water quality surveys were conducted at six reservoir sites in the deepwater areas on the Missouri River and Dry Creek Arms of the reservoir; three inflow sites on the Missouri River, Musselshell River, and Big Dry Creek; and one outflow site. The three inflow sites were chosen to represent water quality conditions of water flowing into the Fort Peck Lake (USACE, 2007c). Samples were taken monthly at the reservoir and inflow sites, from June through September. On a few occasions measured dissolved oxygen concentrations were below the state water quality standards criterion of 5 mg/l. The measured low dissolved oxygen concentrations occurred in the hypolimnion near the reservoir bottom during the late summer/early fall thermal stratification period (USACE, 2007c). During the 3-year period between 2004 and 2006, coldwater habitat ranged from the entire reservoir volume to 2.7 MAF on the low end during August 2006 (USACE, 2007c).

Water temperatures have been monitored in the Missouri River downstream of Fort Peck Dam over the past several years as part of a larger effort to study the federally endangered pallid sturgeon population in the Missouri and Yellowstone Rivers. A late spring/early summer water temperature of 18° C or more in the Missouri River at Frazier Rapids, approximately 25 miles downstream of the Fort Peck Dam, is critical for pallid sturgeon spawning and recruitment within that reach of the river (USACE, 2008). The temperature of the discharged water was found to be below the pallid sturgeon requirement: the temperature of the water discharge in late spring/early summer stayed below 14° C, and water temperatures only rose to near 18° C during the late summer/early fall (USACE, 2007c).

6.4.2 Environmental Consequences

<u>No Action</u>

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. Any new demand for water would be expected to be met

through groundwater sources. There would be no expected effects to the water quality of Fort Peck Lake or downstream of the Fort Peck Dam as a result of taking No Action.

Proposed Action

The Omaha District of USACE utilized the most current model available (CE-QUAL-W2) to model the potential changes to the coldwater habitat water quality conditions in Fort Peck Lake (USACE, 2009). The CE-QUAL-W2 model predicts temperature and dissolved oxygen depth-profiles in modeled lakes based on model inputs (e.g., metrological conditions, inflows, outflows, etc.) and was used to quantify the volume of Fort Peck Lake that meets the coldwater fishery habitat temperature and dissolved oxygen standards under the existing and proposed action conditions.

The QUAL2 model has been applied and calibrated for only a five-year period for Fort Peck Lake, 2004 through 2008 (as opposed to the 1930-present for the DRM). Reservoir models were developed for each year based on the meteorological, inflow, outflow, and inflow water quality conditions that occurred during the year. To identify which year best characterized "most-normal" and "worst-case-drought" conditions, yearly pool elevations, mid-summer thermal stratification, and estimated coldwater habitat in Fort Peck Lake were reviewed. That review did not indicate a wide divergence of conditions among the five-year period, therefore it was decided to select only one year for scenario testing. The year 2006 was selected as the year based on its intermediary pool levels, stronger summer thermal stratification, and its lower modeled coldwater habitat. Thus, 2006 is believed to represent typical and more critical water quality conditions. It is noted that 2006 was influenced by drought conditions (USACE, 2009).

As an extremely conservative approach to the analysis, the maximum change to the water surface elevation of Fort Peck Lake from a system-wide depletion of 150,000 acre-feet/year[11] was modeled. Comparison of the scenarios shows an overall trend of slightly decreased volumes of coldwater habitat due to the cumulative withdrawals. During the summer months when the coldwater habitat volume is low, the difference in coldwater habitat volumes between the scenarios is negligible. Model results show that when available coldwater habitat is 3.5 million acre-feet or less, the impacts of cumulative withdrawals reduce coldwater habitat volumes by an average of 0.0859 million acre-feet or less for the Fort Peck model runs. Differences in coldwater habitat as a percentage of total lake volume are not directly comparable. Although results show that average No Action scenarios yield higher coldwater habitat volumes than the cumulative withdrawal scenarios, the smaller total lake volumes in the cumulative withdrawal scenarios can yield higher coldwater habitat volume percentages than in the No Action scenarios (USACE, 2009). However, to better understand the utility of these results in predicting changes to the areal extent of cold-water habitat in Fort Peck Lake, root mean square errors (RMSE) were calculated.

Root Mean Square Error (RMSE) is a frequently used measure of the differences between values predicted by a model and the values actually observed. The RMSE is the square root of the

[11] Modeled effects to water quality were based on early estimates of system-wide depletions and assumed 150,000 acre-feet would be cumulatively removed from the System. As such, the modeled effects are conservative (i.e., exceed the expected effects) because the total system depletions being evaluated for cumulative effects of temporary water supply are 17,156 acre-feet, only 11-percent of the 150,000 acre-feet in depletions that was modeled.

variance, also known as the standard error. The standard error of a method of measurement or estimation is the standard deviation of the sampling distribution associated with the estimation method. These standard errors are typically reported as a value, plus or minus the reported value.

As shown in Table 8, the standard error for modeling the depth to 19.4º C water temperature is approximately 2.4 meters for 2006.[12] As such, the standard error associated with estimating the depths to the 19.4º C was appreciably larger than the predicted changes in Fort Peck Lake pool elevations (maximally two feet or less) from the extremely conservative assumptions used for modeled depletions. Thus, the uncertainty associated with the model predictions exceed the values predicted from the proposed action. These standard errors indicate that the model does not have the sensitivity to predict effects at the magnitude of the estimated pool elevation changes. Given the difference between the No Action and Proposed Action model results from DRM, especially in light of the difference between the modeled depletion (150,000 acre-feet/year) and the actual system depletion (17,156 acre-feet/year), there would be no significant effects to the cold water habitat predicted as a result of implementing the Proposed Action.

Table 8
Standard Error Estimation for Modeled Effects

Parameter	Standard Error +/- (Meters)
Change to Depth of 19.4-Degrees C	2.4

6.5 Air Quality

6.5.1 Existing Condition

The U.S. Environmental Protection Agency (USEPA) Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. Ozone is the only parameter not directly emitted into the air but forms in the atmosphere when three atoms of oxygen (0^3) are combined by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOC, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air.

The Clean Air Act General Conformity Rule (58 FR 63214, November 30, 1993, Final Rule, Determining Conformity of General Federal Actions to State or Federal Implementation Plans) dictates that a conformity review be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS.

[12] The standard errors for modeling the depth to 5 mg/l dissolved oxygen was not included for 2006 because the modeled effects to dissolved oxygen did not predict changes to depth of the 5 mg/l.

A conformity assessment would require quantifying the direct and indirect emissions of criteria pollutants caused by the Federal action to determine whether the proposed action conforms to Clean Air Act requirements and any State Implementation Plan (SIP).

The general conformity rule was designed to ensure that Federal actions do not impede local efforts to control air pollution. It is called a conformity rule because Federal agencies are required to demonstrate that their actions "conform with" (i.e., do not undermine) the approved SIP for their geographic area. The purpose of conformity is to (1) ensure Federal activities do not interfere with the air quality budgets in the SIPs; (2) ensure actions do not cause or contribute to new violations, and (3) ensure attainment and maintenance of the NAAQS. Federal agencies make this demonstration by performing a conformity review when the actions they are planning to carry out will be conducted in an area designated as a non-attainment or maintenance area for one of the criteria pollutants (USEPA, 1993). However, no detailed conformity analysis would be required because all of the counties surrounding the Fort Peck Lake are in attainment of the EPA's air quality standards (USEPA, 2011).

6.5.2 Environmental Consequences

No Action

Under the No Action alternative, the Corps of Engineers would not make a determination of surplus water and there would be no change to the water supply from Fort Peck Lake. There would be no new depletions from Fort Peck Lake and any increase in M&I water supply demand would be met with groundwater withdrawals. The effects to air quality would not be predicted to change from the existing conditions.

Proposed Action

Implementing the Proposed Action would not have any effect on the air quality of the Fort Peck Project, Fort Peck Lake, or the region.

6.6 Land Use

6.6.1 Existing Condition

The Fort Peck Lake and Project lands are located in a relatively isolated area of northeastern Montana. The entire Fort Peck Project is located within the Charles M. Russell National Wildlife Refuge (CMR) and UL Bend National Wildlife Refuge which are managed by the US Fish and Wildlife Service. The CMR Wildlife Refuge encompasses nearly 1.1 million acres and is the second largest refuge within the lower 48 States. UL Bend National Wildlife Refuge, a "refuge-within-a-refuge," lies within Charles M. Russell NWR and contains 20,000 acres of designated wilderness (USFWS, 2010a). The Fort Peck project's enormous size, remoteness from major transportation corridors and population centers, and location within the CMR Wildlife Refuge make Fort Peck unique among the other Missouri River mainstem projects.

Livestock grazing, tourism, wildlife habitat conservation and management, and recreation are the prominent land uses bordering the Fort Peck Project. Aside from the small towns near the dam, such as Fort Peck, Glasgow, and Nashua, there is no community with a population exceeding 100 people within 20 miles of any part of the lake. Billings, the largest city in Montana is located about 300 miles south of the dam.

6.6.2 Environmental Consequences

No Action

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. Taking no action would not have any effect on the land use practices of the Fort Peck Project, Fort Peck Lake, or the surrounding areas.

Proposed Action

Implementing the Proposed Action would not have any effect on the land use practices of the Fort Peck Project, Fort Peck Lake, or the surrounding region. The declining population trends described in Section 6.9 would not be affected by the Proposed Action. In addition, as stated in Section 10.2, Summary of Agency Meetings, representatives from Montana were not aware of any large-scale users of M&I water (i.e., ethanol or power plants) that were reasonably foreseeable within the next 10 years. Identifying surplus water, as defined in Section 6 of the 1944 Flood Control Act, which the Secretary of the Army can make available to execute surplus water supply agreements with prospective M&I water users will not be likely to have effects on land use.

6.7 Demographics

6.7.1 Existing Condition

As of the 2010 U.S Census, Montana had a total population of 989,415. Montana ranks 44th in population and fourth in area, yielding the third lowest state population density in the U.S. (6.7 persons per square mile). Table 9 shows population data as well as projections through 2020 for the six first tier counties which have shoreline on Fort Peck Lake. The six-county area is large (15.3 million acres) and remote resulting in a low population density of 1.1 persons per square mile. The population of the six counties declined by more than 10-percent from 1990 to 2010, and is projected to decline more than seven-percent from 2010 to 2020 (NPA Data Services, 2007).

Table 9
Historical and Projected Population for Six Montana Counties

County	1990	2000	2010	Percent Change 1990-2010	2020 Projection	Projected Change 2010 to 2020
Fergus	12,083	11,893	11,586	-4.11%	11,560	-0.22%
Garfield	1,589	1,279	1,206	-24.10%	1,070	-11.28%
McCone	2,276	1,977	1,734	-23.81%	1,650	-4.84%
Petroleum	519	493	494	-4.82%	380	-23.08%
Phillips	5,163	4,601	4,253	-17.63%	3,830	-9.95%
Valley	8,239	7,675	7,369	-10.56%	6,190	-16.00%
Total:	29,869	27,918	26,642	-10.80%	24,680	-7.36%

Source: U.S. Census Bureau (2010)

The seasonal population consists of persons who own homes they occupy only on a seasonal basis. Seasonal residents in the counties contiguous to Fort Peck Lake were assumed to not be permanent residents of these counties (USACE, 2008). The estimated seasonal population and total (permanent plus seasonal) population of the counties contiguous to Fort Peck Lake in 2000 are shown in Table 10.

Table 10
Seasonal Population of 2000

County	Total Vacant Housing Units	Seasonal Vacant Units[13]	Average Household Size	Estimated Seasonal Residents	Permanent Residents	Total Residents	Seasonal Percent Total
Fergus	698	187	2.45	458	11,435	11,893	4%
Garfield	429	293	2.40	703	576	1,279	55%
McCone	277	107	2.44	198	1,779	1,977	10%
Petroleum	81	28	2.36	85	408	493	17%
Phillips	654	264	2.49	812	3,789	4,601	18%
Valley	1,697	377	2.44	1,025	6,650	7,675	13%
TOTAL	3,836	1,256	------	3,327	24,591	27,918	12%

Source: U.S. Census Bureau (2000a)

6.7.2 Environmental Consequences

No Action

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. Under the No Action alternative, the population trends observed in recent years in the region would be expected to continue.

Proposed Action

The environmental consequences of implementing the Proposed Action on demographics of the region would be minimal. The changes to population in the six-county area of influence has occurred based on factors other than the availability of M&I water from Fort Peck Lake. In addition, there are no large-scale users of water (i.e., ethanol or power plants) reasonably foreseeable within the next 10 years that could lead to changes in demographics.

[13] Includes housing units for seasonal, occasional, or recreational use. Does not include for rent; for sale; rented or sold, not occupied; recreational vehicles; and other vacant.

6.8 Employment/Income

6.8.1 Existing Condition

The most recent year for which the US Census Bureau has published comprehensive income data is 1999 (Census Bureau, 2000). Table 11 shows income data for the six first tier counties surrounding Fort Peck Lake. The economy of the Fort Peck area of influence is highly dependent on agriculture (USACE, 2008). Median income in this area tends to vary with agricultural yields, which vary greatly with weather and crop prices. Crop prices did not increase in the 1990s nearly as much as the cost of most other goods and services. The relatively low-income levels in the Fort Peck primary area counties may be partly because of the higher proportion of agricultural workers in these counties compared to the other area counties or Montana as a whole (USACE, 2008).

Table 11
Income Data for the Fort Peck Area of Influence and Montana (1999)

Area	Median Household Income	Median Family Income	Per Capita Income
Fergus	$30,409	$36,609	$15,808
Garfield	$25,917	$31,111	$13,930
McCone	$29,718	$35,887	$15,162
Petroleum	$24,107	$32,667	$15,986
Phillips	$28,702	$37,529	$15,058
Valley	$30,979	$39,044	$16,246
Primary Counties	$28,305	$35,475	$15,365
Montana	$33,024	$40,487	$17,151
US	$41,994	$50,046	$21,587

Source: U.S. Census Bureau (2000)

6.8.2 Environmental Consequences

No Action

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. Under the No Action alternative, the employment and income trends of observed in the recent years in the Fort Peck region would be expected to continue.

Proposed Action

The environmental consequences of implementing the Proposed Action on employment and income within the first tier counties would be minimal. Changes in employment and income would not be expected to be altered from current patterns and trends of change based on the identification of 6,932 acre-feet/year of surplus water in Fort Peck Lake.

6.9 Environmental Justice

6.9.1 Existing Condition

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations (Executive Order, 1994), directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority population and low-income populations. When conducting NEPA evaluations, the USACE incorporates Environmental Justice (EJ) considerations into both the technical analyses and the public involvement in accordance with the USEPA and the Council on Environmental Quality guidance (CEQ, 1997).

The CEQ guidance defines “minority” as individual(s) who are members of the following population groups: American Indian or Alaskan native, Asian or Pacific Islander, Black, not of Hispanic origin, and Hispanic (CEQ, 1997). The Council defines these groups as minority populations when either the minority population of the affected area exceeds 50-percent of the total population, or the percentage of minority population in the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

Low-income populations are identified using statistical poverty thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty (U.S. Census Bureau, 2000). In identifying low-income populations, a community may be considered either as a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The threshold for the 2010 census was an income of $10,956 for an individual and $21,954 for a family of four (U.S. Census Bureau, 2010a). This threshold is a weighted average based on family size and ages of the family members.

Executive Order 12898, “Federal Actions To Address Environmental Justice in Minority Populations and Low Income Populations,” issued in 1994, directs Federal and state agencies to incorporate environmental justice as part of their mission by identifying and addressing the effects of all programs, policies and activities on minority and low-income populations. The fundamental principles of EJ are as follows:

1. Ensure the full and fair participation by all potentially affected communities in the decision-making process;
2. Prevent the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations; and
3. Avoid, minimize or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.

In addition to Executive Order 12898, the Environmental Justice analysis is being developed per requirements of "Department of Defense's Strategy on Environmental Justice" (March 24, 1995).

Per the above directives, EJ analyses identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of the project on minority and low-

income populations. The methodology to accomplish this includes identifying low-income and minority populations within the study area, as well as community outreach activities such as stakeholder meetings with the affected population.

The population of Montana is primarily Caucasian, representing 89.5-percent of the population in 2009. American Indians and Alaska Natives, most of whom are members of one of the tribes living on one of the seven reservations in Montana, are numerically the largest minority and accounted for 6.2-percent of Montana's population in 2009. The majority of the remaining minority population in the state is Hispanic. Table 12 shows the 2009-estimated population and the ethnic mix (as a percentage) for each of the six first tier counties surrounding Fort Peck Lake. Portions of two American Indian reservations, Fort Peck and Fort Belknap, are located in the Fort Peck Lake primary region of influence. Fort Peck reservation is partially located in Valley County and the Fort Belknap reservation is partially located in Phillips County. Table 13 shows the percentage of individuals below the poverty level in the six counties, Montana, and the US.

