US Army Corps of Engineers ®
Northwestern Division

Missouri River Basin
Water Management Division

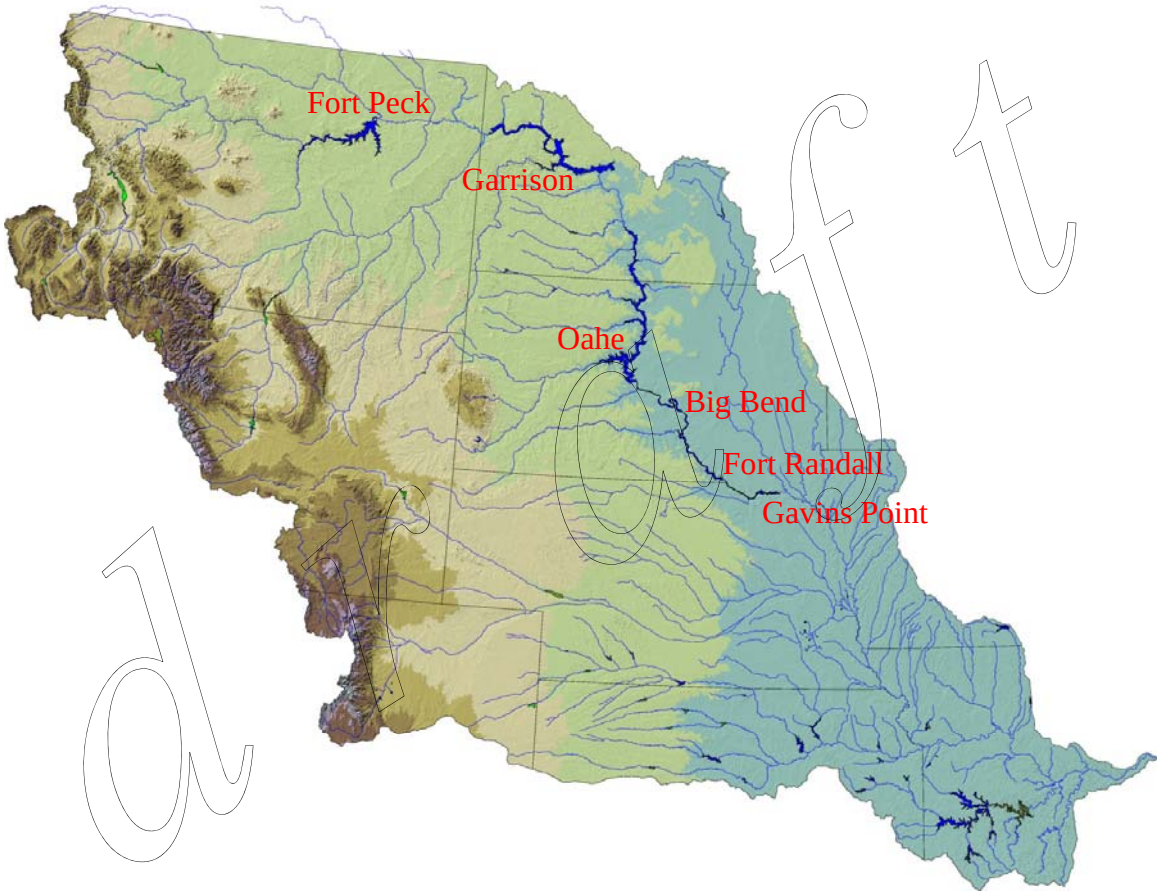
Draft

AOP

2014-2015

Missouri River Mainstem System

2014-2015 Annual Operating Plan



Annual Operating Plan Process
62 Years Serving the Missouri River Basin

September 2014

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTHWESTERN DIVISION
PO BOX 2870
PORTLAND OR 97208-2870

September 2014

This draft Annual Operating Plan (AOP) presents pertinent information regarding water management in the Missouri River Mainstem Reservoir System through December 2015. The information provided in this draft AOP is based upon water management guidelines designed to meet the reservoir regulation objectives of the 2006 Missouri River Master Water Control Manual (Master Manual). Regulation of the mainstem reservoir system is provided by my office, the Missouri River Basin Water Management Division, Northwestern Division, U. S. Army Corps of Engineers, located in Omaha, Nebraska.

The draft AOP presents plans for the regulation of the reservoir system under widely varying water supply conditions. The AOP is not intended to be a forecast for the coming year; rather the guidelines included in the Master Manual are applied to computer simulations of System regulation assuming five statistically derived runoff scenarios based on an analysis of water supply records from 1898 to 2011. This approach provides a good range of water management simulations for dry, average, and wet conditions. The AOP provides a framework for the development of detailed monthly, weekly, and daily regulation schedules for the mainstem reservoir system's six individual projects during the upcoming year to serve its Congressionally-authorized project purposes.

In addition to the AOP, two separate documents are also available entitled: "System Description and Operation" and "Summary of Actual 2013 Regulation." To receive copies of those documents, contact the Missouri River Basin Water Management Division at 1616 Capitol Avenue, Suite 365, Omaha, Nebraska 68102-4909, phone (402) 996-3841. Both reports are available at the "Reports and Publications" link on our web site at: **www.nwd-mr.usace.army.mil/rcc/**

Five public meetings to discuss this draft AOP are scheduled: October 27 in Fort Peck, Montana; October 28 in Bismarck, North Dakota and Pierre, South Dakota; and October 29 in Smithville, Missouri and Council Bluffs, Iowa. We ask that any comments be provided by November 21, 2014. The final AOP is scheduled for publication in December 2014.

We thank you for your interest in the regulation of the mainstem reservoir system and look forward to your participation in this process.

Jody S. Farhat, P.E.
Chief, Missouri River Basin Water
Management Division

MISSOURI RIVER MAINSTEM RESERVOIR SYSTEM

Draft Annual Operating Plan
2014 - 2015

TABLES

PLATES

ABBREVIATIONS

AOP	-	annual operating plan
ACHP	-	Advisory Council on Historic Preservation
AF	-	acre-feet
B	-	Billion
BiOp	-	Biological Opinion
BOR	-	Bureau of Reclamation
cfs	-	cubic feet per second
Corps	-	Corps of Engineers
CY	-	calendar year (January 1 to December 31)
elev	-	elevation
ESA	-	Endangered Species Act
ft	-	feet
FTT	-	Flow-to-Target
FY	-	fiscal year (October 1 to September 30)
GWh	-	gigawatt hour
ISAP	-	Independent Science Advisory Panel
KAF	-	1,000 acre-feet
kcfs	-	1,000 cubic feet per second
kW	-	kilowatt
kWh	-	kilowatt hour
MAF	-	million acre-feet
MRNRC	-	Missouri River Natural Resources Committee
msl	-	mean sea level
MW	-	megawatt
MWh	-	megawatt hour
NEPA	-	National Environmental Policy Act
plover	-	piping plover
PA	-	Programmatic Agreement
P-S MBP	-	Pick-Sloan Missouri Basin Program
RCC	-	Reservoir Control Center
RM	-	river mile
RPA	-	Reasonable and Prudent Alternative
SHPO	-	State Historic Preservation Officers
SR	-	Steady Release
System	-	Missouri River Mainstem System
tern	-	interior least tern
T&E	-	Threatened and Endangered
THPO	-	Tribal Historic Preservation Officers
USFWS	-	United States Fish and Wildlife Service
WY	-	water year
yr	-	year

DEFINITION OF TERMS

Acre-foot (AF, ac-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or 325,850 gallons.

Cubic foot per second (cfs) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to approximately 7.48 gallons per second or 448.8 gallons per minute. The volume of water represented by a flow of 1 cubic foot per second for 24 hours is equivalent to 86,400 cubic feet, approximately 1.983 acre-feet, or 646,272 gallons.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Drainage area of a stream at a specific location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Drainage basin is a part of the surface of the earth that is occupied by drainage system, which consists of a surface stream or body of impounded surface water together with all tributary surface streams and bodies of impounded water.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Runoff in inches shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

MISSOURI RIVER MAINSTEM RESERVOIR SYSTEM

Draft Annual Operating Plan
2014 – 2015

I. FOREWORD

This draft Annual Operating Plan (AOP) presents pertinent information and plans for regulating the Missouri River Mainstem Reservoir System (System) through December 2015 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 projects during the coming year to serve the Congressionally authorized project purposes; to fulfill the Corps' responsibilities to Native American Tribes; and to comply with environmental laws, including the Endangered Species Act (ESA). Regulation of the System is directed by the Missouri River Basin Water Management Division, Northwestern Division, U. S. Army Corps of Engineers (Corps) located in Omaha, Nebraska. A map of the Missouri River basin is shown on ***Plate 1*** and the summary of engineering data for the six individual mainstem projects and System is shown on ***Plate 2***.

It is important to note that the AOP is not intended to be a forecast for the coming year; rather it examines a range of potential runoff scenarios which span 80 percent of the historic record. There is still a 10 percent chance that runoff will be higher than shown in the AOP and a 10 percent chance that it will be lower. The studies included in the AOP provide an array of reservoir levels and releases that may be expected under the various runoff scenarios. Actual real-time regulation of the System is accomplished using the best information and tools available and is adjusted to respond to changing conditions on the ground. As the runoff season unfolds, there is a possibility that real-time regulation plans will indicate runoff volumes, reservoir levels and releases outside those anticipated in this report. Should that occur, the Corps will appreciably increase its communication and outreach efforts to convey that information to stakeholders throughout the basin so that other Federal, state and local agencies, Tribes, communities, and local residents can take appropriate actions.

This plan may require adjustments such as when substantial departures from expected runoff occur; to meet emergencies including short-term intrasystem adjustments to protect human health and safety, to maintain minimum river or reservoir levels to keep intakes operational during periods of extended drought, and to prevent loss of historic and cultural properties; or to meet the provisions of applicable laws, including the ESA. These adjustments would be made to the extent possible after evaluating impacts to all System uses, would generally be short-term in nature, and would continue only until the issue is resolved.

This document provides the plan for future regulation of the System. Other documents that may be of interest include the "System Description and Regulation" report dated November 2007 or the "Summary of Actual 2013 Regulation," dated July 2014. Both reports are currently available at the "Reports and Publications" link on our website at: **www.nwd-mr.usace.army.mil/rcc**, or you may contact the Missouri River Basin Water Management Division at 1616 Capitol Avenue, Suite 365, Omaha, Nebraska 68102-4909, phone (402) 996-3841 for copies. The "Summary of Actual 2014 Regulation" will be available at the same site in late spring or early summer of 2015.

II. BACKGROUND AND AOP PROCESS

Beginning in 1953, projected System reservoir regulation for the year ahead was developed annually as a basis for advance coordination with the various interested Federal, state, and local agencies and private citizens. Also beginning in 1953, a coordinating committee was organized to make recommendations on each upcoming year's System regulation. The Coordinating Committee on Missouri River Mainstem Reservoir Operations held meetings semiannually until 1981 and provided recommendations to the Corps. In 1982, the Committee was dissolved because it did not conform to the provisions of the Federal Advisory Committee Act. Since 1982, to continue providing a forum for public participation, one or more open public meetings are held semiannually in the spring and fall. The fall public meetings are conducted to take public input on the draft AOP, which typically is published in mid-September each year. The spring meetings are conducted to update the public on the current hydrologic conditions and projected System regulation for the remainder of the year as it relates to implementing the final AOP.

Under the terms of Stipulation 18 of the March 2004 "Programmatic Agreement for the Operation and Management of the Missouri River Main Stem System for Compliance with the National Historic Preservation Act, as amended" (PA) the Corps has agreed to consult/meet with the affected Tribes and Tribal Historic Preservation Officers (THPOs), State Historic Preservation Officers (SHPOs), the Advisory Council on Historic Preservation (ACHP) and other parties on the draft AOP. The purpose of this consultation/meeting is to determine whether operational changes are likely to cause changes to the nature, location or severity of adverse effects to historic properties or to the types of historic properties affected and whether amendments to the Corps Cultural Resources Management Plans and Five-Year Plan are warranted in order to better address such effects to historic properties. During 2006 the Corps worked with the affected Tribes to establish processes for consultation on AOPs under 36 CFR Part 800, the PA, and Executive Order 13175. The process consists of a series of informational meetings with the Tribes and/or government-to-government consultation with Tribes, as requested. A letter dated September 12, 2014 was sent to

the Tribes offering consultation on the 2014-2015 AOP. Meeting times and locations of the five fall public meetings were also provided. Separate meetings will be scheduled for all Tribes requesting government-to-government consultation. All tribes, whether signatory to the PA or not, may request government-to-government consultation on this and all future AOPs. In addition, the Tribes have reserved water rights to the Missouri River and its major tributaries. In no way does this AOP attempt to define, regulate or quantify water rights or any other rights that the Tribes are entitled to by law or treaty.

The 2014 spring public meetings were held at the following locations and dates: April 8 at Kansas City, Missouri and Nebraska City, Nebraska; April 9 at Pierre, South Dakota and Bismarck, North Dakota; and April 10 at Fort Peck, Montana. A basin-wide conference call was also held on April 11. The attendees were given an update regarding the outlook for 2014 runoff and projected System regulation for the remainder of 2014. Five fall public meetings on the draft 2014-2015 AOP are planned at the following locations: October 27 in Fort Peck, Montana; October 28 in Bismarck, North Dakota and Pierre, South Dakota; and October 29 in Smithville, Missouri and Council Bluffs, Iowa. In the spring of 2015, public meetings will be held to discuss the basin's hydrologic conditions and the effects those conditions are expected to have on the implementation of the final 2014-2015 AOP.

III. MAINSTEM MASTER MANUAL AND ESA CONSULTATIONS

The System is comprised of six dam and reservoir projects authorized by the Rivers and Harbors Act of 1935 and the Flood Control Act of 1944. Section 9 of the 1944 Flood Control Act authorized the System to be operated for the purposes of flood control, navigation, irrigation, hydropower, water supply, water quality control, recreation and fish and wildlife. In addition, operation of the System must also comply with other applicable Federal statutory and regulatory requirements, including the ESA. The System is regulated using guidelines published in the Master Manual. The Master Manual presents the water control plan and operational objectives for the integrated regulation of the System. Annual water management plans (Annual Operating Plans) are prepared each year, based on the water control criteria contained in the Master Manual, in order to describe potential reservoir regulation of the System for the current operating year under a variety of runoff conditions.

First published in 1960 and subsequently revised during the 1970s, the Master Manual was revised in March 2004 to include more stringent drought conservation measures. A 2000 Biological Opinion issued by the U. S. Fish and Wildlife Service (USFWS), while the Corps was revising the Master Manual, concluded that the operation and regulation of the System would jeopardize the continued existence of three endangered or threatened species: the pallid sturgeon, the interior least tern and the piping plover. In 2003 the USFWS amended the BiOp (2003 Amended BiOp) and

provided a Reasonable and Prudent Alternative (RPA) to avoid jeopardy to the endangered pallid sturgeon that included a provision for the Corps to develop a plan to implement a bimodal spring pulse from Gavins Point Dam. Working with the USFWS, Tribes, states and basin stakeholders, the Corps developed technical criteria for the bimodal spring pulse releases. In March 2006 the Master Manual was revised to include technical criteria for a spring pulse. Neither the 2004 Master Manual, nor the 2006 revisions to the Master Manual, changed the volume of storage in the System reserved for flood risk reduction or the basic principles of how that storage is regulated. The Corps does not store water in the reservoirs specifically for the endangered species and the Master Manual storage allocations were not altered to facilitate the spring pulses. In years when water is released for endangered species reservoir storage levels are not adjusted.

Current regulation of the System in accordance with the Master Manual to serve authorized project purposes is dependent on successful implementation of the 2003 Amended BiOp. Implementation of the RPA elements is accomplished through the Missouri River Recovery Program (MRRP) which includes the following elements: habitat construction including emergent sandbar habitat and shallow water habitat, flow modifications, propagation/hatchery support, research, monitoring and evaluation, and adaptive management. Simply put, the Corps must comply with environmental laws including the ESA, and the MRRP is the vehicle used to accomplish this. This AOP identifies flow modifications at Garrison, Fort Randall and Gavins Point for the benefit of the endangered interior least tern (tern) and the threatened piping plover (plover) while maintaining flood control and navigation as primary authorized purposes.

On November 30, 2011 the Missouri River Recovery Program Independent Science Advisory Panel (ISAP) released its Final Report on Spring Pulses and Adaptive Management. This report, commissioned by the Missouri River Recovery Implementation Committee (MRRIC), evaluated the Gavins Point spring pulses that have been implemented to date in regards to the biological outcomes the USFWS sought in the 2003 Amended BiOp. The ISAP concluded that spring pulses as currently implemented are not accomplishing their intended outcomes and provided recommendations towards achieving a new management paradigm for the Missouri River.

Based on this report, the Corps and USFWS, in coordination with MRRIC, have been aggressively pursuing completing the recommendations laid out by the ISAP. At the center of this effort is the development of a Missouri River Recovery Management Plan/EIS that will establish an overarching Adaptive Management process for implementation of the 2003 Amended BiOp. Accordingly, while this plan is being developed, the agencies believe it is prudent to forego a spring pulse during the 2015

Missouri River operating season and that this suspension is not likely to have an adverse effect on the listed species.

Additional information on other efforts undertaken through the MRRP to meet the requirements of the 2003 Amended BiOp can be found in the Annual Report on the Biological Opinion which can be found on the "MRRP Documents" page of the Recovery Program website at: www.moriverrecovery.org. The ISAP report is also available at this website.

IV. ON-GOING COORDINATION, STUDIES AND REPORTS

As committed to following the 2011 Flood, the Corps communicated more broadly and frequently in 2014 holding monthly conference calls from January to July with Federal, state, county and local officials, Tribes, emergency management officials, independent experts and the media to discuss conditions on the ground and the current release plans and forecasts. Two additional conference calls were held, one in June and one in September, in response to weather events. Recordings of the conference calls were made available to the public through the Corps' website. Outreach calls will be re-initiated in January 2015 or as needed if basin and/or weather conditions change dramatically.

The Corps continues to update a number of technical reports used in the regulation of the reservoir system. The "Missouri River Incremental Flows Below Gavins Point" report has been completed and is posted on the Corps' website. Additional reports include long-term runoff forecasting, which includes an analysis of the relationship of hydrologic factors as they relate to plains snowmelt, and an analysis of coefficients used in determining the upper and lower runoff values used in the monthly reservoir simulations. The Corps continues to collaborate with other Federal, state and local agencies and our field offices to improve runoff forecasts, particularly as it relates to plains snowpack. This will require a collaborative effort to improve both data collection (i.e. plains snowpack water equivalent, soil moisture and frost depth) and hydrologic modeling. A proposal for the Missouri River basin plains snow and basin condition network was prepared by subject matter experts from various Federal and State agencies. This proposal outlined timelines, costs, and agency responsibilities. The Water Management office continues to participate in a variety of regional and national climate change teams. The National Oceanic and Atmospheric Administration (NOAA) is also collaborating with the Corps and other agencies on a two-part study. The first part was completed in December 2013 and was a climate attribution effort focusing on the 2011 event. This report can be found at www.drought.gov under the Reports, Assessments and Outlooks page of the Regional Programs, Missouri River Basin section. The second part of the study is an assessment of the skill and reliability of predictions of seasonal climate and the ability to predict rapid transitions of cycles from wet to dry and dry to wet. Results of this study are expected in fall 2014.

The System reservoirs are surveyed periodically (10- to 25-year intervals) to update reservoir capacities and to assess aggradation and degradation trends. The frequency of reservoir surveys was established based on historic data and reservoir size. Intervening resurveys may be conducted when conditions dictate. High flood events are the most likely causes for these additional surveys. Following the 2011 Flood, Garrison, Oahe, Big Bend, Fort Randall and Gavins Point reservoirs were surveyed. Reservoir capacity (elevation-storage) tables were updated for Garrison, Oahe, Fort Randall and Gavins Point on August 1, 2013, and adjustments to the System storage zones were noted in last year's AOP. Reservoir capacity data for Big Bend was updated on April 1, 2014. There were no additional adjustments to the System storage zones due to the implementation of the new Big Bend reservoir capacity table because of the minor storage changes.

V. FUTURE RUNOFF: SEPTEMBER 2014 - DECEMBER 2015

Runoff into the six System reservoirs is typically low and relatively stable during the August-February period. The August 1 calendar year runoff forecast is normally used as input to the basic reservoir regulation simulation (Basic) in the AOP studies for the period August 2014 to February 2015. Due to the much higher than normal runoff in August, this year's AOP studies use the September 1 calendar runoff forecast as input to the Basic simulation. The September 1 runoff forecast for 2014 was 35.6 million acre-feet (MAF). Two other runoff scenarios based on the September 1 runoff forecast were developed for the same period. These are the Upper Basic and Lower Basic simulations. In previous AOPs, the Upper and Lower Basic simulations were based on 120 percent and 80 percent of the August through February runoff forecast, respectively. These percentages were recently revised based on an analysis of historic water supply. The adjusted Upper and Lower Basic values for each month and reach are shown as percentages in ***Tables I*** and ***II***. The percentages shown are used for the September through February period in the AOP simulations. These percentages were also used in the regularly updated monthly reservoir simulations. The report detailing the computation of these new runoff factors will be posted to the Corps website later this year.

TABLE I
UPPER BASIC RUNOFF PERCENTAGES

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fort Peck	120	120	135	145	135	145	145	130	120	120	120	120
Garrison	120	120	135	145	135	145	145	130	120	120	120	120
Oahe	140	140	150	155	155	145	140	135	135	135	135	135
Fort Randall	140	140	150	155	155	145	140	135	135	135	135	135
Gavins Point	140	140	150	155	155	145	140	135	135	135	135	135
Sioux City	140	140	150	155	155	145	140	135	135	135	135	135

TABLE II
LOWER BASIC RUNOFF PERCENTAGES

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fort Peck	80	75	65	65	70	65	65	70	75	80	80	80
Garrison	80	75	65	65	70	65	65	70	75	80	80	80
Oahe	75	75	55	50	50	50	55	65	75	75	75	75
Fort Randall	75	75	55	50	50	50	55	65	75	75	75	75
Gavins Point	75	75	55	50	50	50	55	65	75	75	75	75
Sioux City	75	75	55	50	50	50	55	65	75	75	75	75

Simulations for the March 1, 2015 to February 28, 2016 time period use five statistically derived runoff scenarios based on an analysis of historic water supply. The report detailing the development of these runoff scenarios, "Runoff Volumes for Annual Operating Plan Studies", was updated in August 2013 to include five additional years of runoff data that now extends from 1898 to 2011. In addition to the five runoff scenarios, the updated analysis added two runoff scenarios, one each at the upper and lower end, to span 96 percent of the historic record. Using statistically derived runoff scenarios for the AOP provides a good range of simulation for dry, average, and wet conditions, and eliminates the need to forecast future precipitation months in advance, which is very difficult. In contrast, real-time regulation of the System is based on all available and relevant hydrometerological information including, but not limited to observed runoff volumes, National Weather Service short and long-range outlooks, plains and mountain snow water equivalent data, observed base flows, soil moisture and frost depths.

The five statistically derived runoffs used in the AOP are identified as the Upper Decile, Upper Quartile, Median, Lower Quartile and Lower Decile runoff conditions. Upper Decile runoff (34.5 MAF) has a 1 in 10 chance of being exceeded, Upper Quartile runoff (30.6 MAF) has a 1 in 4 chance of being exceeded, and Median runoff (24.6 MAF) has a 1 in 2 chance of being exceeded. Lower Quartile runoff (19.3 MAF) has a 1 in 4 chance of the occurrence of less runoff, and Lower Decile runoff (16.1 MAF) has a 1 in 10 chance of the occurrence of less runoff. There is still a 20 percent chance that a runoff condition may occur that has not been simulated; i.e., a 10 percent chance runoff could be lower than Lower Decile and a 10 percent chance runoff could be greater than Upper Decile.

The two additional runoff volumes included in the updated "Runoff Volumes for Annual Operating Plan Studies" report are the 2 percent and 98 percent exceedance levels. Annual runoff at the 2 percent exceedance (40.1 MAF) has a 1 in 50 chance of being exceeded; the 98 percent exceedance (11.4 MAF) has a 1 in 50 chance of the occurrence of less runoff. Although these runoff volumes were not included as scenarios in this year's AOP, additional monthly studies could be performed based on

these runoff volumes as the 2015 runoff season unfolds should the runoff forecast exceed the Upper Decile runoff scenario or be lower than the Lower Decile runoff.

The Upper Decile and Upper Quartile simulations extend from the end of the Upper Basic simulation through February 2016. Likewise, the Median simulation extends from the end of the Basic simulation, and the Lower Quartile and Lower Decile simulations extend from the end of the Lower Basic simulation through February 2016.

The estimated natural flow at Sioux City, the corresponding post-1949 water use effects, and the net flow available above Sioux City are shown in ***Table III,*** where water supply conditions are quantified for the period August 2014 through February 2016. The natural water supply for calendar year (CY) 2013 totaled 25.1 MAF.

TABLE III
NATURAL AND NET RUNOFF AT SIOUX CITY
(Volumes in 1,000 Acre-Feet)

	Natural 1/	Post-1949 Depletions	Net 2/
September 2014 through February 2015 (Basic Runoff Scenario)			
Basic	7,700	1,000	8,700
Upper Basic	9,600	1,000	10,600
Lower Basic	6,000	900	6,900
Runoff Year March 2015 through February 2016 (Statistical Analysis of Past Records)			
Upper Decile	34,500	-2,900	31,600
Upper Quartile	30,600	-2,800	27,800
Median	24,600	-2,800	21,800
Lower Quartile	19,300	-2,700	16,600
Lower Decile	16,100	-2,400	13,700

1/ The word "Natural" is used to designate runoff adjusted to the 1949 level of basin development, except that regulation and evaporation effects of the Fort Peck reservoir have also been eliminated during its period of regulation prior to 1949.

2/ The word "Net" represents the total runoff after deduction of the post-1949 irrigation, upstream storage, and other use effects.

VI. ANNUAL OPERATING PLAN FOR 2014-2015

A. General. The anticipated regulation described in this AOP is designed to meet the regulation objectives presented in the current Master Manual. While some

aspects of System and individual project regulation are clearly defined by technical criteria in the Master Manual, for example navigation service level and season length, others such as minimum releases for irrigation and water supply in the reaches between the reservoirs are based on regulation experience and may be adjusted as needed to respond to changing conditions. Consideration has been given to all of the authorized project purposes, to historic and cultural resources and to the needs of threatened and endangered (T&E) species. The "System Description and Regulation" report provides a concise summary of the primary aspects of System regulation and should be referred to for further information. For ease of use, a summary of the frequently used technical criteria included in the Master Manual is presented on ***Plate 3.***

The plan relies on a wealth of regulation experience. Reservoir regulation experience available for preparation of the 2014-2015 AOP includes 13 years of regulation at Fort Peck (1940) as the sole Mainstem project, plus 61 years of System experience as Fort Randall (1953), Garrison (1955), Gavins Point (1955), Oahe (1962), and Big Bend (1964) were brought progressively into System regulation. This regulation experience includes lessons learned during two major droughts of six and eight years (1987-1992 and 2000–2007) that have occurred since the System filled in 1967. It also includes the high runoff period 1993–1999 during which five of the seven years experienced runoff greater than Upper Quartile including the previous record runoff of 49.0 MAF in 1997, and the record runoff of 61.0 MAF in 2011. In addition to the long period of actual System reservoir regulation experience, many background regulation studies for the completed System are available for reference.

B. <u>2014-2015 AOP Simulations</u>. Reservoir simulations for the Upper Basic, Basic, and Lower Basic runoff scenarios, which span the period of September 2014 through February 2015, are shown in the final section of this AOP as studies 1 through 3. AOP simulations for the five statistically derived runoff scenarios, which span the period of March 2015 through February 2016, are shown in the final section of this AOP as studies 4 through 8. As previously stated, the simulations use five statistically derived runoff scenarios and reflect 80 percent of the historic annual runoff volumes (between Upper Decile and Lower Decile). The simulations provide information for planning purposes on a range of future reservoir levels and release rates, and are not meant to represent a particular forecast. The simulations shown use a monthly time-step, and thus do not provide the level of detail necessary to address specific flood control regulations. Detailed routing of specific flood flows is accomplished using daily and hourly time-step models which incorporate real-time information including observed precipitation, and these situations are handled individually during real-time regulation.

The AOP studies, in summary, provide the following: the full flood control capacity of the reservoir system will be available at the start of the runoff season; use of the Exclusive Flood Control Zone is not anticipated under any of the five runoff

scenarios covered in the AOP; full service flow support under all runoff scenarios to start the navigation season; full service flow support for Lower Quartile and above runoff scenarios after the July 1 System storage check and reduced flow support for Lower Decile runoff; a full length navigation season for all runoff scenarios; normal winter releases for Median runoff, minimum winter releases for Lower Quartile and Lower Decile runoff, and above normal winter releases for Upper Decile and Upper Quartile runoff; a steady release-flow to target regulation during the tern and plover nesting season for Median and below runoff and nearly steady releases for Upper Decile and Upper Quartile runoff with flood water evacuation; emphasis on Fort Peck and Oahe for a steady to rising reservoir level during the forage fish spawn; and reservoir releases and pool levels sufficient to keep all intakes operational under all runoff scenarios. Water conservation measures may be implemented if runoff conditions indicate that it would be appropriate including cycling releases from Gavins Point during the early part of the nesting season, only supporting flow targets in reaches being used by commercial navigation, and utilization of the Kansas River projects authorized for Missouri River navigation flow support. Additional details about the studies are provided in the following paragraphs. Results of the simulations are shown in ***Plate 4*** and ***Plate 5*** for the System storage and the Fort Peck, Garrison and Oahe pool elevations.

Under all runoff scenarios modeled for the AOP, the full flood control capacity of the System is available at the start of the 2015 runoff season. Although the March 1 and May 1 System storage is above the Gavins Point spring pulse precludes of 40.0 MAF, as discussed in Chapter III, spring pulses will not be conducted in 2015. The Corps will continue to work closely with the USFWS to ensure the AOP will meet the intent of the 2003 Amended BiOp and comply with the ESA.

