US Army Corps of Engineers ®
Northwestern Division

Missouri River Basin
Water Management Division

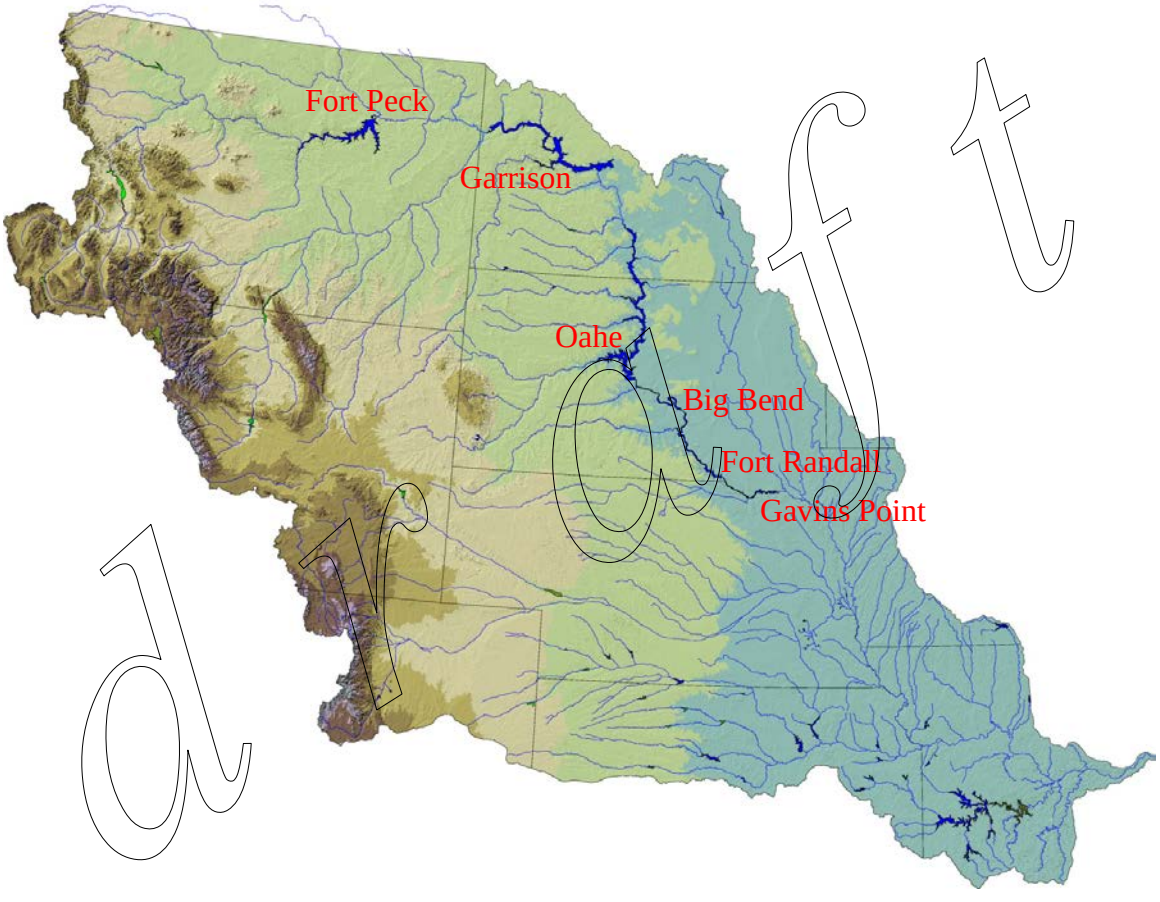
Draft

AOP

2013-2014

Missouri River Mainstem System

2013-2014 Annual Operating Plan



Annual Operating Plan Process
61 Years Serving the Missouri River Basin

September 2013

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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTHWESTERN DIVISION
PO BOX 2870
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September 2013

This Draft Annual Operating Plan (AOP) presents pertinent information regarding water management in the Missouri River Mainstem Reservoir System through December 2014. 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 2012 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 will 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 8 in Kansas City, Missouri and Nebraska City, Nebraska; October 9 in Fort Peck, Montana; and October 10 in Bismarck, North Dakota and Pierre, South Dakota. We ask that any comments be provided by November 15, 2013. The Final AOP is scheduled for publication in December 2013.

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
2013 - 2014

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
2013 – 2014

I. FOREWORD

This draft Annual Operating Plan (AOP) presents pertinent information and plans for regulating the Missouri River Mainstem Reservoir System (System) through December 2014 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 done 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 2012 Regulation," dated June 2013. 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 2013 Regulation" will be available at the same site in late spring or early summer of 2014.

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 17, 2013 was sent to

the Tribes offering consultation on the 2013-2014 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 2013 spring public meetings were held at the following locations and dates: April 8 at Nebraska City, Nebraska; April 9 at Fort Peck, Montana and Bismarck, North Dakota; and April 11 at Smithville, Missouri. The meeting scheduled at Pierre, South Dakota was canceled due to inclement weather. The attendees were given an update regarding the outlook for 2013 runoff and projected System regulation for the remainder of 2013. Five fall public meetings on the Draft 2013-2014 AOP are planned at the following locations: October 8 in Kansas City, Missouri and Nebraska City, Nebraska; October 9 in Fort Peck, Montana; and October 10 in Bismarck, North Dakota and Pierre, South Dakota. In the spring of 2014, 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 2013-2014 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 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 manner in which it 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 2014 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 2013 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. Recordings of the conference calls were made available to the public through the Corps' website. Outreach calls will be re-initiated in January 2014 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 "Runoff Volumes for Annual Operating Plan Studies" report has been completed and is posted on the Corps' website. Additional reports include hydrologic statistics of project elevations and releases, long-term runoff forecasting, which includes an analysis of the relationship of hydrologic factors as they relate to plains snowmelt, and incremental runoff below the System. 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 is a climate attribution effort focusing on the 2011 event. The second part 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 these studies are expected in the fall of 2013.

The System reservoirs are surveyed periodically (10- to 25-year intervals) to update reservoir capacities and to assess the progress of 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. Updated survey data for Big Bend will likely be completed later this fall. Adjustments to the system storage zones were made due to the changed reservoir storages. Total System storage was reduced from 73.1 MAF to 72.4 MAF, the base of the Exclusive Flood Control Zone was reduced from 68.4 MAF to 67.7 MAF, the base of the Annual Flood Control and Multiple Use Zone was reduced from 56.8 MAF to 56.1 MAF, and the Permanent Pool was lowered from 17.9 MAF to 17.6 MAF. Overall flood storage of 16.3 MAF remained the same (11.6 MAF in the Annual Flood Control and Multiple Use Zone and 4.7 MAF in the Exclusive Flood Control Zone).

V. FUTURE RUNOFF: AUGUST 2013 - DECEMBER 2014

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 used as input to the basic reservoir regulation simulation (Basic) in the AOP studies for the period August 2013 to February 2014. The August 1 runoff forecast for 2013 was 22.7 million acre-feet (MAF). Two other runoff scenarios based on the August 1 runoff forecast were developed for the same period. These are the Upper Basic and Lower Basic simulations, which are based on 120 percent and 80 percent of the August through February runoff forecast, respectively.

Simulations for the March 1, 2014 to February 28, 2015 time period use five statistically derived runoff scenarios based on an analysis of historic water supply. Runoff scenarios were updated for last year's AOP to include 5 additional years of runoff data that now extends from 1898 to 2011. The report detailing the development of these updated runoff scenarios was completed in August 2013. 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.

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 2014 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 2015. 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 2015.

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 I,*** where water supply conditions are quantified for the period August 2013 through February 2015. The natural water supply for calendar year (CY) 2012 totaled 19.5 MAF.

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

	Natural 1/	Post-1949 Depletions	Net 2/
August 2013 through February 2014 (Basic Runoff Scenario)			
Basic	6,300	800	7,100
Upper Basic (120%)	7,600	800	8,400
Lower Basic (80%)	5,100	300	5,400
Runoff Year March 2014 through February 2015 (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	-3,000	16,300
Lower Decile	16,100	-2,800	13,300

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 2013-2014

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 will 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 2013-2014 AOP includes 13 years of regulation at Fort Peck (1940) as the sole Mainstem project, plus 60 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 from 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. 2013-2014 AOP Simulations. Reservoir simulations for the Upper Basic, Basic, and Lower Basic runoff scenarios, which span the period of August 2013 through February 2014, 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 2014 through February 2015, 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 forecast models which incorporate real-time information including observed and forecasted 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, as well as additional space in the Carryover Multiple Use Zone, and use of the Exclusive Flood Control Zone is not anticipated under any of the five runoff scenarios covered in the AOP; reduced navigation flow support under all runoff scenarios to start the navigation season; full service flow support under Upper Quartile and Upper Decile runoff scenarios after the July 1 System storage check and reduced flow support for Median runoff and below; a full length navigation season for Median runoff and above; minimum winter releases for Median and lower 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 Upper Quartile and below runoff and nearly steady releases for Upper Decile runoff with flood water evacuation; emphasis on Garrison 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 2014 runoff season. In addition, due to the dry conditions in 2012 and 2013 system storage will begin the runoff season below the base of the Annual Flood Control and Multiple Use Zone. 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 2014. 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 2014. Median runoff starts the season slightly above minimum service and increases to slightly below full service based on the July 1 System storage check (see ***Plate 3***). Upper Quartile and Upper Decile runoff conditions start the season at an intermediate service level and increase to full service or higher after the July 1 System storage check. Minimum service levels are provided for Lower Quartile and Lower Decile throughout the navigation season. Application of the July 1 system storage check indicated that a full length navigation season would be provided for the Median runoff condition. The upper two runoff scenarios provide a 10-day extension to the navigation season, while Lower Quartile runoff contains a 9-day shortening to the navigation season and Lower Decile runoff contains a 17-day shortening. Upper Quartile and Upper Decile simulations reach the desired 56.1 MAF System storage level on March 1, 2014. 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 2014 tern and plover nesting season for Upper Quartile and lower runoff conditions. For these simulations, the monthly average May release used in the simulations was determined by using the long-term average release (see ***Plate 3***) based on the service level for the first third of the month, followed by cycling between the May and July table values for the remainder of the month to reflect an every third day peaking cycle from Gavins Point. 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 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 2014, 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. Under this runoff scenario, releases were based on flood water evacuation. Based on the September 1 storage checks and flood evacuation criteria, modeled Gavins Point winter releases were 12,500 cfs during the 2013-2014 winter season and from 12,500 cfs to 20,000 cfs during the 2014-2015 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, Garrison is scheduled to be favored during the 2014 forage fish spawn while also attempting to maintain rising water levels at Fort Peck and Oahe. 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. Releases in the Lower Quartile and Lower Decile simulations are adjusted to maintain steady-to-rising pool levels at Garrison. The Lower Quartile simulation shows the Fort Peck pool dropping slightly in April and the Lower Decile simulation shows Fort Peck dropping in April and Oahe dropping during April and 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 July 31, 2013 and the simulated regulating plans for each project through CY 2014 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 for Fort Peck, Garrison, Oahe, and Gavins Point the 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 2012 through July 2013. ***Plate 13*** presents past and simulated gross average monthly power generation and gross peaking capability for the System.