Table 12
Percent Race by County

County	2009 Population Estimate	White	Black	American Indian	Asian	Hawaiian-Pacific Islander	Two or More Races	Hispanic
Fergus	11,218	95.8	0.8	2.3	0.6	0.0	0.3	0.9
Garfield	1,135	99.7	0.0	0.0	0.0	0.0	0.3	0.0
McCone	1,747	96.6	0.0	1.2	0.0	0.0	2.2	0.0
Petroleum	512	95.5	1.4	0.0	0.0	0.0	1.6	1.6
Phillips	3,959	86.5	0.0	8.1	0.4	0.0	4.4	1.7
Valley	6,888	86.5	0.6	9.5	0.0	0.1	3.1	1.0
Montana	956,257	89.5	0.6	6.2	0.7	0.1	2.3	2.8
US	301,461,533	74.5	12.4	0.8	4.4	0.1	2.2	15.1

Source: U.S. Census Bureau.

Table 13
2009 Percent of Population Below Poverty Level

Area	Percent Poverty
Fergus	17.0
Garfield	11.3
McCone	9.8
Petroleum	14.6
Phillips	15.8
Valley	13.1

Montana	14.7
US	13.5

Source: U.S. Census Bureau.

6.9.2 Environmental Consequences

No Action

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. There would be no disproportionate effects to minority or low-income communities as a result of implementing the No Action alternative.

Proposed Action

Compliance with Executive Order 12898 on Environmental Justice requires an evaluation of the nature of the proposed actions and the human context into which those actions would be undertaken. In order to have potential Environmental Justice impacts, a proposal must have potential for disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Native American tribes. This action has been evaluated for potential disproportionately high environmental effects on minority or low-income populations and there would not be a high human health or environmental impact on minority or low-income populations. Implementation of the Proposed Action would not result in measurable changes to environmental resources that individuals involved in subsistence fishing or hunting utilize. As such, implementation of the Proposed Action would not create disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Native American tribes.

6.10 Recreation

6.10.1 Existing Condition

Fort Peck Dam and Lake are located in an isolated area of northeastern Montana and access is the primary factor that has influenced land use, development, and recreation at the project. The Fort Peck Project's enormous size and remoteness from major transportation corridors and population centers limit the recreational use. Aside from towns near the dam (e.g., Fort Peck, Glasgow, Nashua) there are no communities with a population exceeding 100 people within 20 miles of any part of the lake. Billings, the largest city in Montana, is located about 300 miles south of the dam. The Project's remoteness significantly reduces the opportunity for quick and easy access to the resources of the Fort Peck Lake and limits most recreational users from accessing many parts of the lake.

The Fort Peck Project has an abundance of natural and scenic resources that make resource-based outdoor recreation activities possible and add to the enjoyment of other outdoor recreation activities. Fort Peck Lake is the largest water body for water-oriented recreation in the State of Montana and seventeen recreation areas totaling 12,550 acres are located around Fort Peck Lake

(USACE, 2008). These areas range from fully developed campgrounds to primitive access points. Outdoor recreation activities common at Fort Peck include sightseeing, hunting, fishing, wildlife viewing, camping, boating, and swimming (USACE, 2008).

Water levels are a key factor in recreational use of Fort Peck Lake, but pool levels vary widely in response to routine operations and extended drought conditions (USACE, 2008). Periods of extended drought that result in substantial lowering of reservoir levels have a greater negative impact on recreational usage than high stages because at low pool levels, boat ramps and recreational areas may no longer have water access. On the more than 1,500 miles of shoreline on Fort Peck Lake, only 12 boat ramps are available (USACE, 2008). As shown in Table 14, the availability of these ramps depends upon the water surface elevation of the lake; if the water surface elevation drops below 2,197 ft., none of the ramps are accessible (USACE, 2008).

Table 14
Fort Peck Lake Boat Ramp Elevations

Boat Ramp	Bottom Elevation	Top Elevation	Managing Agency
Fort Peck Marina	2,197	2,250	USACE/Concessionaire
Duck Creek	2,197	2,250	USACE/MFWP
Flat Lake	2,197	2,250	USACE
Rock Creek (North Fork)	2,197	2,250	USACE/MFWP
Rock Creek Marina	2,197	2,250	Concessionaire
Nelson Creek*	2,220	2,250	USACE
Hell Creek	2,197	2,250	USACE/MFWP
Devils Creek	2,197	2,250	USACE
Crooked Creek*	2,223	2,250	Concessionaire
Fourchette*	2,204	2,250	USACE
Bone Trail	2,197	2,250	USACE
Pines	2,197	2,250	USACE

Source: USACE, 2008.

Charles M Russell National Wildlife Refuge

The Fort Peck Project is unique in that it is entirely within the Charles M Russell (CMR) National Wildlife Refuge (NWR). The CMR Refuge contains approximately 1,100,000 acres of open water, native prairies, forested coulees, river bottoms, and badlands. The refuge is named for the artist Charles M. Russell who often portrayed these lands in his paintings. UL Bend NWR, a "refuge-within-a-refuge," lies within Charles M. Russell NWR and contains 20,000 acres of federally designated wilderness. The CMR and UL Bend Refuge lands provide opportunities for big game and bird hunting, fishing, wildlife viewing, birding, hiking, and horseback riding.

6.10.2 Environmental Consequences

No Action

Under the No Action alternative, there would be no identification of surplus water within Fort Peck Lake and no new water supply available for M&I users. Taking no action would not be expected to have any effect on recreation at Fort Peck Lake or on the Fort Peck Project lands.

Proposed Action

Water levels are a key factor in recreational use of the reservoirs and river reaches. The modeled differences in water surface elevations between No Action and the Proposed Action in the DRM simulation output for Fort Peck Lake and all 18 model nodes were negligible. These modeled output show that for nearly all days modeled, there would be virtually no difference in water surface elevation (See Figure 5). The predicted change in water surface elevations between No Action and the Proposed Action conditions would not result in discernible effects to recreation.

6.11 Aesthetics and Visual Resources

6.11.1 Existing Condition

Away from the obvious man-made features near the dam and powerhouse, Fort Peck Lake Project lands generally present a wild, undeveloped perspective to the viewer. With sweeping vistas, rugged breaks, open plains, and minimal sign of man, the lands possess a wild land visual quality. The lands on the glaciated north side of the reservoir consist mainly of grassy rolling plains dissected by coulees and gullies and isolated buttes; lands on the unglaciated south side include similar rolling plains but also include many hills, gullies, and rough breaks. These natural vistas are valuable, rare, and provide a desirable aesthetic resource (USACE, 2008). Manmade features that affect the natural aesthetics include the scattered presence of cattle and fences and visible development located within and near the recreation and cottage areas. In and near these areas, vehicles have created a network of tracks (USACE, 2008).

6.11.2 Environmental Consequences

No Action

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. This would result in no change from the existing aesthetic conditions at the Fort Peck Lake/Fort Peck Project.

Proposed Action

The effects to aesthetics as a consequence of implementing the Proposed Action would be expected to be minimal. The estimated change to the water surface elevation from implementing the proposed action would be indiscernible from the No Action alternative.

6.12 Noise

6.12.1 Existing Condition

Northeastern Montana contains very little residential, commercial, or recreational areas relative to the total area of undeveloped property. Other than in close proximity to recreation areas, municipalities, or major roadways, the characteristically wild, undeveloped landscape results in minimal background noise.

Changes in noise are typically measured and reported in units of dBA, a weighted measure of sound level. The primary sources of noise within the project area would include everyday vehicular traffic along roadways (typically between 50 and 60 dBA at 100 feet), maintenance of roadways, bridges, and the other structures (typically between 80 and 100 dBA at 50 feet), and seasonal recreational activities in the region.

The U.S. Federal Transit Administration (FTA) has established noise impact criteria founded on well-documented research on community reaction to noise based on change in noise exposure using a sliding scale. The FTA Noise Impact Criteria groups noise sensitive land uses into the following three categories:

- Category 1: Buildings or parks where quiet is an essential element of their purpose,
- Category 2: Residences and buildings where people normally sleep (e.g., residences, hospitals, and hotels with high nighttime sensitivity), and
- Category 3: Institutional buildings with primarily daytime and evening use (e.g., schools, libraries, and churches).

The Fort Peck Project does not have any Category 1 or 3 areas, but does include residential and recreational areas. These areas have varying degrees of associated noise, but the ambient noise levels are very low and characteristic of a natural setting where the intrusion of man-made noise is infrequent and typically of short duration (USACE, 2005). Lease agreements for cabin sites stipulate that the cabin owners will “use the premises in a quiet manner” (USACE, 2005).

6.12.2 Environmental Consequences

<u>No Action</u>

Under the no action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the water supply, and there would be no new depletions from Fort Peck Lake. New water supply needs would be met with groundwater, and therefore no change to the existing noise levels at the project would be expected.

<u>Proposed Action</u>

The effects to ambient noise levels as a consequence of implementing the Proposed Action would be expected to be minimal. The estimated change to the water surface elevation from implementing the proposed action would be minimal with no predicted effects to noise as a result of implementing the proposed action.

6.13 Cultural Resources

6.13.1 Existing Condition

The cultural history of Fort Peck is detailed in the Fort Peck Master Plan (2008) and is herein incorporated-by-reference. The Fort Peck Project area is rich in cultural and paleontological resources. Recorded sites include bison kill sites and corrals, tipi ring, stone effigies, campsites, Lewis and Clark campsites, trails, early homesteaders' cabins, hunting cabins, stage routes, railroads, shanty towns from the dam construction era, and other construction camp era buildings (USACE, 2005). These sites are associated with the Gros Ventre, the Assiniboine bands of Canoe Paddler and Red Bottom, the Sioux divisions of Sisseton/Wahpetons, the Yantonais, and the Heton Hunkpapa, the Blackfoot, early Euro American explorers, homesteaders, and New Deal employees during the Fort Peck Dam construction (USACE, 2008).

Although most of the Corps' land surrounding Fort Peck Lake has not been surveyed for cultural sites, there are known sites that consist of lithic scatters, campsites, tipi rings, and historic structures. The town of Fort Peck has many buildings that are listed on the National Register of Historic Places (NRHP) and the Fort Peck Dam and powerhouse are listed on the NRHP (USACE, 2008). In addition, the Fort Peck Dam is under consideration for National Historic Landmark status. A total of 214 recorded historic properties have been identified at the Fort Peck Project, excluding isolated finds; three are presumed destroyed.

6.13.2 Environmental Consequences

No Action

Under the No Action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the M&I water supply, and there would be no new depletions from Fort Peck Lake. As a result of taking No Action, the majority of water to supply the new demand would be provided by groundwater sources, but not on project lands. There would be no expected effects to cultural resources as a result of implementing No Action.

Proposed Action

Implementing the Proposed Action would not be expected to have any effect on the cultural resources of the Fort Peck Project, Fort Peck Lake, or the region.

6.14 Vegetation and Listed Species

6.14.1 Existing Condition

Fort Peck is located at the western edge of the Great Plains, a low elevation biome dominated by grasslands and grain cultivation. The historic plant cover is short and mixed short-grass prairie, including such species as needle and thread, the grama grasses, little bluestem, and dropseed. Grazing and other farming activities have altered most of this grassland (USACE, 2005).

The largest community is the sagebrush-greasewood-grassland, which represents over 60-percent of the habitat and is dominated by shrubs such as big sagebrush, greasewood, saltbrush, silver sage, rubber rabbitbrush as well as grasses such as western wheatgrass, needle and thread, green needlegrass, bluegrama, Junegrass, plains muhly, and bluebunch wheatgrass (USACE, 2008).

Ponderosa pine-juniper type occurs on approximately 35-percent and includes ponderosa pine, douglas fir, limber pine, and Rocky Mountain juniper.

The remaining other habitat types are grassland-deciduous shrub (1.8-percent), riparian-deciduous river bottoms (0.7-percent), and cultivated land (0.6-percent) (USACE, 2008).

Woody species within the riparian-deciduous river bottoms include four species of cottonwood, four species of willow, green ash, box elder, quaking aspen, and several shrubs also found in the grassland-deciduous shrub biome. Cultivated lands occur primarily in the river bottoms in the western half of the Project and on the uplands in the eastern half (USACE, 2008). Cultivated lands are typically a mixture of small grains (barley and wheat), alfalfa, and wild hay. The vegetation associations of the Fort Peck project are described in detail in the Fort Peck Master Plan (2008) and are herein incorporated-by-reference.

Protected Species

In order to receive protection under the federal Endangered Species Act, a species, subspecies, or distinct population segment must be placed on the federal list of endangered and threatened wildlife and plants. There are no federally listed or endangered plant species known to occur on Fort Peck Project lands. Other plant species listed in Montana (e.g. Water Howellia, *Howellia aquatilis;* Spalding's catchfly, *Silene spaldingii;* Ute lady's tresses, *Sprianthes diluvialis*) are not discussed below because the estimated current ranges of these species do not include the project area (USFWS, 2011).

However, the Montana Natural Heritage Program[14] has identified twenty plant Species of Concern that have the potential to occur in one or more of the six counties with shoreline on the Project (Fergus, Garfield, McCone, Petroleum, Phillips, and Valley). Species of Concern are plants and animals that are rare, threatened, and/or have declining populations and as a result are at risk or potentially at risk of extirpation in Montana. Designation as a Species of Concern is not a statutory or regulatory classification. A Species of Concern is not legally protected in Montana unless it is also listed on the Federal threatened and endangered species list. The Montana Natural Heritage Program lists of Species of Concern are based on information gathered from field inventories, publications, reports, herbaria specimens, and the knowledge of botanists and other taxonomic experts (MTNHP, 2011).

6.14.2 Environmental Consequences

No Action

Under the No Action alternative, the Corps of Engineers would not make a determination of surplus water, there would be no change to the M&I water supply, and there would be no new depletions from Fort Peck Lake. As a result of taking No Action, new M&I demand would be

[14] The Montana Natural Heritage Program provides a comprehensive system for identifying and prioritizing Montana's native species and habitats, emphasizing vulnerable species and habitats and areas providing important habitat values including species of concern. Each species of concern receives a state rank and global rank which indicates its status within the state and globally.

met by groundwater sources, but not on project lands. There would be no expected effects to vegetation or listed plant species as a result of implementing No Action.

Proposed Action

Implementing the Proposed Action would not have any effect on the vegetation of the Fort Peck Project, Fort Peck Lake, or the region. Any future request for easements and water supply agreements could result in ground-disturbing actions and effects to vegetation would require separate review by the Corps of Engineers prior to allowing placement of infrastructure. In this process, the Corps would complete additional NEPA evaluations and comply with all appropriate environmental laws and regulations.

Listed Species

This Environmental Assessment represents the assessment and findings regarding the Proposed Action and serves as the Biological Assessment regarding the Proposed Action to federally listed species as requested under Section 7 of the Endangered Species Act. There are no federally listed or endangered plant species known to occur on Fort Peck Project lands.

6.15 Fish and Wildlife and Listed Species

The fish and wildlife of the Fort Peck project are detailed in the Fort Peck Master Plan (2008) and are herein incorporated-by-reference. The following discussion is summary text taken from the Master Plan (USACE, 2008).

6.15.1 Existing Conditions

Fish

Steep-sided reservoirs, such as the Fort Peck Lake, are typically considered oligotrophic where littoral plants are scarce and plankton growth and organic matter are low in proportion to the total volume of water. The steep slopes associated with the majority of the shoreline and the exposed slopes provide little suitable habitat for spawning, protection of juvenile fishes, attachment of aquatic vegetation, or substrate for benthic macro invertebrates. Despite the limitations, the Fort Peck Lake fishery includes northern pike, walleye, lake trout, shovelnose sturgeon, sauger, smallmouth bass, Chinook salmon, burbot, paddlefish, channel catfish, and pallid sturgeon (USACE, 2008). In the 1980s, cisco (*Coregonus artedi*) and spottail shiners (*Notropis hudsonius*) were introduced for forage fish. Commercial fish harvests were stopped in the 1990s (USACE, 2008).

Supplemental stocking is needed to perpetuate the walleye fishery because of a lack of rocky substrates necessary for spawning. The lake also has a significant coldwater fishery for lake trout and Chinook salmon. Annual recruitment of lake trout is sufficient to no longer need stocking, but the Chinook salmon does not reproduce naturally and are stocked annually (USACE, 2008).

Wildlife

At least 45 mammalian species are found within the Fort Peck Project lands. These species range in size from shrews to Rocky Mountain elk. The primary big game species in the region

include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and Rocky Mountain elk (*Cervus elaphus*), bighorn sheep (*Ovis candensis*), and pronghorn antelope (*Antilocapra americana*). Mule deer exceed all other ungulate wildlife in number and distribution.

Common furbearing animals in the Fort Peck project area are the beaver (*Castor canadensis*), mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), badger (*Taxidea taxus*), and striped skunk (*Mephitis mephitis*). Predatory species include the coyote (*Canis latrans*), fox (*Vulpes spp*.), bobcat (*Lynx rufus*), and weasel (*Mustela spp.*). Prairie dogs (*Cynomys spp.*), ground squirrels (*Spermophilus spp.*), porcupine (*Erethizon dorsatum*), jackrabbits (*Lepus spp*.), and cottontails (*Sylvilagus spp.*) can also be found on project lands. Black-tailed prairie dogs (*Cynomys ludovicianus*) are fairly common on Fort Peck Project lands.