The March 15 and July 1 System storage checks were used to determine the level of flow support for navigation and other downstream purposes as well as the navigation season length in 2015. Full service navigation flows or more are provided for Lower Quartile and above runoff throughout the navigation season. Service levels for Lower Decile start the season at full service, and drop slightly based on the July 1 System storage check (see ***Plate 3***). Application of the July 1 System storage check indicated that a full length navigation season would be provided for all five runoff conditions, with the upper two runoff scenarios including a 10-day extension to the navigation season. Upper Quartile and Upper Decile simulations reach the desired 56.1 MAF System storage level on March 1, 2015. Storage is below the base of the Annual Flood Control and Multiple Use Zone for Median and lower runoff conditions.

For modeling purposes in this AOP, the Steady Release – Flow-to-Target (SR-FTT) regulation scenario for Gavins Point is shown during the 2015 tern and plover nesting season for Median and lower runoff conditions. For these simulations, the monthly average May release used in the simulations was determined by using the long-term

average May release (see ***Plate 3***), based on the service level, for the first third of the month, followed by the July table values for the remainder of the month to reflect a steady release regulation at the start of the nesting season. The modeled June release was set equal to the long-term average release for July (see ***Plate 3***) based on the service level for the first half of the navigation season. The long-term average releases (see ***Plate 3***) were used for July and August to indicate flowing to target. The Upper Decile and Upper Quartile runoff simulations follow the Master Manual, with much above normal runoff requiring release increases mid-year to evacuate flood water from the reservoirs. Although these modeled Gavins Point releases represent our best estimate of required releases during 2015, actual releases will be based on hydrologic conditions and the availability of habitat at that time. To the extent reasonably possible, measures to minimize incidental take of the protected species will be utilized. These may include not meeting flow targets in reaches without commercial navigation and utilizing the Kansas River tributary reservoirs for navigation flow support when appropriate. It may also be necessary to cycle releases for flood control regulation during the T&E species' nesting season.

The long-term average Gavins Point releases to meet target flows were used in the AOP studies for navigation support during the spring and fall months with the exception of Upper Decile and Upper Quartile. Under these runoff scenarios, releases were based on flood water evacuation. Based on the September 1 storage checks and flood evacuation criteria, modeled Gavins Point winter releases were 20,000 cfs during the 2014-2015 winter season and ranged from 12,500 cfs to 20,000 cfs during the 2015-2016 winter season depending on the runoff scenario. Gavins Point releases will be increased to meet downstream water supply requirements in critical reaches, to the extent reasonably possible, if downstream incremental runoff is low.

The Gavins Point releases shown in this and previous AOPs are estimates based on historic averages and experience. Adjustments are made as necessary in real-time based on hydrologic conditions.

Intrasystem releases are adjusted to best serve the multiple purposes of the projects with special emphasis placed on regulation for non-listed fisheries starting in early April and for T&E bird species beginning in early May and continuing through August. As part of the overall plan to rotate emphasis among the upper three reservoirs during low runoff years, Fort Peck and Oahe are scheduled to be favored during the 2015 forage fish spawn while also attempting to maintain rising water levels at Garrison. The Median, Upper Quartile, and Upper Decile simulations show that it is possible to provide steady-to-rising pool levels in each of the three large upper reservoirs during the spring forage fish spawn period. Insufficient runoff is available in the Lower Quartile and Lower Decile simulations to keep all three reservoirs rising during the spawn period. The Garrison reservoir level declines in April and May in the Lower Quartile runoff simulations and declines in April in the Lower Decile simulation.

The Lower Quartile and Lower Decile simulations show the Oahe pool nearly steady in April but dropping in May.

Intrasystem releases are also adjusted so that the upper three reservoirs are shown in a balanced condition each year on March 1, the approximate start of the runoff season. This balancing is computed based on the percent of storage in the respective Carryover Multiple Use Zone.

Actual System regulation from January 1 through August 31, 2014 and the simulated regulating plans for each project through CY 2015 using the five runoff scenarios described on Page 4 are presented on ***Plate 6*** through ***Plate 11***, inclusive. Big Bend regulation is omitted since storage at that project is relatively constant and average monthly releases are essentially the same as those at Oahe. These plates also show, on a condensed scale, actual regulation since 1953.

Plate 12 illustrates Fort Peck, Garrison, Oahe, and Gavins Point actual releases (Regulated Flow) as well as the Missouri River flows that would have resulted if the reservoirs were not in place (Unregulated Flow) during the period January 2013 through July 2014. ***Plate 13*** presents past and simulated gross average monthly power generation and gross peaking capability for the System.

C. <u>Regulation Plan for the Balance of the 2014 Navigation Season and Fall of 2014.</u> The regulation of the System for the period of September through November 2014 is presented in the following paragraphs.

<u>Fort Peck</u>. Releases will average about 6,000 cfs through mid-September and then be lowered to 5,000 cfs as irrigation ceases. Releases will be held near that level through the end of November. The Fort Peck pool will slowly rise through the end of November, ending the month at 2234.5 feet msl or 2.3 feet above the September 1 elevation of 2232.2 feet msl.

<u>Garrison</u>. The threatened least terns and endangered piping plovers were fledged by August 28 on the reach downstream of Garrison and hydropower peaking restrictions were discontinued at that time. Releases will be maintained at 26,000 cfs through mid-September before slowly decreasing to 20,000 cfs and then held steady through the end of November. The Garrison pool will steadily drop throughout the fall and will end the month of November at 1842.1 feet msl or 2.8 feet below the September elevation of 1844.9 feet msl.

<u>Oahe</u>. The reservoir started the month of September at elevation 1615.2 feet msl. Releases will average 39,800 cfs in September in support of navigation and to evacuate the annual flood control pool. Releases will be reduced in October and November to

33,900 and 36,900 cfs, respectively to accommodate the fall drawdown of the Fort Randall pool. At the end of November, the Oahe pool is forecast to be at elevation 1607.7 feet msl or 7.5 feet below the September 1 elevation.

Big Bend. Releases generally parallel those from Oahe. The Big Bend pool generally fluctuates between 1420.0 feet msl and 1421.0 feet msl for weekly cycling during high power load periods.

Fort Randall. Releases will average 44,600 cfs in September, and around 43,900 cfs in October through the end of November to back up the releases from Gavins Point. The fall pool drawdown of Fort Randall will start after Labor Day in early September and will carry over into early December due to the 10-day extension of the navigation season. Releases will be reduced after the navigation season ends in early December to the level required to back up Gavins Point winter releases.

Gavins Point. Releases will be scheduled above full service navigation levels to evacuate water from the reservoir system through early December. A full length navigation season, plus a 10-day extension, will be provided in accordance with the technical criteria for the July 1 System storage check presented in the Master Manual. In accordance with the Master Manual, during years of greater than normal water supply, the navigation season is extended as both an additional evacuation measure and to provide an increased benefit to navigation while striving to reach the base of the Annual Flood Control and Multiple Use Zone by March 1 the following season. The closing dates for the commercial navigation season will range from December 2 at Sioux City to December 11 at the mouth near St. Louis. Releases will be reduced by approximately 3,000 cfs per day beginning on December 3, working toward a target winter release of 20,000 cfs. The Gavins Point pool level will be raised 1.5 feet to elevation 1207.5 feet msl in the fall. The pool level will remain near that elevation during the winter months.

D. Regulation Plan for Winter 2014-2015. The regulation of the System presented in the following paragraphs is based on the previously discussed AOP simulations. Actual real-time regulation of the System is adjusted to respond to changing conditions on the ground. The September 1 System storage check is used to determine the winter release rate from Gavins Point. A winter release of 12,000 cfs is scheduled if System storage is less than 55.0 MAF on September 1; 17,000 cfs is scheduled when System storage is above 58.0 MAF; and the release is prorated for System storages between 55.0 and 58.0 MAF. A modification to the winter release rate from Gavins Point dam may occur when the evacuation of System flood control storage cannot be accomplished by providing a full-service navigation season with a 10-day extension of the navigation season. With an excess annual water supply, the winter season Gavins Point release may be scheduled at a rate of up to 25,000 cfs to continue to evacuate the remaining excess water in System flood control storage. The scheduled winter System release for

2014-2015 is 20,000 cfs. It is anticipated that this year's winter release will be adequate to complete evacuation of stored flood waters and serve all downstream water intakes. Water supply is discussed in more detail in Chapter VII, Section B.

Fort Peck. Releases are expected to average 7,500 cfs in December and 8,500 cfs in January and February to serve winter power loads, drawdown the lake to the base of the annual flood control pool, and to help balance System storage. The Fort Peck pool level is expected to slowly decline about 0.5 feet from elevation 2234.5 feet msl at the end of November to near elevation 2234.0 feet msl by March 1. At the beginning of March, the Fort Peck pool will be at the base of its Annual Flood Control and Multiple Use Zone.

Garrison. Releases are scheduled to be 19,500 cfs in December increasing to 24,000 cfs for January and February to serve winter power loads and to draw down the lake to the base of the annual flood control pool. Releases will be reduced, most likely in December, to prevent ice-induced flooding at the time of freeze-in and then gradually increased as river conditions permit. These temporary reductions in the releases may be scheduled to prevent exceedance of a 13-foot stage at the Missouri River at Bismarck streamgaging station. The Bismarck flood stage is 14.5 feet. Water Management staff will coordinate closely with other Federal, state and local agencies during periods of freeze-in and ice-out to reduce flood risk and ensure communities and local residents are aware of the rapidly changing conditions and are prepared to take appropriate actions. The Garrison pool level will decline 4.6 feet from elevation 1842.1 feet msl at the end of November to near elevation 1837.5 feet msl by March 1, at the base of its Annual Flood Control and Multiple Use Zone.

Oahe. Releases for the winter season will provide backup for the Fort Randall and Gavins Point releases as well as refill the recapture space available in the Fort Randall reservoir consistent with anticipated winter power loads. Monthly average releases may vary substantially with fluctuations in power loads occasioned by weather conditions but, in general, are expected to average between 22,700 cfs and 23,400 cfs. Daily and hourly releases will vary widely to best meet power loads. Peak hourly releases, as well as daily energy generation, will be constrained to prevent urban flooding in the Pierre and Fort Pierre areas if severe ice conditions develop downstream of Oahe Dam. This potential reduction is coordinated with the Western Area Power Administration (Western). The Oahe pool level is expected to slowly decline from 1607.7 feet msl at the end of November to 1607.0 feet msl at the end of December before starting to rise to 1607.5 feet msl by the beginning of March, the base of its Annual Flood Control and Multiple Use Zone.

Big Bend. The Big Bend pool level will be maintained in the normal 1420.0 to 1421.0 feet msl range during the winter.

Fort Randall. Releases will average about 19,000 cfs during the winter season to support Gavins Point winter releases. The Fort Randall pool level is expected to rise from its fall drawdown elevation of near 1337.5 feet msl at the end of November or early December to near elevation 1350.0 feet msl, the seasonal base of flood control, by March 1. However, if the plains snowpack flood potential downstream of Oahe Dam is lower than normal, the Fort Randall pool level will be raised to near 1353.0 feet msl by March 1. It is likely that a pool level as high as 1355.0 feet msl could be reached by the end of March if spring runoff has commenced. The Fort Randall pool level above the White River delta near Chamberlain, South Dakota will remain at a higher elevation than the pool level below the delta from early October through December, due to the damming effect of this delta area.

Gavins Point. Gavins Point winter releases are discussed in the first paragraph of this section. The Gavins Point pool level will be near elevation 1207.5 feet msl until late February when it will be lowered to elevation 1206.0 feet msl to create additional capacity to store spring runoff.

System storage for all runoff conditions will be at the base of the Annual Flood Control and Multiple Use Zone of 56.1 MAF by the beginning of next year's runoff season, approximately March 1, 2015.

E. Regulation During the 2015 Navigation Season. All five runoff scenarios modeled for this year's AOP follow the technical criteria presented in the current Master Manual for downstream flow support. Beginning in mid-March, Gavins Point releases will be gradually increased to provide navigation flow support at the mouth of the Missouri near St. Louis, Missouri by April 1, 2015, the normal navigation season opening date. The corresponding dates at upstream locations are Sioux City, March 23; Omaha, March 25; Nebraska City, March 26; and Kansas City, March 28. However, if during the 2015 navigation season there is no commercial navigation scheduled to use the upper reaches of the navigation channel, we will consider not providing navigation flow support in those reaches to conserve water in the System, reduce flood risk, and/or minimize incidental take of the protected species during the nesting season.

Navigation flow support for the 2015 season will be determined by actual System storage on March 15 and July 1. Runoff scenarios modeled indicate full service flow support at the start of the 2015 navigation season for all runoff conditions. Following the July 1 System storage check, full service would be provided for Lower Quartile and above runoff scenarios. The service level would be 500 cfs below full service for Lower Decile runoff. The normal 8-month navigation season is provided for Median runoff scenarios and below as shown in ***Table IV***. A 10-day extension to the navigation season is provided for the upper two runoff scenarios.

TABLE IV
NAVIGATION SERVICE SUPPORT
FOR THE 2015 SEASON

	Runoff Scenario (MAF)	System Storage March 15 (MAF)	System Storage July 1 (MAF)	Flow Level Above or Below Full Service (cfs) Spring	Flow Level Above or Below Full Service (cfs) Summer/Fall	Season Shortening (Days)
U.D.	34.5	57.4	64.0	0	+19,000	0*
U.Q.	30.6	57.2	63.1	0	+12,000	0*
Med.	24.6	57.0	60.8	0	0	0
L.Q.	19.3	56.6	57.7	0	0	0
L.D.	16.1	56.5	56.5	0	-500	0

*Includes 10-day extension for Upper Quartile and Upper Decile.

As previously stated, the modeled regulation for the 2015 nesting season below Gavins Point is Steady Release – Flow-to-Target (SR-FTT). When the SR-FTT release scenario is used, the initial steady release, which has ranged from 24,000 cfs to 30,000 cfs over the last few years, will be based on hydrologic conditions and the availability of habitat at that time. Model runs included in this AOP have a Gavins Point release which is higher during the last two-thirds of May to keep birds from nesting at low elevations. Gavins Point releases will be adjusted to meet downstream targets as tributary flows recede, but ideally the initial steady release will be sufficient to meet downstream targets until the majority of the birds have nested. The purpose of this regulation is to continue to meet the project purposes while minimizing the loss of nesting T&E species. A Gavins Point peaking cycle of two days down and one day up may be used to conserve water in the upper three reservoirs, if required. Gavins Point releases for the Upper Decile and Upper Quartile runoff simulations are much above normal to evacuate flood water from the reservoirs. Releases from Garrison and Fort Randall will follow repetitive daily patterns from early May, at the beginning of the T&E species' nesting season, to the end of the nesting season in late August. In addition to the intra-day pattern, Fort Randall releases may also be cycled with two days of lower releases and one day of higher releases during the early part of the nesting season to maintain release flexibility in that reach while minimizing the potential for take. If higher daily releases are required later in the nesting season, the daily peaking pattern may be adjusted, reduced or eliminated resulting in a steady release to avoid increased stages at downstream nesting sites.

Gavins Point releases may be quite variable during the 2015 navigation season but are expected to range from 26,000 to 51,000 cfs under the five modeled runoff scenarios. Release reductions necessary to minimize downstream flooding are not reflected in the monthly averages shown in the simulations but will be implemented as conditions

warrant. Reductions in System releases to integrate the use of downstream Missouri River flow support from the designated Kansas River projects (Milford, Tuttle Creek and Perry) authorized to provide Missouri River navigation flow support have not been modeled since they are based on downstream hydrologic conditions. However, this storage will be utilized to the extent possible as a water conservation measure, or to minimize incidental take of protected species during the nesting season if conditions indicate it is prudent to do so. Simulated storages and releases for the System and individual reservoirs within the System are shown on ***Plate 6*** through ***Plate 11.*** As experienced in 2011, runoff above or below simulated levels can occur and result in releases beyond those modeled for the AOP. As previously stated, should that occur, the Corps will increase its efforts to convey that information throughout the basin so that state, Tribal, and local agencies, communities, and local residents can take appropriate action.

F. Regulation Activities for T&E Species and Fish Propagation Enhancement. The ability to provide steady-to-rising pool levels in the upper three reservoirs in low runoff years is very dependent on the volume, timing, and distribution of runoff. The reservoir regulation simulations presented in this AOP for the Upper Decile, Upper Quartile, and Median runoff scenarios show that steady-to-rising pool levels would occur during the spring fish spawn period for the upper three reservoirs. As part of the overall plan to rotate emphasis among the upper three reservoirs during low runoff years, Fort Peck and Oahe are scheduled to be favored during the 2015 forage fish spawn if runoff is below the Median runoff scenario. The studies show that inflows are sufficient to maintain a steady-to-rising pool at Fort Peck from April through June for the Lower Quartile and Lower Decile runoff scenarios. Oahe pool levels rise slightly for April, but decline in May and June for both the Lower Quartile and Lower Decile runoff scenarios. This will be accomplished by setting releases at Fort Peck and Garrison at a level that would attempt to maintain a rising Fort Peck and Oahe pool, but no less than the minimum required for downstream water supply requirements, including irrigation. These adjustments may be restricted when the terns and plovers begin nesting in May. Garrison pool levels drop in April and May for the Lower Quartile runoff scenario, but only decline during April with the Lower Decile runoff. If drought conditions develop, emphasis during the fish spawn will be rotated among the upper three reservoirs and may also be adjusted to be opportunistic in regard to runoff potential. The upper three reservoirs will be managed to benefit forage fish to the extent reasonably possible, while continuing to serve the other Congressionally authorized project purposes.

Fort Peck. The repetitive daily pattern of releases from Fort Peck has not been implemented since the 2004 tern and plover nesting season. This adaptive management decision was made based on data collected during previous nesting seasons. In recent years, birds in this reach have nested on available high elevation habitat, and thus were not expected to be impacted by the potential range of releases from Fort Peck during the

summer. Releases during the 2015 nesting season will not be restricted by the repetitive daily pattern unless habitat conditions or nesting patterns warrant a change.

If high tributary flows enter the Missouri River below the project during the nesting season, hourly releases will generally be lowered to no less than 3,000 cfs in order to keep traditional riverine fish rearing areas continuously inundated, while helping to lower river stages at downstream nesting sites. In rare instances releases below 3,000 cfs may be scheduled for flood damage reduction. April releases are expected to be adequate for trout spawning below the project.

Maintaining a rising Fort Peck pool level will be dependent upon the daily inflow pattern to the reservoir but appears possible for all runoff scenarios.

Garrison. As in previous years, releases from Garrison will follow a repetitive daily pattern during the T&E nesting season to limit peak stages below the project for nesting birds. Releases are scheduled to be 1,000 cfs lower in July and early August than the June releases to enhance conditions for the fledging of chicks. High elevation nesting habitat is expected to be abundant below Garrison Dam during the 2015 nesting season.

During 2015, coldwater habitat in Garrison should be adequate for all runoff scenarios. Coldwater habitat will continue to be monitored during the year and adjustments will be considered if conditions warrant.

A steady-to-rising pool at Garrison during the fish spawn in April and May will be dependent upon the daily inflow pattern to the reservoir. The reservoir rises in April and May for Median and above runoff scenarios, but declines in April under both lower runoff scenarios.

Oahe. Releases in the spring and summer will back up those from Gavins Point. The pool level should be steady to rising in the spring during the fish spawn for Median and above runoff scenarios. Under the Lower Quartile and Lower Decile runoff scenarios, the Oahe pool would rise during April but decline in May, dropping 0.4 feet and 0.9 feet, respectively.

Fort Randall. To the extent reasonably possible, Fort Randall will be regulated to provide for a pool elevation near 1355.0 feet msl during the fish spawn period, provided water can be supplied from other reservoirs for downstream uses. The pool will not be drawn down below elevation 1337.5 feet msl in the fall to ensure adequate supply for water intakes. As a measure to minimize take while maintaining the flexibility to increase releases during the nesting season, hourly releases from Fort Randall will follow a repetitive daily pattern to limit peak stages below the project for nesting birds. Daily average flows may be increased every third day to preserve the capability of

increasing releases later in the summer with little or no incidental take if drier downstream conditions occur. If higher daily releases are required later in the nesting season, the daily peaking pattern may be adjusted, reduced or eliminated resulting in a steady release to avoid increased stages at downstream nesting sites. Periods of zero release will be minimized to the extent reasonably possible during the nesting season given daily average releases, real-time hydrologic conditions, and System generating constraints as defined in coordination with Western.

Gavins Point. As detailed in Section III of this report, the bimodal spring pulse from Gavins Point for the benefit of the endangered pallid sturgeon will not be implemented under any runoff scenarios in 2015.

While less habitat is available than the previous few years, it is anticipated that sufficient habitat to provide for successful nesting will be available at elevations above the planned release rates for all runoff conditions. This expectation is based on experience from the previous record runoff in 1997 and from the high elevation habitat resulting from the record releases in 2011. Flows from Gavins Point Dam may follow the flow-to-target (FTT) release scenario or the steady release-flow to target (SR-FTT) scenario. The FTT scenario limits releases from Gavins Point to those needed to meet downstream targets. The actual release scenario will be evaluated when birds begin nesting in early May. If monitoring determines that nests are likely to be initiated at a lower elevation which would be inundated later in the summer, a SR-FTT release scenario may be implemented. A full description of these release scenarios can be found in the Master Manual. Actual releases will be based on hydrologic conditions and the availability of habitat at that time.

All reasonable measures to minimize the loss of nesting T&E bird species will be used. While not anticipated because of the quantity of high elevation habitat available, these measures include, but are not limited to, a relatively high initial steady release during the peak of nest initiation, the use of the three Kansas River basin reservoirs, moving nests to higher ground, and monitoring nest fledge dates to determine if delaying an increase a few days might allow threatened chicks to fledge. The location of navigation tows and river conditions at intakes would also be monitored to determine if an increase could be temporarily delayed without impact. Cycling releases every third day may be used to conserve water early in the nesting season if extremely dry conditions develop. In addition, cycling may be used during downstream flood control regulation.

The Gavins Point pool will be regulated near 1206.0 feet msl in the spring and early summer, with minor day-to-day variations due to incremental inflows between Fort Randall and Gavins Point resulting from rainfall runoff. Several factors can limit the ability to protect nests from inundation in the upper end of the Gavins Point pool. First, because there are greater numbers of T&E bird species nesting below Gavins

Point, regulation to minimize incidental take usually involves restricting Gavins Point releases, which means that the Gavins Point pool can fluctuate significantly due to increased runoff from rainfall events. Second, rainfall runoff between Fort Randall and Gavins Point can result in relatively rapid pool rises because the Gavins Point project has a smaller storage capacity than the other System reservoirs. And third, the regulation of Gavins Point for downstream flood control may necessitate immediate release reductions to reduce downstream damage. When combined, all these factors make it difficult, and sometimes impossible, to prevent inundation of nests in the upper end of the Gavins Point reservoir. However, because of the quantity of habitat expected we do not anticipate a large number of nests being inundated. The pool will be increased to elevation 1207.5 feet msl late in August when it is determined that there are no terns or plovers nesting along the reservoir.

G. <u>Regulation Activities for Historic and Cultural Properties.</u> As acknowledged in the 2004 Programmatic Agreement (PA) for the Operation and Management of the Missouri River Main Stem System, wave action and fluctuation in the level of the reservoirs results in erosion along the banks of the reservoirs. The Corps will work with the Tribes utilizing 36 CFR Part 800 and the PA to address the exposure of historic and cultural sites. The objective of a programmatic agreement is to deal "…with the potential adverse effects of complex projects or multiple undertakings…" The PA objective was to collaboratively develop a preservation program that would avoid, minimize and/or mitigate adverse effects along the System reservoirs. All tribes, whether signatory to the PA or not, may request government-to-government consultation on the regulation of the System and the resulting effect on historic and cultural properties and other resources. As a result of the 2011 flood event, there were impacts to cultural resources. A gradual drawdown of reservoir levels was preferred to avoid or minimize further damage to cultural resource sites. To address impacts, the most effective and comprehensive strategy was a phased approach; site assessment/ Native American Graves Protection and Repatriation Act (NAGPRA) survey, increased law enforcement efforts, engineering design, rip rap repair, and new rip rap placement. Although condition assessments continue to be conducted for all sites affected by flooding, priority has been given to site assessments at occupation sites. Increased law enforcement will be necessary to detect or prevent, and possibly prosecute individuals for Archeological Resources Protection Act (ARPA) violations. Engineers are currently preparing designs to repair existing rip rap and design protection for any sites that were newly impacted.

Pool levels at the upper three reservoirs will likely be near normal in 2015 but will vary depending on runoff conditions. Continuing exposure of cultural sites along the shoreline is still possible. Actions to avoid, minimize or mitigate adverse impacts and expected results of the actions are covered under Chapter VII of this AOP. ***Plate 14*** shows the locations of the Tribal Reservations.

Fort Peck. Depending on runoff in the Missouri River basin, System regulation during 2015 could result in a Fort Peck pool elevation variation from a high of 2243 feet msl to a low of 2221 feet msl. This is based on the Upper and Lower Decile runoff scenarios (see ***Plate 8*** and the studies included at the end of this report). Based on a review of existing information, approximately 13 known sites could be affected during this period.

Garrison. Based on the Upper and Lower Decile runoff scenarios (see ***Plate 9*** and the studies included at the end of this report), Garrison pool elevations could range between 1848 and 1827 feet msl during 2015. Based on a review of existing information, approximately 53 known sites could be affected during this period.

Oahe. At the Oahe reservoir, the System regulation under the Upper and Lower Decile runoff scenarios could result in pool elevations ranging from 1616 to 1594 feet msl (see ***Plate 10*** and the studies included at the end of this report). Based on a review of existing information, approximately 195 known sites could be affected during this period.

Big Bend. System regulation will be adjusted to maintain the Big Bend pool level in the normal 1420 to 1421 feet msl range during 2015. Short-term increases above 1421 due to local rainfall may also occur. Based on a review of existing information, no known sites will be affected during this period.

Fort Randall. As part of the normal System regulation, the Fort Randall pool elevations will vary between 1350 and 1355 feet msl during the spring and summer of 2015. Short-term increases above 1355 feet msl due to local rainfall may occur. The annual fall drawdown of the reservoir to elevation 1337.5 feet msl will begin prior to the close of the navigation season and will be accomplished by early December. The reservoir will then be refilled during the winter to elevation 1350 feet msl. Based on a review of existing information, approximately eight known sites could be affected during this period.

Gavins Point. System regulation will be adjusted to maintain the Gavins Point pool level in the normal 1206 to 1207.5 feet msl range during 2015. Short-term increases above 1207.5 feet msl may occur due to local rainfall. Based on a review of existing information, one known site could be affected during this period.

VII. SUMMARY OF RESULTS EXPECTED IN 2015

With regulation of the System in accordance with the 2014-2015 AOP outlined in the preceding pages, the following results can be expected. ***Table V*** summarizes the critical decision points throughout the year for all runoff conditions.

Table V
Summary of 2014-2015 AOP Studies

Decision Points	2015 Runoff Condition				
	Upper Decile	**Upper Quartile**	**Median**	**Lower Quartile**	**Lower Decile**
March 1 System Storage March 23-31 GP Release	56.1 MAF 26.7 kcfs	56.1 MAF 26.7 kcfs	56.1 MAF 26.7 kcfs	56.1 MAF 29.8 kcfs	56.1 MAF 29.8 kcfs
March 15 System Storage Spring Service Level	57.4 MAF Full service	57.2 MAF Full service	57.0 MAF Full service	56.6 MAF Full service	56.5 MAF Full service
May 1 System Storage May Early/Late May Avg GP Release	60.1 MAF None 36.0 kcfs	59.4 MAF 28.0/31.6 kcfs 29.9 kcfs	57.8 MAF 28.0/31.6 kcfs 29.9 kcfs	56.4 MAF 31.3/34.3 kcfs 32.8 kcfs	56.1 MAF 31.3/34.3 kcfs 32.8 kcfs
Fish Spawn Rise (Apr-Jun) FTPK Pool Elev Change GARR Pool Elev Change OAHE Pool Elev Change	 +7.0 feet +7.0 feet +5.0 feet	 +6.2 feet +6.5 feet +4.8 feet	 +4.8 feet +4.9 feet +2.3 feet	 +3.5 feet +1.5 feet -0.7 feet	 +1.2 feet +0.6 feet -0.8 feet
July 1 System Storage Sum-Fall Service Level (kcfs) Nav Season Length	64.0 MAF Full Service plus evac 10 Day extension	63.1 MAF Full Service plus evac 10 Day extension	60.8 MAF Full Service 0 Days shortening	57.7 MAF Full Service 0 Days shortening	56.5 MAF 0.5 kcfs blw Full Service 0 Days shortening
September 1 System Storage Winter 2015-16 GP Release	62.1 MAF 20.0 kcfs	61.5 MAF 20.0 kcfs	59.3 MAF 17.0 kcfs	55.0 MAF 12.5 kcfs	53.1 MAF 12.5 kcfs
February 28 System Storage End-Year Pool Balance Percent Pool	56.1 MAF Balanced 100%	56.1 MAF Balanced 100%	55.6 MAF Balanced 99%	50.5 MAF Balanced 85%	48.3 MAF Balanced 79%

A. Flood Control. Flood control is the only authorized project purpose that requires the availability of empty storage space rather than impounded water. Actual flood events, especially those that are a result of rainfall runoff, are difficult to predict with much advance notice; therefore, detailed routing of specific major flood flows is accomplished when floods occur. There is a recurring pattern of high-risk flood periods during each year: a season when snowmelt, ice jams, and protracted heavy rains will almost surely occur with or without generating consequent floods; and a season when these situations are less likely and the flood threat is correspondingly low. The high-risk flood season begins about March 1 and extends through the summer. As a consequence, regulation of the System throughout the fall and winter months is predicated on the achievement of a March 1 System storage level at or below the base of the Annual Flood Control and Multiple Use Zone. All runoff scenarios studied for this AOP will begin the March 1, 2015 runoff season with System storage at the desired 56.1 MAF base of the Annual Flood Control and Multiple Use Zone. Therefore, the entire System flood control storage of 16.3 MAF, (11.6 MAF in the Annual Flood Control and Multiple Use Zone and 4.7 MAF in Exclusive Flood Control Zone) will be available to store surplus runoff.