C. Regulation Plan for the Balance of the 2013 Navigation Season and Fall of 2013. The regulation of the System for the period of August though November 2013 is presented in the following paragraphs.

Fort Peck. Releases will average 8,000 cfs through mid-September and will then be lowered to 5,000 cfs as irrigation ceases. The releases will be held near that level through the end of November. The Fort Peck pool will slowly recede through September and then remain essentially steady through the end of November, ending the month at 2223.4 feet msl or 2.8 feet below the August 1 elevation of 2226.2 feet msl.

Garrison. Releases will be maintained at 19,000 cfs until mid-September when releases will be decreased to 14,000 cfs and held steady until the end of November. The threatened least terns and endangered piping plovers were fledged by August 22 on the reach downstream of Garrison and peaking restrictions were discontinued at that time. The Garrison pool will steadily drop through the end of October before leveling off and ending the month of November at 1833.4 feet msl or 2.7 feet below the August 1 elevation of 1836.1 feet msl.

Oahe. The reservoir started the month of August at elevation 1602.6 feet msl. Releases will average 27,500 cfs in August and 26,700 cfs in September in support of navigation. Releases will be reduced in October and November to 17,900 and 16,800 cfs, respectively to accommodate the fall drawdown of the Fort Randall pool. At the end of November, the Oahe is forecast to be at elevation 1596.6 feet msl or 6.0 feet below the August 1 elevation.

Big Bend. Releases generally parallel those from Oahe. Big Bend 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 26,100 cfs in August and 28,600 cfs in September 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 be completed near the end of November. Releases will be reduced when the navigation season ends starting in late November to the level required to back up Gavins Point winter releases.

Gavins Point. Releases will be scheduled to support downstream intermediate service (3,000 cfs below full service based on the July 1 storage check) flows in reaches with scheduled commercial navigation throughout the 2013 navigation season. A full-length navigation season will be provided in accordance with the technical criteria for the July 1 System storage check presented in the Master Manual. The last day of flow support for the commercial navigation season will range from November 21 at Sioux City to November 30 at the mouth near St. Louis. Releases will be reduced by approximately 3,000 cfs per day beginning in mid-November working toward a target winter release of 12,000 cfs. The final 3,000 cfs of release reductions may be made in smaller increments to ensure water intakes along the lower river remain operational. The Gavins Point pool level will be raised 1.5 feet to elevation 1207.5 feet msl in September. The pool level will remain near that elevation during the fall and winter months.

D. Regulation Plan for Winter 2013-2014. 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. The planned winter System release for 2013-2014 is 12,000 cfs. The planned winter release rate may be less than is required for downstream water supply intakes without sufficient incremental tributary flows below the System, and therefore, releases may need to be set at levels higher than the winter release rate at times to ensure downstream water supply intakes are operable. Water supply is discussed in more detail in Chapter VII, Section B.

Fort Peck. Releases are expected to average 6,500 cfs in December and 7,000 cfs in January and February to serve winter power loads and to help balance System storage. The Fort Peck pool level is expected to hold fairly steady, increasing only about 0.4 foot from elevation 2223.4 feet msl at the end of November to near elevation 2223.8 feet msl by March 1, 10.2 feet below the base of its Annual Flood Control and Multiple Use Zone. The percent of carryover multiple purpose storage in the three large upper reservoirs should be balanced on March 1, 2014.

Garrison. Releases are scheduled to be 18,000 cfs in December increasing to 20,000 cfs for January and February to serve winter power loads and to better balance storage in the upper three reservoirs. 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 is expected to decline about 4.3 feet from elevation 1833.4 feet msl at the end of November to near elevation 1829.1 feet msl by March 1, 8.4 feet below 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 13,100 cfs and 16,000 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 increase from 1596.6 feet msl at the end of November to 1599.4 feet msl at the end of February as the storage of the upper three reservoirs are balanced. The Oahe pool will be 8.1 feet below the base of its Annual Flood Control and Multiple Use Zone at the beginning of March.

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 10,600 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 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 range between 47.2 and 50.9 MAF by March 1, 2014, the approximate beginning of next year's runoff season. System storage at the base of the Annual Flood Control and Multiple Use Zone is 56.1 MAF.

E. Regulation During the 2014 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, 2014, 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 2014 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 2014 season will be determined by actual System storage on March 15 and July 1. Runoff scenarios modeled indicate reductions below full service flow support at the start of the 2014 navigation season for Upper Decile and Upper Quartile runoffs of 2,500 and 2,700 cfs, respectively. With Median runoff, navigation flow support would be 4,800 cfs below full service. Lower Quartile and Lower Decile runoffs would result in minimum service (6,000 cfs below full service). Following the July 1 System storage check, full service would be provided for Upper Decile and Upper Quartile runoffs and Median runoff would provide flows 1,800 cfs below full service. The service level would be minimum service for both Lower Quartile and Lower Decile runoff. The normal 8-month navigation season is provided for the Median runoff scenario as shown in ***Table II***, with Lower Quartile indicating a 9-day shortening of the navigation season and Lower Decile runoff indicating a 17-day shortening of the navigation season. A 10-day extension to the navigation season is provided for the upper two runoff scenarios.

TABLE II
NAVIGATION SERVICE SUPPORT
FOR THE 2014 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	52.2	60.8	-2,500	+10,000	0*
U.Q.	30.6	52.0	59.0	-2,700	0	0*
Med.	24.6	50.1	55.0	-4,800	-1,800	0
L.Q.	19.3	47.8	50.1	-6,000	-6,000	9
L.D.	16.1	47.7	48.9	-6,000	-6,000	17

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

As previously stated, the modeled regulation for the 2014 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 will be based on hydrologic conditions, the availability of habitat at that time and the potential for navigation service level increases after the July 1 storage check. Dry conditions in 2012 required the initial steady release to be set near 30,000 cfs, while in 2013, which had more normal conditions, the initial steady release was 24,000 cfs. Model runs included in this AOP have a Gavins Point release peaking cycle of 2 days down and 1 day up 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 and conserving water in the upper three reservoirs, if required. Gavins Point releases for the Upper Decile runoff simulation 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 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.

Gavins Point releases may be quite variable during the 2014 navigation season but are expected to range from 22,000 to 42,000 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.*** Due to the dry conditions during 2012 and 2013, additional storage space exists in the System to control flood inflows under all scenarios simulated for this AOP. 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 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, Garrison is scheduled to be favored during the 2014 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 Garrison from April through June for 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 maintain a rising Garrison 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. Fort Peck pool levels drop slightly in April under both lower runoff scenarios. Oahe pool levels remain steady with the Lower Quartile runoff scenario, but decline during April and May with Lower Decile runoff. If the current drought conditions continue, 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. State game and fish agencies are currently performing fisheries population surveys and may provide a recommendation regarding the need to favor a specific reservoir pending the results of those surveys.

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 2014 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. The reservoir rises in April and May for Median and above runoff scenarios, but declines in April under both lower 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 2014 nesting season.

During 2014, cold-water habitat in Garrison should be adequate for all runoff scenarios. Cold-water habitat will continue to be monitored during the year and adjustments will be considered if conditions warrant.

A rising pool at Garrison during the fish spawn in April and May will be dependent upon the daily inflow pattern to the reservoir but appears possible for all runoff simulations.

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 all runoff scenarios except Lower Decile. Under the Lower Decile runoff scenario, the Oahe pool would decline 1.3 feet from the beginning of April to the end of May.

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. The need to utilize measures to minimize take may be lessened because of the large quantity of nesting habitat expected during the 2014 nesting season. 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 2014.

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 past record runoff in 1997 and from the high elevation habitat resulting from the record releases in 2011. Following the 1997 runoff, high elevation nesting habitat was readily available and used successfully by the birds. Flows from Gavins Point Dam may follow the flow-to-target (FTT) release scenario. This 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 than nests are likely to be initiated at a lower elevation which would be inundated later in the summer, a steady release-flow to target 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 large 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 considerable 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. Regulation Activities for Historic and Cultural Properties. 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 is 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 will be given to site assessments at occupation sites to determine impacts and check for any NAGPRA-related items. Increased law enforcement will be necessary to detect or prevent, and possibly prosecute individuals for Archeological Resources Protection Act (ARPA) violations. Engineers will need to collect data and prepare 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 remain below normal in 2014 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 2014 could result in a Fort Peck pool elevation variation from a high of 2238 feet msl to a low of 2213 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 one known site 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 1844 and 1821 feet msl during 2014. Based on a review of existing information, approximately 72 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 1614 to 1587 feet msl (see ***Plate 10*** and the studies included at the end of this report). Based on a review of existing information, approximately 204 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 2014. 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 2014. 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 30 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 2014. 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 2014

With regulation of the System in accordance with the 2013-2014 AOP outlined in the preceding pages, the following results can be expected. ***Table III*** summarizes the critical decision points throughout the year for all runoff conditions.