Birds

The diverse habitat in the project area attracts a large variety of birds. Over 240 species have been recorded on the CMR, of which 41-percent nest locally, and 15-percent are year-round residents. Upland sandpipers (*Bartramia longicauda*), mountain plovers (*Charadrius montanus*), long-billed curlews (*Numenius americanus*), and burrowing owls (*Athene cunicularia*) are among the more unique birds inhabiting the grassy benchlands; mountain plovers and burrowing owls are commonly associated with prairie dog towns in the area. Cottonwood trees partly inundated by the reservoir support rookeries of double-crested cormorants (*Phalacrocorax auritus*) and great blue herons (*Ardea herodias*), as well as nests of osprey (*Pandion haliaetus*). Osprey also use artificial nesting structures erected by the USFWS at Hell Creek, the Pines, and near the dam.

Prairie falcons (*Falco mexicanus*) and golden eagles (*Aquila chrysaetos*) are common nesting residents on cliffs of the more rugged and inaccessible portions of the Missouri River Breaks. The most common upland game bird in the project area is the sharp-tailed grouse (*Tympanuchus phasianellus*).

Protected Species

This Environmental Assessment represents the assessment and findings regarding the Proposed Action and serves as the Biological Assessment regarding the Proposed Action to federally listed species as requested under Section 7 of the Endangered Species Act.

As shown in Table 15, there are currently five species with the potential to occur on project lands that are listed as federally threatened or endangered species and protected under the Endangered Species Act: pallid sturgeon, shovelnose sturgeon, interior least tern, piping plover, whooping crane, and black-footed ferret. The Sprague's pipit and greater sage-grouse are candidates for the federal threatened and endangered list, but have not yet been listed. The northern leopard frog was petitioned for listing as threatened under the Endangered Species Act in 2009, a positive 90-day finding was published in the Federal Register on July 1, 2009, and a status review of the species by the USFWS is ongoing. Other animal species listed in Montana (e.g., grizzly bear, *Ursus arctos horribilis;* gray wolf, *Canis lupus;* Canada lynx, *Lynx canadensis*) are not discussed below because the estimated current ranges of these species do not include the project area (USFWS, 2011).

Table 15
Federally Threatened and Endangered Fish and Wildlife on Fort Peck Project Lands

Common Name	Scientific Name	Federal Listing Status	Year Listed
pallid sturgeon	*Scaphirhynchus albus*	Endangered	1990
shovelnose sturgeon	*Scaphirhynchus platorynchus*	Threatened	2010
interior least tern	*Sterna antillarum*	Endangered	1985
piping plover	*Charadrius melodus*	Threatened	1985
whooping crane	*Grus americanus*	Endangered	1967
black-footed ferret	*Mustela nigripes*	Endangered	1967
Northern leopard frog	*Rana pipiens*	Status review ongoing	2009
Sprague's pipit	*Anthus spragueii*	Candidate	2010
greater sage-grouse	*Centrocercus urophasianus*	Candidate	2010

Pallid Sturgeon (*Scaphirynchus albus*)-Endangered

The pallid sturgeon, other sturgeon species, and the paddlefish are the only living descendants of an ancient group of Paleozoic fishes (USACE, 2008). The pallid sturgeon was listed as an endangered species in 1990 primarily due to the loss of habitat from alterations to the Missouri River and the construction of the extensive system of dams in the upper reaches (USACE, 2007). Commercial fishing may have also played a role in the pallid sturgeon's decline (USACE, 2007). These species are adapted to large, turbid, warm-water rivers and fishermen occasionally catch pallid sturgeon in the Yellowstone and Missouri rivers. Within the Missouri River basin, very few wild pallid sturgeons exist; and exact numbers are not known (USFWS, 2010). Pallid sturgeon can be found in the upper reaches of Fort Peck Lake and in the 250 miles of river between the lake and Canyon Ferry Dam near Helena, Montana. They have also been found in the Dredge Cuts downstream of the dam (USACE, 2008).

Pallid sturgeons feed on small fishes, mollusks, and aquatic insects. Their exact requirements for spawning are not yet known, however, it is believed that spawning occurs over gravelly or other hard surfaces in the months of May or June (USFWS, 1995). The pallid sturgeon's habitat requirements are still being investigated; however, some evidence can be deduced from areas where most pallid sturgeon (and the shovelnose sturgeon, a closely-related species) have been captured. In Montana, they have been frequently captured in waters with velocities between 1.3 and 2.9 cubic feet per second. In the Missouri River below Fort Peck Dam and the Yellowstone River below Intake Diversion, pallid sturgeon utilize depths between 1.97 and 47.57 feet (Tews and Clancy, 1993). Pallid sturgeons are most often caught over sandy substrates (USACE,

2008). Gerrity et al. (2008) found pallid sturgeon avoids reaches of river with islands and secondary channels, selecting reaches without islands and main channel habitats.

The 2003 Amended Biological Opinion proposes recovery strategies for the pallid sturgeon that require a coordinated watershed-level approach, and entails habitat creation and restoration, test rises along the river, and implementation of an aggressive adaptive management and monitoring program (USACE, 2008). The Corps Omaha District is conducting flow modification studies, temperature data collection, and a multi-level intake structure study. These studies are being conducted to determine what can be done in terms of management of flows from Fort Peck to stimulate sturgeon spawning. The Corps is also planning to conduct larval drift studies and other research (USACE, 2008).

Shovelnose Sturgeon (*Scaphirhynchus platorynchus*)-Threatened

Effective October 1, 2010, the USFWS has listed the shovelnose sturgeon (*Scaphirhynchus platorynchus*) as threatened under the Similarity of Appearance clause of the Endangered Species Act[15] based on similarity to the endangered pallid sturgeon (*Scaphirynchus albus*) (USFWS, 2010). The shovelnose sturgeon and the endangered pallid sturgeon are difficult to differentiate in the wild and inhabit overlapping portions of the Missouri and Mississippi River basins. Commercial harvest of shovelnose sturgeon in the four states where shovelnose and pallid sturgeon co-exist (IL, KY, MI, and TN) has resulted in the documented take of pallid sturgeon where the two species coexist and is a threat to the pallid sturgeon (USFWS, 2010).

Under this special rule, take of any shovelnose sturgeon, shovelnose-pallid sturgeon hybrids or the roe associated with or related to a commercial fishing activity is prohibited within the geographic areas set forth in the rule. The shovelnose and shovelnose-pallid sturgeon hybrid populations covered by the rule occur within Missouri River (USFWS, 2010).

Interior Least Tern (*Sterna antillarum athalassos*)-Endangered

Least terns are colonial water birds that occupy coastal beaches and river sandbars for nesting and chick rearing. The interior population of the least tern uses several major river systems of the United States including the Rio Grande, Mississippi, Red, Arkansas, Missouri and Ohio Rivers and their tributaries during the breeding season. The stabilization of these river systems for navigation, flood control, hydropower generation, and irrigation has led to a loss of much of the sandbar habitat the species requires and led to the degradation of the remaining habitat (USACE, 2008). Consequently, in 1985, the interior population of the least tern was listed as endangered by the USFWS (50 FR 21792).

[15] Section 4(e) of the Endangered Species Act and implementing regulations (50 CFR 17.50–17.52) authorize the Secretary of the Interior to treat a species as an endangered or threatened species even though it is not itself listed if: (a) The species so closely resembles in appearance a listed endangered or threatened species that law enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species; (b) the effect of this substantial difficulty is an additional threat to an endangered or threatened species; and (c) such treatment of an unlisted species will substantially facilitate the enforcement and further the purposes of the Act.

The interior least tern is a resident of the Fort Peck project during its nesting season from early May to August. The least tern was first documented at Fort Peck Lake in 1987. The most successful breeding year for least terns at Fort Peck was 1994 with three successful nests. There have been few nesting attempts in recent years (USACE, 2008).

Piping Plover (*Charadrius melodus*) - Northern Great Plains Population-Threatened

The piping plover is a shorebird that favors coastal beaches, alkali wetlands, lakeshores, reservoir beaches and river sandbars for nesting and chick rearing. The USFWS listed the Northern Great Plains population as threatened in 1985 (50 FR 50726). The Northern Great Plains population ranges across three Canadian provinces and eight American states. The 2006 International Piping Plover Adult Census found about 4,700 adult plovers in the Northern Great Plains (Eliott-Smith et al, 2009).

The western-most breeding piping plovers in the U.S. are found in Montana on sand flats above the west end of the Fort Peck Dam (Valley County), on the shorelines of the Big Dry Arm of Fort Peck Lake (Garfield and McCone counties), and on the saline wetlands near Dagmar and Medicine Lake National Wildlife Refuge (Sheridan County). The piping plover is a resident of the Fort Peck project area during its nesting season from mid-April to early August. Plovers have been known to nest on flat gravel beaches of the lakeshore and islands that are exposed during periods of low lake levels, but they have also nested on gravel parking lots around Fort Peck Lake (USACE, 2008).

Piping plovers feed primarily on insects and aquatic invertebrates, and soon after hatching the chicks begin foraging for themselves. After fledging juveniles may remain in the nesting area around Fort Peck Lake for a time, but begin their migration to the wintering grounds from early July to mid-August. The most successful breeding year for least terns at Fort Peck was 2005 with seven successful nests (USACE, 2008).

The USFWS designated critical habitat for the Northern Great Plains population of the piping plover, including the Missouri River, in September 2002. This designation includes 183,422 acres of habitat and 1,207.5 river miles in Minnesota, Montana, North Dakota, South Dakota, and Nebraska. Designated areas of critical habitat include prairie alkali wetlands and surrounding shoreline; river channels and associated sandbars and islands; and reservoirs and inland lakes and their sparsely vegetated shorelines, peninsulas, and islands. These areas provide primary courtship, nesting, foraging, sheltering, brood-rearing and dispersal habitat for piping plovers. At Fort Peck, the critical habitat includes Fort Peck Lake adjacent to the dam and extending west and south toward Fort Peck West and most of the Big Dry Arm (USACE, 2008).

Whooping Crane (*Grus americanus*)-Endangered

The whooping crane was listed as endangered in 1967 under a precursor to the Endangered Species Act of 1973 (Volume 32 Federal Register [FR] 4001). Unregulated hunting for sport and food combined with the loss of large expanses of wetland habitat caused the massive decrease in numbers of whooping cranes. Breeding populations of the crane were extirpated from the U.S. portion of its historic breeding range by the early 1900's.

Because of intense conservation efforts and captive breeding programs, the whooping crane population now numbers more than 450 individuals. The whooping crane migrates through eastern counties of Montana during the spring (late April to mid-June) and the fall (late September to mid-October). Whooping cranes use open sand and gravel bars or very shallow

water in rivers and lakes for nightly roosting. Cranes seen feeding during the migration are frequently within short flight distances of reservoirs, lakes, and large rivers that offer bare islands for nightly roosting. Whooping cranes do not readily tolerate disturbances to themselves or their habitat. A human on foot can quickly cause a crane to fly at distances of over a quarter mile (32 FR 4001).

Major food items for cranes during the migration period include insects, crayfish, frogs, small fish, and other small animals as well as some aquatic vegetation and some cereal crops in adjacent croplands (43 FR 36588). None of the designated critical habitat for whooping cranes is located at Fort Peck Lake (43 FR 36588). In 1994 two whooping cranes were seen near Fort Peck and one in Sheridan County (USACE, 2008). As such, other than a potential for brief stoppage during seasonal migration, the whooping crane would not be likely to occur at the Fort Peck Project.

Black-Footed Ferret (*Mustela nigripes*)-Endangered

The black-footed ferret is one of the most endangered mammals in North America. The black-footed ferret was initially protected under the Endangered Species Protection Act in 1967 and later under the Endangered Species Act in 1973 (USFWS, 1995). Black-footed ferrets once occupied most of Montana's grasslands. It has been calculated that if all suitable habitat had been used, as many as 5.6 million black-footed ferrets may have existed in the Great Plains in the late 1800s (USFWS, 1995). Black-footed ferret populations declined drastically in the 1900s, primarily because of the eradication of prairie dogs – their main source of food. The decrease of prairie dog numbers are a result of habitat loss, disease, and purposeful elimination because of grazing conflicts with livestock and feeding on winter wheat crops. Black-footed ferrets also rely on prairie dogs burrows for protection and cover. Current threats to black-footed ferrets also include disease, predation by golden eagles, great-horned owls, and coyotes, road kills, and trappings (USFWS, 1998).

As part of the recovery plan, black-footed ferrets were first released at the CMR in 1994 and a total of 229 black-footed ferrets have been released on the CMR between 1994 and 2005. A minimum of 224 wild-born kits have also been observed, but the spring 2007 population totaled only 9 individuals: 4 males and 5 females. Sylvatic plague, an exotic disease that is fatal to both black-footed ferrets and prairie dogs, was widespread on CMR during 2007 and eliminated nearly 60-percent of the prairie dogs in the Phillips County portion of CMR where ferret recovery has been focused. Despite intensive efforts over the last 14 years, this population of black-footed ferrets is not expected to persist (USACE, 2008). Of the reintroduction sites, only the Conata Basin site in South Dakota is considered to have a sizeable self-sustaining ferret population (USFWS, 2008).

Northern Leopard Frog-Western Population *(Rana pipiens)*- Status pending

Northern leopard frogs were petitioned for listing as threatened under the Endangered Species Act in 2009. A positive 90-day finding was published in the Federal Register on July 1, 2009, and a status review of the species by the USFWS is ongoing.

Northern leopard frogs utilize a variety of aquatic habitats for reproduction, feeding, and overwintering that include slow moving or still water along streams and rivers, wetlands, permanent or temporary pools, beaver ponds, and human-constructed habitats such as earthen

stock tanks and borrow pits. Adults spend the post-breeding summer period in nearby grassy meadows, open wet fields, or damp woods. The frogs were once abundant and widespread across the northern half of North America. They were commercially collected for food as well as laboratory use (USFWS, 2009).

However, a combination of ecological factors: pollution, deforestation, livestock grazing, disease, climate change, and water acidity have significantly reduced their numbers, particularly in Canada and the western United States. Information provided in the USFWS petition indicates that the species is declining, considered rare, or locally extinct from historical locations in Arizona, California, Colorado, Idaho, Iowa, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, Texas, Utah, Washington, Wisconsin, and Wyoming (USFWS, 2009). Evidence presented in the petition states that the remaining western U.S. population of the northern leopard frog is significant because it is markedly different from the eastern population based on genetic characteristics and because its loss would represent a significant gap in the range of the species (USFWS, 2009).

Sightings of between one and three individuals are common in the UL Bend Refuge (USACE, 2008). In 2009, at the UL Bend refuge 50 individuals were found south of Dry Lake; in Valley County, more than 100 leopard frogs were found in ponds by Duck Creek (USFWS, 2010a).

Sprague's Pipit (*Anthus spragueii*) – Candidate Species

Sprague's Pipit is a small (approximately 5.5 inches in length) grassland specialist bird endemic to the mixed-grass prairie in the northern Great Plains of North America. They are a Candidate Species for listing as "Endangered" or "Threatened" (USFWS, 2010a). After having been petitioned for listing in 2008, the USFWS determined that the petition presented substantial information indicating that listing the Sprague's Pipit was warranted but was precluded by higher listing priorities (USFWS, 2010a). The following species information is taken from the USFWS 2010 Sprague's Pipit Conservation Plan (Jones, 2010).

Sprague's Pipits breed in the northern Great Plains, with their highest numbers occurring in the central mixed-grass prairie of north-central and eastern Montana, North Dakota, and northwestern and north-central South Dakota. Sprague's Pipits are closely associated with native prairie grassland throughout their range and are less abundant (or absent) in areas of introduced grasses. Generally, pipits prefer to breed in well-drained native grasslands with high plant species richness and diversity (Jones, 2010).

The principal causes for the declines in Sprague's Pipit range and populations are habitat conversion (to seeded pasture, hayfield, and cropland) as well as overgrazing by livestock. In addition to the habitat losses from changes in land use, energy development, introduced plant species, nest predation and parasitism, drought, and fragmentation of grasslands are all threats that currently impact Sprague's Pipits populations throughout their present range (Jones, 2010).

Anecdotal accounts from early naturalists suggest that Sprague's Pipits were one of the most common grassland songbirds in the northern Great Plains. Since its discovery, the Sprague's Pipit has suffered greatly throughout its breeding range from conversion of short- and mid-grass prairie to agriculture (Jones, 2010).

Sprague's Pipits are likely influenced by the size of grassland patches and the amount of grassland in the landscape. Pipits had a 50-percent probability of occurring on patches approximately 400 acres; pipits were absent from grassland patches <72 acres. The shape of the habitat is also important; sites with a smaller edge-to-area ratio had higher pipit abundance, and were an important predictor of their occurrence. No consistent effect of patch size was found on nest success. Sprague's Pipits rarely occur in cultivated lands, and are uncommon on non-native planted pasturelands. They have not been documented to nest in cropland, in land in the Conservation Reserve Program, or in dense nesting cover planted for waterfowl habitat (Jones, 2010).

The conversion, degradation, fragmentation, and loss of native prairie are the primary threats to Sprague's Pipit populations. The once abundant grasslands of the Great Plains have been drastically reduced, altered, and fragmented by intensive agriculture, roads, tree plantings, encroachment by woody vegetation, invasion of exotic plants, and other human activities, including the removal of native grazers and a change in the natural fire regime. In the United States, about 60-percent of native mixed-grass prairies in Montana, North Dakota, and South Dakota have been converted to cropland. Grassland conversion has greatly reduced the quality and availability of suitable habitat for Sprague's Pipits (Jones, 2010).