To the extent practical, the System is regulated to prevent damaging flows in the river reaches between and below the Mainstem dams. In 2015, the full capacity of the System will be available to capture a significant volume of runoff originating from the upper basin and meter it out over an extended period of time at a rate that does not contribute to flooding in the river reaches between and below the reservoirs. Additionally, the reservoir system will have the capacity to reduce releases and hold back water during periods of high runoff below the System to reduce peak stages and discharges on the lower river. The ability to significantly reduce peak stages on the lower river diminishes at locations further downstream due to the large uncontrolled drainage area and travel time from the dam.

The base of the Exclusive Flood Control Zone defines the maximum level of storage that will be accumulated for purposes other than flood control. When the Exclusive Flood Control Zone at a particular reservoir is encroached upon, the control of subsequent flood inflows becomes the dominant factor. During such periods, releases may substantially exceed the powerplant release capacity with the evacuation rate of any project dependent upon existing flood conditions, the potential for further inflows, and conditions of other reservoirs in the System. Maximum release rates at such times are based upon the Master Manual flood control criteria, the flood control status of the System, and the critical need to preserve the integrity of the dams. Detailed information regarding the adjustments of releases for flood control evacuation and downstream flood control constraints can be found in Chapter 7 of the Master Manual.

Due to release limitations imposed by the formation of downstream ice cover, a major portion of the required flood control space must be evacuated prior to the winter season. Higher releases may be made on occasions when the downstream channel conditions permit. If plains and/or mountain snowpack accumulations are much above normal during the winter of 2014-2015, and studies indicate that available storage in the Carryover Multiple Use Zone as well as the Annual Flood Control and Multiple Use Zone will be fully utilized, releases may be adjusted to the extent reasonably possible to evacuate water from the reservoir system early in the runoff season. High releases during the late winter and early spring periods may exacerbate localized flooding if coincident with plains snowmelt or spring rains, and may also contribute to significant ice jam flooding. Therefore, if higher than normal releases are indicated, local conditions will need to be closely monitored. In addition, all 2015 runoff that is stored in the flood control zones will be evacuated prior to the start of the 2016 runoff season.

B. Water Supply and Water Quality Control. Water supply problems at intakes located in the river reaches both between and below the Mainstem dams and in the reservoirs are related primarily to intake elevations or river access rather than inadequate water supply. In emergency situations, short-term adjustments to protect human health and safety would be considered to keep intakes operational.

Low reservoir levels during the 2000-2007 drought contributed to both intake access and water quality problems for intakes on Garrison and Oahe reservoirs, including several Tribal intakes. A return to more normal reservoir elevations has eliminated concern over many of these intakes. If the drought conditions return, reservoir pool levels and releases may decline renewing the potential for intake access and water quality problems at both river and reservoir intakes. Under the Lower Decile runoff scenario, minimum reservoir levels in 2015 would be at least 22 feet higher than the record lows set in the 2000-2007 drought. Although not below the critical shut-down elevations for any intake, a return to lower reservoir levels would require extra monitoring to ensure the continued operation of the intakes.

Winter releases are determined based on the September 1 System storage check. The winter season extends from December through February and flows are provided during this time to support the Congressionally authorized project purposes of hydropower production and downstream water supply and water quality. Per the Master Manual, if September 1 System storage is 55.0 MAF or less, the winter release from Gavins Point will be 12,000 cfs. Planned winter release rates of 12,000 cfs may be less than required for downstream water supply intakes without sufficient incremental tributary flows below the System. Should that occur, releases may need to be set higher to ensure that downstream water supply intakes are operable. In 2012-2013, winter releases were set at 14,000 cfs rather than 12,000 cfs due to channel degradation and low incremental tributary flows below the System. Improved tributary flows in future winters would facilitate releases reaching the target level of 12,000 cfs. While the

Master Manual indicates that the water control plan's purpose is to meet water supply requirements in river reaches downstream of the reservoirs to the extent reasonably possible, the Corps believes the minimum winter release of 12,000 cfs presented in the Master Manual represents a reasonable long-term goal for water intake operability and for owners to strive for as they make improvements to their facilities. A letter was sent to intake owners in the spring of 2013 informing them of the Master Manual criteria and encouraging them to take necessary action to ensure their intakes are able to operate at reduced release rates. Coordination with intake owners will continue prior to and during the low release periods. In addition, it may be necessary at times to temporarily increase Gavins Point releases to provide adequate downstream flows during periods when excessive river ice formation is forecast or if ice jams or blockages form which temporarily restrict flow. Based on past experiences, these events are expected to occur infrequently and be of short duration.

In order to evacuate excess water, above normal Gavins Point releases are being scheduled in the winter of 2014-2015. Releases of 20,000 cfs are shown under all runoff scenarios. As shown in ***Table V***, 2015-2016 winter releases of 20,000 cfs would be made for the Upper Decile and Upper Quartile runoff scenarios, 17,000 cfs for Median, and 12,500 cfs under Lower Quartile and Lower Decile runoff scenarios. The additional 500 cfs on Lower Quartile and Lower Decile reflects how the Corps, when conditions warrant, temporarily increases Gavins Point releases during extreme cold periods to inhibit the formation of ice jams in the lower river reach.

During non-navigation open water periods in the spring and fall the Master Manual includes System releases as low as 9,000 cfs as a water conservation measure provided that enough downstream tributary flow exists to allow for continued operation of downstream water intakes. If a non-navigation year would occur in the future, summer releases (May through August) could average around 18,000 cfs from the System. However, it should be noted that System releases will be set at levels that meet the operational requirements of water intakes to the extent reasonably possible. Problems have occurred at several downstream intakes in the past, however in all cases the problems have been associated with access to the river or reservoir rather than insufficient water supply. In addition, the low summer release rate would likely result in higher water temperatures in the river, which could impact a powerplant's ability to meet their thermal discharge permits. Again, it should be noted that System releases will be set at levels that allow the downstream powerplant to meet their thermal discharge permit requirements to the extent reasonably possible. This may mean that actual System releases in the hottest part of the summer period may be set well above the 18,000 cfs level. The Corps continues to encourage intake operators between and below the mainstem dams to make necessary modifications to their intakes to allow efficient operation over the widest possible range of hydrologic conditions. While the current level of System storage should allow adequate access for all intakes during the coming year, intake operators that have experienced difficulty with access during the

past drought years should continue to make adjustments to improve access and flexibility when drought returns to the basin.

C. Irrigation. Scheduled releases from the System reservoirs will be sufficient to meet the volumes of flow required for irrigation diversions from the Missouri River. Some access problems may be experienced, however, if Lower Quartile or Lower Decile runoff conditions return. Below Fort Peck, localized dredging may once again be required in the vicinity of irrigation intakes in order to maintain access to the water if releases are low next summer. Intake access problems are the responsibility of the intake owner and the Corps will not guarantee access, only that the supply of water in the Missouri River is adequate to meet this project purpose. Tributary irrigation water usage is fully accounted for in the estimates of water supply.

D. Navigation. The anticipated service level and season length for all runoff conditions simulated are shown in ***Table V***. Service to navigation in 2015 from the beginning of the navigation season through the July 1 storage check will be at full service for all runoff scenarios. After the July 1 storage check, Lower Quartile and higher runoff scenarios indicate at least full service to navigation. The July 1 storage check indicates 500 cfs below full service for the Lower Decile runoff scenario. In addition, the Upper Decile and Upper Quartile runoff scenarios indicate a 10-day extension to the navigation season based on the July 1 storage check. Median and below runoff indicates a full length navigation season. Although the AOP simulations provide a comparison of typical flow support under varying runoff conditions, the actual rate of flow support for the 2015 navigation season will be based on actual System storage on March 15 and July 1, 2015.

E. Power. ***Table VI*** and ***Table VII*** indicate the estimated monthly System load requirements and hydropower supply of the Eastern Division, Pick-Sloan Missouri Basin Program (P-S MBP), from September 2014 through December 2015. Estimates of monthly peak demands and energy include customer requirements for firm, short-term firm, summer firm, peaking, and various other types of power sales, System losses, and the effects of diversity. Also included in the estimated requirements are deliveries of power to the Western Division, P-S MBP, to help meet its firm power commitments. Under the Median runoff scenario, annual generation in 2015 is estimated to be 9.7 million MWh, 103 percent of the 1967-2013 average.

TABLE VI
PEAKING CAPABILITY AND SALES
(1,000 kW at plant)

2014	Estimated Committed Sales*	Expected C of E Capability					Expected Bureau Capability**					Expected Total System Capability				
		U.B.	Basic	L.B.			U.B.	Basic	L.B.			U.B.	Basic	L.B.		
Sep	2012	2382	2381	2379			201	200	198			2583	2581	2577		
Oct	1876	2351	2358	2362			201	199	197			2552	2557	2559		
Nov	1984	2296	2309	2323			200	199	196			2496	2508	2519		
Dec	2115	2289	2296	2305			197	196	194			2486	2492	2499		
2015																
Jan	2129	2311	2315	2319			194	194	192			2505	2509	2511		
Feb	2114	2320	2320	2320			191	192	191			2511	2512	2511		
		U.D.	U.Q.	Med	L.Q.	L.D.	U.D.	U.Q.	Med	L.Q.	L.D.	U.D.	U.Q.	Med	L.Q.	L.D.
Mar	2047	2342	2336	2329	2323	2322	189	189	190	190	190	2531	2525	2519	2513	2512
Apr	1916	2362	2353	2334	2315	2312	183	183	188	189	189	2545	2536	2522	2504	2501
May	1878	2385	2369	2338	2312	2307	185	185	193	193	193	2570	2554	2531	2505	2500
Jun	2078	2399	2393	2372	2324	2312	199	199	199	196	197	2598	2592	2571	2520	2509
Jul	2197	2390	2385	2367	2313	2294	201	201	201	196	196	2591	2586	2568	2509	2490
Aug	2201	2376	2373	2355	2291	2270	199	199	199	195	194	2575	2572	2554	2486	2464
Sep	2017	2368	2365	2342	2282	2253	201	199	200	197	195	2569	2564	2542	2479	2448
Oct	1879	2334	2335	2319	2242	2230	201	198	200	198	195	2535	2533	2519	2440	2425
Nov	1987	2294	2298	2284	2214	2191	199	197	199	197	194	2493	2495	2483	2411	2385
Dec	2116	2251	2254	2248	2181	2155	197	195	196	195	192	2448	2449	2444	2376	2347

* Estimated sales, including system reserves. Power in addition to hydro production needed for these load requirements will be obtained from other power systems by interchange or purchase.
** Total output of Canyon Ferry and 1/2 of the output of Yellowtail powerplant.

TABLE VII
ENERGY GENERATION AND SALES
(Million kWh at plant)

2014	Estimated Committed Sales*	Expected C of E Generation					Expected Bureau Generation **					Expected Total System Generation				
		U.B.	Basic	L.B.			U.B.	Basic	L.B.			U.B.	Basic	L.B.		
Sep	738	1206	1125	1070			74	64	57			1280	1190	1127		
Oct	736	1231	1023	791			78	64	55			1309	1087	846		
Nov	803	1191	1005	795			76	63	53			1267	1068	848		
Dec	913	843	737	688			78	72	57			921	810	744		
2015																
Jan	927	782	776	739			77	73	57			859	849	796		
Feb	896	687	686	656			68	64	50			755	750	706		
		U.D.	U.Q.	Med	L.Q.	L.D.	U.D.	U.Q.	Med	L.Q.	L.D.	U.D.	U.Q.	Med	L.Q.	L.D.
Mar	813	648	653	615	654	667	75	75	71	52	52	723	728	685	707	719
Apr	767	756	689	740	855	862	101	95	67	46	46	857	784	807	901	909
May	716	1063	913	903	1004	1000	117	117	92	50	50	1180	1030	995	1054	1051
Jun	778	1262	1117	938	1000	996	114	114	105	52	52	1375	1230	1043	1052	1047
Jul	868	1452	1312	1013	1072	1055	118	117	80	51	51	1570	1429	1093	1124	1106
Aug	861	1454	1315	1050	1069	1051	97	96	71	51	51	1551	1412	1121	1121	1102
Sep	740	1348	1202	923	874	913	86	85	67	49	48	1434	1287	990	923	961
Oct	736	1241	1079	762	781	750	82	85	67	51	47	1323	1164	829	832	797
Nov	805	1217	1062	671	701	639	79	76	73	53	43	1296	1138	744	754	682
Dec	914	840	808	661	545	542	81	78	75	57	44	922	886	736	602	586
CY TOT		12750	11619	9738	9950	9870	1094	1083	904	620	592	13844	12702	10641	10570	10462

* Estimated sales including system reserves and losses. Power in addition to hydro production needed for these load requirements will be obtained from other systems by interchange or purchase.
** Total output Canyon Ferry and 1/2 output of Yellowtail powerplant.

F. Recreation, Fish and Wildlife. The regulation of the System will continue to provide recreation and fish and wildlife opportunities in the project areas and along the Missouri River as well as other benefits of a managed system. Recreation access is expected to be at near normal levels in 2015. If Lower Quartile or Lower Decile runoff were to occur in 2015, boat ramps that were lowered and low water ramps that were constructed during the two recent drought periods will provide adequate reservoir access. Special regulation adjustments incorporating specific objectives for these purposes will be made to the extent reasonably possible. Overall conditions should be favorable for the many visitors who enjoy the camping, boating, fishing, hunting, swimming, picnicking, and other recreational activities associated with the System reservoirs.

The effects of the simulated System regulation during 2015 on fish and wildlife are included in Chapter VI, Section F, entitled, "Regulation Activities for T&E Species and Fish Propagation Enhancement."

G. Historic and Cultural Properties. As mentioned in Chapter VI of this AOP, the regulation of the System during 2014 and 2015 will expose cultural sites due to erosion from the normal fluctuation of pool elevations. The Corps will work with the Tribes utilizing 36 CFR Part 800 and the PA to address the exposure of these sites. The objective of a programmatic agreement is to deal "…with the potential adverse effects of complex projects or multiple undertakings…" The PA objective was to collaboratively develop a preservation program that would avoid, minimize and/or mitigate the adverse affects of the System operation. All tribes, whether signatory to the PA or not, may request government-to-government consultation on the regulation of the System and the resulting effect on historic and cultural properties and other resources.

The planned preservation program for this AOP is outlined by multiple stipulations in the PA. One of the stipulations, or program components, is the Five-Year Plan. This plan outlines how the Corps will accomplish its responsibilities under the PA and the National Historic Preservation Act. The "Cultural Resource Program Final Five Year Plan, dated February 2012" (see http://www.nwo.usace.army.mil/Missions/CivilWorks/CulturalResources.aspx) is currently being implemented. The plan includes inventory, testing and evaluation, mitigation and other specific activities that will allow the Corps to avoid, minimize and/or mitigate the adverse effects to cultural sites on Corps lands within the System. Many of the actions listed in the plan are within the elevation ranges that will occur with the implementation of the Master Manual criteria in 2014 and 2015. Two critical components of the Five-Year Plan that are applicable to this AOP are monitoring and mitigation, which will be briefly discussed in the following paragraphs.

First, a collaboratively developed plan, entitled "Final Cultural Resource Monitoring Plan, dated June 2014" (see http://www.nwo.usace.army.mil/Missions/CivilWorks/CulturalResources.aspx) is in place. This monitoring plan outlines the sites that require monitoring and specifies a frequency for monitoring. The Corps is strategically monitoring sites, including those sites within the potential operating pool elevations, to document the effects of the implementation of the 2014-2015 AOP. Specific sites are identified in the draft Monitoring and Enforcement Plan for the monitoring team, comprised of Corps rangers and Tribal monitors, to visit and document impacts. This focused monitoring is resulting in more accurate data on the current impacts to sites along the river plus it is assisting with the identification of sites for mitigation. The most recent training for the monitoring teams was held in July 2014.

Second, mitigation or protection of sites that are being adversely impacted continues. During the reporting period for the 2013 Annual Report by the Corps on the implementation of the Programmatic Agreement, 12 sites were either completed, started, or in the design phase. The annual report is available at http://www.nwo.usace.army.mil/Missions/CivilWorks/CulturalResources.aspx. In addition the Corps completed a contract to develop an erosion model that will compare modeling data against actual erosion data, collected by the monitoring team, to assist in the prioritization of sites for protection. Work on the erosion model was completed in June 2011.

Results expected from the proposed monitoring and mitigation actions include more accurate horizontal and vertical data on existing cultural sites, detailed impact data, proactive protection and preservation of sites. The effects of the simulated System regulation during 2014-2015 on cultural sites are included in the Chapter VI, section G., entitled, "Regulation Activities for Historic and Cultural Properties."

H. System Storage. If the September 1, 2014 Basic runoff forecast verifies, System storage will decline to 56.5 MAF by the end of 2014. This would be 22.6 MAF higher than the record low System storage of 33.9 MAF set on February 9, 2007 and 6.4 MAF higher than the 2013 end-of-year storage of 50.1 MAF. This end-of-year storage is 3.9 MAF more than the 1967-2013 average. The lowest storage during the 1988-1992 drought was 40.8 MAF in January 1991, and the record low storage was set during the 2000-2007 drought at 33.9 MAF in February 2007. The end-of-year System storages have ranged from a maximum of 60.9 MAF in 1975, to the 2006 minimum of 34.4 MAF. Forecasted System storage on December 31, 2015 is presented in ***Table VIII*** for the runoff scenarios simulated.

TABLE VIII
ANTICIPATED DECEMBER 31, 2015 SYSTEM STORAGE

Water Supply Condition	Total (12/31/15)	Carryover Storage Remaining 1/	Unfilled Carryover Storage 2/	Total Change CY 2015
	(Volumes in 1,000 Acre-Feet)			
Upper Decile	56,300	38,500	0	200
Upper Quartile	56,500	38,500	0	500
Median	55,800	38,200	300	-700
Lower Quartile	50,500	32,900	5,600	-6,400
Lower Decile	48,400	30,800	7,700	-8,500

1/ Net usable storage above 17.6 MAF System minimum pool level established for power, recreation, irrigation diversions, and other purposes.

2/ System base of Annual Flood Control and Multiple Use Zone containing 56.1 MAF.

I. Summary of Water Use by Functions. Anticipated water use in CY 2014, under the regulation plan with the Basic forecast of water supply is shown in ***Table IX***. Under the reservoir regulation simulations in this AOP, estimated water use in CY 2015 also is shown in ***Table IX.*** Actual water use data for CY 2013 are included for information and comparison.

TABLE IX
MISSOURI RIVER MAINSTEM SYSTEM
WATER USE FOR CALENDAR YEARS 2013, 2014, AND 2015 ABOVE SIOUX CITY, IOWA
in Million Acre-Feet (MAF)

		CY 2013 Actual	CY 2014 Basic Simulation	Simulations for Calendar Year 2015 Upper Decile	Upper Quartile	Median	Lower Quartile	Lower Decile
Upstream Depletions	(1)							
Irrigation, Tributary Reservoir Evaporation & Other Uses		2.7	2.6					
Tributary Reservoir Storage Change		0.0	0.2					
Total Upstream Depletions		2.7	2.8	2.9	2.7	2.9	2.7	2.4
System Reservoir Evaporation	(2)	2.8	2.5	1.2	1.2	1.8	2.1	2.0
Sioux City Flows								
Navigation Season								
Unregulated Flood Inflows Between Gavins Point & Sioux City	(3)	0.0	0.4					
Navigation Service Requirement	(4)	13.6	16.3	16.6	16.2	16.0	16.3	16.1
Supplementary Releases								
T&E Species	(5)	0.2	0.5	0.3	0.3	0.3	0.3	0.3
Flood Evacuation	(6)	0.0	2.8	8.4	5.0	0.0	0.0	0.0
Non-navigation Season								
Flows		3.4	3.5	4.4	4.4	4.3	4.1	3.8
Flood Evacuation Releases	(7)	0.0	0.4	0.5	0.4	0.0	0.0	0.0
System Storage Change		1.7	6.4	0.2	0.4	-0.7	-6.4	-8.5
Total		25.1	35.6	34.5	30.6	24.6	19.3	16.1
Project Releases								
Fort Peck		5.5	5.1	8.1	7.2	6.1	5.9	6.1
Garrison		13.1	16.5	21.0	19.1	15.9	15.7	17.3
Oahe		13.3	18.7	23.8	21.1	17.4	18.8	18.5
Big Bend		12.3	18.0	23.7	21.0	17.3	18.7	18.3
Fort Randall		13.9	19.4	25.1	22.1	18.0	18.0	18.5
Gavins Point		15.2	20.1	27.2	24.0	19.4	20.1	19.6

(1) Tributary uses above the 1949 level of development including agricultural depletions and tributary storage effects.
(2) Net evaporation is shown for 2015.
(3) Incremental inflows to reach which exceed those usable in support of navigation at the target level, even if Gavins Point releases were held to as low as 6,000 cfs.
(4) Estimated requirement for downstream water supply and water quality is approximately 6.0 MAF.
(5) Increased releases required for endangered species regulation.
(6) Includes flood control releases for flood control storage evacuation and releases used to extend the navigation season beyond the normal December 1 closing date at the mouth of the Missouri River.
(7) Releases for flood control storage evacuation in excess of a 17,000 cfs Gavins Point release.

VIII. TENTATIVE PROJECTION OF REGULATION THROUGH FEBRUARY 2021

(Not completed until final plan is adopted.)

USACE Mainstem Project

USACE Tributary Project

USBR SECTION 7 PROJECT

☆ **State Capitol**

-------- District Boundary

Missouri River Basin

U.S. ARMY ENGINEERS, NORTHWESTERN DIVISION
CORPS OF ENGINEERS, OMAHA, NEBRASKA
AUGUST 2011

PLATE 1. Missouri River Basin Map.

Summary of Engineering Data -- Missouri River Mainstem System

Item No.	Subject	Fort Peck Dam - Fort Peck Lake	Garrison Dam - Lake Sakakawea	Oahe Dam - Lake Oahe
1	Location of Dam	Near Glasgow, Montana	Near Garrison, ND	Near Pierre, SD
2	River Mile - 1960 Mileage	Mile 1771.5	Mile 1389.9	Mile 1072.3
3	Total & incremental drainage areas in square miles	57,500	181,400 (2) 123,900	243,490 (1) 62,090
4	Approximate length of ful reservoir (in valley miles)	134, ending near Zortman, MT	178, ending near Trenton, ND	231, ending near Bismarck, ND
5	Shoreline in miles (3)	1520 (elevation 2234)	1340 (elevation 1837.5)	2250 (elevation 1607.5)
6	Average total & incrementa inflow in cfs	10,200	25,600 15,400	28,900 3,300
7	Max. discharge of record near damsite in cfs	137,000 (June 1953)	348,000 (April 1952)	440,000 (April 1952)
8	Construction started - calendar yr	1933	1946	1948
9	In operation (4) calendar yr.	1940	1955	1962
	Dam and Embankment			
10	Top of dam, elevation in feet msl	2280.5	1875	1660
11	Length of dam in feet	21,026 (excluding spillway	11,300 (including spillway	9,300 (excluding spillway
12	Damming height in feet (5)	220	180	200
13	Maximum height in feet (5)	250.5	210	245
14	Max. base width, total & w/o berms in feet	3500, 2700	3400, 2050	3500, 1500
15	Abutment formations (under dam & embankment)	Bearpaw shale and glacial fil	Fort Union clay shale	Pierre shale
16	Type of fill	Hydraulic & rolled earth fil	Rolled earth fillec	Rolled earth fill & shale berms
17	Fill quantity, cubic yards	125,628,000	66,500,000	55,000,000 & 37,000,000
18	Volume of concrete, cubic yards	1,200,000	1,500,000	1,045,000
19	Date of closure	24 June 1937	15 April 1953	3 August 1958
	Spillway Data			
20	Location	Right bank - remote	Left bank - adjacent	Right bank - remote
21	Crest elevation in feet ms	2225	1825	1596.5
22	Width (including piers) in fee	820 gated	1336 gated	456 gated
23	No., size and type of gates	16 - 40' x 25' vertical lift gates	28 - 40' x 29' Tainter	8 - 50' x 23.5' Tainter
24	Design discharge capacity, cfs	275,000 at elev 2253.3	827,000 at elev 1858.5	304,000 at elev 1644.4
25	Discharge capacity at maximun operating pool in cfs	230,000	660,000	80,000
	Reservoir Data (6)			
26	Max. operating pool elev. & area	2250 msl 245,000 acres	1854 msl 383,000 acres	1620 msl 386,000 acres
27	Max. normal op. pool elev. & area	2246 msl 240,000 acres	1850 msl 365,000 acres	1617 msl 362,000 acres
28	Base flood control elev & area	2234 msl 211,000 acres	1837.5 msl 308,000 acres	1607.5 msl 311,000 acres
29	Min. operating pool elev. & area	2160 msl 89,000 acres	1775 msl 125,000 acres	1540 msl 115,000 acres
	Storage allocation & capacity			
30	Exclusive flood contro	2250-2246 971,000 a.f.	1854-1850 1,495,000 a.f.	1620-1617 1,107,000 a.f.
31	Flood control & multiple use	2246-2234 2,704,000 a.f.	1850-1837.5 4,211,000 a.f.	1617-1607.5 3,208,000 a.f.
32	Carryover multiple use	2234-2160 10,700,000 a.f.	1837.5-1775 12,951,000 a.f.	1607.5-1540 13,353,000 a.f.
33	Permanent	2160-2030 4,088,000 a.f.	1775-1673 4,794,000 a.f.	1540-1415 5,315,000 a.f.
34	Gross	2250-2030 18,463,000 a.f.	1854-1673 23,451,000 a.f.	1620-1415 22,983,000 a.f.
35	Reservoir filling initiate	November 1937	December 1953	August 1958
36	Initially reached min. operating poc	27 May 1942	7 August 1955	3 April 1962
37	Estimated annual sediment inflov	15,600 a.f. 1180 yrs.	21,600 a.f. 1080 yrs.	17,800 a.f. 1560 yrs.
	Outlet Works Data			
38	Location	Right bank	Right Bank	Right Bank
39	Number and size of conduits	2 - 24' 8" diameter (nos. 3 & 4)	1 - 26' dia. and 2 - 22' dia.	6 - 19.75' dia. upstream, 18.25' dia. downstream
40	Length of conduits in feet (8)	No. 3 - 6,615, No. 4 - 7,240	1529	3496 to 3659
41	No., size, and type of service gates	1 - 28' dia. cylindrical gate 6 ports, 7.6' x 8.5' high (net opening) in each control shaft	1 - 18' x 24.5' Tainter gate per conduit for fine regulation	1 - 13' x 22' per conduit, vertical lift, 4 cable suspension and 2 hydraulic suspension (fine regulation)
42	Entrance invert elevation (msl	2095	1672	1425
43	Avg. discharge capacity per condui & total	Elev. 2250 22,500 cfs - 45,000 cfs	Elev. 1854 30,400 cfs - 98,000 cfs	Elev. 1620 18,500 cfs - 111,000 cfs
44	Present tailwater elevation (ft msl	2032-2036 5,000 - 35,000 cfs	1669-1677 15,000- 60,000 cfs	1422-1427 20,000-55,000 cfs
	Power Facilities and Data			
45	Avg. gross head available in feet (14	194	161	174
46	Number and size of conduits	No. 1-24'8" dia., No. 2-22'4" dia.	5 - 29' dia., 25' penstocks	7 - 24' dia., imbedded penstocks
47	Length of conduits in feet (8)	No. 1 - 5,653, No. 2 - 6,355	1829	From 3,280 to 4,005
48	Surge tanks	PH#1: 3-40' dia., PH#2: 2-65' dia.	65' dia. - 2 per penstock	70' dia., 2 per penstock
49	No., type and speed of turbines	5 Francis, PH#1-2: 128.5 rpm, 1-164 rpm , PH#2-2: 128.6 rpm	5 Francis, 90 rpm	7 Francis, 100 rpm
50	Discharge cap. at rated head in cfs	PH#1, units 1&3 170', 2-140' 8,800 cfs, PH#2-4&5 170'-7,200 cfs	150' 41,000 cfs	185' 54,000 cfs
51	Generator nameplate rating in kW	1&3: 43,500; 2: 18,250; 4&5: 40,000	3 - 121,600, 2 - 109,250	112,290
52	Plant capacity in kW	185,250	583,300	786,030
53	Dependable capacity in kW (9)	181,000	388,000	534,000
54	Avg. annual energy, million kWh (12	1,046	2,251	2,625
55	Initial generation, first and last uni	July 1943 - June 1961	January 1956 - October 1960	April 1962 - June 1963
56	Estimated cost September 1999 completed project (13)	$158,428,000	$305,274,000	$346,521,000