Table III
Summary of 2013-2014 AOP Studies

Decision Points	2014-2015 Runoff Condition				
	Upper Decile	**Upper Quartile**	**Median**	**Lower Quartile**	**Lower Decile**
March 1 System Storage March 23-31 GP Release	50.9 MAF 24.2 kcfs	50.9 MAF 24.0 kcfs	49.3 MAF 21.9 kcfs	47.2 MAF 23.8 kcfs	47.2 MAF 23.8 kcfs
March 15 System Storage Spring Service Level	52.2 MAF 2.5 kcfs blw full service	52.0 MAF 2.7 kcfs blw full service	50.1 MAF 4.8 kcfs blw full service	47.8 MAF minimum service	47.7 MAF minimum service
May 1 System Storage May Cycling May GP Release	55.3 MAF 25.5/29.1 kcfs 26.2 kcfs	54.5 MAF 25.3/28.9 kcfs 26.0 kcfs	51.3 MAF 23.2/26.8 kcfs 23.9 kcfs	48.0 MAF 25.3/28.3 kcfs 25.9 kcfs	47.7 MAF 25.3/28.3 kcfs 25.9 kcfs
Fish Spawn Rise (Apr-Jun) FTPK Pool Elev Change GARR Pool Elev Change OAHE Pool Elev Change	 +9.0 feet +9.0 feet +8.7 feet	 +8.3 feet +8.6 feet +5.8 feet	 +6.3 feet +6.8 feet +3.8 feet	 +4.3 feet +4.4 feet 0.0 feet	 +1.5 feet +4.3 feet -1.8 feet
July 1 System Storage Sum-Fall Service Level (kcfs) Nav Season Length	60.8 MAF Full Service 10-Day extension	59.0 MAF Full Service 10- Day extension	55.0 MAF 1.8 kcfs blw Full Service 0 Days shortening	50.1 MAF Minimum Service 9 Days shortening	48.9 MAF Minimum Service 17 Days shortening
September 1 System Storage Winter 2013-14 GP Release	60.3 MAF 20.0 kcfs	58.7 MAF 18.0 kcfs	53.9 MAF 12.5 kcfs	48.2 MAF 12.5 kcfs	46.1 MAF 12.5 kcfs
February 28 System Storage End-Year Pool Balance Percent Pool	56.1 MAF Balanced 100%	56.1 MAF Balanced 100%	51.4 MAF Balanced 87%	45.1 MAF Balanced 70%	42.8 MAF Balanced 64%

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. Drought conditions throughout the basin during 2012 and 2013 have reduced runoff and lowered System storage. As a result, all runoff scenarios studied for this AOP indicate that the March 1, 2014 System storage will be below the desired 56.1 MAF base of the Annual Flood Control and Multiple Use Zone. Therefore, additional flood control storage beyond the normal 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. The additional space available varies from 5.2 MAF in the Upper Decile runoff scenario to 8.9 MAF in Lower Decile runoff scenario.

To the extent practical, the System is regulated to prevent damaging flows in the river reaches between and below the Mainstem dams. In 2014, 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 2013-2014, 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 2014 runoff that is stored in the flood control zones will be evacuated prior to the start of the 2015 runoff season.

B. <u>Water Supply and Water Quality Control</u>. 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 higher reservoir elevations has eliminated concern over many of these intakes. If the drought conditions continue, 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 2014 would be at least 15 feet higher than the record lows set in the 2000-2007 drought. Although not below the critical shut-down elevations for any intake, return to lower 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.

System storage was below 55.0 MAF on September 1, 2013, therefore monthly average releases of 12,500 cfs are shown on the simulations in the winter of 2013-2014. The additional 500 cfs 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. As shown in ***Table III***, 2014-2015 winter releases of 20,000 cfs would be made for the Upper Decile runoff scenario, 18,000 cfs for Upper Quartile, and 12,500 cfs under Median, Lower Quartile and Lower Decile runoff scenarios.

During non-navigation periods in the spring and fall from 2004 through 2007, System releases were scheduled as low as 9,000 cfs provided that enough downstream tributary flow existed 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. 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 III***. Service to navigation in 2014 from the beginning of the navigation season through the July 1 storage check for Upper Decile, Upper Quartile, and Median runoff scenarios will be at 2,500, 2,700 and 4,800 cfs below full service, respectively. After the July 1 storage check, Upper Decile and Upper Quartile scenarios indicate at least full service to navigation, with Median runoff 1,800 cfs below full service. Lower Quartile and Lower Decile indicate minimum service throughout the navigation season. 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. The Median runoff scenario indicates a full season while the Lower Quartile and Lower Decile runoff scenarios indicate a 9-day and 17-day shortening of the navigation season respectively. Although the AOP simulations provide a comparison of typical flow support under varying runoff conditions, the actual rate of flow support for the 2014 navigation season will be based on actual System storage on March 15 and July 1, 2014.

E. Power. ***Table IV and Table V*** indicate the estimated monthly System load requirements and hydropower supply of the Eastern Division, Pick-Sloan Missouri Basin Program (P-S MBP), from August 2013 through December 2014. 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 2014 is estimated to be 8.1 million MWh, 86 percent of the 1967-2012 average.

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 slightly below normal levels in 2014. If Lower Quartile or Lower Decile runoff were to occur in 2014, 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 2014 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 2013 and 2014 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 2013 and 2014. 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.

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

2013	Estimated Committed Sales*	Expected C of E Capability					Expected Bureau Capability**					Expected Total System Capability				
			120%	Basic	80%			120%	Basic	80%			120%	Basic	80%	
Aug	2199		2267	2263	2259			198	197	197			2465	2460	2456	
Sep	2008		2259	2253	2243			200	198	197			2459	2451	2440	
Oct	1876		2244	2236	2220			200	198	197			2444	2434	2417	
Nov	1984		2221	2211	2193			198	198	196			2419	2409	2389	
Dec	2115		2219	2205	2182			195	195	194			2414	2400	2376	
2014																
Jan	2128		2245	2228	2203			192	193	191			2437	2421	2394	
Feb	2113		2258	2239	2211			188	191	190			2446	2430	2401	
		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	2046	2284	2278	2251	2214	2212	189	189	190	190	190	2473	2467	2441	2404	2402
Apr	1916	2312	2299	2260	2214	2210	182	182	190	190	190	2494	2481	2450	2404	2400
May	1877	2336	2317	2270	2217	2210	188	191	195	194	194	2524	2508	2465	2411	2404
Jun	2081	2370	2346	2301	2235	2221	198	198	200	197	197	2568	2544	2501	2432	2418
Jul	2196	2386	2362	2301	2228	2203	201	201	201	197	197	2587	2563	2502	2425	2400
Aug	2199	2371	2345	2283	2208	2180	199	200	200	197	196	2570	2545	2483	2405	2376
Sep	2010	2353	2336	2275	2203	2171	201	201	200	199	197	2554	2537	2475	2402	2368
Oct	1874	2332	2323	2257	2168	2133	200	200	200	200	199	2532	2523	2457	2368	2332
Nov	1983	2307	2301	2233	2150	2121	199	199	199	199	198	2506	2500	2432	2349	2319
Dec	2114	2252	2252	2189	2114	2085	196	196	196	196	195	2448	2448	2385	2310	2280

* 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 V
ENERGY GENERATION AND SALES
(Million kWh at plant)

2013	Estimated Committed Sales*	Expected C of E Generation					Expected Bureau Generation **					Expected Total System Generation				
			120%	Basic	80%			120%	Basic	80%			120%	Basic	80%	
Aug	861		826	835	844			48	44	41			874	879	885	
Sep	736		770	803	797			46	41	39			816	844	836	
Oct	736		636	642	657			56	41	38			692	683	695	
Nov	803		552	558	552			62	39	37			614	597	589	
Dec	913		494	488	481			64	48	38			558	536	519	
2014																
Jan	926		556	546	543			63	47	38			619	593	581	
Feb	895		484	478	479			55	42	34			539	520	513	
		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	812	553	566	523	550	557	62	62	47	38	38	615	628	570	588	595
Apr	767	611	615	604	645	649	107	107	51	34	34	718	722	655	679	683
May	715	779	743	704	774	762	127	117	72	37	37	906	860	776	811	799
Jun	778	900	858	781	800	792	138	136	96	39	39	1038	994	877	839	831
Jul	880	1127	973	916	866	850	121	104	73	41	41	1248	1077	989	907	891
Aug	860	1250	1018	951	864	848	97	90	71	41	40	1347	1108	1022	905	888
Sep	736	1112	904	830	694	687	86	82	68	43	40	1198	986	898	737	727
Oct	735	974	767	683	619	609	82	82	67	49	40	1056	849	750	668	649
Nov	803	964	753	602	423	375	78	79	73	50	45	1042	832	675	473	420
Dec	912	785	683	525	504	492	80	81	75	59	49	865	764	600	563	541
CY TOT		10095	8920	8143	7761	7643	1096	1057	783	502	476	11191	9977	8926	8263	8119

* 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.

First, a collaboratively developed plan, entitled "Draft Monitoring and Enforcement Plan, dated April 2005" (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 2013-2014 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 2013.

Second, mitigation or protection of sites that are being adversely impacted continues. During the reporting period for the 2012 Annual Report by the Corps on the implementation of the Programmatic Agreement, 16 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 2013-2014 on cultural sites are included in the Chapter VI, section G., entitled, "Regulation Activities for Historic and Cultural Properties."