Fragmentation of native prairie has likely contributed to the decline of Sprague's Pipit populations through a reduction in average patch size, increased isolation of habitat patches, and increase in the ratio of edge-to-interior in habitat and potentially, an increase in parasitism. In fragmented landscapes, habitat interior species such as Sprague's Pipits may experience lower reproductive success when nesting near habitat edges, where they are more susceptible to nest predators and brood parasites (e.g., brown headed cowbird). Sprague's Pipit abundance has been inversely correlated with distance to cropland and to water (Jones, 2010).

Sprague's Pipits may avoid roads and trails during the breeding season and the increased roads densities associated with energy development may have negative effects on Sprague's Pipit habitat. The type of road (e.g., secondary or tertiary, the presence of deep ditches on the sides, heavily graveled) and the level of traffic are the potential issues in determining the degree of effect roads and trails have on Sprague's Pipit populations. In Saskatchewan, Sprague's Pipits were significantly more abundant along trails (wheel ruts visually indistinct from surroundings) than along roadsides (fenced surfaced roads with adjacent ditches), which may be attributed to the reduction of suitable habitat associated with the road right-of-way. Sprague's Pipits avoidance of roads may also be due to the roadside habitat which tended to have non-native vegetation, dominated by smooth brome (*Bromus inermis*) (Jones, 2010).

As with the Greater Sage-Grouse, the candidate species receive no legal protection under the Endangered Species Act; that is, there are no legal prohibitions under the federal Endangered Species Act against taking candidate species. The Fish and Wildlife Service works to implement conservation actions for candidate species that may eliminate the need to list the species as threatened or endangered.

Greater Sage-Grouse *Centrocercus urophasianus*- Candidate Species

Greater Sage-Grouse is the largest of Montana's grouse. Both sexes have relatively long, pointed tails, feathered legs, and mottled gray-brown, buff, and black plumage. Males have a blackish-

brown throat patch and an inconspicuous yellow eye comb. Both sexes have blackish bellies which contrast sharply with white under-wing coverts when the birds are in flight. Females appear to dip from side to side while flying. Adult males range from 26 to 30 inches in length and average 4 to 7 pounds in weight; adult females range from 19 to 23 inches in length and 2.5 to 3.5 pounds in weight.

Sagebrush is the preferred habitat. They use 6 to 18 inch high sagebrush covered benches in June to July (average 213 acres); move to alfalfa fields (144 acres) or greasewood bottoms (91 acres) when forbs on the benches dry out; and move back to sagebrush (average 128 acres) in late August to early. These birds cannot survive in areas where sagebrush no longer exists (USFWS, 2011a).

Chicks eat mostly insects (60-percent); juveniles mostly forbs (75-percent) (dandelion and salsify); adults mostly big sagebrush and dandelion (79-percent). During the spring breeding season, male sage-grouse gather together and perform courtship displays in areas called leks (also known as "strutting grounds"), which are relatively open sites surrounded by denser sagebrush. These leks which may be as large as a football field are used for many generations of sage-grouse. Males defend individual territories within leks, by strutting with tails fanned and emitting drumming sounds from the air sacs on their chests to attract females. Lek activity extends from March to May (USFWS, 2011a). Mating sites move from year to year; nests are located 0.2 to 6.5 miles from the lek (MTNHP, 2011a).

Grazing and agricultural development led to a 50-percent decrease in populations by the 1930's (MTNHP, 2011a). Evidence suggests that habitat fragmentation and destruction across much of the species' range has contributed to significant population declines over the past century. Other important factors in the species' decline include fire and invasive plant species. If current trends persist, many local populations may disappear in the next several decades, with the remaining fragmented population vulnerable to extinction (USFWS, 2011a).

In southwest Montana 34-percent of hens observed had broods, with the average size being 4.3. Courtship starts in early March and persists to nesting in May. Egg records are probably similar to Wyoming: April 18 to July 27 (MTNHP, 2011a). On March 5, 2010, the U.S. Fish and Wildlife Service determined that the Greater Sage-Grouse warrants protection under the Endangered Species Act, but that listing the species under the Act is precluded by the need to address other listing actions of a higher priority.

6.15.2 Environmental Consequences

No Action

Under the No Action alternative, there would be no activities that could affect the fish and wildlife resources, including listed species.

Proposed Action

The predicted differences in water surface elevation and cold water habitat within Fort Peck Lake between the No Action and the Proposed Action would be virtually indiscernible and would not lead to significant effects to fish and wildlife resources.

Listed Species Effects Determinations

Pallid Sturgeon (*Scaphirynchus albus*)- Endangered

The predicted differences in water surface elevation within Fort Peck Lake and downstream between the No Action and the Proposed Action would be virtually indiscernible and would not lead to significant effects to the pallid sturgeon.

The finding is a determination of may affect, but not likely to adversely affect the pallid sturgeon.

The finding with respect to the pallid sturgeon critical habitat is not likely to adversely affect or adversely modify the critical habitat for the pallid sturgeon.

Shovelnose Sturgeon (*Scaphirhynchus platorynchus*) - Threatened

Because this species is listed as threatened, but is not biologically threatened or endangered, no Biological Assessment or further Section 7 consultation under the Endangered Species Act would be required with the USFWS.

Because the proposed projects are not associated with commercial fishing, a determination for the shovelnose sturgeon is not required.

Black-Footed Ferret (*Mustela nigripes*) - Endangered

The counties bordering Fort Peck Lake are all within the historic range of the black-footed ferret but have had no known sightings of the ferrets. As such, the black-footed ferret would not be likely to occur within the study areas. Effects of the Proposed Action on the black-footed ferret would be highly unlikely.

The finding is a determination of no effect to the black-footed ferret.

Whooping Crane (*Grus americana*) - Endangered

Other than a potential for brief stoppage during seasonal migration, the whooping crane would not be likely to occur at the Fort Peck Project. Effects of the Proposed Action on the whooping crane would be highly unlikely.

The finding is a determination of may affect, but not likely to adversely affect the whooping crane.

Interior Least Tern (*Sterna antillarum athalassos*) - Endangered

The effect of the depletions associated with implementing the Proposed Action on interior least tern nesting area would be virtually identical to the effect of the No Action alternative. However, if the effect of the depletions were discernible, the action would create a small amount of additional shoreline, providing a small increase in potential nesting area.

The finding is a determination of may affect, but not likely to adversely affect the interior least tern.

Piping Plover (*Charadrius melodus*) - Northern Great Plains population - Threatened

The effect of the depletions associated with implementing the Proposed Action on piping plover nesting area would be virtually identical to the effect of the No Action alternative. However, if the effect of the depletions were discernible, the action would create a small amount of additional shoreline, providing a small increase in potential nesting area.

The finding is a determination of may affect, but not likely to adversely affect the piping plover.

The finding with respect to the piping plover critical habitat is a determination that the project would not impact the critical habitat for the piping plover.

Northern Leopard Frog-Western Population *(Rana pipiens)*- Status Pending

The effect of the depletions associated with implementing the Proposed Action on northern leopard frog-western population breeding habitat would be virtually indiscernible from the No Action alternative. No significant effects to the northern leopard frog-western population would be expected.

The finding is a determination of not likely to adversely affect the western population of the northern leopard frog.

Sprague's Pipit (*Anthus spragueii*) – Candidate Species

The predicted differences in water surface elevation within Fort Peck Lake and downstream between the No Action and the Proposed Action would be virtually indiscernible and would not lead to significant effects to upland habitat. Therefore there would be no effect to Sprague's pipit habitat. Determinations are not required for candidate species unless the Proposed Action is likely to jeopardize the continued existence of the species. The USFWS encourages agencies to avoid impacts to candidate species and for that reason, the analysis and finding of effects is included.

The finding is a determination of no effect to the Sprague's pipit.

Greater Sage-Grouse (*Centrocercus urophasianus)*- Candidate Species

The predicted differences in water surface elevation within Fort Peck Lake and downstream between the No Action and the Proposed Action would be virtually indiscernible and would not lead to significant effects to upland habitat. Therefore there would be no effect to greater sage-grouse habitat. Determinations are not required for candidate species unless the Proposed Action is likely to jeopardize the continued existence of the species. The USFWS encourages agencies to avoid impacts to candidate species and for that reason, the analysis and finding of effects is included.

The finding is a determination of no effect to the greater sage-grouse.

7 Cumulative Effects of the Proposed Action

NEPA requires a Federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impact of the action. A cumulative impact is defined as "*the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR§1508.7).*" Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. These actions include on- or off-site projects conducted by government agencies, businesses, or individuals that are within the spatial and temporal boundaries of the actions considered.

7.1 Effects of Depletions

As stated the beginning of Section 6, three separate planning scenarios were used to evaluate the magnitude of the predicted environmental effects. The indirect effects were evaluated based on the baseline depletions (No Action) and the additional 630 acre-feet/year of depletions at Fort Peck Lake (Proposed Action). In addition, a total of 17,156 acre-feet/year of depletions (including the additional 630 acre-feet/year at Fort Peck Lake) was assessed to evaluate the cumulative effects of removing an additional 17,624 acre-feet/year of water (combined) from the other five system reservoirs. This section addresses these cumulative effects to System hydrology.

The source of the actual System inflow data is the U.S. Geological Survey, which began acquiring daily data beginning in late 1929. The DRM adjusts these inflow data by the difference for depletions that have been estimated to occur between each year and 2002. The Bureau of Reclamation provided the monthly depletions, and these monthly data were further separated to daily values for use in the DRM. Inflow and depletion data are available for each of the DRM modeling reaches. The 2002 depletion data are assumed to remain constant through 2010 (assumes no change from 2002 to 2010).

Because the Missouri River reservoirs are operated as an integrated system, 630 acre-feet/year in additional depletions from the Fort Peck Lake and 17,156 acre-feet/year in system depletions could conceivably reduce releases and water surface elevations throughout all six System reservoirs and the free-flowing reaches of the Missouri River. Reductions in reservoir releases and lake elevations have the potential effect on resources through these reductions in flows and water surface elevations.

As described in Section 5.2, 88-percent of the System's combined storage capacity is in the upper three reservoirs of Fort Peck, Lake Sakakawea, and Lake Oahe. The lower three projects (Big Bend, Fort Randall, and Gavins Point) are regulated in much the same manner, regardless of the runoff conditions. Therefore, potential cumulative effects to water surface elevations would only be observed in the upper three reservoirs.

Figures 16, 17, and 18 show the duration plots for the water surface elevations of the big three upper reservoirs (Fort Peck Lake, Lake Sakakawea, and Lake Oahe), the line label "CUMWP" is an abbreviation for "cumulative with project." For nearly all days modeled, the differences in the duration plots of the differences in daily values (comparing same day to same day) were the same or resulted in less than a foot of elevation difference. Figure 19 shows the duration plots

for the releases from Gavins Point Dam showing the cumulative effects on discharges from the downstream-most reservoir in the system. The figure indicates that the cumulative effect of implementing of the temporary water supply projects on each of the System reservoirs would result in virtually no change to the discharge from the Gavins Point Dam, relative to the current conditions. Because of the overt inability of the cumulative depletions to effect change to the physical environment (water surface elevations and discharge), there would be no discernible change to the authorized project purposes of flood control, navigation, hydropower, water supply, or recreation.