Summary of Engineering Data -- Missouri River Mainstem System

Big Bend Dam - Lake Sharpe	Fort Randall Dam - Lake Francis Case	Gavins Point Dam - Lewis & Clark Lake	Total	Item No.	Remarks
21 miles upstream Chamberlain, SD	Near Lake Andes, SD	Near Yankton, SD		1	(1) Includes 4,280 square miles of non-contributing areas.
Mile 987.4	Mile 880.0	Mile 811.1		2	
249,330 (1) 5,840	263,480 (1) 14,150	279,480 (1) 16,000		3	
80, ending near Pierre, SD	107, ending at Big Bend Dam	25, ending near Niobrara, NE	755 miles	4	(2) Includes 1,350 square miles of non-contributing areas.
200 (elevation 1420)	540 (elevation 1350)	90 (elevation 1204.5)	5,940 miles	5	(3) With pool at base of flood control.
28,900	30,000 1,100	32,000 2,000		6	
440,000 (April 1952)	447,000 (April 1952)	480,000 (April 1952)		7	(4) Storage first available for regulation of flows
1959	1946	1952		8	(5) Damming height is heigh from low water to maximum
1964	1953	1955		9	operating pool. Maximum height is from average streambed to top of dam.
1440	1395	1234		10	
10,570 (including spillway	10,700 (including spillway	8,700 (including spillway	71,596	11	(6) Based on latest available storage data.
78	140	45	863 feet	12	
95	165	74		13	(7) River regulation is attained by flows over low-crested spillway and through turbines.
1200, 700	4300, 1250	850, 450		14	
Pierre shale & Niobrara chalk	Niobrara chalk	Niobrara chalk & Carlile shale		15	(8) Length from upstream face of outlet or to spiral case.
Rolled earth, shale, chalk fil	Rolled earth fill & chalk berms	Rolled earth & chalk fil		16	
17,000,000	28,000,000 & 22,000,000	7,000,000	358,128,000 cu. yds	17	(9) Based on 8th year (1961) of drought drawdown (From study 8-83-1985).
540,000	961,000	308,000	5,554,000 cu. yds.	18	
24 July 1963	20 July 1952	31 July 1955		19	
Left bank - adjacent	Left bank - adjacent	Right bank - adjacent		20	(10) Affected by level of Lake Francis case. Applicable to pool at elevation 1350.
1385	1346	1180		21	
376 gated	1000 gated	664 gated		22	(11) Spillway crest
8 - 40' x 38' Tainter	21 - 40' x 29' Tainter	14 - 40' x 30' Tainter		23	(12) 1967-2013 Average
390,000 at elev 1433.6	633,000 at elev 1379.8	584,000 at elev 1221.4		24	(13) Source: Annual Report on Civil Works Activities of the Corps of Engineers. Extract Report Fiscal Year 1999.
270,000	508,000	345,000		25	
1423 msl 61,000 acres	1375 msl 102,000 acres	1210 msl 29,000 acres	1,207,000 acres	26	(14) Based on Study 8-83-1985
1422 msl 60,000 acres	1365 msl 94,000 acres	1208 msl 25,000 acres	1,146,000 acres	27	
1420 msl 57,000 acres	1350 msl 76,000 acres	1204.5 msl 21,000 acres	985,000 acres	28	
1415 msl 50,000 acres	1320 msl 36,000 acres	1204.5 msl 21,000 acres	437,000 acres	29	
1423-1422 61,000 a.f.	1375-1365 986,000 a.f.	1210-1208 54,000 a.f.	4,673,000 a.f.	30	
1422-1420 118,000 a.f.	1365-1350 1,306,000 a.f.	1208-1204.5 79,000 a.f.	11,625,000 a.f.	31	
	1350-1320 1,532,000 a.f.		38,536,000 a.f.	32	
1420-1345 1,631,000 a.f.	1320-1240 1,469,000 a.f.	1204.5-1160 295,000 a.f.	17,582,000 a.f.	33	
1423-1345 1,810,000 a.f.	1375-1240 5,293,000 a.f.	1210-1160 428,000 a.f.	72,416,000 a.f.	34	
November 1963	January 1953	August 1955		35	
25 March 1964	24 November 1953	22 December 1955		36	
5,300 a.f. 340 yrs.	15,800 a.f. 340 yrs.	2,600 a.f. 160 yrs.	78,700 a.f.	37	
	Left Bank			38	
None (7)	4 - 22' diameter	None (7)		39	
	1013			40	
	2 - 11' x 23' per conduit, vertical lift, cable suspension			41	
1385 (11)	1229	1180 (11)		42	
	Elev 1375			43	
	32,000 cfs - 128,000 cfs				
1351-1355(10) 25,000-100,000 cfs	1228-1237 10,000-60,000 cfs	1153-1161 15,000-60,000 cfs		44	
70	117	48	764 feet	45	
None: direct intake	8 - 28' dia., 22' penstocks	None: direct intake		46	
	1,074		55,083	47	
None	59' dia, 2 per alternate penstock	None		48	
8 Fixed blade, 81.8 rpm	8 Francis, 85.7 rpm	3 Kaplan, 75 rpm	36 units	49	
67' 103,000 cfs	112' 44,500 cfs	48' 36,000 cfs		50	
3 - 67,276, 5 - 58,500	40,000	44,100		51	
494,320	320,000	132,300	2,501,200 kw	52	
497,000	293,000	74,000	1,967,000 kw	53	Corps of Engineers, U.S. Army
981	1,726	725	9,354 million kWh	54	Compiled by Northwestern Division
October 1964 - July 1966	March 1954 - January 1956	September 1956 - January 1957	July 1943 - July 1966	55	
				56	Missouri River Region
$107,498,000	$199,066,000	$49,617,000	$1,166,404,000		August 2014

Plate 3
Summary of Master Manual Technical Criteria

NAVIGATION TARGET FLOWS

Location	Minimum Service (kcfs)	Full Service (kcfs)
Sioux City	25	31
Omaha	25	31
Nebraska City	31	37
Kansas City	35	41

RELATION OF SYSTEM STORAGE TO NAVIGATION SERVICE LEVEL

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

RELATION OF SYSTEM STORAGE TO NAVIGATION SEASON LENGTH

Date	System Storage (MAF)	Final Day of Navigation Support at Mouth of the Missouri River
July 1	51.5 or more	November 30 (8-month season)
July 1	46.8 through 41.0	October 31 (7-month season)
July 1	36.5 or less	September 30 (6-month season)

RELATION OF SYSTEM WINTER RELEASE TO SYSTEM STORAGE

September 1 System Storage (MAF)	Average Winter Release for Gavins Point
58.0 or more	17,000 cfs
55.0 or less	12,000 cfs

GAVINS POINT RELEASES NEEDED TO MEET TARGET FLOWS

1950 to 1996 Data (kcfs)

Median, Upper Quartile, Upper Decile Runoff

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Full Service	26.7	28.0	27.9	31.6	33.2	32.6	32.0	31.1
Minimum Service	20.7	22.0	21.9	25.6	27.2	26.6	26.0	25.1

Lower Quartile, Lower Decile Runoff

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Full Service	29.8	31.3	31.2	34.3	34.0	33.5	33.1	31.2
Minimum Service	23.8	25.3	25.2	28.3	28.0	27.5	27.1	25.2

RESERVOIR UNBALANCING SCHEDULE

	Fort Peck		Garrison		Oahe	
Year	*March 1*	*Rest of Year*	*March 1*	*Rest of Year*	*March 1*	*Rest of Year*
1	High	Float	Low	Hold Peak	Raise & hold during spawn	Float
2	Raise & hold during spawn	Float	High	Float	Low	Hold peak
3	Low	Hold peak	Raise & hold during spawn	Float	High	Float

Notes: **Float year:** Normal regulation, then unbalance 1 foot during low pool years or 3 feet when System storage is near 57.0 MAF on March 1.

Low year: Begin low, then hold peak the remainder of the year.

High year: Begin high, raise and hold pool during spawn, then float.

MRNRC RECOMMENDED RESERVOIR ELEVATION GUIDELINES FOR UNBALANCING

	Fort Peck	Garrison	Oahe
Implement unbalancing if March 1 pool is above this level.	2234 feet msl	1837.5 feet msl	1607.5 feet msl
Implement unbalancing if March 1 pool level is in this range **and** the pool is expected to raise more than 3 feet after March 1.	2227-2234 feet msl	1827-1837.5 feet msl	1600-1607.5 feet msl
Scheduling Criteria	Avoid pool level decline during spawn period which ranges from April 15 – May 30	Schedule after spawn period of April 20 – May 20	Schedule after spawn period of April 8 – May 15

Plate 3 (cont'd)
Summary of Master Manual Technical Criteria

TECHNICAL CRITERIA FOR SPRING PULSES FROM GAVINS POINT DAM

Criteria Applicable to Both the March and May Spring Pulses

Flood Control Constraints	No change from current levels

Criteria Applicable to the March Spring Pulse

Drought Preclude	40.0 MAF or below measured on March 1.
Drought Proration of Pulse Magnitude*	None, 5 kcfs added to navigation releases, but no greater than 35 kcfs.
Initiation of Pulse	Extend the stepped System release increases that precede the beginning of the navigation season.
Rate of Rise before Peak	Approximately 5 kcfs for 1 day.
Duration of Peak	Two days.
Rate of Fall after Peak	Drop over 5 days to navigation target release.

Criteria Applicable to Time Period Between the Bimodal Pulses

Release	Existing Master Manual Criteria

Criteria Applicable to the May Spring Pulse

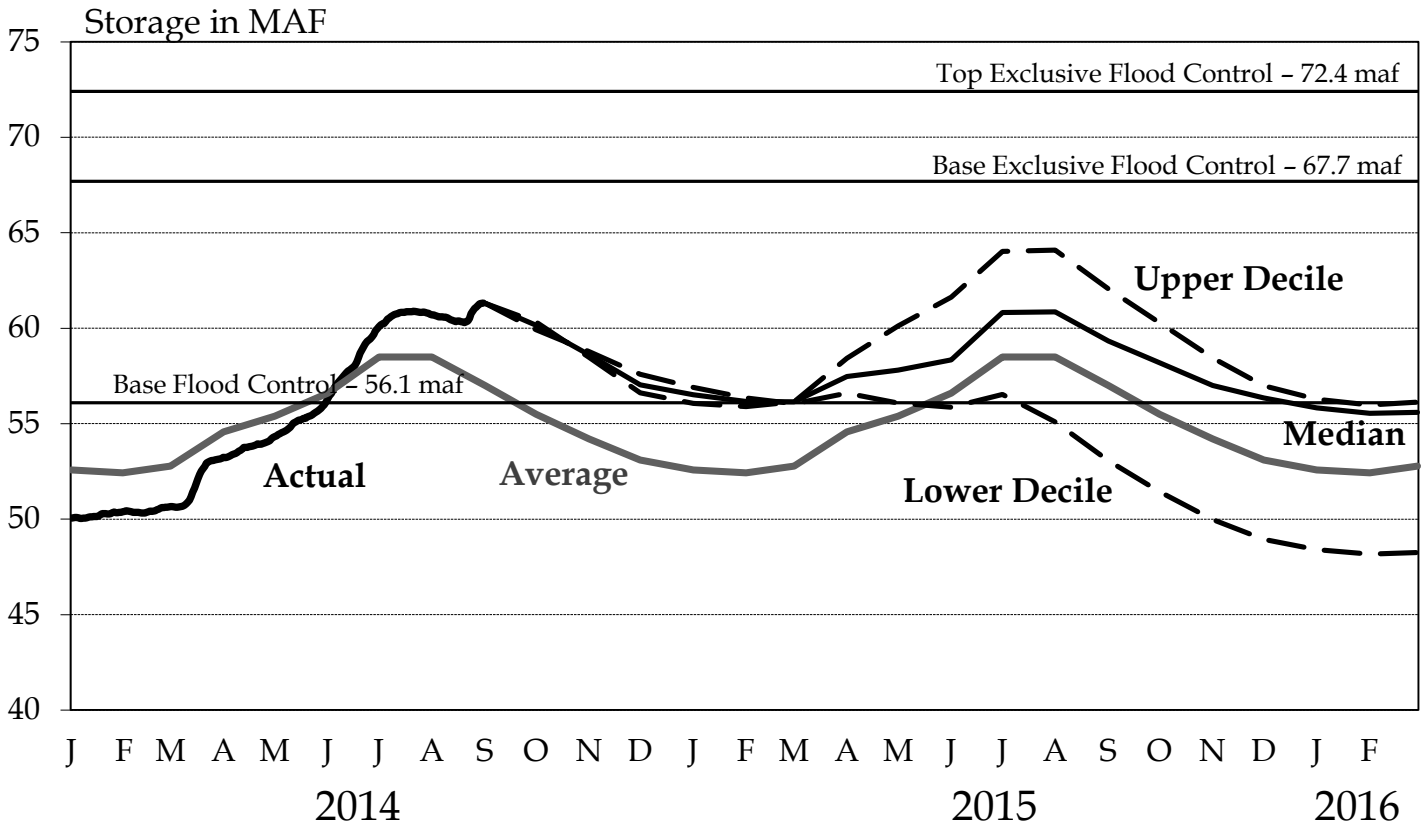
Drought Preclude	40.0 MAF or below measured on May 1.
Proration of Pulse Magnitude Based On System Storage*	Prorated from 16 kcfs based on a May 1 System Storage check; 100% at 54.5 MAF; straight line interpolation to 75% at 40.0 MAF.
Proration of Pulse Magnitude Based On Projected Runoff*	After the proration of the spring pulse magnitude for System Storage, the resultant magnitude would be further adjusted either up or down based on the May CY runoff forecast; 100% for Median; straight-line interpolation to 125% at Upper Quartile runoff; 125% for runoff above Upper Quartile; straight-line interpolation to 75% at Lower Quartile runoff; 75% for runoff below Lower Quartile.
Initiation of Pulse	Between May 1 to May 19, depending on Missouri River water temperature immediately below Gavins Point Dam. If possible, pulse will be initiated after the second daily occurrence of a 16 degree Celsius water temperature; however, the decision will be informed by the potential for 'take' of Threatened and Endangered bird species.
Rate of Rise before Peak	Approximately 6 kcfs per day.
Duration of Peak	Two days.
Rate of Fall after Peak	Approximately 30% drop over 2 days followed by a proportional reduction in releases back to the existing Master Manual criteria over an 8-day period.

Spring Pulse Downstream Flow Limits

Omaha	41,000 cfs
Nebraska City	47,000 cfs
Kansas City	71,000 cfs

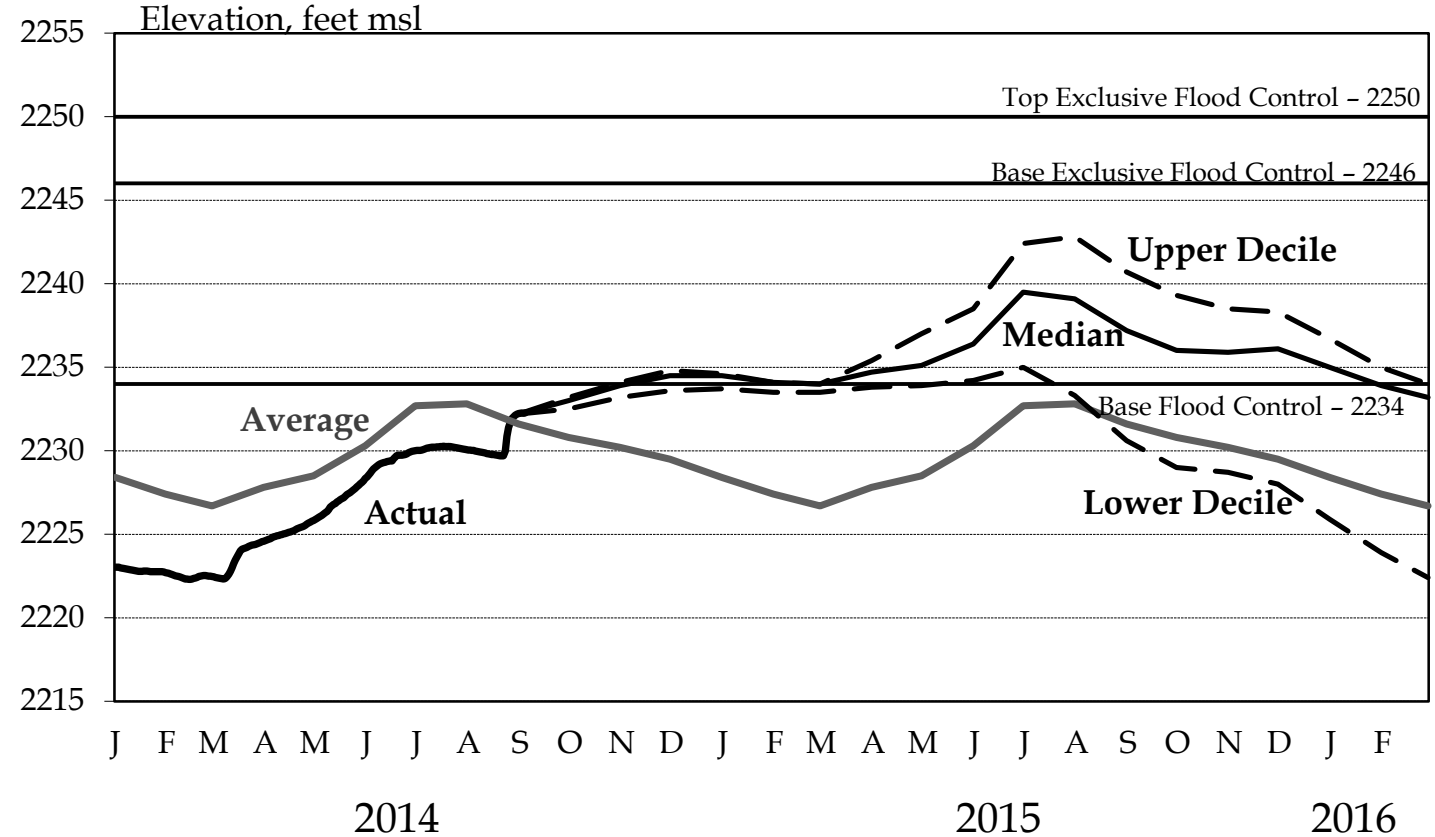
* Spring pulse magnitudes will be determined by taking the difference between pre-pulse Gavins Point releases and the peak pulse Missouri River flows measured just downstream of the mouth of the James River.