H. System Storage. If the August 1, 2013 Basic runoff forecast verifies, System storage will decline to 48.7 MAF by the end of 2013. This would be 14.8 MAF higher than the record low System storage of 33.9 MAF set on February 9, 2007 and 0.3 MAF higher than the 2012 end-of-year storage of 48.4 MAF. This end-of-year storage is 1.9 MAF less than the 1967-2012 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, 2014 is presented in ***Table VI*** for the runoff scenarios simulated.

I. Summary of Water Use by Functions. Anticipated water use in CY 2013, under the regulation plan with the Basic forecast of water supply is shown in ***Table VII***. Under the reservoir regulation simulations in this AOP, estimated water use in CY 2014 also is shown in ***Table VII.*** Actual water use data for CY 2012 are included for information and comparison.

TABLE VI
ANTICIPATED DECEMBER 31, 2014 SYSTEM STORAGE

Water Supply Condition	Total (12/31/14)	Carryover Storage Remaining 1/	Unfilled Carryover Storage 2/	Total Change CY 2013
	(Volumes in 1,000 Acre-Feet)			
Upper Decile	56,300	38,500	0	6,200
Upper Quartile	56,200	38,500	0	6,200
Median	51,100	33,500	5,000	2,300
Lower Quartile	45,100	27,500	11,000	-2,100
Lower Decile	42,900	25,300	13,200	-4,200

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.

TABLE VII
MISSOURI RIVER MAINSTEM SYSTEM
WATER USE FOR CALENDAR YEARS 2012, 2013, AND 2014 ABOVE SIOUX CITY, IOWA
in Million Acre-Feet (MAF)

		CY 2012 Actual	CY 2013 Basic Simulation	Simulations for Calendar Year 2014 Upper Decile	Upper Quartile	Median	Lower Quartile	Lower Decile
Upstream Depletions	(1)							
Irrigation, Tributary Reservoir Evaporation & Other Uses		2.6	2.7					
Tributary Reservoir Storage Change		-0.2	-0.2					
Total Upstream Depletions		2.4	2.5	2.9	2.8	2.7	3.0	2.8
System Reservoir Evaporation	(2)	3.0	2.5	1.2	1.2	1.7	1.9	1.8
Sioux City Flows								
Navigation Season								
Unregulated Flood Inflows Between Gavins Point & Sioux City	(3)	0.0	0.0					
Navigation Service Requirement	(4)	16.7	12.9	16.5	16.5	14.5	13.0	12.2
Supplementary Releases								
T&E Species	(5)	1.0	0.6	0.3	0.3	0.3	0.2	0.2
Flood Evacuation	(6)	0.0	0.0	3.9	0.4	0.0	0.0	0.0
Non-navigation Season								
Flows		3.9	3.2	3.1	3.1	3.1	3.2	3.3
Flood Evacuation Releases	(7)	0.9	0.0	0.4	0.1	0.0	0.0	0.0
System Storage Change	(8)	-8.4	0.4	6.2	6.2	2.3	-2.0	-4.2
Total		19.5	22.7	34.5	30.6	24.6	19.3	16.1
Project Releases								
Fort Peck		7.2	5.6	6.6	6.6	5.3	5.3	5.4
Garrison		16.5	13.4	17.2	15.5	13.9	13.4	12.9
Oahe		19.8	13.4	17.7	15.3	14.6	14.4	14.4
Big Bend		18.3	12.9	17.7	15.2	14.5	14.3	14.2
Fort Randall		19.7	13.8	19.0	16.3	15.2	14.6	14.4
Gavins Point		21.3	15.1	21.1	18.2	16.6	15.7	15.5

(1) Tributary uses above the 1949 level of development including agricultural depletions and tributary storage effects.
(2) Net evaporation is shown for 2014.
(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.
(8) Area capacity tables and system storage adjusted on August 1, 2013 as discussed in Chapter IV.

VIII. TENTATIVE PROJECTION OF REGULATION THROUGH FEBRUARY 2020

(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 full 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 & incremental 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 fill	Fort Union clay shale	Pierre shale
16	Type of fill	Hydraulic & rolled earth fill	Rolled earth filled	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 msl	2225	1825	1596.5
22	Width (including piers) in feet	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 maximum operating pool in cfs	230,000	660,000	80,000
	Reservoir Data (6)			
26	Max. operating pool elev. & area	2250 msl 241,000 acres	1854 msl 380,000 acres	1620 msl 374,000 acres
27	Max. normal op. pool elev. & area	2246 msl 234,000 acres	1850 msl 364,000 acres	1617 msl 360,000 acres
28	Base flood control elev & area	2234 msl 210,000 acres	1837.5 msl 307,000 acres	1607.5 msl 312,000 acres
29	Min. operating pool elev. & area	2160 msl 89,000 acres	1775 msl 128,000 acres	1540 msl 117,000 acres
	Storage allocation & capacity			
30	Exclusive flood control	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 initiated	November 1937	December 1953	August 1958
36	Initially reached min. operating pool	27 May 1942	7 August 1955	3 April 1962
37	Estimated annual sediment inflow	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 conduit & 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	1670-1680 15,000- 60,000 cfs	1423-1428 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)	1,048	2,259	2,641
55	Initial generation, first and last unit	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	(2) Includes 1,350 square miles of non-contributing areas.
80, ending near Pierre, SD	107, ending at Big Bend Dam	25, ending near Niobrara, NE	755 miles	4	
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 height from low water to maximum operating pool. Maximum height is from average streambed to top of dam.
1964	1953	1955		9	
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 fill	Rolled earth fill & chalk berms	Rolled earth & chalk fill		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) 1967-2012 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 30,000 acres	1,188,000 acres	26	(14) Based on Study 8-83-1985
1422 msl 60,000 acres	1365 msl 95,000 acres	1208 msl 27,000 acres	1,140,000 acres	27	
1420 msl 57,000 acres	1350 msl 77,000 acres	1204.5 msl 23,000 acres	986,000 acres	28	
1415 msl 51,000 acres	1320 msl 38,000 acres	1204.5 msl 23,000 acres	446,000 acres	29	
1423-1422 60,000 a.f.	1375-1365 986,000 a.f.	1210-1208 54,000 a.f.	4,673,000 a.f.	30	
1422-1420 117,000 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 1,621,000 a.f.	1320-1240 1,469,000 a.f.	1204.5-1160 295,000 a.f.	17,582,000 a.f.	33	
1423-1345 1,798,000 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	1228-1239 5,000-60,000 cfs	1155-1163 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
986	1,733	726	9,367 million kWh	54	Compiled by
October 1964 - July 1966	March 1954 - January 1956	September 1956 - January 1957	July 1943 - July 1966	55	Northwestern Division
				56	Missouri River Region
$107,498,000	$199,066,000	$49,617,000	$1,166,404,000		August 2013

Plate 2

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

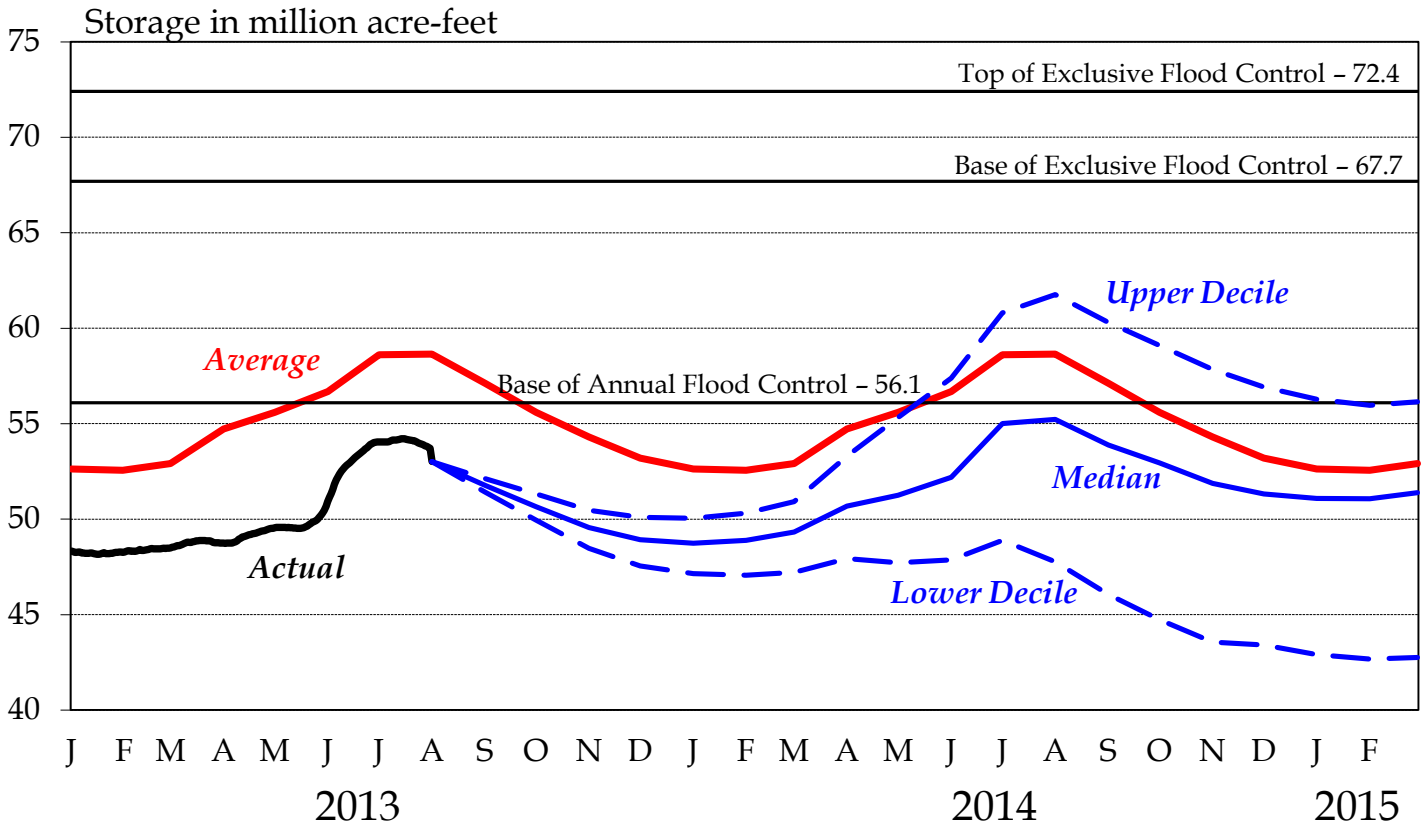
Drought Preclude	40.0 MAF or below measured on May 1.
Proration of Pulse Magnitude Based On System Storage*	Prorated from 16 kcfs based on a May 1 System Storage check; 100% at 54.5 MAF; straight line interpolation to 75% at 40.0 MAF.
Proration of Pulse Magnitude Based On Projected Runoff*	After the 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