Figure 16
Cumulative Fort Peck Lake WSE Difference Distribution

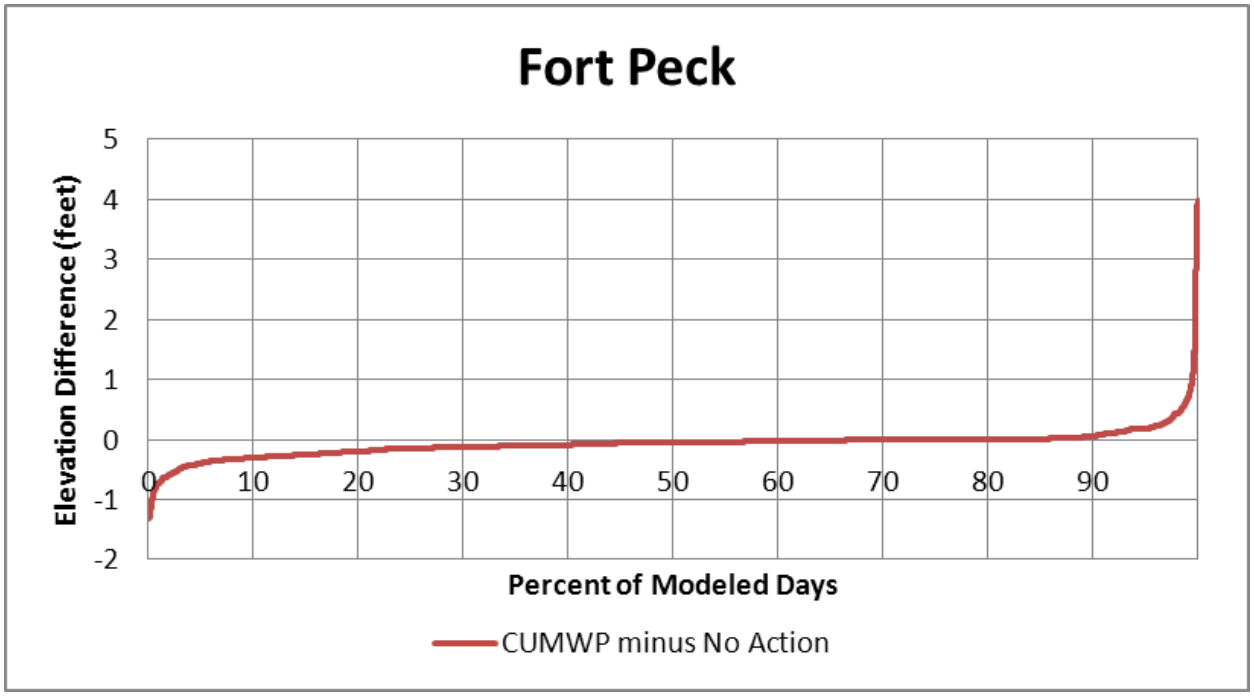


Figure 17
Cumulative Lake Sakakawea WSE Difference Distribution

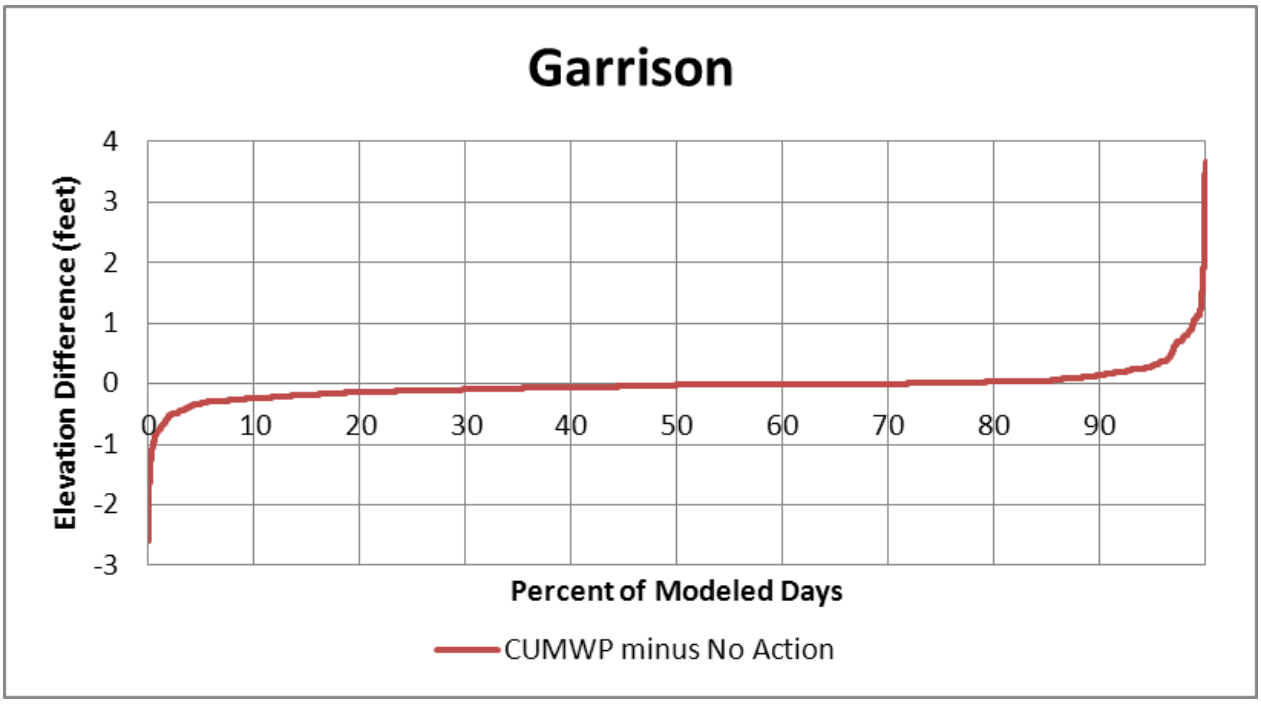


Figure 18
Cumulative Lake Oahe WSE Difference Distribution

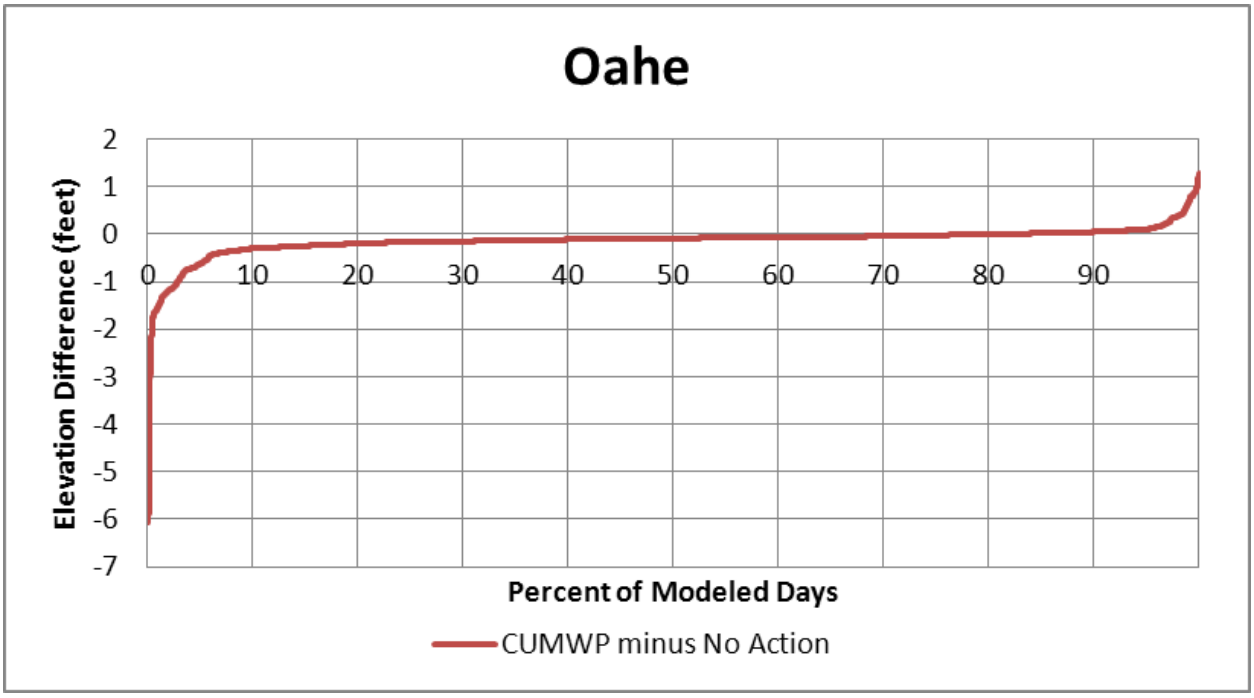
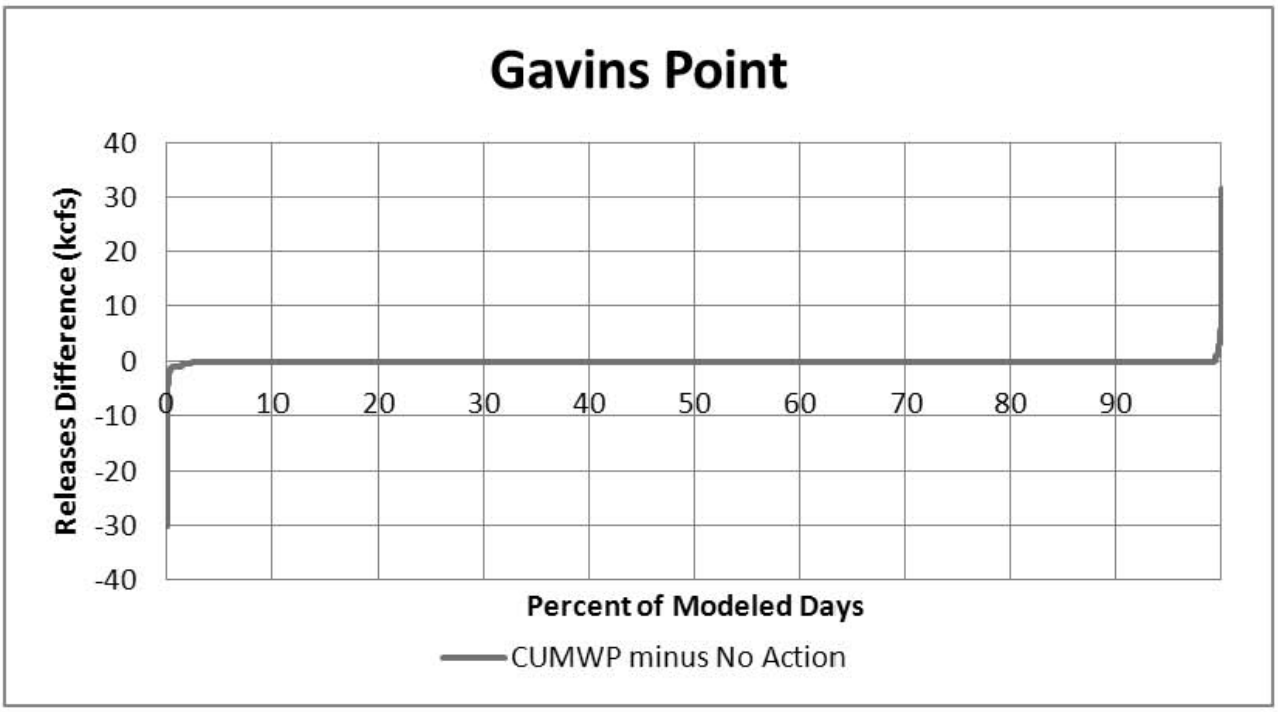


Figure 19
Cumulative Gavins Point Dam Release Difference Distribution



8 Compliance with Environmental Laws and Regulations

Making the surplus water determination would not commence until the proposed action achieves environmental compliance with all applicable laws and regulations, as described below. Environmental compliance for the proposed action would be achieved upon coordination of this Environmental Assessment with appropriate agencies, organizations, and individuals for their review and comments.

American Indian Religious Freedom Act (AIRFA) of 1978, 42 U.S.C. 1996.

In compliance.

The American Indian Religious Freedom Act (AIRFA) calls for the U.S. government to respect and protect the rights of Indian tribes to the free exercise of their traditional religions. The courts have interpreted this act as requiring agencies to consider the effects of their actions on traditional religious practices. Federal agencies must make reasonable efforts to ensure religious rights are accommodated. AIRFA does not protect Native American religions beyond the guarantees of the First Amendment. There is no affirmative relief provision under the act. It merely provides that any subsequent federal laws enacted take into consideration religious practices of Native Americans. This project would not adversely affect the protections offered by this Act.

Bald Eagle Protection Act, 16 U.S.C. Sec. 668, 668 note, 668a-668d.

In compliance.

The Bald Eagle Protection Act contains requirements on Corps projects concerning bald eagles. This project would not adversely affect bald eagles or their habitat.

Clean Air Act, as amended, 42 U.S.C. 1857h-7, et seq.

In compliance.

The purpose of this Act is to protect public health and welfare by the control of air pollution at its source, and to set forth primary and secondary National Ambient Air Quality Standards to establish criteria for States to attain, or maintain. Air quality would not be affected to any measurable degree by this project.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq.

In compliance.

The objective of this Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters (33 U.S.C. 1251). The Corps regulates discharges of dredge or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act. This permitting authority applies to all waters of the United States including navigable waters and wetlands. The Section 404 requires authorization to place dredged or fill material into water

bodies or wetlands. If a section 404 authorization is required, a section 401-water quality certification from the state in which the discharge originates is also needed.

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.)

In compliance.

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 *et seq.*) requires authorization from the U.S. Army Corps of Engineers for the construction of any structure in or over any navigable water of the United States, the excavation/dredging or deposition of material in these waters or any obstruction or alteration in a "navigable water." Navigable waters of the U.S. include waters that (1) are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or (2) are presently used, or have been used in the past, or are likely for future use to transport interstate or foreign commerce. The Corps of Engineers requires authorization in the form of a permit prior to construction of any structure or work that affects the course, location, or condition of the water body.

Endangered Species Act, as amended. 16 U.S.C. 1531, et seq.

Partial compliance.

Section 7 (16 U.S.C. 1536) states that all Federal departments and agencies shall, in consultation with and with the assistance of the Secretary of the Interior, insure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any threatened or endangered (T&E) species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical.

This Environmental Assessment represents the assessment and findings regarding the Proposed Action and serves as the Biological Assessment with a determination of 'no effect' to the black-footed ferret, greater sage-rouse and the Sprague's pipit. The findings allow a determination of 'may affect, but not likely to adversely affect' for the pallid sturgeon, whooping crane, interior least tern, piping plover, and the Western population of the northern leopard frog. The findings allow a determination of 'not likely to adversely affect or adversely modify the critical habitat' for the pallid sturgeon or piping plover. A letter concurring that this project would have no effect on or would not likely adversely affect threatened and endangered species is expected from the USFWS.

Environmental Justice (E.O. 12898).

In compliance.

Federal agencies shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States. The project does not disproportionately affect minority or low-income populations.

Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), et seq.

Not applicable.

The Act establishes the policy that consideration be given to the opportunities for outdoor recreation and fish and wildlife enhancement in the investigating and planning of any Federal navigation, flood control, reclamation, hydroelectric or multi-purpose water resource project, whenever any such project can reasonably serve either or both purposes consistently. There is no opportunity to enhance recreational resources in conjunction with this project.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq.

In compliance.

The FWCA requires governmental agencies, including the Corps, to coordinate activities so that adverse effects on fish and wildlife would be minimized when water bodies are proposed for modification. There are no new intakes or water supply infrastructure proposed as part of the Proposed Action. All future easements and water supply agreements will require review by the Corps of Engineers prior to allowing placement of infrastructure. In this process, the Corps will complete NEPA evaluations and comply with all appropriate environmental laws and regulations, including the Fish and Wildlife Coordination Act.

Land and Water Conservation Fund Act (LWCFA), as amended, 16 U.S.C. 4601-4601-11, et seq.

Not applicable.

Planning for recreation development at Corps projects is coordinated with the appropriate states so that the plans are consistent with public needs as identified in the State Comprehensive Outdoor Recreation Plan (SCORP). The Corps must coordinate with the National Park Service (NPS) to insure that no property acquired or developed with assistance from this Act will be converted to other than outdoor recreation uses. If conversion is necessary, approval of NPS is required, and plans are developed to relocate or re-create affected recreational opportunities. No lands involved in the proposed project were acquired or developed with LWCFA funds.

Migratory Bird Treaty Act

Partial compliance.

The Migratory Bird Treaty Act of 1918 (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over utilization. Executive Order 13186 (2001) directs executive agencies to take certain actions to implement the act. The Corps will be in consultation with the USFWS with regard to this activity’s potential effects on migratory birds.

National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq.

Partial compliance.

Federal agencies having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking must take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. Discussion is included in the EA with respect to the requirements of this law. The Corps has made the determination that the proposed project will have no effect on cultural resource and SHPO concurrence is expected.

1990 - Native American Graves Protection and Repatriation Act (P.L. 101-601; 25 U.S.C § 3001-13; 104 Stat. 3042)

In Compliance

The Native American Graves Protection and Repatriation Act (NAGPRA) addresses certain Native American and Native Hawaiian cultural items. In part, it establishes a process to follow in the event of an inadvertent discovery of human remains, funerary, sacred, and other objects of cultural patrimony from sites located on land owned or controlled by the federal government.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq.

In compliance.

This draft environmental assessment (EA) has been prepared in accordance with the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1508.9).

Noise Control Act of 1972, 42 U.S.C. Sec. 4901 to 4918.

In compliance.

This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Federal agencies are required to limit noise emissions to within compliance levels. The Corps has made the determination that the proposed project does not have the potential to adversely impact noise.

North American Wetlands Conservation Act, 16 U.S. C. Sec. 4401 et. seq.

Not applicable.

This Act establishes the North American Wetlands Conservation Council (16 U.S.C.4403) (NAWCC) to recommend wetlands conservation projects to the Migratory Bird Conservation Commission (MBCC). Section 9 of the Act (16 U.S.C. 4408) addresses the restoration, management, and protection of wetlands and habitat for migratory birds on Federal lands. Federal agencies acquiring, managing, or disposing of Federal lands and waters are to cooperate with the Fish and Wildlife Service to restore, protect, and enhance wetland ecosystems and other

habitats for migratory birds, fish and wildlife on their lands, to the extent consistent with their missions and statutory authorities. There will be no disposal of land with this project.

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)

In compliance.

This law prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Secretary's approval authority has since been delegated to the Chief of Engineers. Because the Corps of Engineers is doing this project, no authorization is required because the law specifically exempts the Corps of Engineers from regulation under Section 10.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1101, et seq.

Not applicable.

This Act authorizes the Secretary of Agriculture to cooperate with states and other public agencies in works for flood prevention and soil conservation, as well as the conservation, development, utilization, and disposal of water. This act imposes no requirements on Corps Civil Works projects.

Flood plain Management (E.O. 11988).

In compliance.

Section 1 requires each agency to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. The proposed project would not affect the flood holding capacity or flood surface profiles of any stream.

Protection of Wetlands (E.O. 11990).

In compliance.

Federal agencies shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies responsibilities. Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from

such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors. Each agency shall also provide opportunity for early public review of any plans or proposals for new construction in wetlands. There are no new intakes or water supply infrastructure proposed as part of the Proposed Action. No wetlands will be impacted by this project. All future easements and water supply agreements will require review by the Corps of Engineers prior to allowing placement of infrastructure. In this process, the Corps will complete NEPA evaluations and comply with all appropriate environmental laws and regulations, including the Protection of Wetlands.

CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers In the Nationwide Inventory.

Not applicable.

This memorandum states that each Federal agency shall take care to avoid or mitigate adverse effects on rivers identified in the Nationwide Inventory (FR 1980). No portion of Fort Peck Lake is listed on the Nationwide Rivers Inventory.

Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et sq.

In compliance.

This act establishes that certain rivers of the Nation, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The area in which the direct effects of the proposed activity would occur is not designated as a wild or scenic river, nor is it on the National Inventory of Rivers potentially eligible for inclusion. The downstream indirect effects of the proposed action would be indiscernible from existing conditions within segments of the Missouri River designated as Wild and Scenic Rivers.

9 Summary of Environmental Effects

Because of the small magnitude of the predicted changes to discharges and water surface elevations of Fort Peck Lake, the remaining five System reservoirs, and the riverine reaches of the Upper Missouri River as a result of the Proposed Action, the following environmental resources discussed in Section 6 would not be expected to have any measurable change over the existing condition: groundwater, water quality (including cold water habitat fishery of Fort Peck Lake), air quality, demographics, employment/income, environmental justice, recreation, aesthetics/visual resources, land use, cultural resources, vegetation/terrestrial habitat and listed plants, and fish and wildlife and listed species. In addition, there would be no effects to project purposes anticipated.

This Environmental Assessment represents the assessment and findings regarding the Proposed Action and serves as the Biological Assessment with a determination of ‘no effect’ to the black-footed ferret, greater sage-rouse and the Sprague’s pipit. The findings allow a determination of ‘may affect, but not likely to adversely affect’ for the pallid sturgeon, whooping crane, interior

least tern, piping plover, and the Western population of the northern leopard frog. The findings allow a determination of 'not likely to adversely affect or adversely modify the critical habitat' for the pallid sturgeon or piping plover.

The expected environmental consequences of implementing the Proposed Action would not be expected to be significant and would not require the preparation of an Environmental Impact Statement.

As stated in Section 5.1.3, the scope of the environmental analysis in this EA evaluates the indirect and cumulative effects of the depletions of the surplus water. As applicants submit requests for surplus water, applicants would need to prepare site-specific analyses to assess the site-specific effects of the water supply intake infrastructure and distribution. The applicant would work directly with the local Project Office (e.g., Fort Peck Lake Project Office) receiving the necessary instruction that has been established to evaluate water supply requests and their associated real estate outgrant requests (Real Estate Policy Guidance; USACE, 2011).

Following the guidelines in the Real Estate Policy Guidance, the applicant would complete and submit the necessary request (typically including a request letter, maps/locations, area of disturbance, development plan, regulatory permit application, and draft NEPA documentation). Once in receipt of a complete application, the District would complete the NEPA process, provide notification to the real estate office for issuance of an easement, and obtain the necessary permits prior to construction. Each Project Office has a set of conditions of consideration for evaluating requests for water intake site selection. These conditions of consideration have been developed to avoid important environmental resources and minimize the environmental consequences of intake construction and operation.

10 Coordination, Consultation, and List of Preparers

10.1 List of Tribes, Agencies, and Persons Consulted

In early September 2010, a letter was sent to Governors, state and federal agencies, and Tribes formally notifying them of the intent to undertake the surplus water studies and Environmental Assessment and inviting their representation at an informational meeting on 29 September 2010 in Bismarck, ND. Governors included in the correspondence were: Honorable Dave Heineman, Governor of Nebraska; Honorable Brian Schweitzer, Governor of Montana, Montana State Capitol Building; Honorable Mike Rounds, Governor of South Dakota; Honorable John Hoeven; Governor of North Dakota; Honorable Chet Culver, Governor of Iowa; Honorable Jay Nixon; Governor of Missouri; and Honorable Mark Parkinson, Governor of Kansas. An example copy of one of these letters is attached in Appendix A.