System Storage
2014-2015 Draft AOP



Average 1967-2013

Fort Peck
2014-2015 Draft AOP

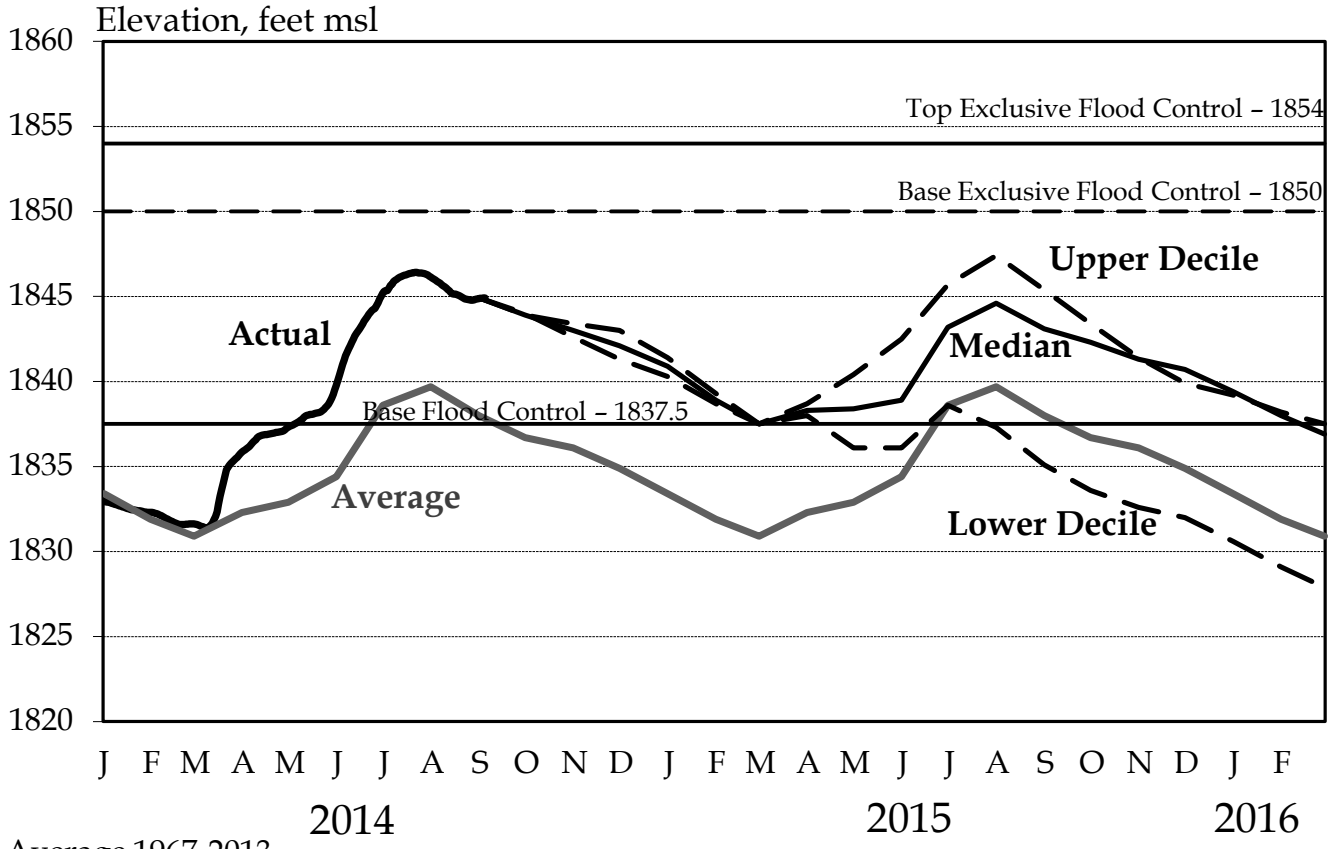


Average 1967-2013

Plate 4

Garrison

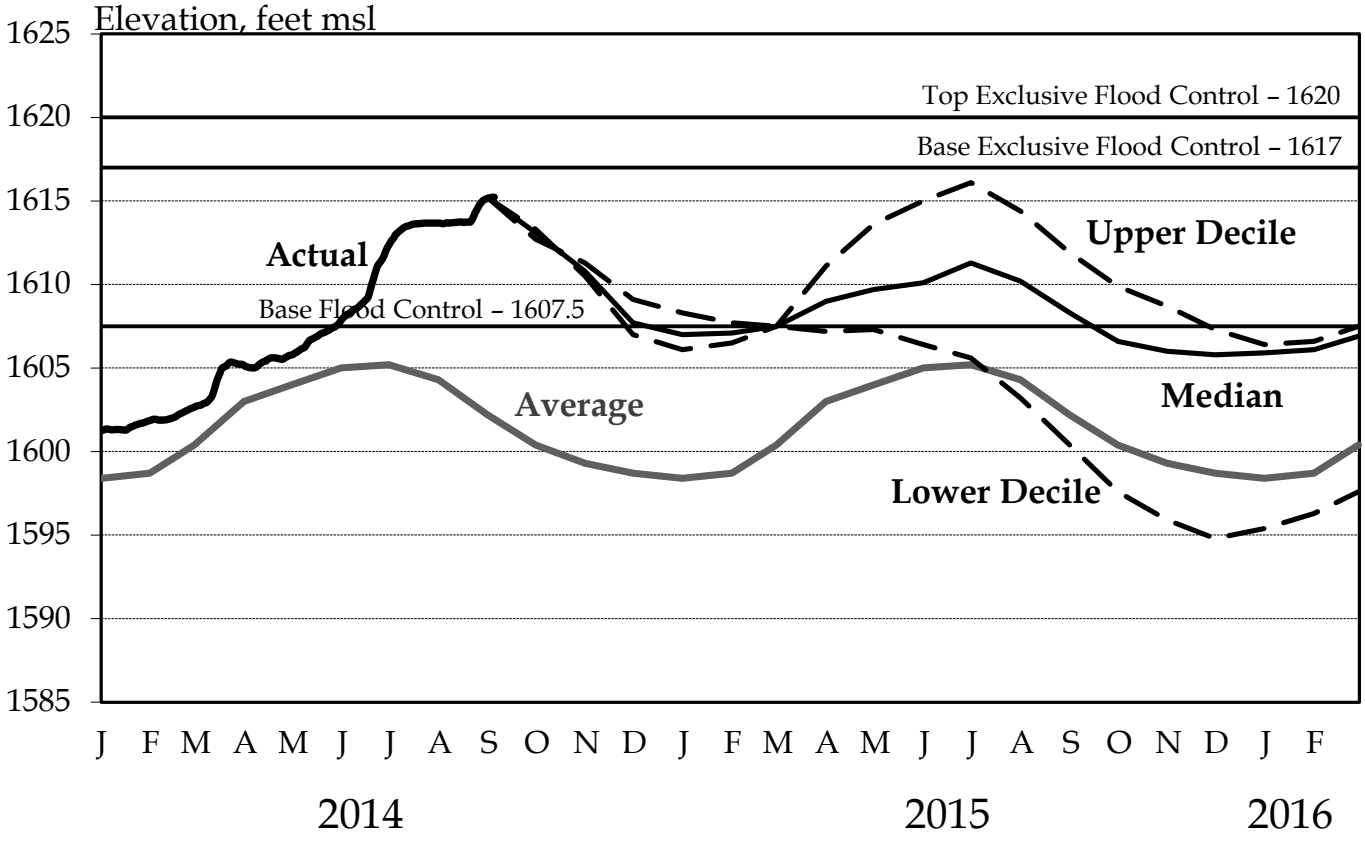
2014-2015 Draft AOP



Average 1967-2013

Oahe

2014-2015 Draft AOP



Average 1967-2013

System Storage

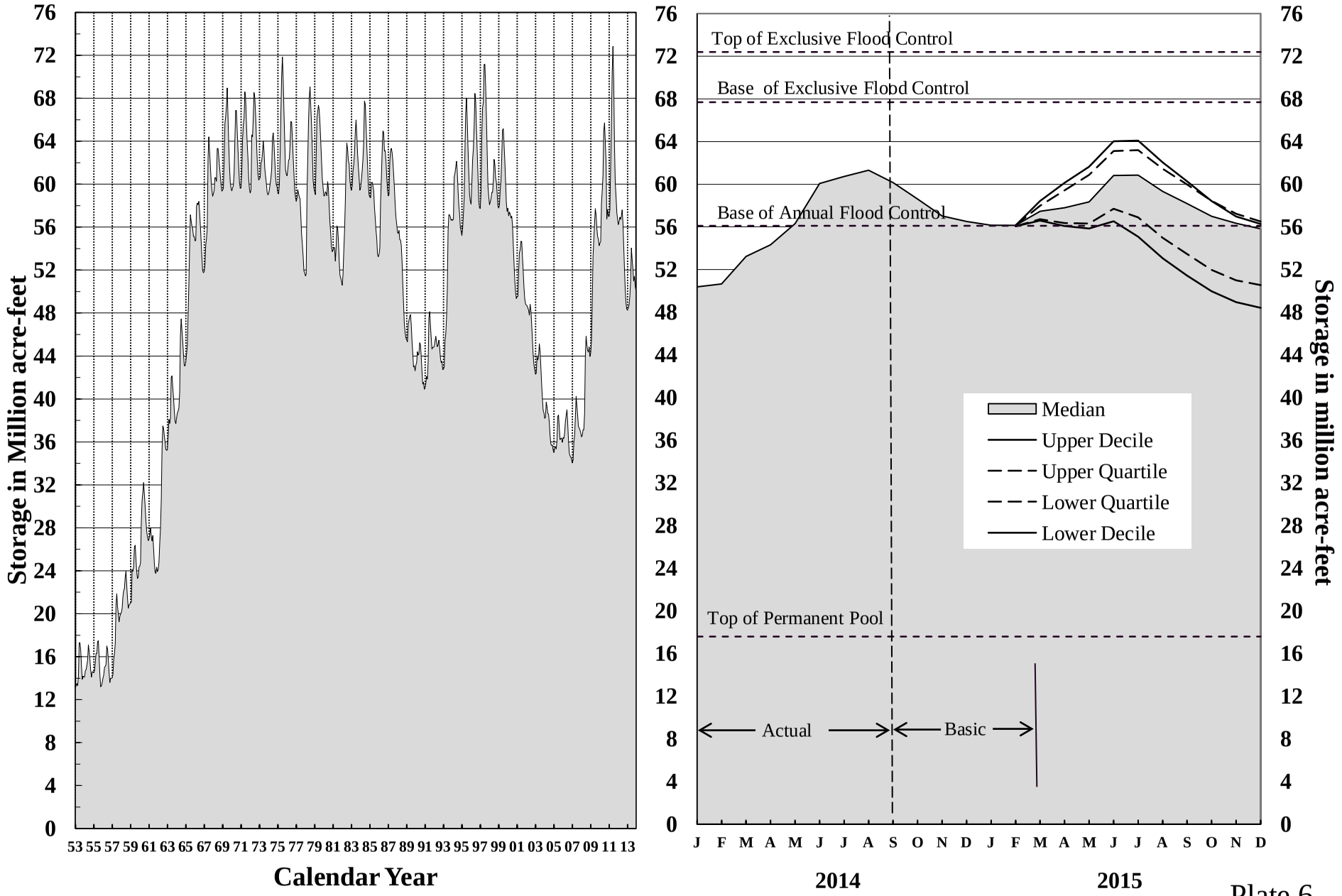


Plate 6

Gavins Point Releases

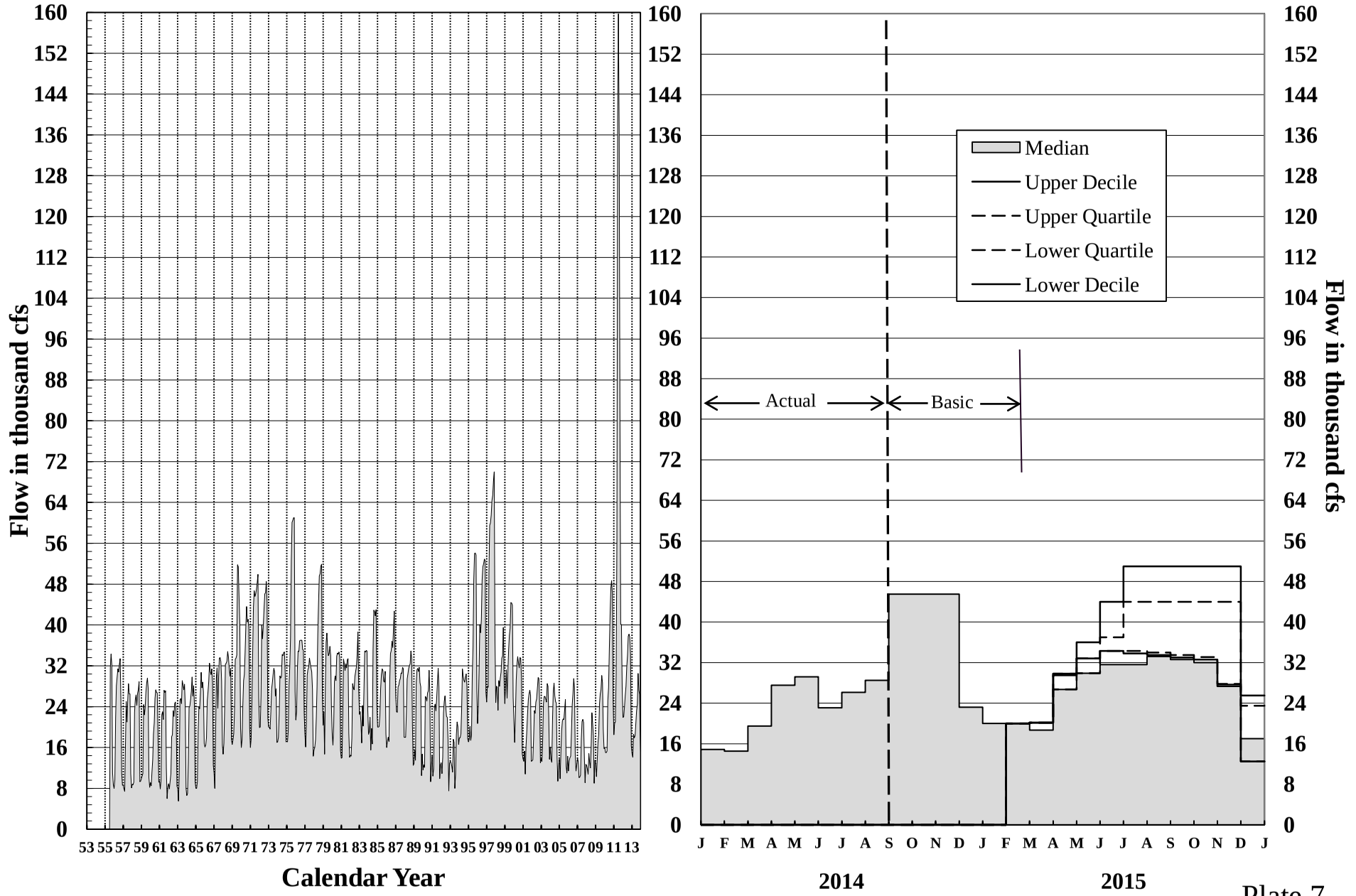
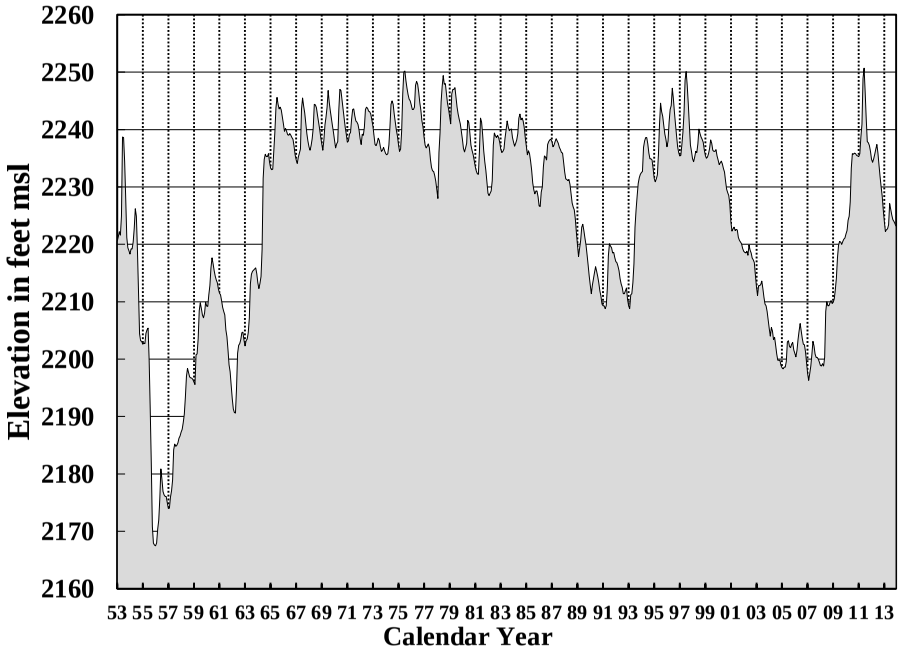
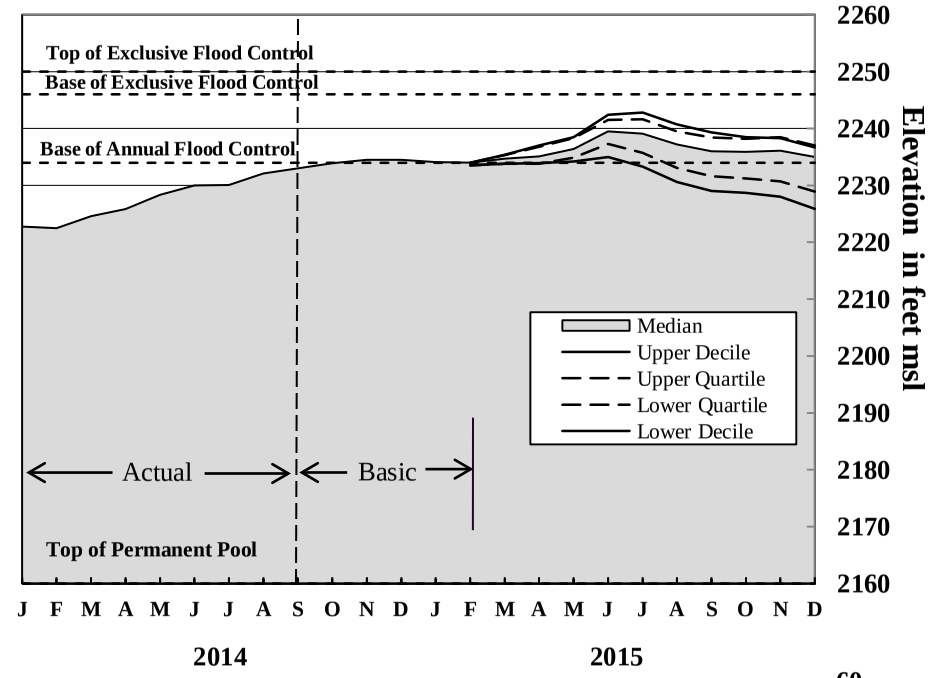


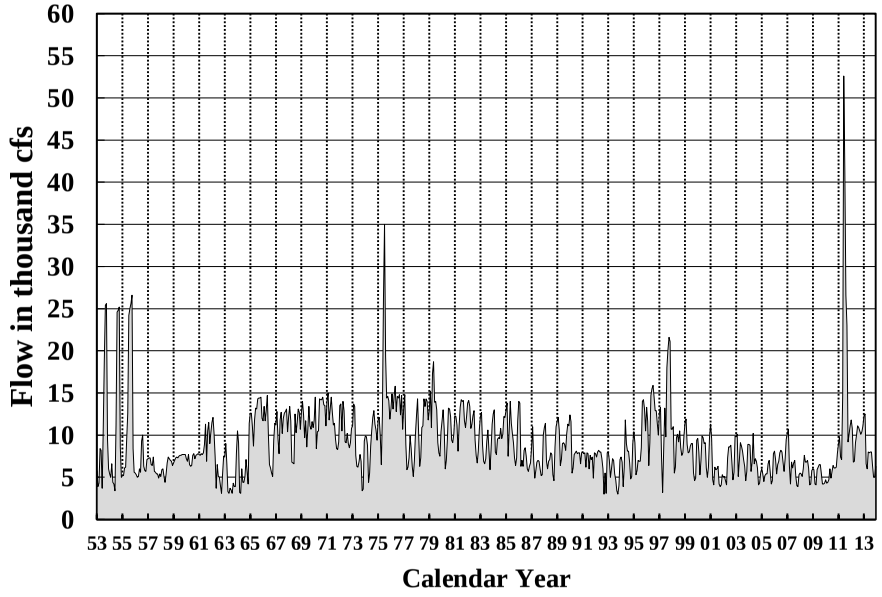
Plate 7

Fort Peck

Elevations and Releases







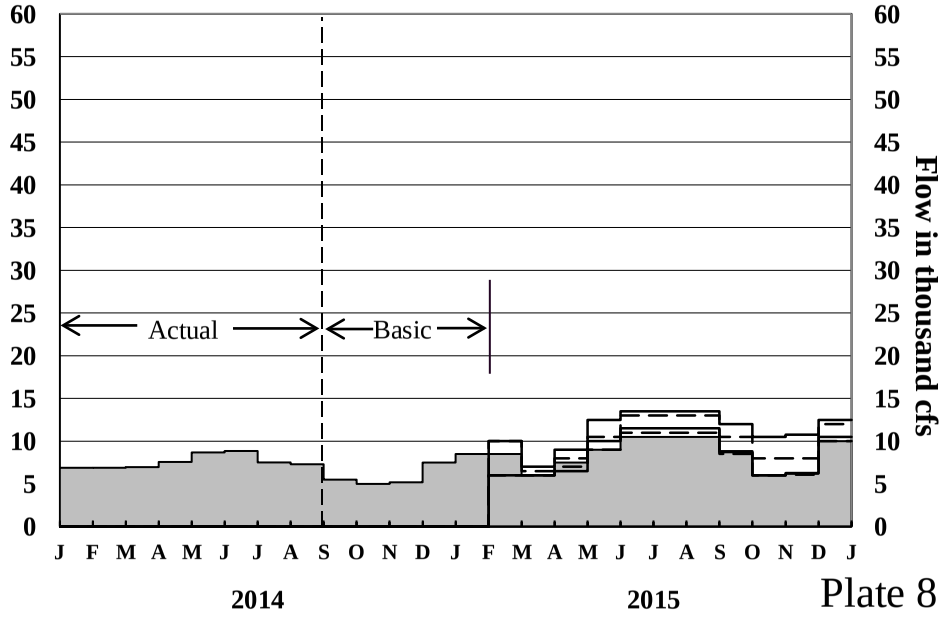
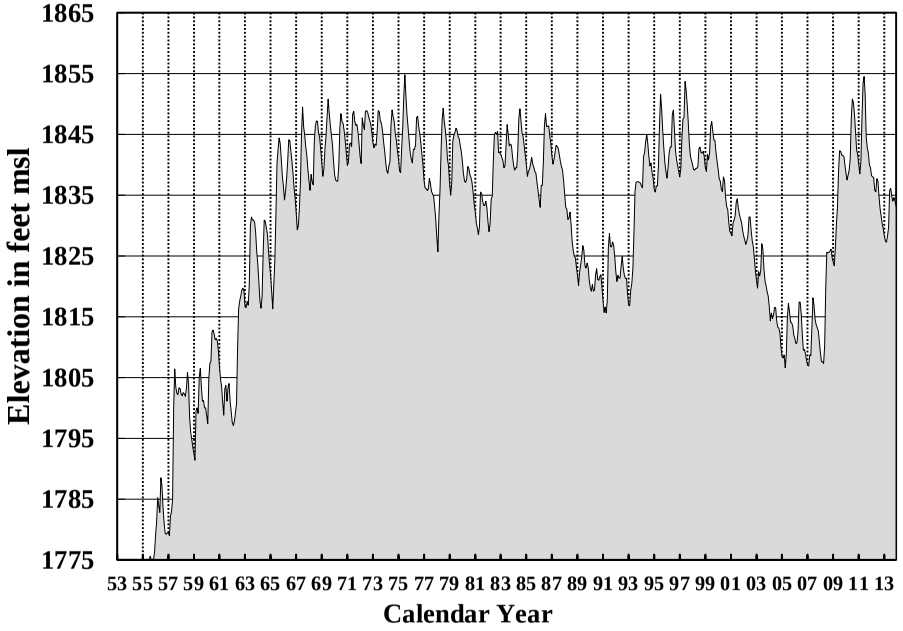
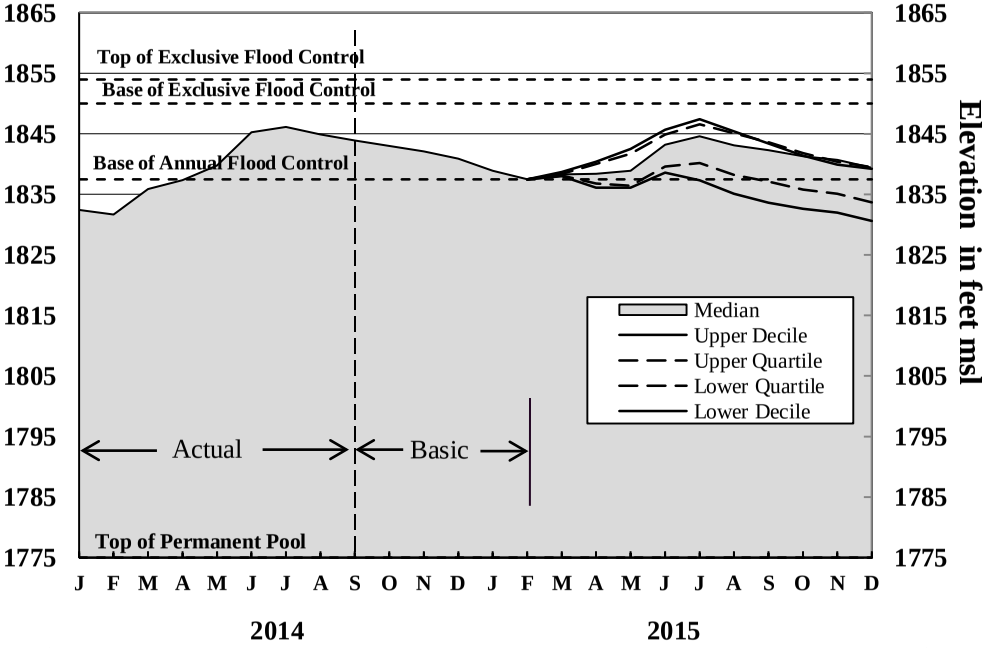


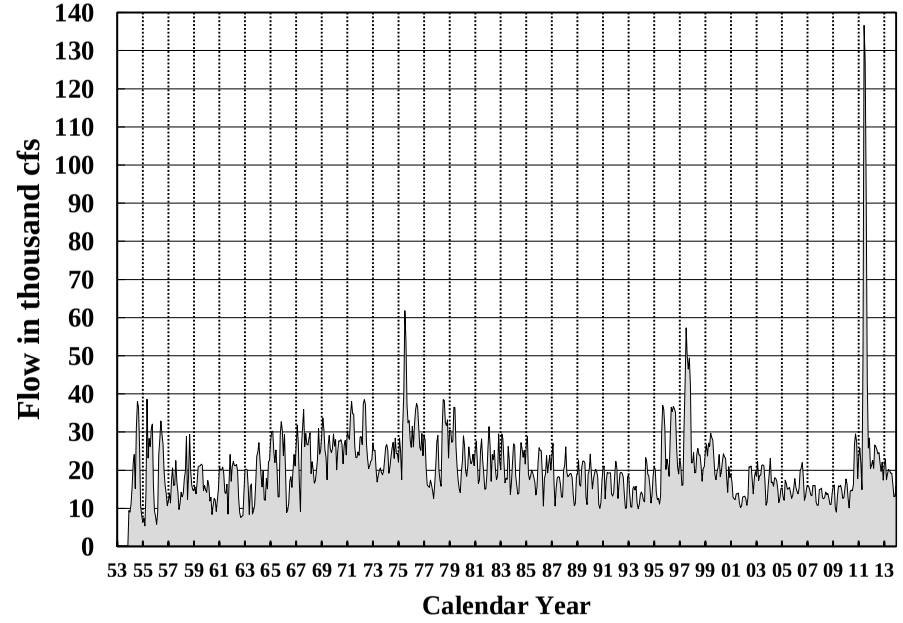
Plate 8

Garrison

Elevations and Releases







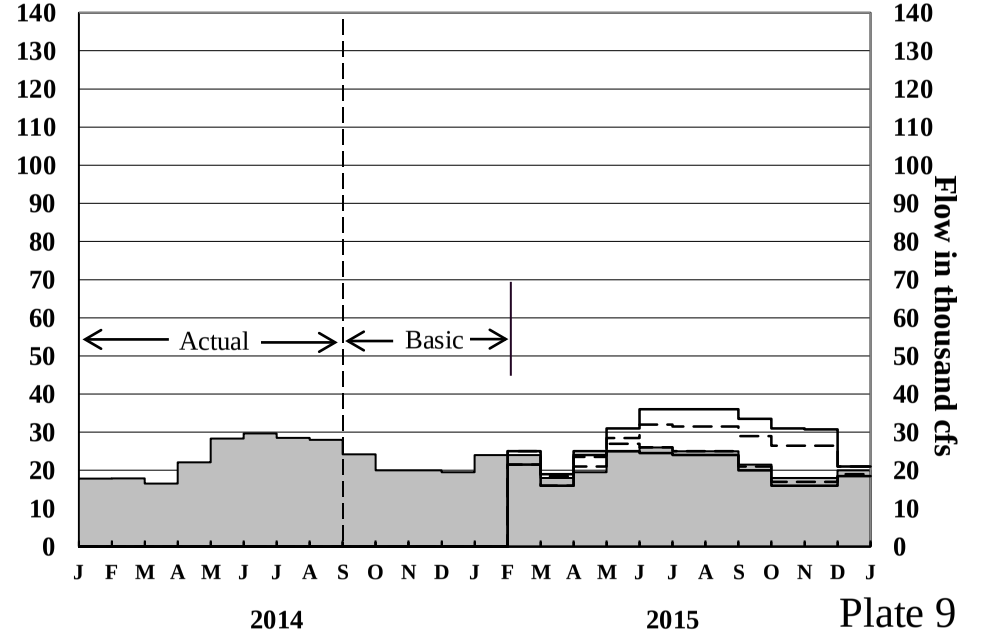
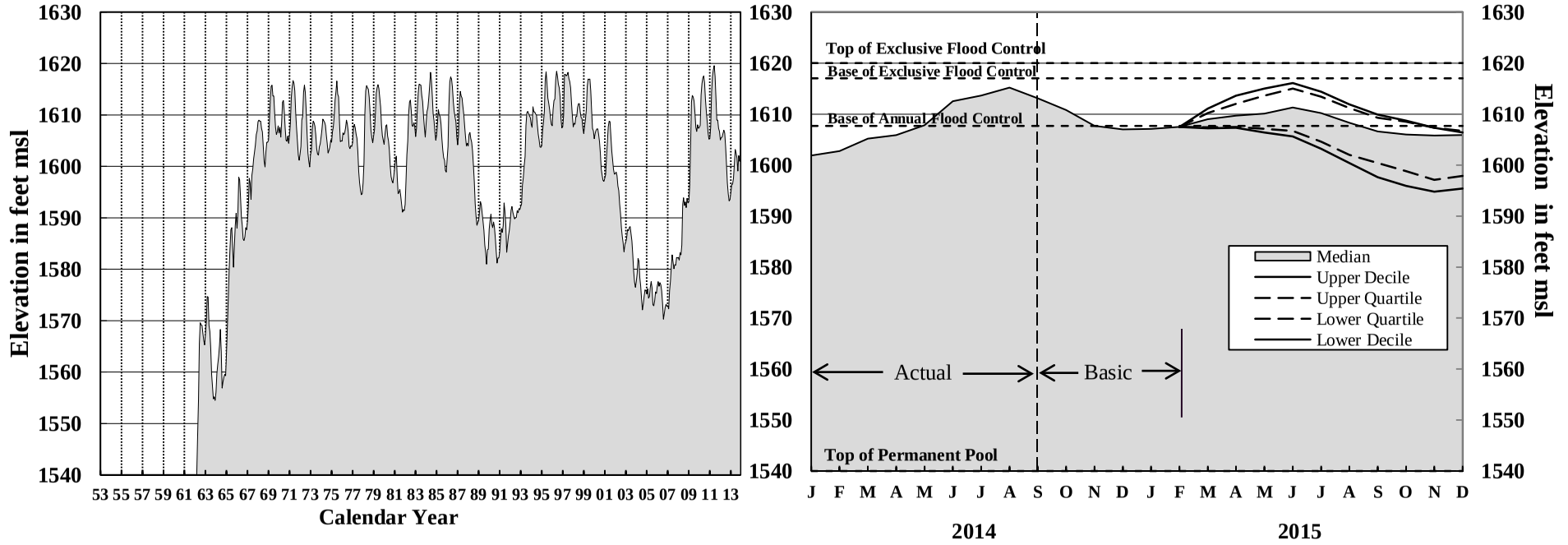


Plate 9

Oahe

Elevations and Releases



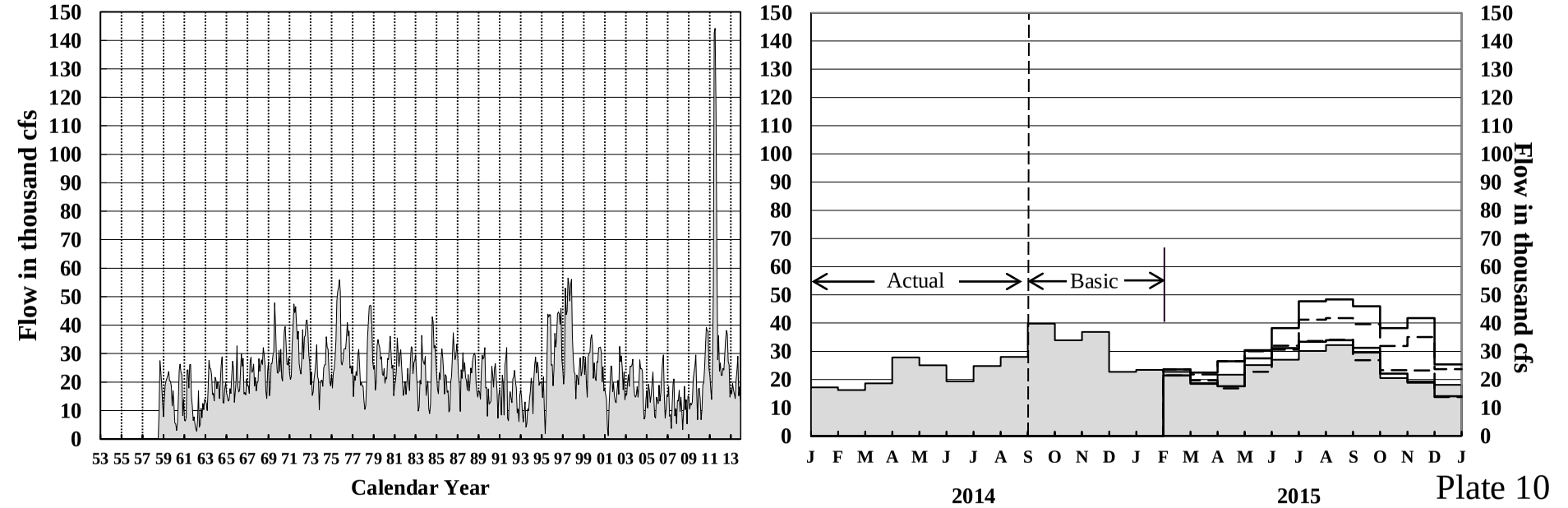
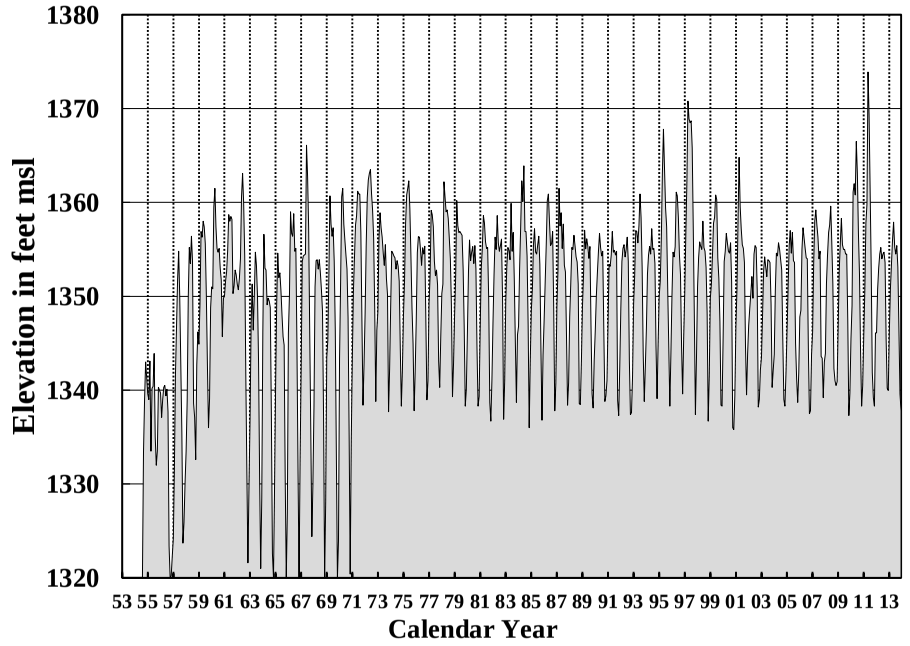
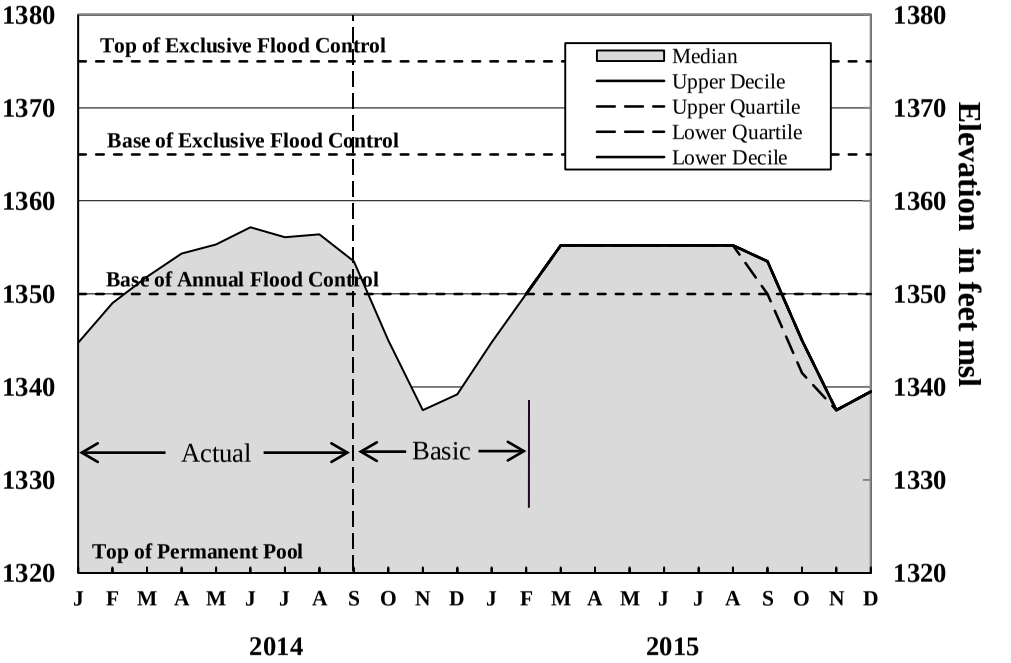
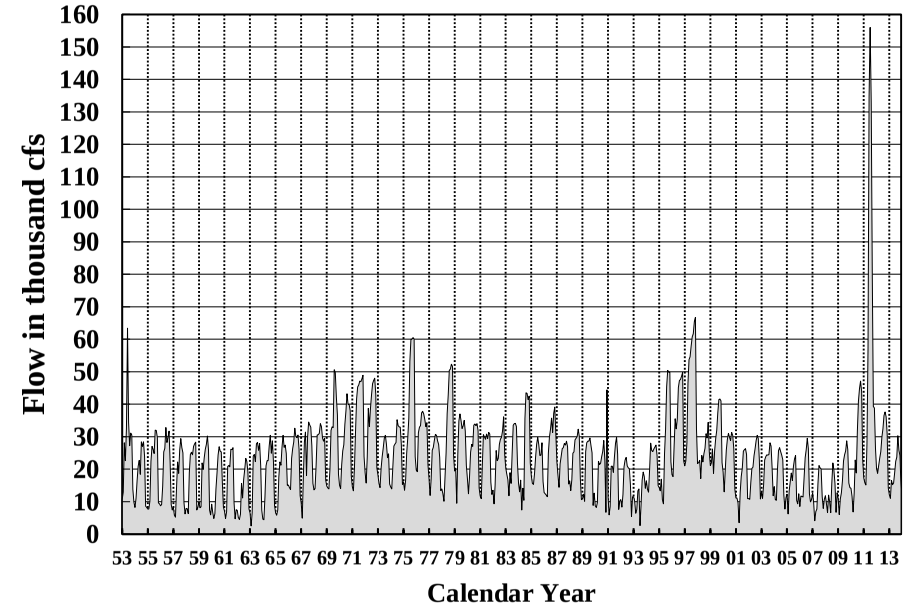