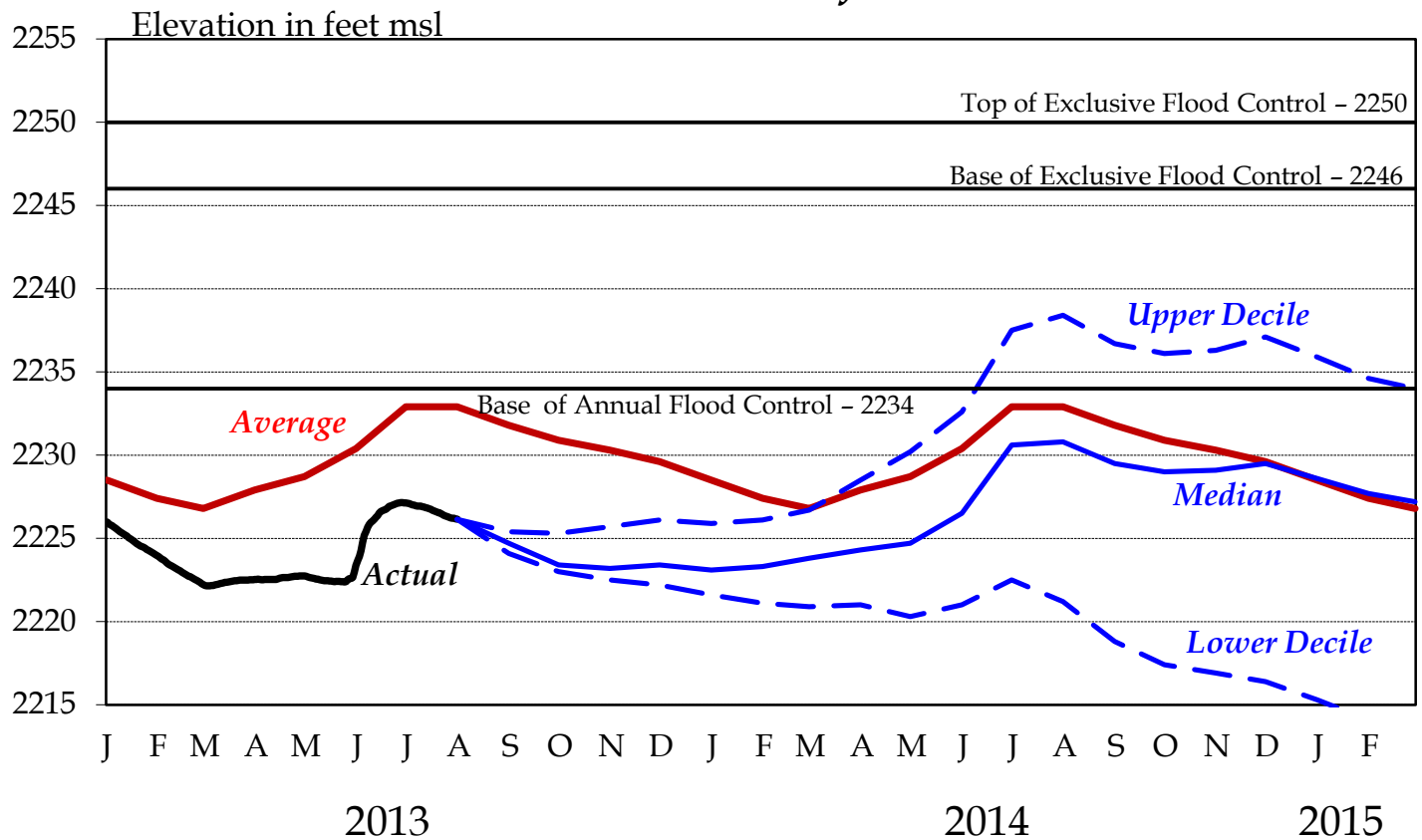
* Spring pulse magnitudes will be determined by taking the difference between pre-pulse Gavins Point releases and the peak pulse Missouri River flows measured just downstream of the mouth of the James River.