In late April 2011, the Corps of Engineers formally invited the respective Tribes, federal, and state agencies to attend any of three informational meetings on the surplus water studies. The first was held on 10 May 2011 at the Fort Peck Interpretive Center, Fort Peck, Montana; the second was held on 11 May 2011 at the South Dakota Cultural Heritage Center, Pierre, South Dakota; and the third was held 23 May 2011 at the Zorinsky Federal Building, Omaha, Nebraska. The purpose of the meetings was to provide information to the attendees on the surplus water studies as well as give the agencies an opportunity to ask questions and provide initial feedback. Example copies of letters sent to both the Tribes and agencies is also attached in Appendix A. The distribution list of Tribes and agencies invited to participate in these meetings is provided below.

<u>Tribes</u>
Assiniboine and Sioux Tribes of Fort Peck, Poplar, Montana 59255
    Chairman, A.T. Stafne
    Vice Chairperson, Ms. Roxann Bighorn
Blackfeet Nation, Browning, Montana 59417
    Chairman, Willie A. Sharp, Jr
    Vice Chairman, Peter “Rusty” Tatsey
Cheyenne River Sioux Tribe, Eagle Butte, South Dakota 57625
    Chairman, Kevin Keckler
    Vice Chairman, Ted Knife, Jr.
Chippewa Cree Tribe of the Rocky Boy Reservation, Box Elder, Montana 59521-9724
    Chairman, Jake Parker
    Vice Chairman, Bruce Sunchild
Confederated Salish and Kootenai Tribes of the Flathead Reservation
    Chairman, E.T. Bud Morgan
    Vice Chairman, Joe Durglo
Crow Creek Sioux Tribe, Fort Thompson, South Dakota 57339-0050
    Chairman, Duane Big Eagle Sr.
    Vice Chairman, Wilfred Keeble
Crow Nations, Crow Reservation, Montana 59022
    Chairman Cedric Black Eagle
    Vice Chairman, Coolidge Jefferson

Eastern Shoshone Tribe, Wind River Reservation, Wyoming 82514
Chairman, Mike LaJeunesse
Vice Chairman, Wes Martel
Flandreau Santee Sioux Tribe, Flandreau, South Dakota 57028
President, Anthony Reider
Vice President, Cynthia Allen-Weddell
Gros Ventre and Assiniboine Tribes, Harlem, Montana 59526-9705
Chairman, Tracey King
Vice Chairperson, Ms. Mel L. Adams Doney
Iowa Tribe of Kansas and Nebraska, White Cloud, KS 66094
Chairman, Tim Rhodd
Kaw Nation, Kaw City, OK 74641
Chairman, Guy Munroe
Vice Chairman, Bill Kekahbah
Kickapoo Tribe of Kansas, Horton, KS 66439-9537
Chairman, Russell Bradley
Vice Chairman, Ms. Laura Razo
Lower Brule Sioux Tribe, Lower Brule, South Dakota 57548-0187
Chairman, Michael Jandreau
Vice Chairman, Floyd Gourneau
Northern Arapaho Tribe, Fort Washakie, Wyoming 82514
Chairperson, Mrs. Kim Harjo
Co-Chairman, Keith Spoonhunter
Northern Cheyenne Tribe, Lame Deer, Montana 59043
President, Leroy Spang
Vice President, Joe Fox, Jr.
Oglala Sioux Tribe, Pine Ridge, South Dakota 57770
Chairman, John Yellow Bird Steele
Vice Chairman, Tom Poor Bear
Omaha Tribe of Nebraska, Macy, Nebraska 68039-0368
Chairman, Amen Sheridan
Vice Chairman, Forrest Aldrich
Osage Nation, Pawhuska, Oklahoma 74056
Principal Chief, John D. Red Eagle
Assistant Chief, Scott Bighorse
Pawnee Tribe of Oklahoma, Pawnee, OK 74058
President, George E. Howell
Vice President, Charles Lone Chief
Ponca Tribe of Nebraska, Niobrara, Nebraska 68760
Chairperson, Ms. Rebecca White
Vice Chairman, James LaPointe
Prairie Band Potawatomi Nation, Mayetta KS 66509-8970
Chairman, Steve Ortiz
Vice Chairperson, Mrs. Joyce Guerrero
Rosebud Sioux Tribe, Rosebud, South Dakota 57570-0430
President, Rodney M. Bordeaux

Vice President, William Kindle

Sac and Fox of the Mississippi in Iowa/Meskwaki, Tama, IA 52339

Chairman, Adrian Pushetonequa

Vice Chairman, Jon Papakee

Sac and Fox Nation of Missouri in Kansas and Nebraska, Reserve, Kansas 66434

Chairperson, Ms. Twen Barton

Vice Chairperson, Mrs. Carey Wahwahsuck

Santee Sioux Nation, Santee, Nebraska 68760

Chairman, Roger Trudell

Vice Chairman, David Henry

Sisseton-Wahpeton Sioux Tribe, Agency Village, South Dakota 57262-0509

Chairman, Robert Shepherd

Vice Chairman, Gerald Rousseau

Spirit Lake Sioux Tribe, Fort Totten, North Dakota 58335

Chairperson, Ms. Myra Pearson

Vice Chairman, Darwin Brown

Standing Rock Sioux Tribe, Fort Yates, North Dakota 58538

Chairman, Charlie Murphy

Vice Chairman, Mike Faith

Three Affiliated Tribes, Fort Berthold Reservation, New Town, ND 58763

Chairman, Tex Hall

Vice Chairman, Scott Eagle

Turtle Mountain Band of Chippewa, Turtle Mountain Reservation Belcourt, North Dakota 58316

Chairman, Merle St. Claire

Vice Chairman, Curtis Poitra

Wichita and Affiliated Tribes, Anadarko, OK 73005

President, Stratford Williams

Winnebago Tribe of Nebraska, Winnebago, Nebraska 68071-0687

Chairman, John Blackhawk

Vice Chairman, Brian Chamberlain

Yankton Sioux Tribe, Marty, South Dakota 57361

Chairman, Robert Cournoyer

Vice Chairman, Ms. Karen Archambeau

Sac and Fox Nation of Oklahoma, Stroud, Oklahoma 74079

Ms. Sandra Massey

Region-Wide Contacts

Larry Svoboda, US Environmental Protection Agency Region 8, Denver CO 80202

Joe Cothern, US Environmental Protection Agency Region 7, Kansas City, KS 66101

Robin Johnson, Western Area Power Administration, Billings, MT 59107

Mike Ryan, Bureau of Reclamation Great Plains Regional Office, Billings, MT 59107

Dana Darlington, Missouri River Conservation Districts Council, Great Falls, MT 59401

USACE Regulatory Offices

Todd Tillinger, USACE Montana Regulatory Field Office, Helena, MT 59626

John Moeschen, Nebraska Regulatory Field Office, Omaha, NE 68138

Dan Cimarosti, USACE North Dakota Regulatory Field Office, Bismarck, ND 58504

Steven Naylor, USACE South Dakota Regulatory Field Office, Pierre, SD 57501

North Dakota

Dennis Breitzman, Bureau of Reclamation, Dakotas Area Office, Bismarck, ND 5850

Jeff Towner, US Fish and Wildlife Service, North Dakota Field Office, Bismarck, ND 58501

Terry Steinwand, North Dakota Game and Fish, Bismarck, ND 58501-5095

Dr. Terry Dwelle, North Dakota Department of Health, Bismarck, ND 58501-

Wayne Stenehjem, North Dakota Attorney General, Bismarck ND 58505

Doug Goehring, North Dakota Department of Agriculture, Bismarck, ND 58595

Todd Sando, PE, North Dakota State Engineer, Bismarck, ND 58505-0850

Paul Sweeney, North Dakota Natural Resource Conservation Service, Bismarck, ND 58505

Merlan E. Paaverud, Jr., North Dakota State Historical Society, Bismarck, ND 58505

Scott J. Davis, North Dakota Indian Affairs Commission, Bismarck, ND 58505

Mark Zimmerman, North Dakota Parks & Recreation Department, Bismarck, ND 58503

South Dakota

Pete Gober, US Fish and Wildlife Service, South Dakota Field Office, Pierre, SD 57501

Marty J. Jackley, SD Attorney General, Pierre, SD 57501

Walt Bones, SD Department of Agriculture, Pierre, SD 57501

Steven M. Pirner, P.E., SD Department of Environment and Natural Resources, Pierre, SD 57501

Jeff Vonk, SD Game Fish and Parks, Pierre, SD 57501

Doreen Hollingworth, SD Department of Health, Pierre, SD 57501

Leroy LaPlante, SD Department of Tribal Relations, Pierre, SD 57501

Jay Vogt, SD State Historical Society, Pierre, SD 57501

Janet Oertly, SD Natural Resources Conservation Service, Huron, SD 57350

Montana

Mark Wilson, US Fish and Wildlife Service, Montana Field Office, Helena, MT 59601

Dan Jewell, Montana Area Office, Bureau of Reclamation, Billings, MT 59107

Richard Opper, Montana Department of Environmental Quality, Helena, MT 59620

Mary Sexton, Montana Department of Natural Resources and Conservation, Helena, MT 59620

Joe Maurier, Montana Department of Fish, Wildlife, and Parks, Helena, MT 59601

Joyce Swartzendruber, Montana State Conservationist, Bozeman, MT 59715

Ron de Yong, Montana Department of Agriculture, Helena, MT 59601

Steve Bullock, Montana Attorney General, Helena, MT 59620

Mark Baumler, Montana Historical Society, Helena, MT 59620

Nebraska

Michael George, US Fish and Wildlife Service, Nebraska Field Office, Grand Island, NE 68801

Aaron Thompson, Bureau of Reclamation, Grand Island, NE 68802

Greg Ibach, NE Department of Agriculture, Lincoln, NE 68509

Jon Bruning, Nebraska Attorney General, Lincoln, NE 68509

Mike Linder, Nebraska Department of Environmental Quality, Lincoln, NE 68509

Rex Amack, Nebraska Game and Parks Commission, Lincoln, NE 68503

Michael Smith, Nebraska State Historical Society, Lincoln, NE 68501

Judi M. Gaiashkibos, Nebraska Commission on Indian Affairs, Lincoln, NE 68509

Brian Dunnigan, Nebraska Department of Natural Resources, Lincoln, NE 68509

Iowa

Bill Northey, Iowa Department of Agriculture, Des Moines, IA 50319

Roger Lande, Iowa Department of Natural Resources, Des Moines, IA 50319

Tom Miller, Iowa Attorney General, Des Moines, IA 50319

Missouri

Sara Parker Pauley, Missouri Department of Natural Resources, Jefferson City, MO 65102

Chris Koster, Missouri Attorney General, Jefferson City, MO 65102

10.2 Summary of Agency Meetings

The three agency coordination meetings were held in the respective states (MT/SD/NE) for the proposed projects. Surplus Water Reports are being completed for Ft. Peck Lake (Ft. Peck Project), Montana; Lake Oahe (Oahe Project), North and South Dakota; Lake Sharpe (Big Bend

Project), South Dakota; Lake Francis Case (Ft. Randall Project), South Dakota and Lewis and Clark Lake (Gavins Point Project), South Dakota. Agencies and individuals that were in attendance at the meetings are listed below.

Affiliation	Individual
U.S. Department of the Interior-Bureau of Reclamation	Nell McPhillips
U.S. Department of the Interior-Bureau of Reclamation	Greg Gere
U.S. Fish and Wildlife Service - Biologist	Terry Quesinberry
U.S. Fish and Wildlife Service - Field Supervisor	Scott Larson
U.S. Fish and Wildlife Service - NE Field Supervisor	Mike George
U.S. Army Corps of Engineers - SD Regulatory Office	Steve Naylor
U.S. Army Corps of Engineers - Omaha District	Tiffany Vanosdall
U.S. Army Corps of Engineers - Omaha District	Eric Laux
U.S. Army Corps of Engineers - Fort Peck Lake Manager	Darin McMurry
U.S. Army Corps of Engineers - Regulatory	Mary Hoffman
U.S. Army Corps of Engineers - Regulatory	John Moeschen
U.S. Army Corps of Engineers - Water Supply Manager	Larry Janis
U.S. Bureau of Reclamation	Kelly Titensor
U.S. Bureau of Reclamation	Dan Fritz
Crow Creek Sioux	Wanda Wells
MT Department of Natural Resources and Conservation	Tim Bryggman
MT Department of Agriculture	Robyn Cassel
SD Department of Environment and Natural Resources	Mark Rath
SD Game Fish and Parks - Aquatics Chief	John Lott
SD Department of Natural Resources - Chief Engineer	Garland Erbele
ND Attorney General's Office - Assistant AG	Jennifer Verleger
ND State Water Commission	Kelly Casteel
ND State Water Commission	Bob Shaver
NE Game and Parks Commission	Gene Zuerlein
NE Historical Society	Terry Steinacher
NE Department of Natural Resources	Susan France
NE Department of Natural Resources	Steve Gaul
NE Department of Environmental Quality	John Bender
KS Water Office	Nathan Westrup
IA Department of Natural Resources	Michael Anderson
IA Department of Agriculture	Harold Hommes

Tiffany Vanosdall and Eric Laux (USACE, Omaha District) presented an overview of the proposed actions and information regarding:

- General information about Missouri River system, authorized purposes, storage;
- USACE water supply authorities and policies;
- Challenges of completing the study on the Missouri River;
- An Outline of a Surplus Water Report;

- Details of Demand, Storage Yield Analysis, Alternatives, Policy Pricing, Compensation to Others;
- The Requirements of the National Environmental Policy Act and Public Participation; and
- Data Gaps, Informational Needs, and Methods for Information Sharing.

Throughout the presentation, discussion occurred. The following summarizes the main points of the comments/questions received.

Natural Flows

Mark Rath (SDDENR) reiterated that the State's positions are similar to the State of North Dakota relative to surplus water determination at Lake Sakakawea (i.e., the Missouri River natural flow, now impounded by Missouri River System reservoirs, remains subject to the exclusive authority and jurisdiction of the individual states and that natural flow would be sufficient to meet water supply needs of the states).

USDOI, Bureau of Reclamation Projects

Bureau of Reclamation stated that they had recently sent a letter to Colonel Ruch (Omaha District Commander) seeking to work with the Corps of Engineers on a comprehensive review of Reclamation's authorized projects with withdrawals from Lakes Oahe and Sakakawea. Coming to consensus on all projects that are congressionally-authorized should prevent future delays regarding the Corps' issuance of construction easements for Reclamation projects, and clarify that those projects would be exempt from Corps water supply agreements.

Storage Yield Analysis

The North Dakota State Water Commission (ND SWC) was interested in the methodologies employed to figure system yield in the Lake Sakakawea Report. The Corps of Engineers agreed to have our hydrologist provide a thorough explanation via phone or email.

Kansas Water asked if there was a yield report available regarding the Corps' computation of system yield. They would like to see the details of how that was computed. The Omaha District responded that they would provide the Lake Sakakawea Surplus Water Report and refer to sections that have that information. The Corps also offered to make their hydrologist available if there were any questions.

Water Supply Demand Analysis

While total demand appears to be sufficient to address demand that may be reasonable and foreseeable, some of the numbers within the demand analysis table appeared to be off. For example, the Corps' reported 16,000 AF of domestic use at Gavins Point was questioned. As a response, the Corps of Engineers would re-check the demand calculations as well as cross check the demand figures with data from SD DENR.

NGPC informed the Corps that they may have water intakes that are not covered under existing recreation leases. The Corps responded that the NGPC does currently have leases to use/manage recreational areas at Louis and Clark Lake. The Omaha District agreed to look to ensure water

withdrawal is covered under those leases. NE DNR mentioned that water rights information for existing users can be obtained online, and that the data are in terms of the PLSS system.

Alternatives for Meeting Water Demand

Based on input from several individuals in attendance, water hauling for water distribution in rural South Dakota is still a common practice. Much of the reasoning behind the legislation for creating Rural Water Systems in South Dakota appears to be twofold: the transporting of water for rural domestic use is very expensive and Rural Water Distribution Systems offset those costs. Because of water quality concerns, ground water is not an option in many cases in both states. Thus, surface water is the main source for domestic use. SD DENR specifically stated that there are "not a lot of options" [outside of surface water] in South Dakota. The following were provided as potential points of contact for information regarding water hauling option: SD - Denny Davis, Association of Rural Water Systems, MT - Ron Miller - Ft. Peck Rural County Water District, and MT – Bobby Kirkland – Water Hauling - 406.526.3220

Based on their review of the Lake Sakakawea Surplus Water Report, NE DNR asked if existing users would need alternative sources of water, require new pipelines, etc. The Omaha District indicated that existing users would not be forced to utilize other sources under the no action alternative. It is assumed that if no federal action was to take place (to identify surplus water in the respective reservoirs), that existing water users would continue to withdraw water from the reservoirs.

Charging for Water

There was considerable discussion regarding the issue of charging for using water. Much of the discussion was captured in previous comments received by states on Lake Sakakawea Report. Of particular interest was the idea of what happens when Native Americans perfect their water right as many Tribes are currently undertaking such efforts. The Corps of Engineers' position (and the policy taken in the Lake Sakakawea Study) was that water rights are a pre-condition of entering into contract with Corps for use of surplus water (tribal or state water rights). Tribes are not considered differently in this respect than a state or private entity. Legally, the Corps can only enter into agreements with an individual or entity that has a valid state or Tribal water right.