Plate 10

Fort Randall
Elevations and Releases







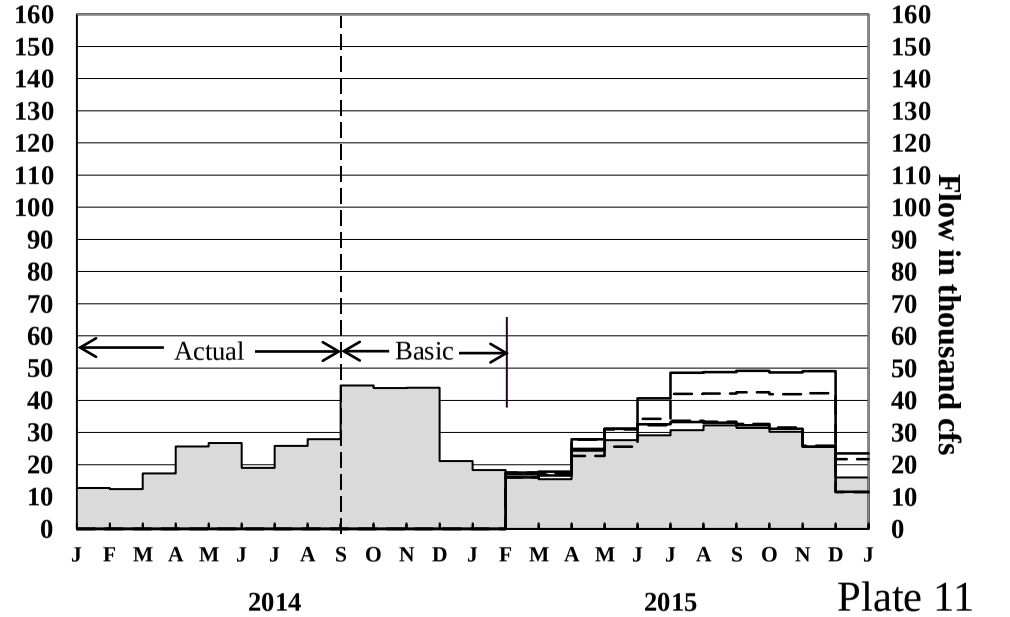
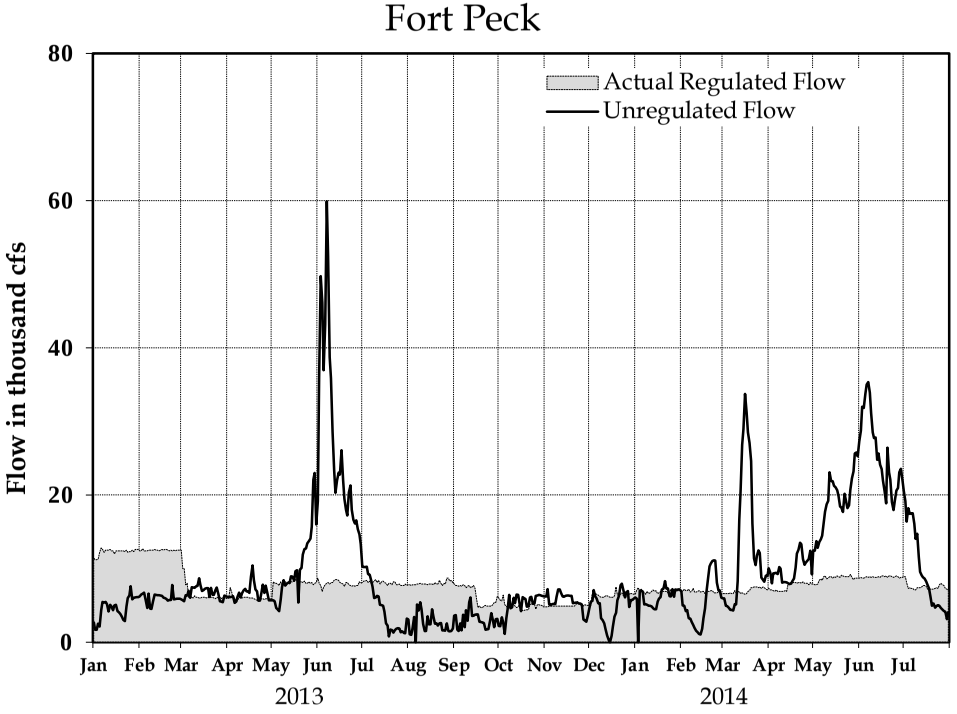
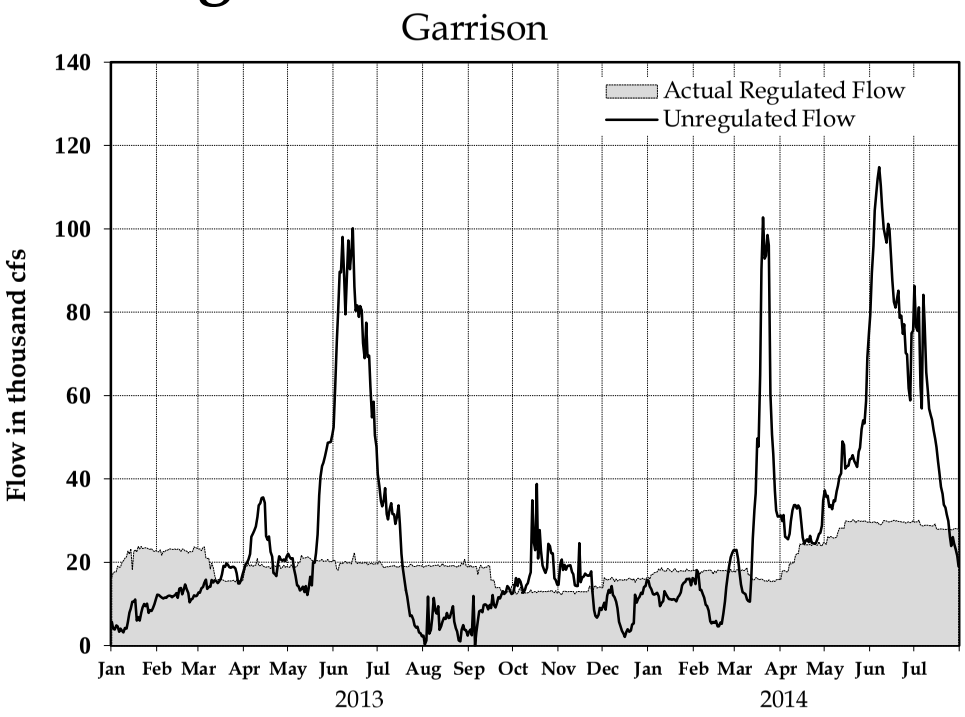
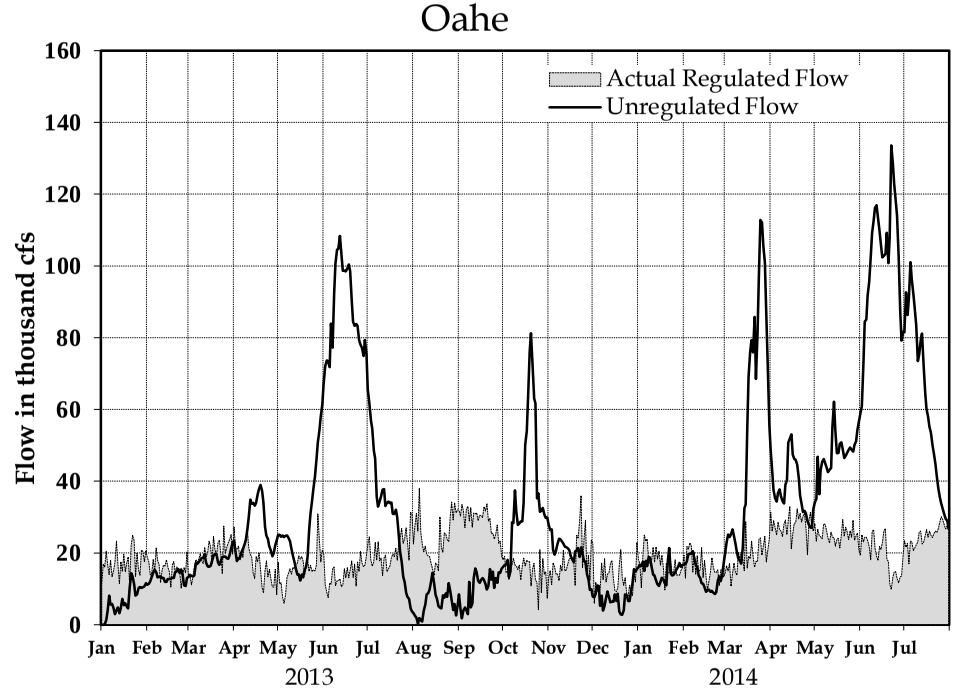


Plate 11

Reservoir Release and Unregulated Flow







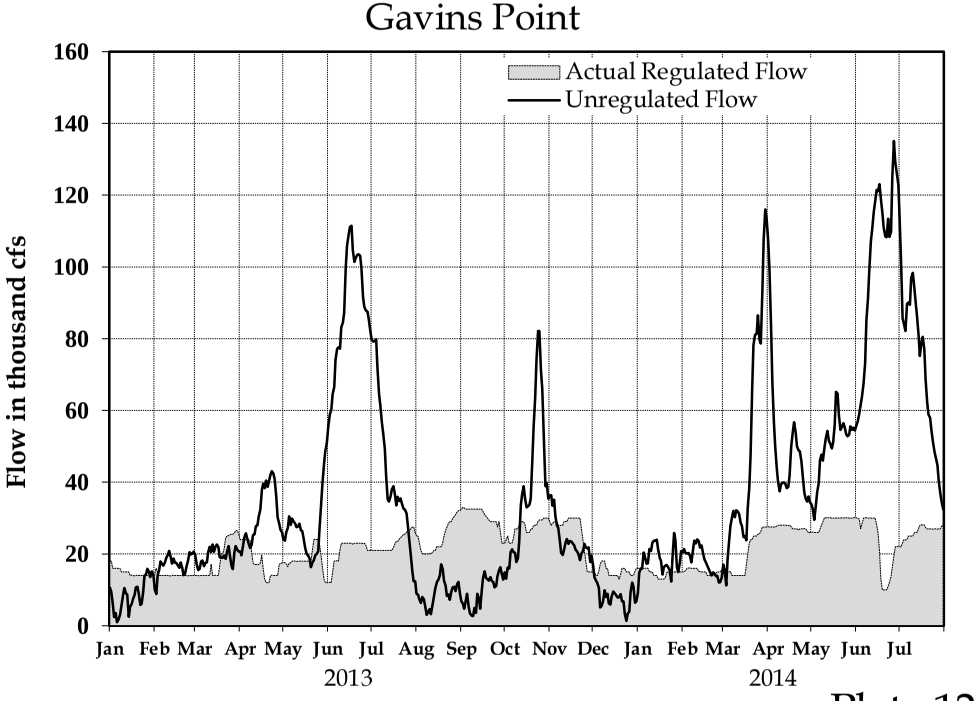


Plate 12

System Gross Capability and Average Monthly Generation

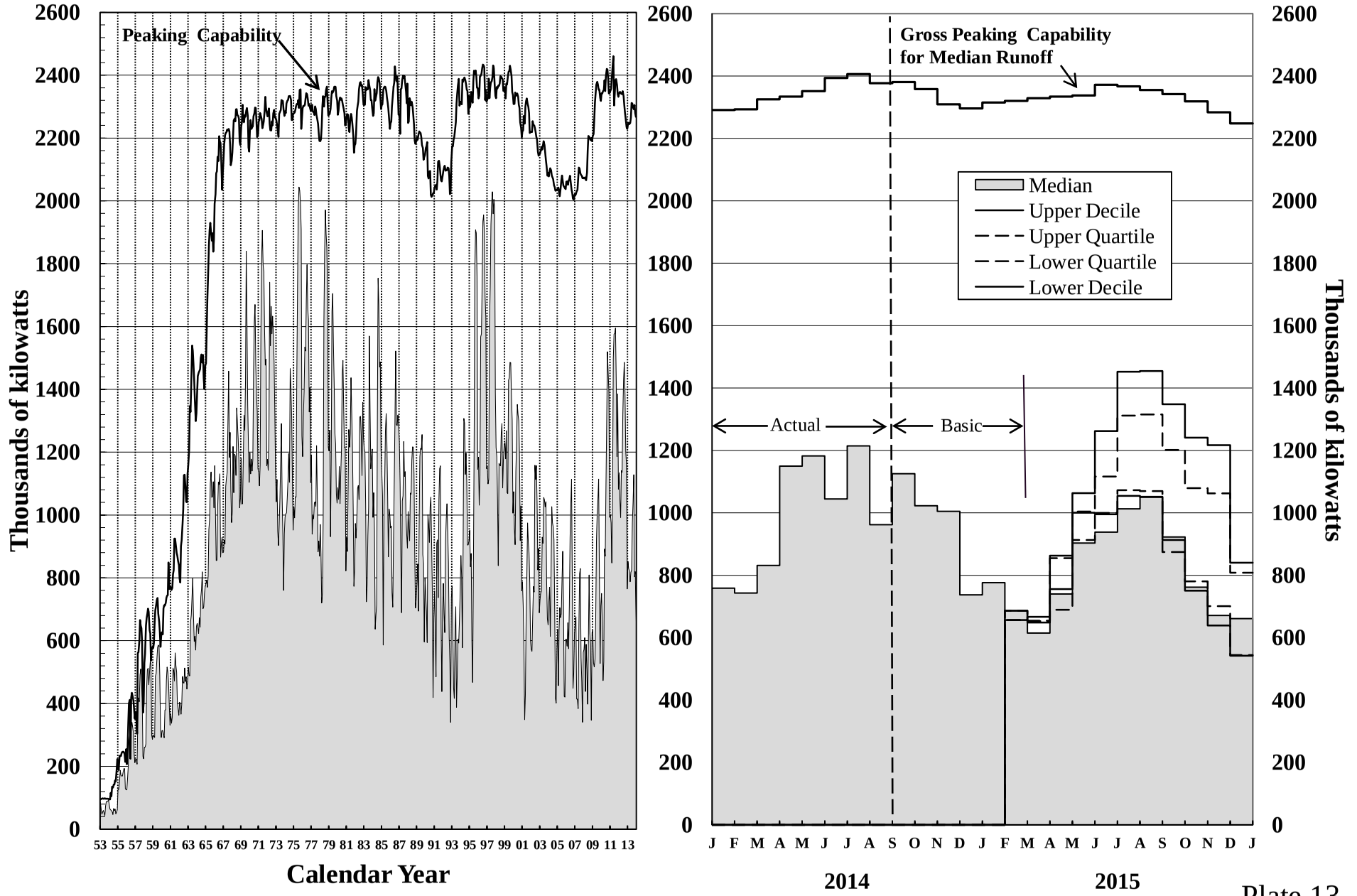
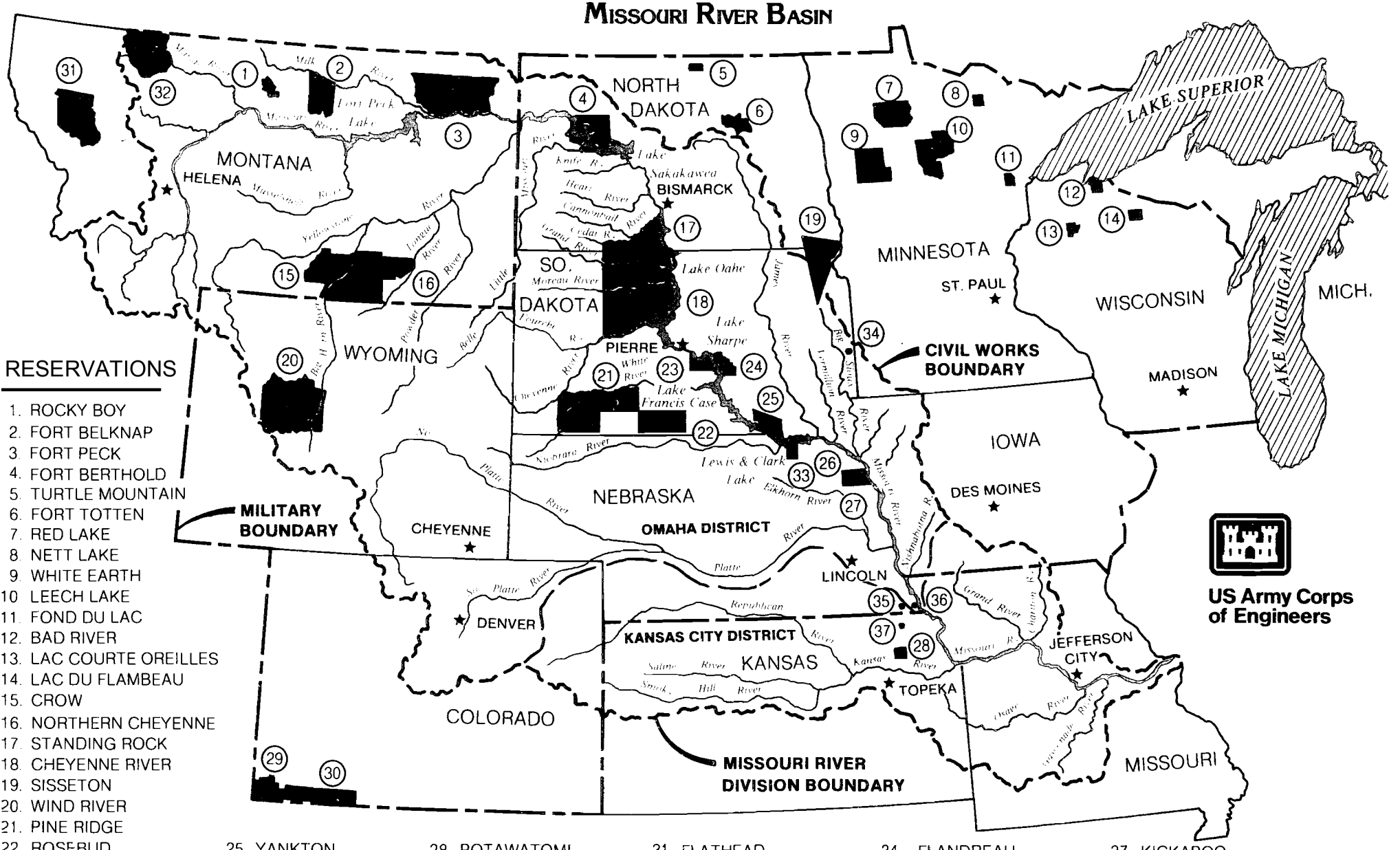


Plate 13

AMERICAN INDIAN RESERVATIONS

MISSOURI RIVER BASIN



RESERVATIONS

1. ROCKY BOY
2. FORT BELKNAP
3. FORT PECK
4. FORT BERTHOLD
5. TURTLE MOUNTAIN
6. FORT TOTTEN
7. RED LAKE
8. NETT LAKE
9. WHITE EARTH
10. LEECH LAKE
11. FOND DU LAC
12. BAD RIVER
13. LAC COURTE OREILLES
14. LAC DU FLAMBEAU
15. CROW
16. NORTHERN CHEYENNE
17. STANDING ROCK
18. CHEYENNE RIVER
19. SISSETON
20. WIND RIVER
21. PINE RIDGE
22. ROSEBUD
23. LOWER BRULE
24. CROW CREEK
25. YANKTON
26. WINNEBAGO
27. OMAHA
28. POTAWATOMI
29. UTE MOUNTAIN
30. SOUTHERN UTE
31. FLATHEAD
32. BLACKFEET
33. SANTEE
34. FLANDREAU
35. IOWA
36. SAC AND FOX
37. KICKAPOO

US Army Corps of Engineers

For illustrative purposes. No legal boundaries are implied.

VALUES IN 1000 AF EXCEPT AS INDICATED

	31AUG14	2014						2015	
	INI-SUM	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--									
NAT INFLOW	2573	500	520	245	114	131	390	312	361
DEPLETION	-539	-97	-68	-14	-6	-7	-119	-136	-92
EVAPORATION	335	106	94	43	20	23	50		
MOD INFLOW	2777	491	494	216	101	115	459	448	453
RELEASE	2399	327	307	149	69	90	461	523	472
STOR CHANGE	378	164	187	67	31	25	-2	-75	-19
STORAGE	14417.	14581	14767	14834	14866	14890	14888	14814	14795
ELEV FTMSL	2232.2	2233.0	2233.9	2234.2	2234.4	2234.5	2234.5	2234.1	2234.0
DISCH KCFS	7.300	5.5	5.0	5.0	5.0	5.7	7.5	8.5	8.5
POWER									
AVE POWER MW		75	68	68	68	78	102	116	116
PEAK POW MW		161	162	162	162	163	163	162	162
ENERGY GWH	395.9	53.8	50.7	24.6	11.5	15.0	76.2	86.3	77.9
--GARRISON--									
NAT INFLOW	2807	750	670	230	107	123	310	262	355
DEPLETION	-664	-142	-47	-125	-58	-66	-106	-75	-45
CHAN STOR	-12	17	5		0	-7	-17	-10	
EVAPORATION	406	132	114	51	24	27	58		
REG INFLOW	5452	1104	915	452	211	246	801	850	872
RELEASE	7866	1438	1230	595	278	317	1199	1476	1333
STOR CHANGE	-2414	-334	-315	-143	-67	-72	-398	-626	-461
STORAGE	20145.	19811	19497	19354	19287	19215	18818	18192	17731
ELEV FTMSL	1844.9	1843.9	1843.0	1842.5	1842.3	1842.1	1840.9	1838.9	1837.5
DISCH KCFS	28.000	24.2	20.0	20.0	20.0	20.0	19.5	24.0	24.0
POWER									
AVE POWER MW		310	256	255	255	254	247	302	299
PEAK POW MW		499	498	493	490	487	480	473	468
ENERGY GWH	1206.4	223.4	190.4	91.8	42.8	48.8	183.8	224.5	200.8
--OAHE--									
NAT INFLOW	809	350	170	65	30	35	52	12	95
DEPLETION	95	30	-11	2	1	1	16	22	34
CHAN STOR	13	14	16		0	0	2	-18	
EVAPORATION	407	136	115	51	23	26	56		
REG INFLOW	8186	1636	1311	607	284	325	1181	1448	1394
RELEASE	10744	2369	2084	1009	506	679	1395	1441	1262
STOR CHANGE	-2558	-733	-773	-402	-222	-354	-213	7	132
STORAGE	21222.	20489	19716	19315	19093	18739	18525	18533	18664
ELEV FTMSL	1615.2	1613.1	1610.8	1609.5	1608.9	1607.7	1607.0	1607.1	1607.5
DISCH KCFS	28.000	39.8	33.9	33.9	36.4	42.8	22.7	23.4	22.7
POWER									
AVE POWER MW		528	446	442	472	551	293	302	293
PEAK POW MW		737	725	719	715	709	705	705	708
ENERGY GWH	1695.4	380.5	331.7	159.2	79.3	105.8	217.7	224.4	196.9
--BIG BEND--									
EVAPORATION	79	25	22	10	5	5	12		
REG INFLOW	10665	2344	2062	999	501	674	1383	1441	1262
RELEASE	10690	2369	2062	999	501	674	1383	1441	1262
STORAGE	1656.	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.4	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	25.300	39.8	33.5	33.6	36.1	42.5	22.5	23.4	22.7
POWER									
AVE POWER MW		189	163	167	179	210	113	115	109
PEAK POW MW		517	538	538	538	538	538	538	529
ENERGY GWH	630.4	135.8	121.6	60.1	30.1	40.3	83.9	85.4	73.2
--FORT RANDALL--									
NAT INFLOW	212	80	20	5	2	3	20	28	54
DEPLETION	19	7	1	1	0	1	3	3	3
EVAPORATION	83	32	24	9	4	4	9		
REG INFLOW	10802	2410	2056	994	499	671	1393	1466	1313
RELEASE	11331	2656	2696	1307	610	697	1298	1126	941
STOR CHANGE	-528	-246	-639	-313	-111	-26	95	340	372
STORAGE	3527.	3281	2642	2328	2217	2192	2287	2627	2999
ELEV FTMSL	1356.4	1353.5	1345.0	1340.0	1338.0	1337.5	1339.2	1344.8	1350.0
DISCH KCFS	27.900	44.6	43.8	43.9	43.9	43.9	21.1	18.3	16.9
POWER									
AVE POWER MW		346	326	302	289	285	154	139	135
PEAK POW MW		350	319	296	287	285	293	319	339
ENERGY GWH	1011.6	248.8	242.2	108.8	48.6	54.6	114.8	103.1	90.5
--GAVINS POINT--									
NAT INFLOW	652	100	110	55	26	29	100	100	132
DEPLETION	18	-5	2	5	2	3	10	1	
CHAN STOR	20	-31	1	0	0	0	42	5	3
EVAPORATION	26	8	7	3	2	2	4		
REG INFLOW	11959	2721	2798	1354	632	722	1427	1230	1076
RELEASE	11980	2707	2798	1354	632	722	1427	1230	1111
STOR CHANGE	-21	14							-35
STORAGE	348.	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.9	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	28.500	45.5	45.5	45.5	45.5	45.5	23.2	20.0	20.0
POWER									
AVE POWER MW		115	116	116	116	116	82	71	70
PEAK POW MW		116	116	116	116	116	117	117	114
ENERGY GWH	412.8	83.1	86.2	41.7	19.5	22.2	60.7	52.5	47.0
--GAVINS POINT - SIOUX CITY--									
NAT INFLOW	651	160	140	65	30	35	70	50	101
DEPLETION	93	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY									
KAF	12538	2842	2927	1412	659	753	1483	1265	1197
KCFS		47.8	47.6	47.5	47.5	47.5	24.1	20.6	21.5
--TOTAL--									
NAT INFLOW	7704	1940	1630	665	310	355	942	764	1098
DEPLETION	-978	-182	-112	-124	-58	-66	-182	-170	-85
CHAN STOR	23	0	22	0	0	-7	29	-23	3
EVAPORATION	1336	440	377	167	77	87	188		
STORAGE	61315.	60155	58615	57824	57456	57029	56511	56158	56147
SYSTEM POWER									
AVE POWER MW		1563	1375	1351	1379	1493	991	1043	1021
PEAK POW MW		2381	2358	2324	2309	2298	2296	2315	2320
ENERGY GWH	5352.5	1125.4	1022.7	486.3	231.7	286.8	737.1	776.2	686.2
DAILY GWH		37.5	33.0	32.4	33.1	35.8	23.8	25.0	24.5

	31AUG14	2014						2015	
	INI-SUM	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--									
NAT INFLOW	3087	600	624	294	137	157	468	374	433
DEPLETION	-603	-103	-92	-30	-14	-16	-112	-143	-93
EVAPORATION	336	106	94	43	20	23	50		
MOD INFLOW	3354	597	622	281	131	150	530	517	526
RELEASE	2988	386	430	208	97	111	584	615	555
STOR CHANGE	366	210	192	73	34	39	-54	-98	-29
STORAGE	14417.	14627	14819	14892	14926	14965	14911	14813	14783
ELEV FTMSL	2232.2	2233.2	2234.1	2234.5	2234.6	2234.8	2234.6	2234.1	2234.0
DISCH KCFS	7.300	6.5	7.0	7.0	7.0	7.0	9.5	10.0	10.0
POWER									
AVE POWER MW		88	95	96	96	96	130	136	136
PEAK POW MW		162	162	163	163	163	163	162	162
ENERGY GWH	492.4	63.5	71.0	34.4	16.1	18.4	96.5	101.2	91.4
--GARRISON--									
NAT INFLOW	3368	900	804	276	129	147	372	314	426
DEPLETION	-630	-123	-23	-126	-59	-67	-111	-78	-44
CHAN STOR	-26	8	-5				-24	-5	0
EVAPORATION	405	132	114	51	24	27	58		
REG INFLOW	6554	1285	1139	559	261	298	985	1002	1025
RELEASE	8959	1596	1599	774	361	413	1291	1537	1388
STOR CHANGE	-2405	-311	-460	-215	-100	-114	-306	-535	-363
STORAGE	20145.	19834	19374	19159	19059	18945	18639	18104	17740
ELEV FTMSL	1844.9	1844.0	1842.6	1841.9	1841.6	1841.3	1840.3	1838.7	1837.5
DISCH KCFS	28.000	26.8	26.0	26.0	26.0	26.0	21.0	25.0	25.0
POWER									
AVE POWER MW		344	332	330	329	329	266	313	311
PEAK POW MW		499	494	484	483	482	478	472	468
ENERGY GWH	1371.2	247.7	246.7	118.7	55.3	63.1	197.5	233.2	208.9
--OAHE--									
NAT INFLOW	1099	473	230	88	41	47	70	17	133
DEPLETION	95	30	-11	2	1	1	16	22	34
CHAN STOR	11	4	3		0	0	20	-16	
EVAPORATION	406	136	115	50	23	26	55		
REG INFLOW	9568	1907	1727	809	378	433	1310	1516	1487
RELEASE	12127	2551	2664	1285	634	826	1598	1382	1187
STOR CHANGE	-2559	-644	-936	-476	-256	-394	-288	134	301
STORAGE	21222.	20578	19642	19167	18910	18517	18229	18363	18663
ELEV FTMSL	1615.2	1613.3	1610.5	1609.1	1608.3	1607.0	1606.1	1606.5	1607.5
DISCH KCFS	28.000	42.9	43.3	43.2	45.7	52.1	26.0	22.5	21.4
POWER									
AVE POWER MW		569	568	560	589	653	333	288	275
PEAK POW MW		738	724	716	712	705	700	703	708
ENERGY GWH	1905.8	409.6	422.8	201.7	98.9	125.3	248.1	214.4	185.0
--BIG BEND--									
EVAPORATION	79	25	22	10	5	5	12		
REG INFLOW	12048	2525	2642	1275	630	821	1587	1382	1187
RELEASE	12073	2550	2642	1275	630	821	1587	1382	1187
STORAGE	1656.	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.4	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	25.300	42.9	43.0	42.8	45.4	51.7	25.8	22.5	21.4
POWER									
AVE POWER MW		203	208	212	224	254	129	110	102
PEAK POW MW		517	538	538	538	538	538	538	529
ENERGY GWH	710.8	146.2	155.0	76.3	37.6	48.9	96.0	82.0	68.9
--FORT RANDALL--									
NAT INFLOW	291	108	27	7	3	4	27	39	76
DEPLETION	19	7	1	1	0	1	3	3	3
EVAPORATION	83	32	24	9	4	4	9		
REG INFLOW	12265	2620	2643	1272	629	819	1605	1418	1260
RELEASE	12794	2866	3283	1585	740	845	1510	1078	888
STOR CHANGE	-529	-246	-639	-313	-111	-26	94	340	372
STORAGE	3527.	3281	2642	2328	2217	2191	2286	2626	2998
ELEV FTMSL	1356.4	1353.5	1345.0	1340.0	1338.0	1337.5	1339.2	1344.7	1350.0
DISCH KCFS	27.900	48.2	53.4	53.3	53.3	53.3	24.6	17.5	16.0
POWER									
AVE POWER MW		355	335	306	290	285	179	133	127
PEAK POW MW		350	318	295	286	283	293	318	339
ENERGY GWH	1036.6	255.7	249.5	110.3	48.8	54.6	133.3	98.8	85.4
--GAVINS POINT--									
NAT INFLOW	893	135	149	75	35	40	135	140	185
DEPLETION	18	-5	2	5	2	3	10	1	
CHAN STOR	22	-38	-10	0	0	0	53	13	3
EVAPORATION	26	8	7	3	2	2	4		
REG INFLOW	13665	2959	3413	1651	771	881	1685	1230	1076
RELEASE	13686	2945	3413	1651	771	881	1685	1230	1111
STOR CHANGE	-21	14							-35
STORAGE	348.	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.9	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	28.500	49.5	55.5	55.5	55.5	55.5	27.4	20.0	20.0
POWER									
AVE POWER MW		115	115	115	115	115	96	71	70
PEAK POW MW		116	115	115	115	115	117	117	114
ENERGY GWH	421.9	82.8	85.5	41.4	19.3	22.1	71.4	52.5	47.0
--GAVINS POINT - SIOUX CITY--									
NAT INFLOW	887	216	189	88	41	47	95	70	141
DEPLETION	93	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY									
KAF	14480	3136	3591	1733	809	924	1766	1285	1237
KCFS		52.7	58.4	58.2	58.2	58.2	28.7	20.9	22.3
--TOTAL--									
NAT INFLOW	9625	2432	2023	828	386	441	1167	954	1394
DEPLETION	-1008	-169	-112	-141	-66	-75	-180	-180	-85
CHAN STOR	9	-26	-11	0	0	-1	52	-8	3
EVAPORATION	1334	440	377	166	77	87	187		
STORAGE	61315.	60313	58469	57539	57106	56611	56057	55898	56143
SYSTEM POWER									
AVE POWER MW		1674	1654	1619	1643	1731	1133	1051	1022
PEAK POW MW		2382	2351	2310	2296	2286	2289	2311	2320
ENERGY GWH	5938.7	1205.6	1230.5	582.8	276.0	332.4	842.8	782.2	686.5
DAILY GWH		40.2	39.7	38.9	39.4	41.5	27.2	25.2	24.5