System Storage
2013-2014 Draft AOP



Average 1967-2012

Fort Peck
2013-2014 Draft AOP

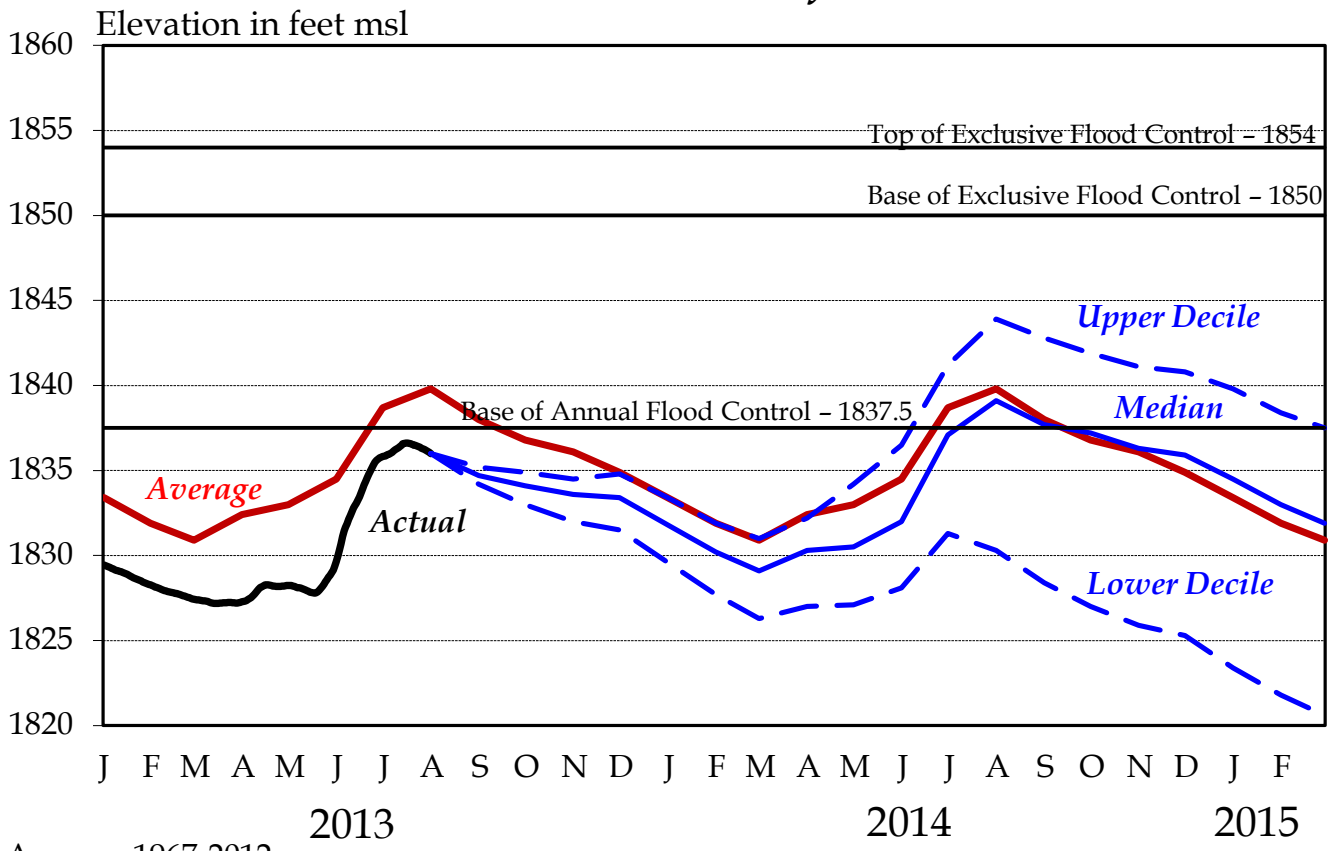


Average 1967-2012

Plate 4

Garrison

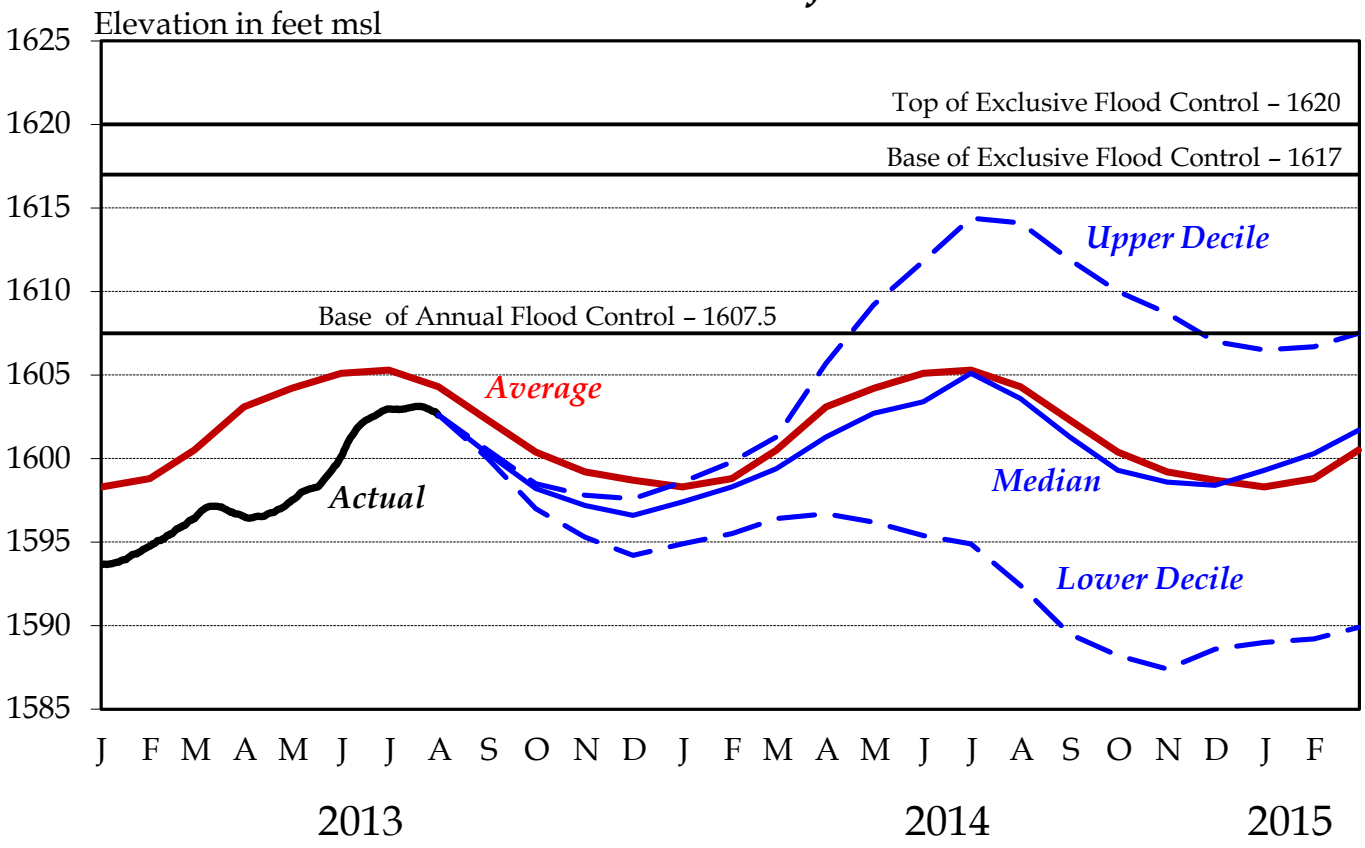
2013-2014 Draft AOP



Average 1967-2012

Oahe