Bureau of Reclamation discussed that they were beginning to move toward "market based" pricing for Municipal and Industrial water, and thought the Corps should look into this as well. The Corps indicated that eventually there would be discussions between Corps and Bureau regarding federal water supply policies, etc. But that this will most likely take place during the process of developing the long-term comprehensive strategy for the basin.

Future Water Use/Sources of M&I Demand

None of the representatives from SD or NE were aware of any large-scale users of water (i.e., ethanol or power plants) that were reasonably foreseeable within the next 10 years. As a result, the assumed 10-percent increase in demand--with no specifically designated future uses--was agreed to as a reasonable approach. The Bureau of Reclamation indicated that there could be fairly large BOR MR&I projects in next 10 years, but they wouldn't require water contract with Corps, as they will be specifically authorized by Congress to use Missouri River water.

10.3 Public Participation

Held For Comments On Draft Environmental Assessment That Will Be In The Final EA.

10.4 List of Preparers

Environmental Manager	Eric Laux, CENWO
Project Manager	Tiffany Vanosdall, CENWO
Review	Catherine Grow, Office of Counsel, CENWO
DRM Assessment Modeler	Roy F. McAllister, Jr., CENWO
Economist/Planner	David Miller, David Miller & Associates, Inc.
NEPA Specialist	Michael McGarry, David Miller & Associates, Inc.
Economist/Planner	Dr. Jerry Diamantides, David Miller & Associates, Inc.
Economist/Planner	Alex Hettinger, David Miller & Associates, Inc.
Environmental Planner	Emma Brower, David Miller & Associates, Inc.
Environmental Planner	Corey Miles, David Miller & Associates, Inc.
Economist/Planner	John Burns, Burns Consulting

Additional Persons Consulted

Name	Affiliation
Millie Heffner	Montana Department of Natural Resources & Conservation
Joe Meek	Montana Department of Environmental Quality
Jamie Ellis	Montana Department of Natural Resources & Conservation
James Ferch	Montana Department of Natural Resources & Conservation

11 References

Code of Federal Regulations. 1978. Title 40, Chapter V, Part 1508, Sec. 1508.8. Nov. 29, 1978. From the U.S. Government Printing Office via GPO Access.

Code of Federal Regulations. 2002. Title 43, Volume 2, CHAPTER II, PART 3100 Sec. 3101.7. Revised as of October 1, 2002. From the U.S. Government Printing Office via GPO Access.

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance Under the National Environmental Policy Act. Executive Office of the President. Washington, D.C.

Eliott-Smith, E., Haig, S.M., and Powers, B.M. 2009. Data from the 2006 International Piping Plover Census: U.S. Geological Survey Data Series 426, 332 p.

Executive Office of the President (Executive Order). 1994. Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations. Executive Order 12898, 59 Fed. Reg. 7629.

Gerrity, P.C., C.S. Guy, and W.M. Gardner. 2008. Habitat Use of Juvenile Pallid Sturgeon and Shovelnose Sturgeon with Implications for Water-level Management in a Downstream Reservoir. North American Journal of Fisheries Management 28:832-843.

Jones, S. L. 2010. Sprague's Pipit (*Anthus spragueii*) Conservation Plan. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C.

Montana Department of Environmental Quality (MTDEQ). 2010. Water Quality Standards Attainment Record, Fort Peck Reservoir. On-line at: http://cwaic.mt.gov/wqrep/2010/assmtrec/MT40E004_010.pdf (accessed January 2011)

Montana Natural Heritage Program (MTNHP). 2011. Species of Concern database. On-line at: http://mtnhp.org/speciesofconcern/?AorP=p (accessed May 2011)

Montana Natural Heritage Program (MTNHP). 2011a. Montana Field Guide-Greater Sage-Grouse. On-line at: http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/ (accessed May 2011).

Montana Natural Resource Information System (MTNRIS). 1996. Montana Groundwater Atlas. On-line at: http://nris.mt.gov/wis/pdf/gwatlas/mtgwa.pdf (accessed December 2010).

NPA Data Services Inc. 2007. Montana Population Projections. 2007 Regional Economic Projections Series. On-line at: http://ceic.mt.gov/Demog/project/NPActy_total_and_65+_1107_web.pdf (accessed December 2010).

Tews, A. and P. Clancy. 1993. Fort Peck Pallid Sturgeon Study. Montana Fish Wildlife and Parks Final Report Submitted to U.S. Army Corps of Engineers. Omaha, Nebraska.

U.S. Army Corps of Engineers (USACE). 1978. Master Plan, Fort Peck Dam – Fort Peck Lake, Missouri River. Design Memorandum No. MGR-107D. USACE, Omaha District, Omaha, NE.

U.S. Army Corps of Engineers (USACE). 1998. Missouri River Master Water Control Manual Review & Update, Reservoir Regulation Studies Daily Routing Model, August 1998. Missouri River Region, Northwest Division.

U.S. Army Corps of Engineers (USACE). 2000. ER 1105-2-100, Planning Guidance Notebook, 22 April 2000.

U.S. Army Corps of Engineers (USACE). 2003. Final Supplemental Environmental Impact Statement (FSEIS) for the Missouri River Fish and Wildlife Mitigation Project. Northwest Division, Omaha and Kansas City Districts.

U.S. Army Corps of Engineers (USACE). 2003a. Big Bend Dam/Lake Sharpe Master Plan with Integrated Programmatic Environmental Assessment (EA) Missouri River, South Dakota Update of Design Memorandum MB-90. Northwest Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2003b. Gavins Point Dam/Lewis and Clark Lake Master Plan Missouri River, Nebraska and South Dakota, Update of Design Memorandum MG-123. Northwest Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2004. Missouri River Master Water Control Manual Review and Update Final Environmental Impact Statement (FEIS). Northwest Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2004a. EM 1110-2-2300, General Design and Construction Considerations for Earth and Rock-Fill Dams, 30 July 2004

U.S. Army Corps of Engineers (USACE). 2005. Environmental Assessment, Implementation of the Charles M. Russell National Wildlife Refuge Enhancement Act of 2000. Northwestern Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2006. Environmental Assessment for the Inclusion of Technical Criteria for Spring Pulse Releases from Gavins Point Dam. Northwestern Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2007. Garrison Dam/Lake Sakakawea Master Plan with Integrated Programmatic Environmental Assessment Missouri River, North Dakota Update of Design Memorandum MGR-107D. USACE, Omaha District, Omaha, NE. December 2007.

U.S. Army Corps of Engineers (USACE). 2007a. Missouri River Master Water Control Manual. Northwest Division, Omaha District. http://www.nwd-mr.usace.army.mil/rcc/reports/mmanual/MasterManual.pdf

U.S. Army Corps of Engineers (USACE). 2007b. Missouri River Mainstem Reservoir System, System Description and Regulation, Missouri River Basin. Northwestern Division, Missouri River Basin, Water Management Division.

U.S. Army Corps of Engineers (USACE). 2007c. Water Quality Special Study Report: Water Quality Conditions Monitored at the Corps' Fort Peck Project in Montana during the 3-Year Period 2004 through 2006. Report Number: CENWO-ED-HA/WQSS/Fort Peck/2007. Water Quality Unit, Water Control and Water Quality Section, Hydrologic Engineering Branch, Engineering Division, Omaha District, USACE, Omaha, NE.

U.S. Army Corps of Engineers (USACE). 2008. Fort Peck Dam/Fort Peck Lake Master Plan with Integrated Programmatic Environmental Assessment, Missouri River, Montana. Update of Design Memorandum MFP-105D. Northwest Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2008a. Real Estate Policy Guidance Letter No. 26 – Easements to Support Water Supply Storage Agreements and Surplus Water Agreements. S. Whiteford, Acting Director of Real Estate, 10 June 2008.

U.S. Army Corps of Engineers (USACE). 2009. Application of the CE-QUAL-W2 Hydrodynamic and Water Quality Model to Fort Peck Reservoir, Montana. Water Quality Unit, Water Control and Water Quality Section, Hydrologic Engineering Branch, Engineering Division, Omaha District, U.S. Army Corps of Engineers. Omaha, Nebraska.

U.S. Army Corps of Engineers (USACE). 2009a. Final Missouri River Mainstem System 2009-2010 Annual Operating Plan, Plate 2. Omaha District.

U.S. Army Corps of Engineers (USACE). 2010. Missouri River Mainstem System, 2010-2011 Annual Operating Plan, Northwestern Division, Missouri River Basin, Water Management Division.

U.S. Army Corps of Engineers (USACE). 2010a. Missouri River Recovery Program, Emergent Sandbar Habitat Complexes in the Missouri River, Nebraska and South Dakota, Draft Project Implementation Report (PIR) With Integrated Environmental Assessment. Northwestern Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2010b. Final Oahe Dam/Lake Oahe Master Plan Missouri River, South Dakota and North Dakota Design Memorandum MO-224. Northwestern Division, Omaha District.

U.S. Army Corps of Engineers (USACE). 2010c. Draft Programmatic Environmental Impact Statement for the Mechanical Creation and Maintenance of Emergent Sandbar Habitat in the Riverine Segments of the Upper Missouri River. On Line at: www.moriverrecovery.org/mrrp/f?p=136:1:709330460640206

U.S. Army Corps of Engineers (USACE). 2011. Operations Division Real Estate Policy. Omaha District, Northwest Division.

U.S. Census Bureau. 1990. 1990 Montana Detailed Population Data Tables. On-line at: http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_1990_STF1_&_lang=en&_ts=326205158978 (accessed January 2011).

U.S. Census Bureau. 2000. 2000 Montana Detailed Population Data Tables. On-line at: http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF1_U&_lang=en&_ts=326201986338 (accessed January 2011).

U.S. Census Bureau. 2000a. GCT-H5 - Montana: General Housing Characteristics: 2000 - State -- County / County Equivalent. On-line at: http://factfinder.census.gov/servlet/GCTTable?_bm=y&-context=gct&-ds_name=DEC_2000_SF1_U&-mt_name=DEC_2000_SF1_U_GCTH5_US9&-tree_id=4001&-redoLog=true&-_caller=geoselect&-geo_id=04000US30&-format=ST-2|ST-2S&-_lang=en (accessed January 2011).

U.S. Census Bureau. 2009. State and County Quick Facts. On-line at: http://quickfacts.census.gov/qfd/states/30000.html

U.S. Census Bureau. 2010. Montana Detailed Population Data Tables. On-line at: http://www2.census.gov/census_2010/03-Demographic_Profile/Montana/ (accessed May 2011).

U.S. Census Bureau. 2010a. U.S. Poverty Thresholds in 2010. On-line at: www.census.gov/hhes/poverty/threshld/thresh00.html (accessed January 2011).

U.S. Environmental Protection Agency (USEPA). 1993. General Conformity Rule, Basic Information. On-line at: http://www.epa.gov/air/genconform/background.html (accessed December 2010).

U.S. Environmental Protection Agency (USEPA). 2011. Nonattainment for Each County by Year (Green Book). On-line Resource at: http://www.epa.gov/oar/oaqps/greenbk/anay.html (accessed January 2011)

U.S. Fish and Wildlife Service (USFWS). 1988. Black-footed Ferret Recovery Implementation Team. 1998. Black-footed Ferret: Return of a Native. USFWS, Pierre, South Dakota.

U.S. Fish and Wildlife Service (USFWS). 1995. North Dakota's federally listed endangered, threatened, and candidate species - 1995. USFWS, Bismarck, North Dakota. Jamestown, North Dakota: Northern Prairie Wildlife Research Center Online. On-line at: http://www.npwrc.usgs.gov/resource/wildlife/nddanger/index.htm (accessed December 2010).

U.S. Fish and Wildlife Service (USFWS). 2003. U.S. Fish and Wildlife Service Amendment to the 2000 Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System.

U.S. Fish and Wildlife Service (USFWS). 2008. Black-footed Ferret (*Mustela nigripes*) 5 year status review: summary and evaluation. Mountain-Prairie Region, South Dakota Field Office. On Line at: http://www.fws.gov/southdakotafieldoffice/5%20year%20bff%20Final_2008.pdf

U.S. Fish and Wildlife Service (USFWS). 2009. 90-Day Finding on a Petition to List the Northern Leopard Frog in the Western United States as Threatened. Federal Register, Vol. 74,

No. 125, Page 31389-31401. On Line at:
http://www.fws.gov/midwest/eco_serv/soc/amphibians/nlfr90day.pdf

U.S. Fish and Wildlife Service (USFWS). 2010. Threatened Status for Shovelnose Sturgeon Under the Similarity of Appearance Provisions of the Endangered Species Act, Final Rule. Federal Register, Vol. 75, No. 169, Page 53598-53606. On Line at:
http://edocket.access.gpo.gov/2010/pdf/2010-21861.pdf

U.S. Fish and Wildlife Service (USFWS). 2010a. Draft Comprehensive Conservation Plan and Environmental Impact Statement Charles M. Russell National Wildlife Refuge, UL Bend National Wildlife Refuge, Montana.

U.S. Fish and Wildlife Service (USFWS). 2011. Endangered, Threatened, Proposed, and Candidate Species – Montana Counties. http://fwpiis.mt.gov/content/getItem.aspx?id=48797 (accessed June 2011).

U.S. Fish and Wildlife Service (USFWS). 2011a. Greater sage-grouse Factsheet. Mountain-Prairie Region, South Dakota Field Office. On-line at: http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/ (accessed June 2011).

U.S. Geological Survey (USGS). 1996. HA 730-I Groundwater Atlas of the United States; Montana, North Dakota, South Dakota, Wyoming. On-line at:http://pubs.usgs.gov/ha/ha730/ch_i/index.html (accessed March 2010).

U.S. Geological Survey (USGS). 2005. Estimated Use of Water in the United States County-Level Data for 2005. On-line at: http://water.usgs.gov/watuse/data/2005/

U.S. Geological Survey (USGS). 2010. Seismicity of Montana 1990-2006. On-line at:
http://earthquake.usgs.gov/earthquakes/states/montana/seismicity.php (accessed November 2010).

Water Resources Council. 1983. Economic and Environmental Principles for Water and Related Land Resources Implementation Studies and The Economic and Environmental Guidelines for Water and Related Land Resources Implementation Studies, U.S. Water Resources Council.

Appendices

Appendix A– Gubernatorial, Tribal, and Agency Correspondence

Example Letter to the Governors

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

REPLY TO
ATTENTION OF

SEP 21 2010

District Commander

Honorable Dave Heineman
Governor of Nebraska
P.O. Box 94848
Lincoln, Nebraska 68509-4848

Dear Governor Heineman:

The U.S. Army Corps of Engineers, Omaha District (Corps) has received new requests for water storage at several of its reservoirs, which cannot be processed until a Surplus Water Letter Report with appropriate National Environmental Policy Act documentation has been completed for each of the reservoirs. The purpose of a Letter Report is to identify and quantify surplus water storage, which the Secretary of the Army can use to execute temporary (5-10 years) surplus water storage contracts. The Letter Reports will also determine the updated cost of water storage. A system wide reallocation study will be undertaken in the future to address the needs for long-term water storage.

The Letter Reports will be completed in accordance with Engineering Regulation-1105-2-100, Planning Guidance Notebook and the Revised U.S. Army Institute for Water Resources Report 96-PS-4, a Handbook on Water Supply Planning and Resource Management. The Water Surplus Letter Report Outline will include the following:

1. Purpose
   a. Request for Municipal and Industrial water supply
   b. Authority for seeking reallocation

2. Project Background
   a. Project authorization, construction and operation history
   b. Project purpose and outputs
   c. Project map and pertinent data table
   d. Information on previous water supply agreements

3. Economic Analysis
   a. Water supply demand analysis
   b. Analysis of water supply alternatives (benefits)
   c. Impacts on other project purposes (benefits forgone)
   d. Information on approved cost allocation

4. Derivation of User Cost
   a. Water supply storage/yield analysis
   b. Cost of storage analysis

-2-

c. Revenues foregone and cost account adjustments
d. Summary, user cost

5. Other Considerations
   a. Test of financial feasibility
   b. Cost account adjustments
   c. Environmental considerations

6. Conclusions and Recommendations
   a. Summarization of findings
   b. Reference applicable appendices
   c. Recommendation of District Engineer

7. Appendices
   a. National Environmental Protection Act Documentation (Environmental Assessment/Finding of No Significant Impact)
   b. Documentation of opportunity for public review action
   c. Letters and views of Tribes, federal, state and/or local interests affected by the action

The Corps is committed to transparent communication regarding these important decision documents. The Corps is contacting state, tribal and federal agencies to assist in development of the Surplus Water Letter Reports which will be provided for your review and comment in January 2011. If you have any additional questions regarding the letter reports please contact the Project Manager, Mr. Larry Janis, Branch Chief Recreation and Natural Resources by telephone at (402) 995-2697 or by email at larry.d.janis@usace.army.mil. The Corps looks forward to working with you in the completion of this important report.

Sincerely,

FOR
Robert J. Ruch
Colonel, Corps of Engineers
District Commander

Example Letter to the Tribes

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

REPLY TO
ATTENTION OF

District Commander

«Prefix» «FirstMiddle_Name» «Last_Name», «Suffix»«Title»
«Organization»
«Address1»
«Address2»
«City», «State» «Zip»

Dear «Salutation» «Last_Name»:

The U.S. Army Corps of Engineers (Corps), Omaha District has received requests for water supply at the Missouri River mainstem reservoirs. These requests cannot be processed until a Surplus Water Report, with appropriate National Environmental Policy Act documentation, has been completed for each reservoir. The purpose of the reports is to identify and quantify surplus water, which the Secretary of the Army can use to execute temporary (5-10 years) surplus water agreements. The reports will also determine the updated cost of water storage.