VALUES IN 1000 AF EXCEPT AS INDICATED

	31AUG14	2014						2015	
	INI-SUM	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--									
NAT INFLOW	2016	375	416	196	91	105	312	250	271
DEPLETION	-488	-109	-92	-26	-12	-14	-83	-89	-63
EVAPORATION	333	106	93	42	20	23	49		
MOD INFLOW	2171	378	415	180	84	96	346	339	334
RELEASE	1900	315	277	134	62	71	338	369	333
STOR CHANGE	271	63	138	46	21	24	8	-30	1
STORAGE	14417.	14480	14618	14664	14685	14709	14717	14687	14688
ELEV FTMSL	2232.2	2232.5	2233.2	2233.4	2233.5	2233.6	2233.7	2233.5	2233.5
DISCH KCFS	7.300	5.3	4.5	4.5	4.5	4.5	5.5	6.0	6.0
POWER									
AVE POWER MW		72	61	61	61	61	75	82	82
PEAK POW MW		161	162	162	162	162	162	162	162
ENERGY GWH	313.2	51.8	45.6	22.1	10.3	11.8	55.8	60.8	54.9
--GARRISON--									
NAT INFLOW	2191	563	536	184	86	98	248	210	266
DEPLETION	-657	-177	-58	-118	-55	-63	-91	-59	-36
CHAN STOR	12	19	8				-10	-5	
EVAPORATION	408	132	114	52	24	27	59		
REG INFLOW	4352	942	764	384	179	205	609	633	635
RELEASE	6757	1280	922	446	208	246	1138	1322	1194
STOR CHANGE	-2405	-338	-158	-62	-29	-41	-529	-689	-559
STORAGE	20145.	19807	19649	19587	19558	19517	18988	18299	17740
ELEV FTMSL	1844.9	1843.9	1843.4	1843.2	1843.1	1843.0	1841.4	1839.3	1837.5
DISCH KCFS	28.000	21.5	15.0	15.0	15.0	15.5	18.5	21.5	21.5
POWER									
AVE POWER MW		277	193	192	192	198	235	271	268
PEAK POW MW		499	498	498	498	498	482	475	468
ENERGY GWH	1039.6	199.1	143.4	69.3	32.3	38.1	175.2	202.0	180.3
--OAHE--									
NAT INFLOW	608	263	128	49	23	26	39	9	71
DEPLETION	95	30	-11	2	1	1	16	22	34
CHAN STOR	22	24	24			-2	-12	-12	0
EVAPORATION	410	136	115	51	24	27	57		
REG INFLOW	6883	1401	970	442	207	242	1092	1297	1231
RELEASE	9437	2261	1455	712	366	520	1338	1475	1309
STOR CHANGE	-2554	-860	-485	-270	-160	-278	-247	-178	-77
STORAGE	21222.	20362	19877	19607	19448	19170	18923	18745	18668
ELEV FTMSL	1615.2	1612.7	1611.3	1610.4	1610.0	1609.1	1608.3	1607.7	1607.5
DISCH KCFS	28.000	38.0	23.7	23.9	26.4	32.8	21.8	24.0	23.6
POWER									
AVE POWER MW		504	312	314	345	426	283	310	304
PEAK POW MW		735	728	723	721	716	712	709	708
ENERGY GWH	1494.1	363.1	232.4	113.1	58.0	81.8	210.4	231.0	204.5
--BIG BEND--									
EVAPORATION	79	25	22	10	5	5	12		
REG INFLOW	9358	2236	1433	702	362	515	1327	1475	1309
RELEASE	9383	2261	1433	702	362	515	1327	1475	1309
STORAGE	1656.	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.4	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	25.300	38.0	23.3	23.6	26.1	32.4	21.6	24.0	23.6
POWER									
AVE POWER MW		180	114	118	130	162	108	118	113
PEAK POW MW		517	538	538	538	538	538	538	529
ENERGY GWH	553.8	129.6	84.9	42.5	21.9	31.0	80.5	87.5	75.8
--FORT RANDALL--									
NAT INFLOW	160	60	15	4	2	2	15	21	41
DEPLETION	19	7	1	1	0	1	3	3	3
EVAPORATION	83	32	24	9	4	4	9		
REG INFLOW	9442	2282	1423	696	359	512	1331	1493	1347
RELEASE	9970	2528	2062	1009	470	538	1235	1153	975
STOR CHANGE	-528	-246	-639	-313	-111	-26	96	340	372
STORAGE	3527.	3281	2642	2329	2218	2192	2287	2627	2999
ELEV FTMSL	1356.4	1353.5	1345.0	1340.0	1338.0	1337.5	1339.2	1344.8	1350.0
DISCH KCFS	27.900	42.5	33.5	33.9	33.9	33.9	20.1	18.8	17.5
POWER									
AVE POWER MW		338	268	255	247	244	147	142	139
PEAK POW MW		350	319	296	287	285	293	319	339
ENERGY GWH	931.6	243.1	199.4	91.9	41.5	46.9	109.4	105.6	93.7
--GAVINS POINT--									
NAT INFLOW	490	75	83	42	19	22	75	75	99
DEPLETION	18	-5	2	5	2	3	10	1	
CHAN STOR	19	-27	17	-1	0	0	26	2	2
EVAPORATION	26	8	7	3	2	2	4		
REG INFLOW	10435	2573	2152	1041	486	555	1322	1230	1076
RELEASE	10456	2559	2152	1041	486	555	1322	1230	1111
STOR CHANGE	-21	14							-35
STORAGE	348.	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.9	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	28.500	43.0	35.0	35.0	35.0	35.0	21.5	20.0	20.0
POWER									
AVE POWER MW		116	115	115	115	115	76	71	70
PEAK POW MW		116	117	117	117	117	117	117	114
ENERGY GWH	407.3	83.2	85.5	41.4	19.3	22.1	56.3	52.5	47.0
--GAVINS POINT - SIOUX CITY--									
NAT INFLOW	490	120	105	49	23	26	53	38	76
DEPLETION	93	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY									
KAF	10853	2654	2246	1084	506	578	1361	1253	1172
KCFS		44.6	36.5	36.4	36.4	36.4	22.1	20.4	21.1
--TOTAL--									
NAT INFLOW	5955	1456	1283	524	244	279	742	603	824
DEPLETION	-920	-229	-147	-130	-60	-69	-131	-107	-47
CHAN STOR	54	15	49	-1	0	-3	5	-14	2
EVAPORATION	1338	439	377	168	77	88	190		
STORAGE	61315.	59923	58779	58180	57901	57581	56909	56352	56053
SYSTEM POWER									
AVE POWER MW		1486	1063	1056	1091	1207	924	994	977
PEAK POW MW		2379	2362	2335	2323	2317	2305	2319	2320
ENERGY GWH	4739.5	1069.9	791.2	380.2	183.3	231.7	687.6	739.4	656.2
DAILY GWH		35.7	25.5	25.3	26.2	29.0	22.2	23.9	23.4

INI-SUM 30SEP 31OCT 15NOV 22NOV 30NOV 31DEC 31JAN 28FEB

VALUES IN 1000 AF EXCEPT AS INDICATED

28FEB15		2015										2016				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB
--FORT PECK--																	
NAT INFLOW	9450	341	159	205	825	1400	2355	1205	440	385	480	288	134	153	350	310	420
DEPLETION	609	-17	-8	-10	-40	295	663	274	5	-103	-63	-21	-10	-11	-109	-136	-101
EVAPORATION	327							22	70	87	75	18	8	9	38		
MOD INFLOW	8514	358	167	215	865	1105	1692	909	365	401	468	290	135	155	421	446	521
RELEASE	8515	208	97	125	536	769	803	830	830	715	646	312	146	182	769	799	748
STOR CHANGE	-2	150	70	90	329	336	889	79	-465	-314	-177	-22	-10	-28	-348	-353	-227
STORAGE	14783.	14933	15003	15093	15423	15759	16648	16726	16261	15947	15770	15748	15738	15710	15362	15009	14782
ELEV FTMSL	2234.0	2234.7	2235.0	2235.4	2237.0	2238.5	2242.4	2242.8	2240.7	2239.3	2238.5	2238.4	2238.4	2238.3	2236.7	2235.0	2234.0
DISCH KCFS	10.000	7.0	7.0	7.0	9.0	12.5	13.5	13.5	13.5	12.0	10.5	10.5	10.5	11.5	12.5	13.0	13.0
POWER																	
AVE POWER MW		96	96	96	123	165	167	168	168	163	144	144	144	156	165	164	163
PEAK POW MW		163	163	163	164	165	168	169	167	166	166	165	165	165	164	163	162
ENERGY GWH	1341.3	34.4	16.1	20.7	88.9	122.7	120.1	125.3	124.8	117.7	107.3	51.8	24.2	30.0	122.6	121.7	113.1
--GARRISON--																	
NAT INFLOW	14000	530	247	318	1355	1840	3460	2715	835	570	645	248	116	132	260	315	415
DEPLETION	1049	7	3	4	-103	-6	1015	695	101	-132	-12	-128	-60	-68	-117	-89	-62
CHAN STOR	-30	30			-20	-34	-10			14	15			-10	-10	-5	
EVAPORATION	373							26	81	99	85	20	9	10	43		
REG INFLOW	21064	761	341	439	1974	2580	3239	2825	1483	1332	1233	668	312	362	1093	1198	1225
RELEASE	21068	565	264	339	1428	1906	2142	2214	2214	1994	1906	922	430	476	1291	1537	1438
STOR CHANGE	-4	196	77	100	546	674	1096	611	-730	-662	-674	-255	-119	-114	-198	-339	-213
STORAGE	17740.	17936	18014	18113	18659	19333	20430	21041	20310	19648	18974	18720	18601	18487	18289	17950	17737
ELEV FTMSL	1837.5	1838.1	1838.4	1838.7	1840.4	1842.5	1845.7	1847.4	1845.4	1843.4	1841.4	1840.6	1840.2	1839.9	1839.2	1838.2	1837.5
DISCH KCFS	25.000	19.0	19.0	19.0	24.0	31.0	36.0	36.0	36.0	33.5	31.0	31.0	31.0	30.0	21.0	25.0	25.0
POWER																	
AVE POWER MW		237	237	238	301	392	452	459	459	427	393	391	390	377	264	312	310
PEAK POW MW		470	471	473	479	493	500	502	500	498	482	480	478	477	475	471	468
ENERGY GWH	3215.7	85.2	39.8	51.3	216.8	291.5	325.7	341.7	341.3	307.2	292.1	140.8	65.5	72.3	196.3	232.1	216.0
--OAHE--																	
NAT INFLOW	3900	569	265	341	510	390	710	310	125	185	145	118	55	63	15	10	90
DEPLETION	734	25	12	15	51	75	157	190	128	31	-12	1	0	1	13	19	29
CHAN STOR	3	24			-19	-26	-18			9	10			4	36	-16	
EVAPORATION	368							26	80	98	83	20	9	10	42		
REG INFLOW	23870	1133	518	665	1868	2195	2677	2307	2130	2060	1990	1019	476	532	1287	1512	1499
RELEASE	23873	523	282	338	1046	1694	2272	2935	2977	2735	2349	1155	573	757	1554	1460	1223
STOR CHANGE	-4	610	236	327	822	502	405	-628	-846	-675	-359	-136	-98	-225	-266	52	276
STORAGE	18663.	19273	19509	19837	20659	21161	21565	20937	20091	19416	19057	18921	18823	18598	18332	18384	18660
ELEV FTMSL	1607.5	1609.4	1610.1	1611.1	1613.6	1615.0	1616.1	1614.4	1611.9	1609.9	1608.7	1608.3	1608.0	1607.3	1606.4	1606.6	1607.5
DISCH KCFS	21.370	17.6	20.3	18.9	17.6	27.5	38.2	47.7	48.4	46.0	38.2	38.8	41.3	47.7	25.3	23.7	21.3
POWER																	
AVE POWER MW		228	265	249	233	367	511	634	634	599	495	501	532	608	325	305	274
PEAK POW MW		718	722	727	739	747	753	744	731	720	714	712	711	707	702	703	708
ENERGY GWH	3777.9	82.3	44.5	53.7	167.7	273.3	367.8	471.5	471.8	431.4	368.4	180.4	89.3	116.7	241.6	226.7	190.7
--BIG BEND--																	
EVAPORATION	72							5	15	19	17	4	2	2	9		
REG INFLOW	23801	523	282	338	1046	1694	2272	2931	2962	2716	2333	1151	572	755	1545	1460	1223
RELEASE	23801	523	282	338	1046	1694	2272	2931	2962	2716	2333	1151	572	755	1545	1460	1223
STORAGE	1631.	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	21.370	17.6	20.3	18.9	17.6	27.5	38.2	47.7	48.2	45.6	37.9	38.7	41.2	47.6	25.1	23.7	21.3
POWER																	
AVE POWER MW		83	95	89	82	129	179	223	225	216	184	192	204	234	126	116	102
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	1374.1	30.0	16.0	19.1	59.3	95.9	128.6	165.8	167.5	155.4	137.2	69.0	34.2	45.0	93.5	86.5	71.0
--FORT RANDALL--																	
NAT INFLOW	1500	150	70	90	440	230	155	80	70	100	40				15		60
DEPLETION	80	1	1	1	4	9	12	18	15	7	1	1	0	1	3	3	3
EVAPORATION	80							6	19	24	18	4	2	2	7		
REG INFLOW	25143	672	351	427	1482	1915	2415	2987	2998	2786	2353	1146	570	752	1553	1457	1280
RELEASE	25140	388	207	427	1482	1915	2415	2987	2998	2930	2992	1459	681	778	1444	1116	921
STOR CHANGE	3	283	144				0	0	0	-144	-639	-313	-111	-26	109	341	359
STORAGE	2998.	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2301	2642	3001
ELEV FTMSL	1350.0	1353.5	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.5	1345.0	1350.0
DISCH KCFS	15.987	13.1	14.9	23.9	24.9	31.1	40.6	48.6	48.8	49.2	48.7	49.1	49.0	49.0	23.5	18.1	16.0
POWER																	
AVE POWER MW		108	126	202	210	262	331	356	356	353	336	307	291	286	172	138	128
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	287	284	294	320	339
ENERGY GWH	2255.3	38.9	21.1	43.7	151.4	194.9	238.0	264.8	264.8	254.2	250.1	110.7	48.9	54.8	127.7	102.5	88.8
--GAVINS POINT--																	
NAT INFLOW	2250	111	52	67	280	330	245	205	165	130	150	65	30	35	90	105	190
DEPLETION	114	0	0	0	5	19	24	39	10	-5	2	5	2	3	10	1	
CHAN STOR	-2	6	-4	-17	-2	-12	-18	-15	0	-1	1	-1	0	0	47	10	4
EVAPORATION	23							1	5	6	5	1	1	1	3		
REG INFLOW	27251	506	256	477	1755	2214	2618	3136	3148	3058	3136	1517	708	809	1568	1230	1115
RELEASE	27251	506	256	477	1755	2214	2618	3136	3136	3035	3136	1517	708	809	1568	1230	1150
STOR CHANGE									12	23							-35
STORAGE	327.	327	327	327	327	327	327	327	339	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	19.999	17.0	18.4	26.7	29.5	36.0	44.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	25.5	20.0	20.0
POWER																	
AVE POWER MW		59	64	91	100	114	113	112	113	115	115	115	115	115	79	70	69
PEAK POW MW		114	114	114	114	114	113	112	113	115	115	115	115	115	78	78	76
ENERGY GWH	866.6	21.2	10.7	19.7	71.8	84.8	81.4	83.1	83.7	82.5	85.8	41.5	19.4	22.1	58.6	52.0	48.3
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	3400	189	88	113	470	890	550	290	225	165	85	50	23	27	60	35	140
DEPLETION	278	7	3	4	23	36	32	40	38	25	12	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	30373	687	340	586	2202	3068	3136	3386	3323	3175	3209	1561	728	832	1614	1250	1275
KCFS		23.1	24.5	32.8	37.0	49.9	52.7	55.1	54.0	53.4	52.2	52.5	52.5	52.5	26.2	20.3	22.2
--TOTAL--																	
NAT INFLOW	34500	1890	882	1133	3880	5080	7475	4805	1860	1535	1545	768	358	409	790	775	1315
DEPLETION	2864	23	11	14	-60	428	1903	1256	297	-177	-72	-135	-63	-72	-186	-187	-116
CHAN STOR	-26	59	-4	-17	-41	-72	-46	-15	0	23	25	-1	0	-6	76	-11	4
EVAPORATION	1242							86	269	332	283	66	30	34	141		
STORAGE	56143.	57382	57909	58426	60123	61636	64025	64087	62058	60285	58436	57711	57373	56980	56277	55978	56138
SYSTEM POWER																	
AVE POWER MW		811	882	964	1050	1429	1752	1952	1954	1873	1668	1651	1676	1776	1129	1104	1046
PEAK POW MW		2333	2336	2342	2362	2385	2399	2390	2376	2368	2334	2306	2294	2287	2251	2272	2282
ENERGY GWH	12831.0	291.9	148.2	208.2	755.9	1063.1	1261.7	1452.1	1454.1	1348.4	1241.0	594.2	281.5	341.0	840.3	821.5	727.8
DAILY GWH		19.5	21.2	23.1	25.2	34.3	42.1	46.8	46.9	44.9	40.0	39.6	40.2	42.6	27.1	26.5	25.1

VALUES IN 1000 AF EXCEPT AS INDICATED

28FEB15		2015										2016				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB
--FORT PECK--																	
NAT INFLOW	8650	310	144	186	755	1285	2155	1105	405	350	440	263	123	140	320	285	385
DEPLETION	552	-17	-8	-10	-46	308	656	275	-5	-114	-86	-27	-13	-14	-114	-136	-97
EVAPORATION	325							22	69	85	74	18	8	9	39		
MOD INFLOW	7773	327	152	196	801	977	1499	808	341	379	452	272	127	145	395	421	482
RELEASE	7773	193	90	116	476	646	774	799	799	626	492	238	111	127	738	799	748
STOR CHANGE	1	133	62	80	325	331	725	9	-458	-248	-40	34	16	18	-342	-378	-266
STORAGE	14783.	14917	14979	15059	15384	15715	16441	16449	15991	15743	15703	15737	15753	15771	15428	15050	14784
ELEV FTMSL	2234.0	2234.6	2234.9	2235.3	2236.8	2238.3	2241.5	2241.6	2239.5	2238.4	2238.2	2238.4	2238.5	2238.5	2237.0	2235.2	2234.0
DISCH KCFS	10.000	6.5	6.5	6.5	8.0	10.5	13.0	13.0	13.0	10.5	8.0	8.0	8.0	8.0	12.0	13.0	13.0
POWER																	
AVE POWER MW		89	89	89	110	144	166	168	167	144	110	110	110	111	162	164	163
PEAK POW MW		163	163	163	164	165	168	168	166	165	165	165	165	166	164	163	162
ENERGY GWH	1241.6	32.0	14.9	19.2	79.0	106.8	119.9	124.8	124.2	104.0	82.2	39.8	18.6	21.2	120.2	121.8	113.2
--GARRISON--																	
NAT INFLOW	12750	482	225	289	1230	1675	3200	2475	760	520	555	215	100	115	235	295	380
DEPLETION	1003	7	3	4	-71	-14	995	691	78	-153	-51	-125	-58	-67	-108	-77	-51
CHAN STOR	-30	35	0	0	-15	-25	-24			24	24		0	0	-39	-10	
EVAPORATION	373							25	80	99	85	20	9	11	43		
REG INFLOW	19117	703	312	401	1762	2310	2954	2558	1401	1223	1037	558	261	298	999	1162	1179
RELEASE	19116	550	257	330	1250	1752	1904	1937	1937	1726	1629	788	368	421	1291	1537	1438
STOR CHANGE	1	152	55	71	513	558	1050	621	-536	-502	-592	-230	-107	-123	-292	-376	-259
STORAGE	17740.	17893	17948	18018	18531	19089	20139	20760	20224	19722	19129	18899	18791	18669	18376	18001	17741
ELEV FTMSL	1837.5	1838.0	1838.2	1838.4	1840.0	1841.7	1844.9	1846.6	1845.1	1843.6	1841.8	1841.1	1840.8	1840.4	1839.5	1838.3	1837.5
DISCH KCFS	25.000	18.5	18.5	18.5	21.0	28.5	32.0	31.5	31.5	29.0	26.5	26.5	26.5	26.5	21.0	25.0	25.0
POWER																	
AVE POWER MW		230	231	231	263	360	407	406	406	372	337	335	335	334	265	312	310
PEAK POW MW		470	471	471	477	484	499	501	500	499	484	481	480	479	476	471	468
ENERGY GWH	2930.9	82.9	38.8	49.9	189.6	267.6	293.1	302.1	302.3	267.5	250.7	120.7	56.3	64.2	196.9	232.5	216.1
--OAHE--																	
NAT INFLOW	3200	457	213	274	430	310	640	250	95	150	120	95	44	51	-10		80
DEPLETION	734	25	12	15	51	75	157	190	128	31	-12	1	0	1	13	19	29
CHAN STOR	2	26			-10	-28	-13	2		9	10				22	-16	
EVAPORATION	365							26	79	97	83	19	9	10	42		
REG INFLOW	21219	1009	459	590	1619	1959	2374	1973	1825	1758	1689	863	403	460	1248	1502	1489
RELEASE	21219	555	296	357	1005	1397	1904	2535	2571	2358	1964	954	480	650	1456	1479	1259
STOR CHANGE	1	454	162	233	614	562	470	-562	-746	-601	-275	-91	-77	-189	-207	24	230
STORAGE	18663.	19117	19280	19513	20127	20689	21159	20597	19851	19250	18975	18884	18807	18618	18411	18434	18664
ELEV FTMSL	1607.5	1608.9	1609.4	1610.2	1612.0	1613.6	1615.0	1613.4	1611.2	1609.3	1608.5	1608.2	1607.9	1607.3	1606.7	1606.7	1607.5
DISCH KCFS	21.370	18.7	21.3	20.0	16.9	22.7	32.0	41.2	41.8	39.6	31.9	32.1	34.6	40.9	23.7	24.0	21.9
POWER																	
AVE POWER MW		242	278	261	222	301	426	547	550	516	414	414	446	526	305	309	282
PEAK POW MW		715	718	722	731	740	747	739	727	718	713	711	710	707	703	704	708
ENERGY GWH	3354.9	87.1	46.7	56.4	160.2	224.2	306.9	407.1	408.9	371.6	308.0	149.2	74.9	100.9	226.7	229.8	196.3
--BIG BEND--																	
EVAPORATION	72							5	15	19	17	4	2	2	9		
REG INFLOW	21147	555	296	357	1005	1397	1904	2530	2556	2340	1947	950	478	648	1447	1479	1259
RELEASE	21147	555	296	357	1005	1397	1904	2530	2556	2340	1947	950	478	648	1447	1479	1259
STORAGE	1631.	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	21.370	18.7	21.3	20.0	16.9	22.7	32.0	41.1	41.6	39.3	31.7	31.9	34.4	40.8	23.5	24.0	21.9
POWER																	
AVE POWER MW		88	100	94	79	106	150	192	194	186	154	159	171	202	118	118	105
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	1222.5	31.8	16.8	20.2	56.9	79.1	107.8	143.2	144.7	134.0	114.9	57.2	28.7	38.8	87.7	87.6	73.0
--FORT RANDALL--																	
NAT INFLOW	1200	123	58	74	350	185	140	75	65	75	10	-3	-1	-1	5	-5	50
DEPLETION	80	1	1	1	4	9	12	18	15	7	1	1	0	1	3	3	3
EVAPORATION	80							6	19	24	18	4	2	2	7		
REG INFLOW	22188	677	353	430	1351	1573	2032	2581	2587	2384	1938	943	475	644	1444	1471	1306
RELEASE	22184	393	209	430	1351	1573	2032	2581	2587	2528	2577	1256	586	670	1335	1130	947
STOR CHANGE	3	283	144	0	0		0	0	0	-144	-639	-313	-111	-26	109	341	359
STORAGE	2998.	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2301	2642	3001
ELEV FTMSL	1350.0	1353.5	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.5	1345.0	1350.0
DISCH KCFS	15.987	13.2	15.1	24.1	22.7	25.6	34.2	42.0	42.1	42.5	41.9	42.2	42.2	42.2	21.7	18.4	16.5
POWER																	
AVE POWER MW		109	127	203	192	216	287	336	337	336	319	297	284	280	159	139	131
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	288	285	294	320	339
ENERGY GWH	2111.2	39.4	21.4	43.9	138.2	160.6	206.5	250.2	250.5	241.8	237.0	106.9	47.8	53.7	118.2	103.7	91.2
--GAVINS POINT--																	
NAT INFLOW	2000	106	50	64	240	290	210	180	145	115	135	60	28	32	85	95	165
DEPLETION	114	0	0	0	5	19	24	39	10	-5	2	5	2	3	10	1	
CHAN STOR	-3	5	-4	-17	3	-6	-16	-15	0	-1	1	-1	0	0	38	6	4
EVAPORATION	23							1	5	6	5	1	1	1	3		
REG INFLOW	24045	506	256	477	1589	1839	2202	2705	2717	2641	2705	1309	611	698	1445	1230	1115
RELEASE	24045	506	256	477	1589	1839	2202	2705	2705	2618	2705	1309	611	698	1445	1230	1150
STOR CHANGE									12	23							-35
STORAGE	327.	327	327	327	327	327	327	327	339	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	19.999	17.0	18.4	26.7	26.7	29.9	37.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	23.5	20.0	20.0
POWER																	
AVE POWER MW		59	64	91	91	101	114	113	114	115	116	116	116	116	78	70	69
PEAK POW MW		114	114	114	114	114	114	113	114	116	116	116	116	116	78	78	76
ENERGY GWH	854.7	21.2	10.7	19.7	65.6	74.9	82.2	84.1	84.8	82.9	86.3	41.8	19.5	22.3	58.4	52.0	48.3
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	2800	165	77	99	390	730	435	240	180	135	70	43	20	23	50	30	115
DEPLETION	278	7	3	4	23	36	32	40	38	25	12	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	26567	663	329	571	1956	2533	2605	2905	2847	2728	2763	1345	628	717	1481	1245	1250
KCFS		22.3	23.7	32.0	32.9	41.2	43.8	47.3	46.3	45.8	44.9	45.2	45.2	45.2	24.1	20.2	21.7
--TOTAL--																	
NAT INFLOW	30600	1643	766	985	3395	4475	6780	4325	1650	1345	1330	673	314	359	685	700	1175
DEPLETION	2761	23	11	14	-34	433	1876	1253	264	-209	-134	-139	-65	-74	-182	-175	-101
CHAN STOR	-29	66	-4	-17	-22	-58	-54	-13	0	32	35	-1	0	-1	23	-20	4
EVAPORATION	1237							85	267	330	282	66	30	35	142		
STORAGE	56143.	57166	57590	57973	59425	60876	63121	63189	61461	59989	58443	57842	57562	57242	56509	56120	56149
SYSTEM POWER																	
AVE POWER MW		818	888	969	958	1227	1551	1763	1768	1669	1450	1432	1462	1568	1086	1112	1060
PEAK POW MW		2330	2331	2336	2353	2369	2393	2385	2373	2365	2335	2308	2298	2291	2254	2274	2282
ENERGY GWH	11715.7	294.4	149.2	209.4	689.4	913.2	1116.5	1311.5	1315.4	1201.8	1079.1	515.5	245.7	301.1	808.0	827.4	738.0
DAILY GWH		19.6	21.3	23.3	23.0	29.5	37.2	42.3	42.4	40.1	34.8	34.4	35.1	37.6	26.1	26.7	25.4