2013-2014 Draft AOP



Average 1967-2012

Plate 5

System Storage

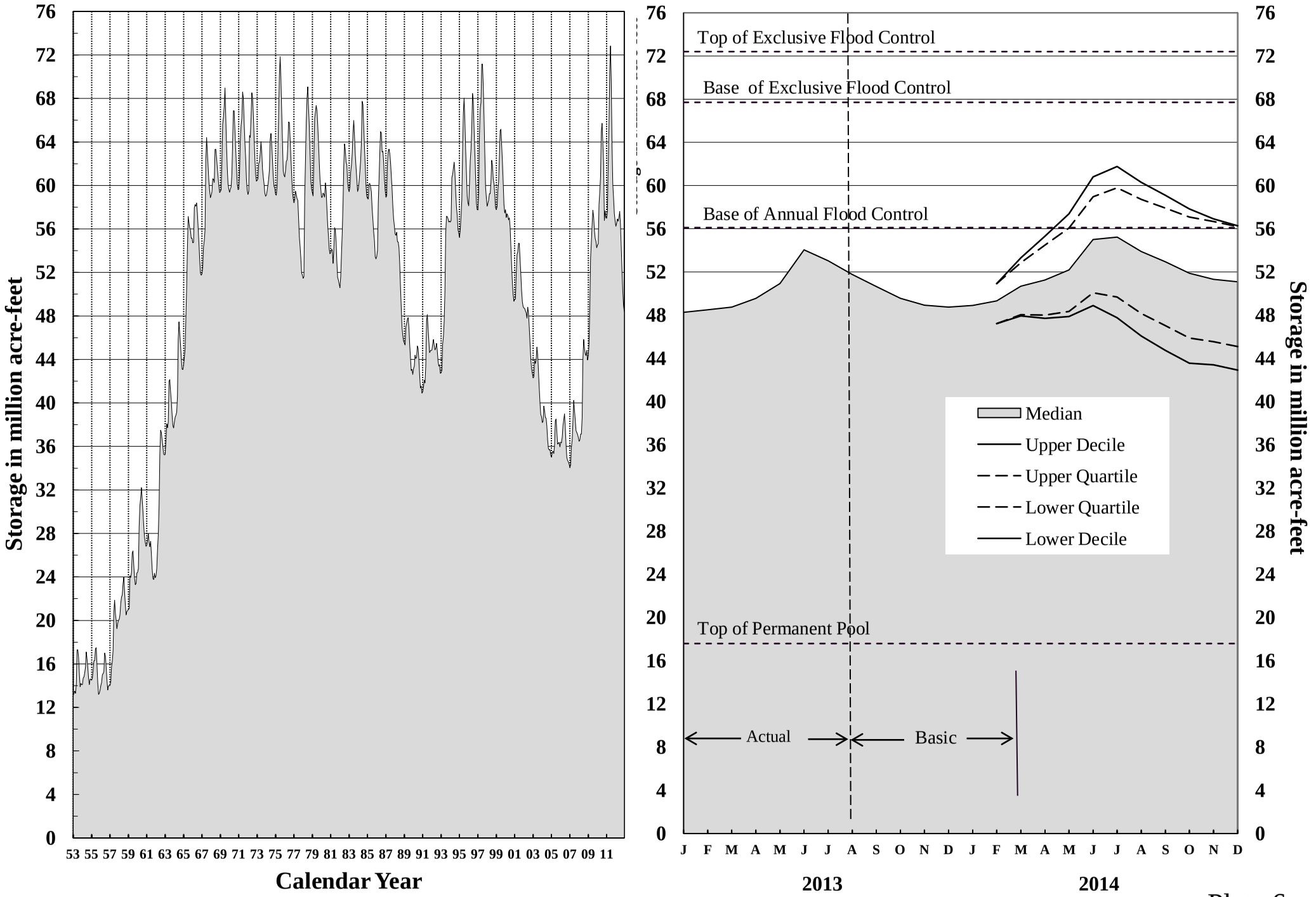


Plate 6

Gavins Point Releases

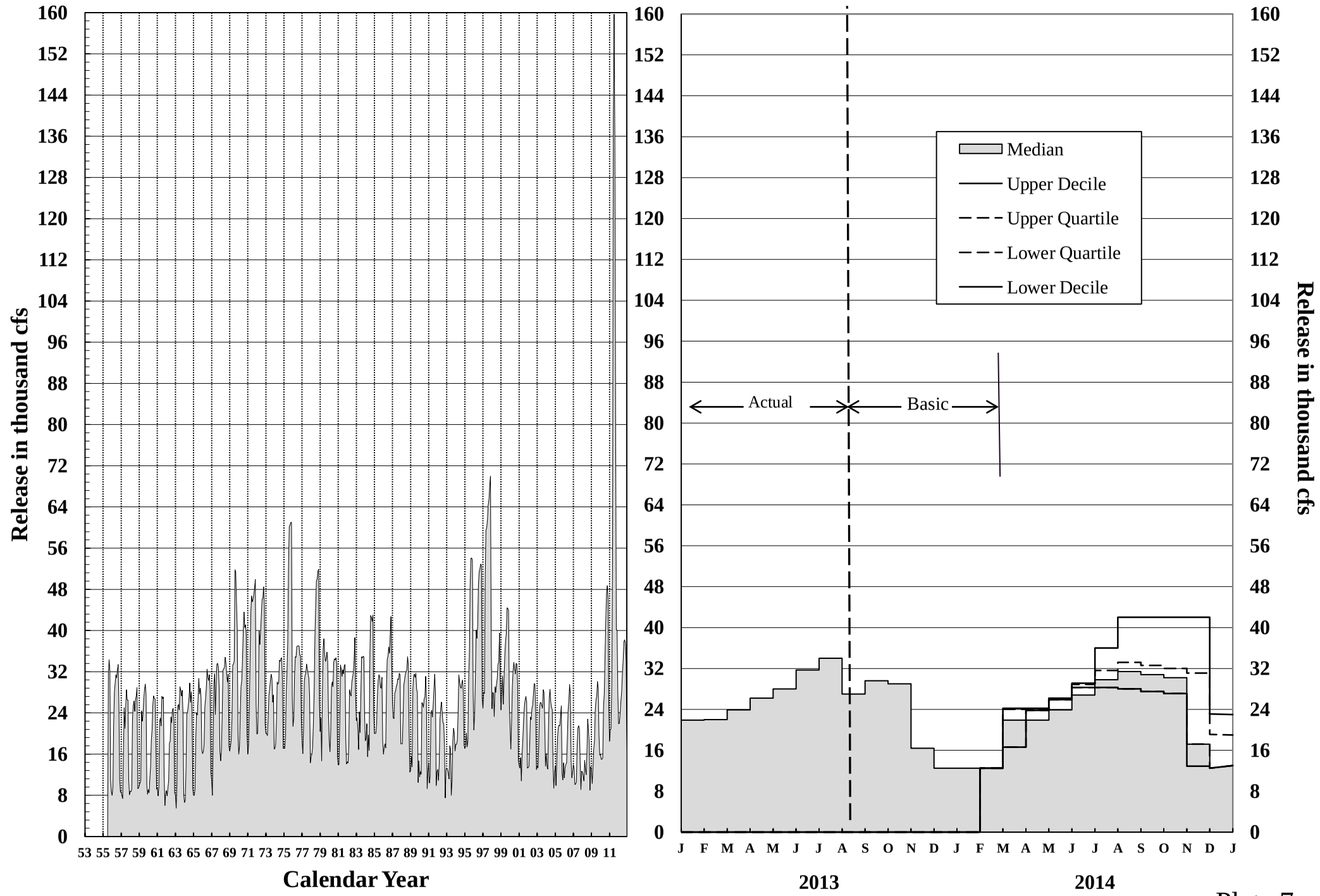
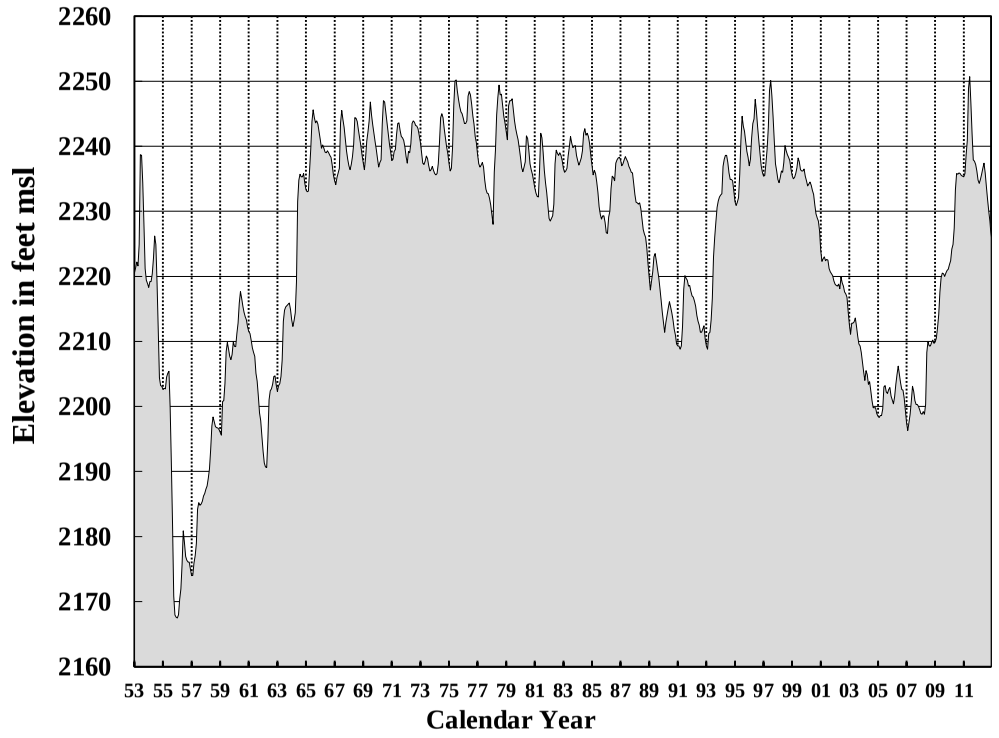
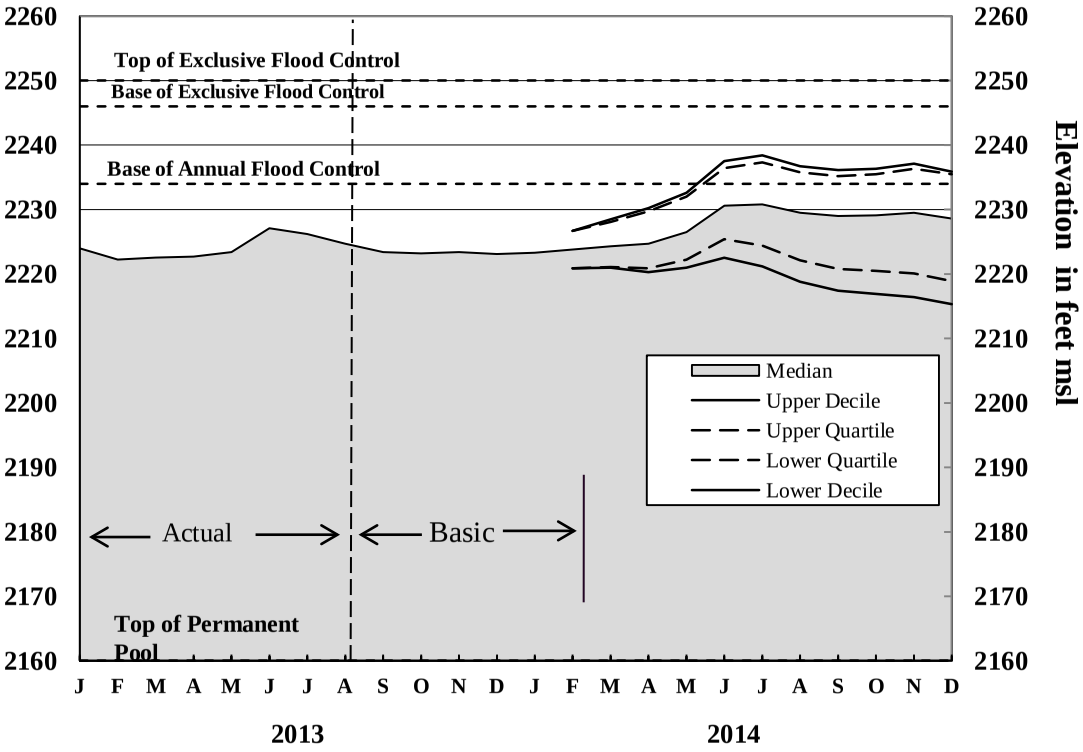