Surplus Water Reports will be completed for Ft. Peck Lake (Fort Peck Project), Montana; Lake Oahe (Oahe Project), North and South Dakota; Lake Sharpe (Big Bend Project), South Dakota; Lake Francis Case (Fort Randall Project), South Dakota and Lewis and Clark Lake (Gavins Point Project), South Dakota. The reports will be completed in accordance with ER-1105-2-100, Planning Guidance Notebook and the Revised IWR Report 96-PS-4, A Handbook on Water Supply Planning and Resource Management. The Surplus Water Report Outline will include the following:

1. Purpose
    a. Request for Municipal and Industrial water supply
    b. Authority for seeking reallocation
2. Project Background
    a. Project authorization, construction and operation history
    b. Project purpose and outputs
    c. Project map and pertinent data table
    d. Information on previous water supply agreements
3. Economic Analysis
    a. Water supply demand analysis
    b. Analysis of water supply alternatives (benefits)
    c. Impacts on other project purposes (benefits forgone)
    d. Information on approved cost allocation

Printed on Recycled Paper

- 2 -

4. Derivation of User Cost
    a. Water supply storage/yield analysis
    b. Cost of storage analysis
    c. Revenues foregone and cost account adjustments
    d. Summary, user cost
5. Other Considerations
    a. Test of financial feasibility
    b. Cost account adjustments
    c. Environmental considerations
6. Conclusions and Recommendations
    a. Summarization of findings
    b. Reference applicable appendices
    c. Recommendation of District Engineer
7. Appendices
    a. NEPA Documentation (EA/FONSI)
    b. Documentation of opportunity for public review action
    c. Letters and views of tribes, federal, state and/or local interests affected by the action

The Corps is committed to transparent communication regarding these important decision documents. We will be holding agency meetings in Fort Peck, Montana; Pierre, South Dakota and Omaha, Nebraska. The agency meeting in Fort Peck will be held on 10 May 2011 at the Fort Peck Interpretive Center, Yellowstone Road, Fort Peck, Montana from 2:30-4:00 PM MDT. The agency meeting in Pierre will be held on 11 May 2011 at the South Dakota Cultural Heritage Center, 900 Governors Drive, Pierre, South Dakota from 1:00-3:00 PM CDT. The agency meeting in Omaha will be held on 23 May 2011 at the Zorinsky Federal Building, 1616 Capitol Ave, Omaha, Nebraska from 1:00-3:00 PM CDT. The purpose of the meetings is to provide information to the Tribes and agencies on the studies; as well as, providing them with an opportunity to ask questions and provide initial feedback. If you are interested in participating in this effort, please contact Tiffany Vanosdall via phone, mail, fax, or email:

U.S. Army Corps of Engineers
Attention: CENWO-PM-AA (Tiffany Vanosdall)
1616 Capitol Avenue
Omaha, Nebraska 68102-4901
Phone number: (402) 995-2695
Fax number: (402) 995-2758
E-mail: tiffany.k.vanosdall@usace.army.mil

- 3 -

The Corps looks forward to working with you in the completion of these important reports. If you have any additional questions or concerns please feel free to contact my Tribal Liaison, Mr. Joel Ames at (402) 995-2909 or by e-mail at joel.o.ames@usace.army.mil.

Sincerely,

Robert J. Ruch
Colonel, Corps of Engineers
District Commander

OMAHA DISTRICT TRIBAL LEADERS INFORMATION

updated January 24, 2011 (Price)

TTL	Olst TtL	District	Additional District	States	Tribal Name	Title	Name	Effective	Address 1
1	1	Omaha		MT, CANADA	Assiniboine and Sioux Tribes of Fort Peck, Fort Peck Reserva	Chairman	A.T. (Rusty) Stafne		PO Box 1027
		Omaha		MT, CANADA	Assiniboine and Sioux Tribes of Fort Peck, Fort Peck Reserva	Vice Chairperson Ms.	Roxann Bighorn		PO Box 1027
2	2	Omaha		MT	Blackfeet Nation	Chairman	Willie A. Sharp, Jr		
		Omaha		MT	Blackfeet Nation	Vice Chairman	Peter "Rusty" Tatsey		
3	3	Omaha		SD	Cheyenne River Sioux Tribe	Chairman	Kevin Keckler		P.O. Box 590
		Omaha		SD	Cheyenne River Sioux Tribe	Vice Chairman	Ted Knife Jr.		P.O. Box 590
4	4	Omaha		MT	Chippewa Cree Tribe of the Rocky Boy Reservation	Chairman	Jake Parker		na
		Omaha		MT	Chippewa Cree Tribe of the Rocky Boy Reservation	Vice Chairman	Bruce Sunshild		na
5	5	Omaha	Walla Walla	MT, ID, CANADA	Confederated Salish & Kootenai Tribes of the Flathead Reser	Chairman	E.T. Bud Moran		P.O. Box 278
		Omaha	Walla Walla	MT, ID, CANADA	Confederated Salish & Kootenai Tribes of the Flathead Reser	Vice Chairman	Joe Durglo		P.O. Box 278
6	6	Omaha		SD	Crow Creek Sioux Tribe	Chairman	Duane Big Eagle Sr.		P.O. Box 50
		Omaha		SD	Crow Creek Sioux Tribe	Vice Chairman	Wilfred Keeble		P.O. Box 50
7	7	Omaha		MT, WY	Crow Nations, Crow Reservation	Chairman	Cedric Black eagle		na
		Omaha		MT, WY	Crow Nations, Crow Reservation	Vice Chairman	Coolidge Jefferson		na
8	8	Omaha		WY	Eastern Shoshone Tribe, Wind River Reservation	Chairman	Mike LaJeunesse		P.O. Box 538
		Omaha		WY	Eastern Shoshone Tribe, Wind River Reservation	Vice Chairman	Wes Martel		P.O. Box 538
9	9	Omaha		SD	Flandreau Santee Sioux Tribe	President	Anthony Reider		P.O. Box 283
		Omaha		SD	Flandreau Santee Sioux Tribe	Vice President	Cynthia Allen-Weddell		P.O. Box 283
10	10	Omaha		MT	Gros Ventre & Assiniboine Tribes, Fort Belknap	Chairman	Tracey King		na
		Omaha		MT	Gros Ventre & Assiniboine Tribes, Fort Belknap	Vice Chairperson	Ms. Mel A. Adams Doney (Female ? On Title)		na
11	11	Omaha		SD	Lower Brule Sioux Tribe, Lower Brule Reservation	Chairman	Micheal Jandreaux		na
		Omaha		SD	Lower Brule Sioux Tribe, Lower Brule Reservation	Vice Chairman	Floyd Gourneau		na
12	12	Omaha		WY, CO, NE	Northern Arapaho Tribe, Wind River Reservation	Chairperson	Mrs. Kim Harjo		PO Box 396, Fort Washakie, WY 82514
		Omaha		WY, CO, NE	Northern Arapaho Tribe, Wind River Reservation	Co - Chairman	Keith Spoonhunter		PO Box 396, Fort Washakie, WY 82514
13	13	Omaha		MT	Northern Cheyenne Tribe	President	Leroy Spang		P.O Box 128
		Omaha		MT	Northern Cheyenne Tribe	Vice President	Joe Fox Jr.		P.O Box 128
14	14	Omaha		SD, NE	Oglala Sioux Tribe	Chairman	John Yellow Bird Steele		P.O. Box 2070
		Omaha		SD, NE	Oglala Sioux Tribe	Vice Chairman	Tom Poor Bear		P.O. Box 2070
15	15	Omaha		NE, SD, KS, MO, IA	Omaha Tribe of Nebraska	Chairman	Amen Sheridan		P.O. Box 368
		Omaha		NE, SD, KS, MO, IA	Omaha Tribe of Nebraska	Vice Chairman	Forrest Aldrich		P.O. Box 368
16	16	Omaha		NE, SD, IA	Ponca Tribe of Nebraska	Chairman	Ms. Rebecca White	Jan-11	PO Box 288
		Omaha		NE, SD, IA	Ponca Tribe of Nebraska	Vice Chairman	James LaPointe	Jan-11	PO Box 288
17	17	Omaha		SD, NE	Rosebud Sioux Tribe	President	Rodney Bordeaux		P.O. Box 430
		Omaha		SD, NE	Rosebud Sioux Tribe	Vice President	William Kendle		P.O. Box 430
18	18	Omaha	Kansas City	NE, KS, IA	Sac and Fox Nation of Oklahoma	Chairperson	Ms. Stella Nullake		na
		Omaha	Kansas City	NE, KS, IA	Sac and Fox Nation of Oklahoma	Vice Chairman	NA		
19	19	Omaha		NE, KS, IA	Santee Sioux Nation	Chairman	Roger Trudell		na
		Omaha		NE, KS, IA	Santee Sioux Nation	Vice Chairman	David Henry		na
20	20	Omaha		SD, ND, MN	Sisseton-Wahpeton Sioux Tribe	Chairman	Robert Shepherd	effective 1-2011	PO Box 509
		Omaha		SD, ND, MN	Sisseton-Wahpeton Sioux Tribe	Vice Chairman	Gerald Rousseau	effective 1-2011	PO Box 509
21	21	Omaha		ND, KS	Spirit Lake Sioux Tribe	Chairman	Ms. Myra Pearson		P.O. Box 359
		Omaha		ND, KS	Spirit Lake Sioux Tribe	Vice Chairman	Darwin Brown		P.O. Box 359
21	21	Omaha		ND, SD	Standing Rock Sioux Tribe	Chairman	Charles W. Murphy		PO Box D
		Omaha		ND, SD	Standing Rock Sioux Tribe	Vice Chairman	Mike Faith		PO Box D
22	22	Omaha		ND, MT	Three Affiliated Tribes, Fort Berthold Reservation	Chairman	Tex Hall		na
		Omaha		ND, MT	Three Affiliated Tribes, Fort Berthold Reservation	Vice Chairman	Scott Eagle		na
23	23	Omaha		ND, CANADA	Turtle Mtn. Band of Chippewas, Turtle Mtn. Reservation	Chairman	Merle St. Claire		PO Box 900
		Omaha		ND, CANADA	Turtle Mtn. Band of Chippewas, Turtle Mtn. Reservation	Vice Chairman	Curtis Poitra		PO Box 900

Page 1 of 4

24	24	Omaha	Kansas City	SD, NE, KS, MO, IA	Winnebago Tribe of Nebraska	Chairman	John Blackhawk		P.O. Box 687
		Omaha	Kansas City	SD, NE, KS, MO, IA	Winnebago Tribe of Nebraska	Vice Chairman	Brian Chamberlain		P.O. Box 687
25	25	Omaha		SD, NE, IA, KS	Yankton Sioux Tribe	Chairman	Robert Cournoyer		P.O. Box 248
		Omaha		SD, NE, IA, KS	Yankton Sioux Tribe	Vice Chairman	Ms. Karen Archambeau		P.O. Box 248
1	1	Kansas City	Tulsa	MO, KS	Osage Nation	Principal Chief	John D. Red Eagle		P.O. Box 779
		Kansas City	Tulsa	MO, KS	Osage Nation	Assistant Chief	Scott Bighorse		P.O. Box 779
2	2	Kansas City		MO, KS, IA	Iowa Tribe of Kansas and Nebraska	Chairman	Tim Rhodd, Chairperson		
		Kansas City		MO, KS, IA	Iowa Tribe of Kansas and Nebraska	Vice Chairman			
3	3	Kansas City		KS, MO	Prairie Band Potawatomi Nation	Chairman	Steve Ortiz		na
		Kansas City		KS, MO	Prairie Band Potawatomi Nation	Vice Chairperson	Mrs. Joyce Guerrero		na
4	4	Kansas City		KS, MO	Kickapoo Tribe of Kansas	Chairman	Russell Bradley		na
		Kansas City		KS, MO	Kickapoo Tribe of Kansas	Vice Chairman	Laura Razo Ms.		na
5	5	Kansas City		KS, MO	Kaw Nation	Chairman	Guy Munroe		Drawer 50
		Kansas City		KS, MO	Kaw Nation	Vice Chairman	Bill Kekahbah		Drawer 50
6	6	Kansas City		KS, NE	Pawnee Indian Tribe of Oklahoma	President	George E. Howell		PO Box 470
		Kansas City		KS, NE	Pawnee Indian Tribe of Oklahoma	Vice Presidnet	Charles Lone Chief		PO Box 470
7	7	Kansas City		KS	Wichita and Affiliated Tribes	President	Stratford Williams		PO Box 729
		Kansas City		KS	Wichita and Affiliated Tribes	Vice President	vacant		PO Box 729
8	8	Kansas City		NE, IA, MO, KS	Sac and Fox Nation of Missouri in Kansas and Nebraksa	Chairperson	Ms. Twen Barton		na
		Kansas City		NE, IA, MO, KS	Sac and Fox Nation of Missouri in Kansas and Nebraksa	Vice Chairman	Mrs. Carrie Wahwahsuck		na
9	9	Kansas City		IA, NE, KS, MO	Sac and Fox of the Mississippi in Iowa/Meskwaki	Chairman	Adrian Pushetonequa		
		Kansas City		IA, NE, KS, MO	Sac and Fox of the Mississippi in Iowa/Meskwaki	Vice Chairman	Jon Papakee		

Page 2 of 4

Example Letter to State and Federal Agencies

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

REPLY TO
ATTENTION OF

April 29, 2011

Planning, Programs, and Project Management Division

«Prefix» «FirstMiddle_Name» «Last_Name», «Suffix»«Title»
«Organization»
«Address1»
«Address2»
«City», «State» «Zip»

Dear «Salutation» «Last_Name»:

The U.S. Army Corps of Engineers, Omaha District (Corps) has received requests for water supply at the Missouri River mainstem reservoirs. These requests cannot be processed until a Surplus Water Report, with appropriate National Environmental Policy Act documentation, has been completed for each reservoir. The purpose of the Report is to identify and quantify surplus water, which the Secretary of the Army can use to execute temporary (5-10 years) surplus water agreements. The Reports will also determine the updated cost of water storage.

Surplus Water Reports will be completed for Ft. Peck Lake (Ft. Peck Project), Montana; Lake Oahe (Oahe Project), North and South Dakota; Lake Sharpe (Big Bend Project), South Dakota; Lake Francis Case (Ft. Randall Project), South Dakota and Lewis and Clark Lake (Gavins Point Project), South Dakota. The Reports will be completed in accordance with ER-1105-2-100, Planning Guidance Notebook and the Revised IWR Report 96-PS-4, A Handbook on Water Supply Planning and Resource Management. The Water Surplus Report Outline will include the following:

1. Purpose
    a. Request for Municipal and Industrial water supply
    b. Authority for seeking reallocation
2. Project Background
    a. Project authorization, construction and operation history
    b. Project purpose and outputs
    c. Project map and pertinent data table
    d. Information on previous water supply agreements
3. Economic Analysis
    a. Water supply demand analysis
    b. Analysis of water supply alternatives (benefits)
    c. Impacts on other project purposes (benefits forgone)
    d. Information on approved cost allocation

Printed on Recycled Paper

- 2 -

4. Derivation of User Cost
    a. Water supply storage/yield analysis
    b. Cost of storage analysis
    c. Revenues foregone and cost account adjustments
    d. Summary, user cost
5. Other Considerations
    a. Test of financial feasibility
    b. Cost account adjustments
    c. Environmental considerations
6. Conclusions and Recommendations
    a. Summarization of findings
    b. Reference applicable appendices
    c. Recommendation of District Engineer
7. Appendices
    a. NEPA Documentation (EA/FONSI)
    b. Documentation of opportunity for public review action
    c. Letters and views of tribes, federal, state and/or local interests affected by the action

The Corps is committed to transparent communication regarding these important decision documents. We will be holding agency meetings in Fort Peck, Montana; Pierre, South Dakota and Omaha, Nebraska. The agency meeting in Fort Peck will be held on 10 May 2011 at the Fort Peck Interpretive Center, Yellowstone Road, Fort Peck, Montana from 2:30-4:00 PM MDT. The agency meeting in Pierre will be held on 11 May 2011 at the South Dakota Cultural Heritage Center, 900 Governors Drive, Pierre, South Dakota from 1:00-3:00 PM CDT. The agency meeting in Omaha will be held on 23 May 2011 at the Zorinsky Federal Building, 1616 Capitol Ave, Omaha, Nebraska from 1:00-3:00 PM CDT. The purpose of the meetings is to provide information to the agencies on the studies as well as give the agencies an opportunity to ask questions and provide initial feedback. If you are interested in participating in this effort, please contact Tiffany Vanosdall via phone, mail, fax, or email:

U.S. Army Corps of Engineers
Attention: CENWO-PM-AA (Tiffany Vanosdall)
1616 Capitol Avenue
Omaha, Nebraska 68102-4901
Phone number: (402) 995-2695
Fax number: (402) 995-2758
E-mail: tiffany.k.vanosdall@usace.army.mil

- 3 -

The Corps looks forward to working with you in the completion of these important reports.

Sincerely,

Kayla A. Eckert Uptmor

Kayla A. Eckert Uptmor
Chief, Planning Branch

THIS PAGE INTENTIONALLY LEFT BLANK