INI-SUM 15MAR 22MAR 31MAR 30APR 31MAY 30JUN 31JUL 31AUG 30SEP 31OCT 15NOV 22NOV 30NOV 31DEC 31JAN 29FEB

VALUES IN 1000 AF EXCEPT AS INDICATED

28FEB15		2015									2016					
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB
--FORT PECK--																	
NAT INFLOW	7200	227	106	136	560	1145	1830	840	365	290	385	205	96	109	295	260	350
DEPLETION	505	-22	-10	-13	34	308	517	274	33	-75	-56	-42	-20	-22	-131	-155	-115
EVAPORATION	462							29	89	111	96	43	20	23	50		
MOD INFLOW	6233	249	116	149	526	837	1313	537	243	254	345	204	95	109	376	415	465
RELEASE	6403	179	83	107	446	553	625	646	646	517	369	179	83	106	615	646	604
STOR CHANGE	-170	71	33	42	80	284	688	-108	-403	-263	-24	25	12	2	-239	-231	-139
STORAGE	14795.	14865	14898	14941	15020	15304	15992	15884	15481	15219	15195	15220	15231	15233	14994	14764	14625
ELEV FTMSL	2234.0	2234.4	2234.5	2234.7	2235.1	2236.4	2239.5	2239.1	2237.2	2236.0	2235.9	2236.0	2236.1	2236.1	2235.0	2233.9	2233.2
DISCH KCFS	8.500	6.0	6.0	6.0	7.5	9.0	10.5	10.5	10.5	8.7	6.0	6.0	6.0	6.7	10.0	10.5	10.5
POWER																	
AVE POWER MW		82	82	82	103	123	144	144	144	119	82	82	82	92	137	142	142
PEAK POW MW		162	163	163	163	164	166	166	165	164	164	164	164	164	163	162	162
ENERGY GWH	1058.5	29.5	13.8	17.7	73.8	91.7	103.5	107.4	107.0	85.9	61.3	29.7	13.8	17.7	101.6	105.6	98.5
--GARRISON--																	
NAT INFLOW	10900	479	223	287	780	1300	3120	2100	580	480	445	180	84	96	180	255	310
DEPLETION	1082	6	3	4	15	153	799	672	114	-147	-44	-130	-60	-69	-110	-74	-50
CHAN STOR	-20	25			-15	-15	-15			18	26			-7	-32	-5	
EVAPORATION	534							33	104	129	112	50	23	27	57		
REG INFLOW	15667	676	304	391	1196	1686	2931	2041	1008	1032	772	438	204	238	816	970	964
RELEASE	15849	536	250	321	1160	1537	1547	1537	1537	1278	1107	536	250	286	1230	1414	1323
STOR CHANGE	-182	141	54	69	36	148	1384	504	-529	-246	-334	-98	-45	-48	-414	-445	-359
STORAGE	17731.	17872	17926	17995	18031	18179	19563	20067	19537	19292	18957	18860	18814	18767	18352	17908	17549
ELEV FTMSL	1837.5	1837.9	1838.1	1838.3	1838.4	1838.9	1843.2	1844.6	1843.1	1842.3	1841.3	1841.0	1840.9	1840.7	1839.4	1838.0	1836.9
DISCH KCFS	24.000	18.0	18.0	18.0	19.5	25.0	26.0	25.0	25.0	21.5	18.0	18.0	18.0	18.0	20.0	23.0	23.0
POWER																	
AVE POWER MW		224	224	225	243	312	329	320	320	274	229	228	228	228	252	287	285
PEAK POW MW		470	470	471	472	473	498	499	498	490	482	480	480	480	475	470	466
ENERGY GWH	2418.1	80.7	37.7	48.5	175.3	232.1	236.6	238.1	238.1	197.0	170.1	82.0	38.3	43.7	187.7	213.8	198.4
--OAHE--																	
NAT INFLOW	2300	259	121	155	405	220	625	170	70	95	45	45	21	24	-15	-10	70
DEPLETION	734	25	12	15	51	75	157	190	128	31	-12	1	0	1	13	19	29
CHAN STOR	4	24			-6	-21	-4	4		14	14				-8	-12	
EVAPORATION	507							32	100	122	105	47	22	25	54		
REG INFLOW	16912	794	359	462	1508	1661	2011	1489	1380	1234	1073	533	249	284	1139	1373	1364
RELEASE	17110	464	307	360	1293	1543	1609	1849	1983	1754	1263	587	309	223	1113	1315	1137
STOR CHANGE	-198	329	52	101	216	118	402	-360	-603	-520	-190	-54	-61	61	26	58	227
STORAGE	18664.	18994	19046	19148	19363	19481	19884	19523	18920	18400	18210	18156	18095	18156	18182	18240	18467
ELEV FTMSL	1607.5	1608.5	1608.7	1609.0	1609.7	1610.1	1611.3	1610.2	1608.3	1606.6	1606.0	1605.8	1605.6	1605.8	1605.9	1606.1	1606.9
DISCH KCFS	22.727	15.6	22.1	20.2	21.7	25.1	27.0	30.1	32.2	29.5	20.5	19.7	22.3	14.1	18.1	21.4	19.8
POWER																	
AVE POWER MW		202	287	263	283	328	354	394	419	380	264	253	285	181	232	274	254
PEAK POW MW		713	714	716	720	721	728	722	712	703	700	699	698	699	699	700	704
ENERGY GWH	2681.2	72.9	48.2	56.7	203.9	243.7	255.1	292.9	311.5	273.3	196.2	91.0	47.8	34.7	172.7	203.8	176.8
--BIG BEND--																	
EVAPORATION	105							6	20	25	22	10	5	5	12		
REG INFLOW	17005	464	307	360	1293	1543	1609	1843	1963	1729	1241	577	305	218	1102	1315	1137
RELEASE	17005	464	307	360	1293	1543	1609	1843	1963	1729	1241	577	305	218	1102	1315	1137
STORAGE	1631.	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	22.727	15.6	22.1	20.2	21.7	25.1	27.0	30.0	31.9	29.1	20.2	19.4	21.9	13.7	17.9	21.4	19.8
POWER																	
AVE POWER MW		74	103	95	102	117	127	140	149	138	99	97	110	69	90	105	95
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	982.3	26.6	17.4	20.4	73.2	87.4	91.1	104.4	111.1	99.1	73.7	35.1	18.5	13.3	67.1	78.0	66.0
--FORT RANDALL--																	
NAT INFLOW	900	121	56	73	160	165	135	70	60	35		-5	-2	-3		-10	45
DEPLETION	80	1	1	1	4	9	12	18	15	7	1	1	0	1	3	3	3
EVAPORATION	116							8	25	31	24	9	4	4	9		
REG INFLOW	17710	584	362	432	1449	1699	1732	1887	1982	1725	1216	562	298	211	1089	1302	1179
RELEASE	17708	301	218	432	1449	1699	1732	1887	1982	1869	1855	875	409	237	981	961	820
STOR CHANGE	2	282	144	0		0		0	0	-144	-639	-313	-111	-26	108	341	359
STORAGE	2999.	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2300	2641	3000
ELEV FTMSL	1350.0	1353.5	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.5	1345.0	1350.0
DISCH KCFS	16.947	10.1	15.7	24.2	24.3	27.6	29.1	30.7	32.2	31.4	30.2	29.4	29.5	15.0	16.0	15.6	14.3
POWER																	
AVE POWER MW		84	133	204	206	233	245	258	271	262	242	222	215	109	117	119	114
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	287	285	294	320	339
ENERGY GWH	1748.8	30.2	22.3	44.2	148.1	173.3	176.5	192.1	201.7	188.9	179.7	79.9	36.2	21.0	87.2	88.4	79.1
--GAVINS POINT--																	
NAT INFLOW	1500	102	47	61	145	165	175	100	90	95	120	58	27	31	80	85	120
DEPLETION	114	0	0	0	5	19	24	39	10	-5	2	5	2	3	10	1	
CHAN STOR	4	13	-11	-16	0	-6	-3	-3	-3	2	2	1	0	27	-2	1	3
EVAPORATION	34							2	6	8	7	3	2	2	4		
REG INFLOW	19064	417	255	477	1588	1839	1880	1943	2053	1963	1968	925	432	290	1045	1045	943
RELEASE	19064	417	255	477	1588	1839	1880	1943	2041	1940	1968	925	432	290	1045	1045	978
STOR CHANGE									12	23							-35
STORAGE	327.	327	327	327	327	327	327	327	339	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	20.000	14.0	18.4	26.7	26.7	29.9	31.6	31.6	33.2	32.6	32.0	31.1	31.1	18.3	17.0	17.0	17.0
POWER																	
AVE POWER MW		49	64	91	91	101	105	105	109	109	108	106	106	65	60	60	60
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	781.0	17.6	10.7	19.7	65.6	74.9	75.3	77.8	80.9	78.3	80.6	38.3	17.9	12.4	44.7	44.7	41.5
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	1800	162	76	97	280	345	190	165	130	110	60	30	14	16	25	25	75
DEPLETION	278	7	3	4	23	36	32	40	38	25	12	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	20586	571	328	570	1845	2148	2038	2068	2133	2025	2016	949	443	303	1056	1055	1038
KCFS		19.2	23.6	31.9	31.0	34.9	34.3	33.6	34.7	34.0	32.8	31.9	31.9	19.1	17.2	17.2	18.0
--TOTAL--																	
NAT INFLOW	24600	1350	630	810	2330	3340	6075	3445	1295	1105	1055	513	239	273	565	605	970
DEPLETION	2793	17	8	10	132	600	1541	1233	338	-164	-97	-158	-74	-84	-201	-191	-118
CHAN STOR	-12	62	-11	-16	-21	-42	-21	1	-3	33	42	1	0	21	-43	-16	3
EVAPORATION	1757							110	344	426	366	163	75	86	186		
STORAGE	56147.	56970	57253	57466	57798	58348	60822	60857	59334	58185	56997	56557	56352	56341	55822	55546	55599
SYSTEM POWER																	
AVE POWER MW		715	893	959	1028	1214	1303	1361	1412	1281	1024	989	1027	743	888	987	949
PEAK POW MW		2327	2327	2329	2334	2338	2372	2367	2355	2342	2319	2294	2284	2282	2248	2268	2276
ENERGY GWH	9670.0	257.5	150.0	207.2	739.9	903.1	938.2	1012.8	1050.2	922.6	761.6	355.9	172.5	142.7	661.0	734.4	660.5
DAILY GWH		17.2	21.4	23.0	24.7	29.1	31.3	32.7	33.9	30.8	24.6	23.7	24.6	17.8	21.3	23.7	22.8
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB

VALUES IN 1000 AF EXCEPT AS INDICATED

28FEB15		2015										2016				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB
--FORT PECK--																	
NAT INFLOW	5950	201	94	120	460	945	1510	645	290	240	320	168	78	89	240	240	310
DEPLETION	434	-8	-4	-5	40	159	345	279	50	-74	-78	-18	-8	-9	-83	-89	-63
EVAPORATION	549							35	107	132	114	51	24	27	59		
MOD INFLOW	4967	209	98	125	420	786	1165	331	133	182	284	134	62	71	264	329	373
RELEASE	6505	179	83	107	417	553	655	676	676	504	369	179	83	100	615	676	633
STOR CHANGE	-1538	31	14	18	3	233	510	-345	-543	-322	-85	-45	-21	-29	-351	-347	-260
STORAGE	14688.	14718	14733	14751	14754	14987	15498	15153	14609	14287	14202	14157	14136	14107	13757	13409	13149
ELEV FTMSL	2233.5	2233.7	2233.7	2233.8	2233.8	2234.9	2237.3	2235.7	2233.1	2231.6	2231.2	2230.9	2230.8	2230.7	2228.9	2227.2	2225.8
DISCH KCFS	6.000	6.0	6.0	6.0	7.0	9.0	11.0	11.0	11.0	8.5	6.0	6.0	6.0	6.3	10.0	11.0	11.0
POWER																	
AVE POWER MW		82	82	82	95	123	149	149	148	115	81	81	81	85	134	144	143
PEAK POW MW		162	162	162	162	163	165	163	162	160	160	160	160	160	159	157	156
ENERGY GWH	1057.9	29.4	13.7	17.7	68.7	91.3	107.1	110.8	109.9	82.8	60.4	29.2	13.6	16.3	99.8	107.2	99.7
--GARRISON--																	
NAT INFLOW	9150	404	189	242	640	1150	2600	1700	475	395	395	160	75	85	150	210	280
DEPLETION	1081	13	6	8	37	146	716	603	124	-128	-19	-121	-56	-65	-90	-55	-38
CHAN STOR	-50				-10	-20	-20			25	25			-3	-37	-10	
EVAPORATION	624							39	122	151	130	58	27	31	66		
REG INFLOW	13900	570	266	342	1010	1538	2519	1734	905	901	678	401	187	216	752	931	951
RELEASE	15878	476	222	286	1398	1660	1547	1537	1537	1251	1045	506	236	270	1168	1414	1323
STOR CHANGE	-1978	94	44	56	-389	-123	971	197	-632	-350	-368	-104	-49	-54	-417	-483	-372
STORAGE	17740.	17834	17878	17934	17545	17422	18394	18591	17958	17609	17241	17137	17088	17034	16618	16135	15762
ELEV FTMSL	1837.5	1837.8	1837.9	1838.1	1836.8	1836.4	1839.6	1840.2	1838.2	1837.1	1835.8	1835.5	1835.3	1835.1	1833.7	1832.1	1830.8
DISCH KCFS	21.500	16.0	16.0	16.0	23.5	27.0	26.0	25.0	25.0	21.0	17.0	17.0	17.0	17.0	19.0	23.0	23.0
POWER																	
AVE POWER MW		199	200	200	291	332	323	314	313	261	210	209	209	209	232	277	274
PEAK POW MW		469	470	470	466	464	476	478	471	466	462	461	460	460	454	448	443
ENERGY GWH	2368.6	71.7	33.5	43.1	209.7	247.3	232.5	233.7	232.8	188.1	156.3	75.3	35.1	40.0	172.3	206.1	191.0
--OAHE--																	
NAT INFLOW	1350	177	82	106	285	130	315	110	50	55	15	13	6	7	-35	-15	50
DEPLETION	734	25	12	15	51	75	157	190	128	31	-12	1	0	1	13	19	29
CHAN STOR	-6	22	0	0	-30	-14	4	4		17	17				-9	-18	
EVAPORATION	576							37	114	140	120	53	24	28	61		
REG INFLOW	15911	650	293	377	1603	1701	1709	1424	1346	1152	970	464	217	248	1051	1363	1344
RELEASE	17954	516	373	448	1577	1846	1820	2069	2096	1592	1435	704	412	260	848	1058	899
STOR CHANGE	-2043	134	-80	-71	26	-145	-110	-645	-751	-440	-465	-240	-195	-12	202	304	445
STORAGE	18668.	18801	18721	18650	18675	18531	18420	17775	17025	16585	16120	15880	15685	15672	15875	16179	16624
ELEV FTMSL	1607.5	1607.9	1607.7	1607.4	1607.5	1607.1	1606.7	1604.6	1602.0	1600.4	1598.8	1597.9	1597.2	1597.1	1597.9	1599.0	1600.6
DISCH KCFS	23.560	17.4	26.9	25.1	26.5	30.0	30.6	33.6	34.1	26.8	23.3	23.7	29.7	16.4	13.8	17.2	15.6
POWER																	
AVE POWER MW		225	347	324	342	386	392	428	428	333	288	290	362	200	169	212	194
PEAK POW MW		710	709	707	708	705	704	692	679	671	662	657	654	654	657	663	671
ENERGY GWH	2738.8	80.9	58.3	69.9	246.0	287.3	282.5	318.7	318.7	239.9	214.5	104.6	60.8	38.5	125.8	157.6	134.9
--BIG BEND--																	
EVAPORATION	131							8	25	31	28	12	6	7	14		
REG INFLOW	17823	516	373	448	1577	1846	1820	2061	2071	1561	1407	692	406	254	834	1058	899
RELEASE	17823	516	373	448	1577	1846	1820	2061	2071	1561	1407	692	406	254	834	1058	899
STORAGE	1631.	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	23.560	17.4	26.9	25.1	26.5	30.0	30.6	33.5	33.7	26.2	22.9	23.3	29.3	16.0	13.6	17.2	15.6
POWER																	
AVE POWER MW		82	126	117	124	140	143	157	158	126	114	117	146	80	68	85	75
PEAK POW MW		517	509	509	509	509	509	509	509	529	538	538	538	538	538	538	529
ENERGY GWH	1030.0	29.6	21.1	25.4	89.3	104.5	103.0	116.7	117.3	90.4	84.7	41.9	24.5	15.5	50.9	62.9	52.2
--FORT RANDALL--																	
NAT INFLOW	450	77	36	46	80	65	110	35	25		-20	-8	-4	-4	-10	-20	40
DEPLETION	80	1	1	1	4	9	12	18	15	7	1	1	0	1	3	3	3
EVAPORATION	139							10	32	38	28	10	4	5	12		
REG INFLOW	18056	592	409	494	1653	1902	1918	2068	2050	1516	1358	673	397	245	810	1035	936
RELEASE	18054	310	265	494	1653	1902	1918	2068	2050	1940	1939	884	414	245	701	694	577
STOR CHANGE	2	282	144	0	0			0	0	-424	-581	-211	-17	0	109	341	359
STORAGE	2999.	3281	3425	3425	3425	3425	3425	3425	3425	3001	2420	2209	2192	2192	2301	2642	3001
ELEV FTMSL	1350.0	1353.5	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1350.0	1341.5	1337.8	1337.5	1337.5	1339.5	1345.0	1350.0
DISCH KCFS	17.547	10.4	19.1	27.7	27.8	30.9	32.2	33.6	33.3	32.6	31.5	29.7	29.8	15.4	11.4	11.3	10.0
POWER																	
AVE POWER MW		86	160	233	234	260	271	283	280	268	245	219	216	113	84	86	80
PEAK POW MW		350	356	356	356	356	356	356	356	339	303	286	285	285	294	319	339
ENERGY GWH	1778.7	31.1	27.0	50.3	168.6	193.6	195.1	210.3	208.4	193.2	182.2	78.7	36.2	21.6	62.5	64.1	55.8
--GAVINS POINT--																	
NAT INFLOW	1300	92	43	55	125	140	150	85	70	80	105	50	23	27	75	75	105
DEPLETION	114	0	0	0	5	19	24	39	10	-5	2	5	2	3	10	1	
CHAN STOR	13	14	-17	-16	0	-6	-2	-3	1	1	2	3	0	27	8	0	2
EVAPORATION	42							2	8	10	9	4	2	2	5		
REG INFLOW	19211	417	291	533	1773	2017	2041	2109	2103	2016	2035	928	433	294	769	769	684
RELEASE	19211	417	291	533	1773	2017	2041	2109	2091	1993	2035	928	433	294	769	769	719
STOR CHANGE									12	23							-35
STORAGE	327.	327	327	327	327	327	327	327	339	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	20.000	14.0	21.0	29.8	29.8	32.8	34.3	34.3	34.0	33.5	33.1	31.2	31.2	18.5	12.5	12.5	12.5
POWER																	
AVE POWER MW		49	72	100	100	107	111	111	110	111	111	107	107	65	44	44	44
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	775.3	17.6	12.1	21.7	72.3	79.8	79.6	82.2	82.1	79.8	82.5	38.3	17.9	12.5	33.0	33.0	30.7
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	1100	121	56	73	145	185	115	100	80	65	35	23	11	12	10	20	50
DEPLETION	278	7	3	4	23	36	32	40	38	25	12	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	20033	530	344	601	1895	2166	2124	2169	2133	2033	2058	944	441	302	765	774	754
KCFS		17.8	24.8	33.7	31.8	35.2	35.7	35.3	34.7	34.2	33.5	31.7	31.7	19.0	12.4	12.6	13.1
--TOTAL--																	
NAT INFLOW	19300	1072	500	643	1735	2615	4800	2675	990	835	850	405	189	216	430	510	835
DEPLETION	2721	38	18	23	160	444	1286	1169	365	-144	-94	-125	-58	-67	-133	-106	-54
CHAN STOR	-43	35	-17	-16	-40	-40	-18	1	1	43	44	3	-1	25	-38	-27	2
EVAPORATION	2062							131	407	502	428	190	88	100	216		
STORAGE	56053.	56593	56714	56717	56358	56323	57694	56902	54987	53474	51975	51375	51093	50999	50543	50358	50495
SYSTEM POWER																	
AVE POWER MW		723	987	1056	1187	1349	1389	1441	1437	1214	1049	1022	1120	752	732	848	811
PEAK POW MW		2323	2320	2320	2315	2312	2324	2313	2291	2282	2242	2220	2214	2213	2181	2204	2215
ENERGY GWH	9749.3	260.4	165.8	228.2	854.6	1003.8	999.8	1072.4	1069.3	874.1	780.7	368.1	188.1	144.5	544.5	631.0	564.2
DAILY GWH		17.4	23.7	25.4	28.5	32.4	33.3	34.6	34.5	29.1	25.2	24.5	26.9	18.1	17.6	20.4	19.5

VALUES IN 1000 AF EXCEPT AS INDICATED

28FEB15		2015										2016				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB
--FORT PECK--																	
NAT INFLOW	5300	194	90	116	440	850	1180	595	260	230	310	145	68	77	220	230	295
DEPLETION	206	-9	-4	-6	34	153	339	201	20	-112	-98	-28	-13	-15	-79	-98	-79
EVAPORATION	532							34	104	128	111	50	23	26	57		
MOD INFLOW	4562	203	95	122	406	697	841	360	136	214	297	123	58	66	242	328	374
RELEASE	6748	179	83	107	387	615	684	707	707	522	369	179	83	111	646	707	661
STOR CHANGE	-2186	24	11	15	19	82	157	-347	-571	-308	-72	-55	-26	-45	-403	-379	-287
STORAGE	14688.	14712	14723	14738	14757	14839	14996	14649	14078	13770	13698	13643	13617	13572	13168	12789	12502
ELEV FTMSL	2233.5	2233.6	2233.7	2233.8	2233.9	2234.2	2235.0	2233.3	2230.6	2229.0	2228.7	2228.4	2228.2	2228.0	2225.9	2223.9	2222.4
DISCH KCFS	6.000	6.0	6.0	6.0	6.5	10.0	11.5	11.5	11.5	8.8	6.0	6.0	6.0	7.0	10.5	11.5	11.5
POWER																	
AVE POWER MW		82	82	82	89	136	154	153	152	118	81	80	80	94	138	147	146
PEAK POW MW		162	162	162	162	162	163	162	160	159	158	158	158	158	156	154	153
ENERGY GWH	1082.8	29.4	13.7	17.7	63.8	101.1	110.6	114.0	113.0	85.0	59.9	29.0	13.5	18.0	102.9	109.5	101.5
--GARRISON--																	
NAT INFLOW	7400	382	178	229	580	1100	2165	935	325	215	385	150	70	80	140	195	270
DEPLETION	955	13	6	8	37	146	615	535	102	-144	-34	-110	-51	-58	-65	-29	-16
CHAN STOR	-55				-5	-35	-15			27	28			-10	-36	-10	
EVAPORATION	598							38	117	144	124	56	26	30	64		
REG INFLOW	12539	548	256	329	925	1534	2219	1069	813	765	692	382	178	210	751	921	947
RELEASE	15302	476	222	286	1488	1537	1458	1476	1476	1192	984	476	222	254	1138	1353	1265
STOR CHANGE	-2763	72	33	43	-563	-3	761	-407	-663	-427	-292	-94	-44	-44	-386	-432	-318
STORAGE	17740.	17812	17846	17889	17326	17323	18084	17677	17015	16587	16295	16202	16158	16114	15728	15296	14978
ELEV FTMSL	1837.5	1837.7	1837.8	1838.0	1836.1	1836.1	1838.6	1837.3	1835.1	1833.6	1832.6	1832.3	1832.1	1832.0	1830.6	1829.1	1827.9
DISCH KCFS	21.500	16.0	16.0	16.0	25.0	25.0	24.5	24.0	24.0	20.0	16.0	16.0	16.0	16.0	18.5	22.0	22.0
POWER																	
AVE POWER MW		199	199	200	309	307	303	298	295	244	194	193	193	192	221	260	258
PEAK POW MW		469	469	470	463	463	472	467	459	454	450	449	449	448	443	437	433
ENERGY GWH	2254.6	71.7	33.5	43.1	222.3	228.4	218.4	221.9	219.5	175.6	144.2	69.5	32.4	37.0	164.5	193.4	179.3
--OAHE--																	
NAT INFLOW	1150	169	79	102	200	110	305	105	40	45	5	8	4	4	-45	-20	40
DEPLETION	734	25	12	15	51	75	157	190	128	31	-12	1	0	1	13	19	29
CHAN STOR	-2	22	0	0	-36		2	2		17	18		0	0	-11	-16	
EVAPORATION	557							36	111	135	114	51	24	27	58		
REG INFLOW	15158	643	290	372	1601	1572	1608	1356	1276	1088	904	432	202	231	1010	1298	1276
RELEASE	18012	539	383	461	1576	1871	1850	2052	2086	1854	1359	594	313	233	864	1068	909
STOR CHANGE	-2854	104	-94	-89	24	-299	-242	-696	-809	-766	-454	-162	-112	-3	146	230	368
STORAGE	18668.	18771	18678	18589	18613	18314	18073	17377	16568	15801	15347	15185	15073	15071	15216	15446	15814
ELEV FTMSL	1607.5	1607.8	1607.5	1607.2	1607.3	1606.4	1605.6	1603.2	1600.4	1597.6	1595.9	1595.3	1594.8	1594.8	1595.4	1596.3	1597.6
DISCH KCFS	23.560	18.1	27.6	25.8	26.5	30.4	31.1	33.4	33.9	31.2	22.1	20.0	22.6	14.7	14.1	17.4	15.8
POWER																	
AVE POWER MW		234	356	333	341	390	397	422	423	383	269	242	272	177	170	211	193
PEAK POW MW		710	708	706	707	702	698	685	670	656	648	645	642	642	645	650	656
ENERGY GWH	2726.0	84.4	59.9	71.9	245.6	290.4	285.7	313.9	314.5	275.5	200.0	87.0	45.7	34.1	126.4	156.8	134.2
--BIG BEND--																	
EVAPORATION	131							8	25	31	28	12	6	7	14		
REG INFLOW	17881	539	383	461	1576	1871	1850	2044	2061	1822	1331	582	307	227	850	1068	909
RELEASE	17881	539	383	461	1576	1871	1850	2044	2061	1822	1331	582	307	227	850	1068	909
STORAGE	1631.	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631	1631
ELEV FTMSL	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	23.560	18.1	27.6	25.8	26.5	30.4	31.1	33.2	33.5	30.6	21.6	19.5	22.1	14.3	13.8	17.4	15.8
POWER																	
AVE POWER MW		86	129	121	124	142	145	156	157	145	106	98	111	72	70	85	76
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	1030.5	30.9	21.7	26.1	89.3	106.0	104.7	115.7	116.7	104.5	78.9	35.3	18.7	13.8	51.9	63.5	52.8
--FORT RANDALL--																	
NAT INFLOW	350	68	32	41	85	50	95	25	15	-5	-25	-10	-5	-5	-20	-25	35
DEPLETION	80	1	1	1	4	9	12	18	15	7	1	1	0	1	3	3	3
EVAPORATION	145							10	32	39	31	12	5	5	12		
REG INFLOW	18007	605	414	501	1657	1912	1933	2041	2029	1771	1275	559	298	216	815	1040	941
RELEASE	18005	323	270	501	1657	1912	1933	2041	2029	1915	1914	872	409	242	706	699	582
STOR CHANGE	2	282	144	0	0		0	0	0	-144	-639	-313	-111	-26	109	341	359
STORAGE	2999.	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2301	2642	3001
ELEV FTMSL	1350.0	1353.5	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.5	1345.0	1350.0
DISCH KCFS	17.547	10.9	19.5	28.1	27.9	31.1	32.5	33.2	33.0	32.2	31.1	29.3	29.4	15.3	11.5	11.4	10.1
POWER																	
AVE POWER MW		90	164	236	235	262	273	279	277	269	249	221	215	111	85	87	81
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	287	285	294	319	339
ENERGY GWH	1785.1	32.4	27.5	51.1	169.0	194.7	196.6	207.5	206.4	193.5	185.3	79.6	36.2	21.4	63.0	64.6	56.3
--GAVINS POINT--																	
NAT INFLOW	1200	80	37	48	120	130	135	80	60	75	100	48	22	25	70	70	100
DEPLETION	114	0	0	0	5	19	24	39	10	-5	2	5	2	3	10	1	
CHAN STOR	13	13	-17	-16	0	-6	-3	-1	0	2	2	3	0	26	7	0	2
EVAPORATION	42							2	8	10	9	4	2	2	5		
REG INFLOW	19062	417	291	533	1773	2017	2041	2078	2072	1987	2005	913	426	289	769	769	684
RELEASE	19062	417	291	533	1773	2017	2041	2078	2060	1964	2005	913	426	289	769	769	719
STOR CHANGE									12	23							-35
STORAGE	327.	327	327	327	327	327	327	327	339	362	362	362	362	362	362	362	327
ELEV FTMSL	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.0	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	20.000	14.0	21.0	29.8	29.8	32.8	34.3	33.8	33.5	33.0	32.6	30.7	30.7	18.2	12.5	12.5	12.5
POWER																	
AVE POWER MW		49	72	100	100	107	111	109	109	110	110	105	105	64	44	44	44
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	771.3	17.6	12.1	21.7	72.3	79.8	79.6	81.4	81.3	79.0	81.6	37.9	17.7	12.3	33.0	33.0	30.7
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	700	87	41	52	90	120	65	70	40	30	30	18	8	9	5	15	20
DEPLETION	278	7	3	4	23	36	32	40	38	25	12	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	19484	496	329	580	1840	2101	2074	2108	2062	1969	2023	924	431	295	760	769	724
KCFS		16.7	23.7	32.5	30.9	34.2	34.9	34.3	33.5	33.1	32.9	31.1	31.1	18.6	12.4	12.5	12.6
--TOTAL--																	
NAT INFLOW	16100	980	457	588	1515	2360	3945	1810	740	590	805	358	167	191	370	465	760
DEPLETION	2367	37	17	22	154	438	1179	1023	313	-198	-129	-124	-58	-66	-104	-89	-48
CHAN STOR	-45	35	-17	-16	-40	-41	-16	1	0	46	48	3	0	17	-40	-26	2
EVAPORATION	2005							128	397	488	416	184	85	97	209		
STORAGE	56053.	56535	56630	56598	56079	55859	56536	55087	53056	51432	49975	49351	49059	48941	48406	48166	48252
SYSTEM POWER																	
AVE POWER MW		740	1003	1072	1198	1345	1383	1417	1413	1268	1008	940	977	711	728	834	797
PEAK POW MW		2322	2319	2318	2312	2307	2312	2294	2270	2253	2230	2203	2191	2188	2155	2177	2186
ENERGY GWH	9650.2	266.5	168.5	231.6	862.4	1000.4	995.5	1054.6	1051.3	913.1	750.1	338.3	164.1	136.6	541.8	620.8	554.8
DAILY GWH		17.8	24.1	25.7	28.7	32.3	33.2	34.0	33.9	30.4	24.2	22.6	23.4	17.1	17.5	20.0	19.1
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	29FEB