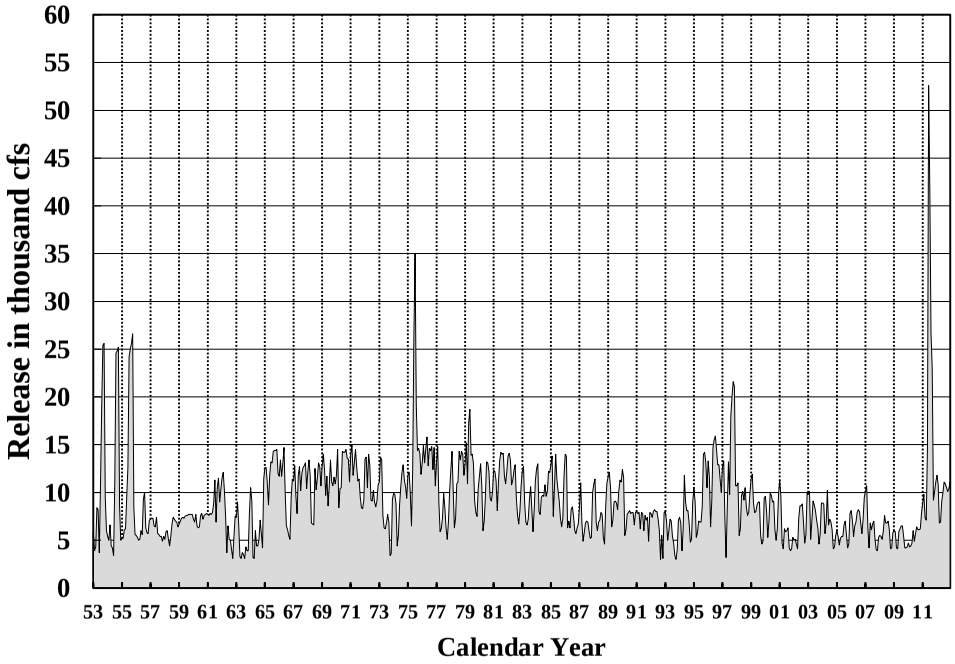
Plate 7

Fort Peck

Elevations and Releases







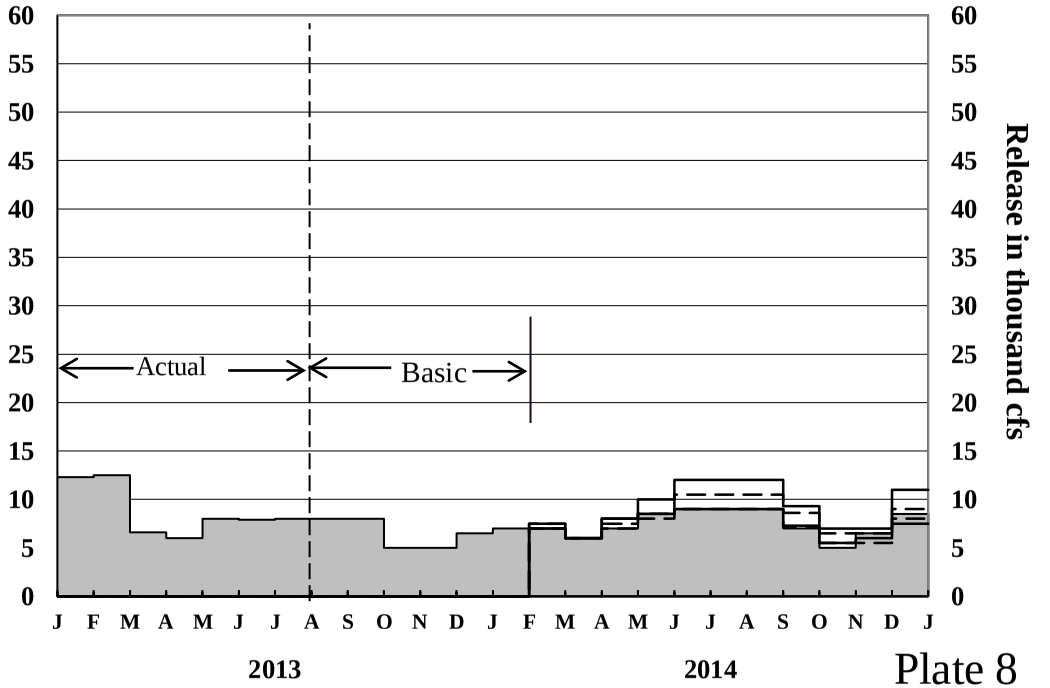
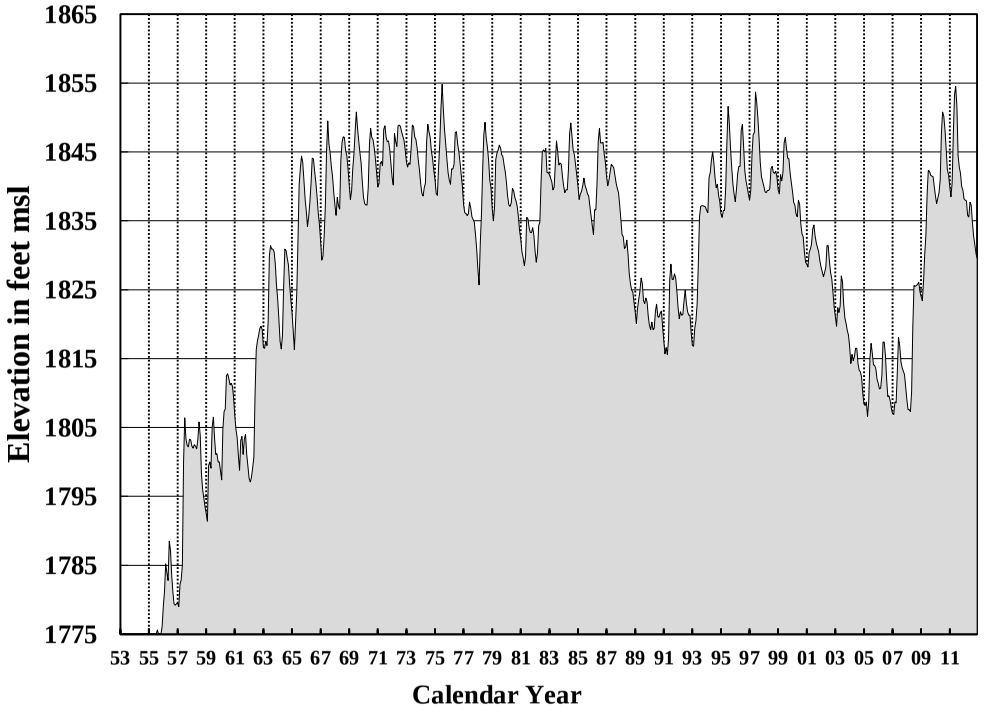
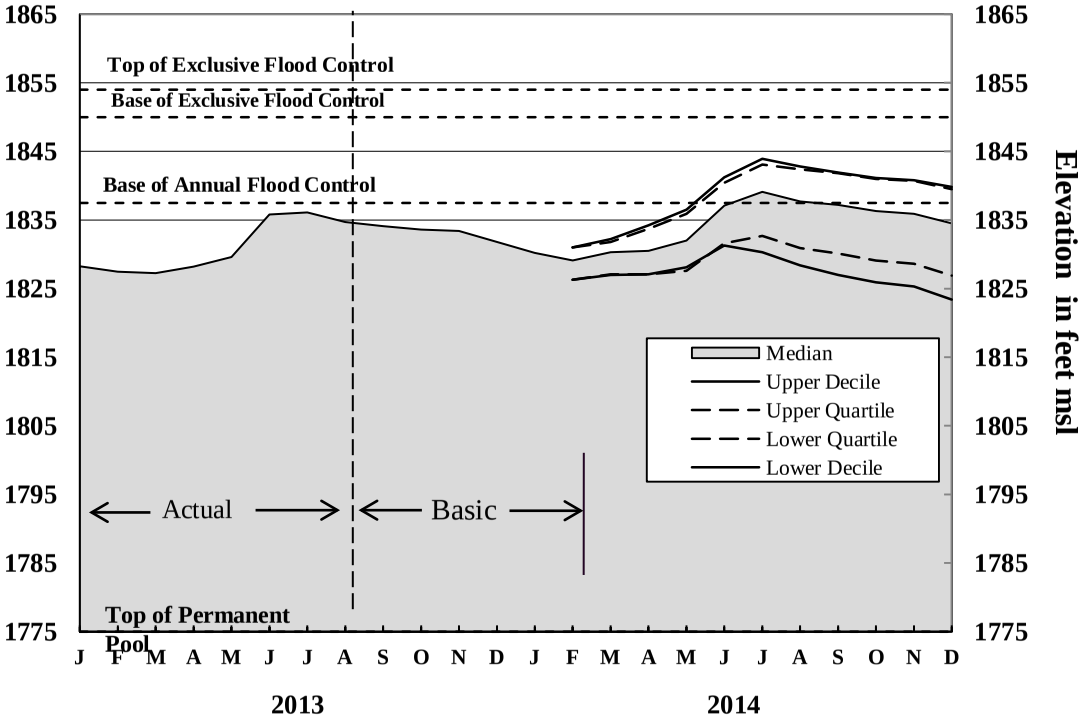


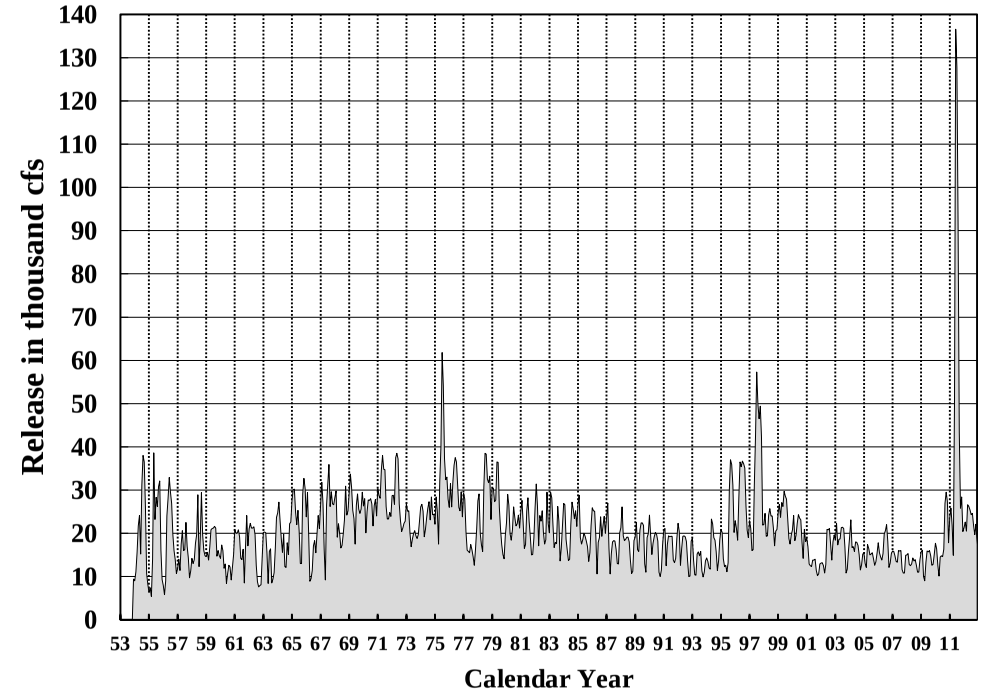
Plate 8

Garrison

Elevations and Releases







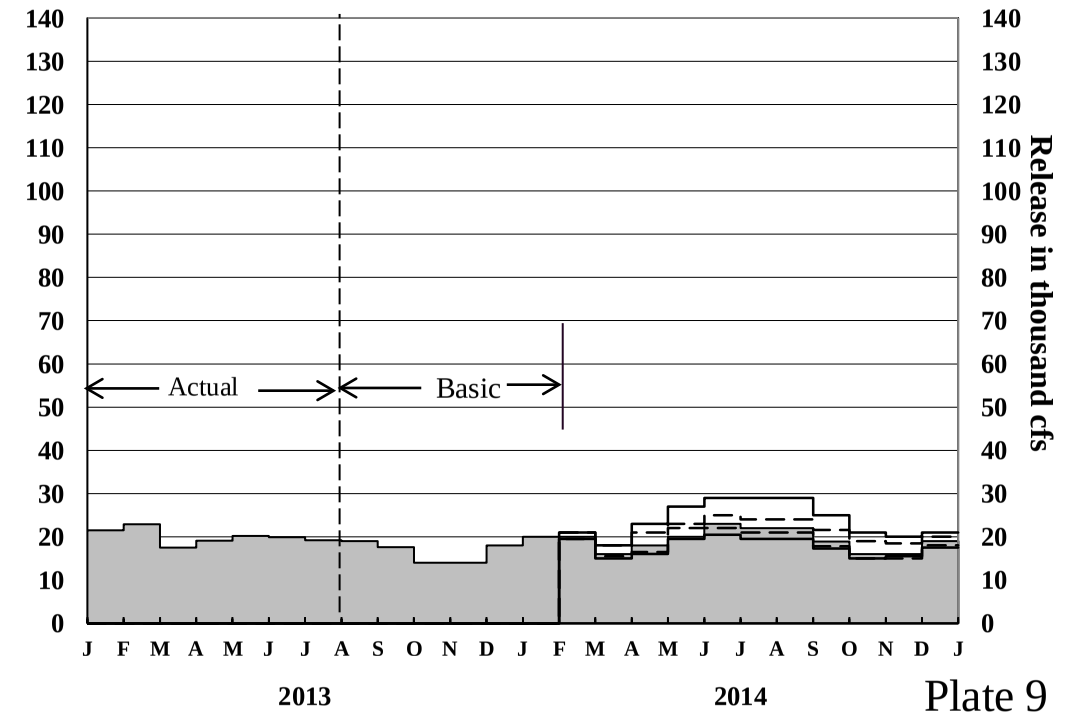
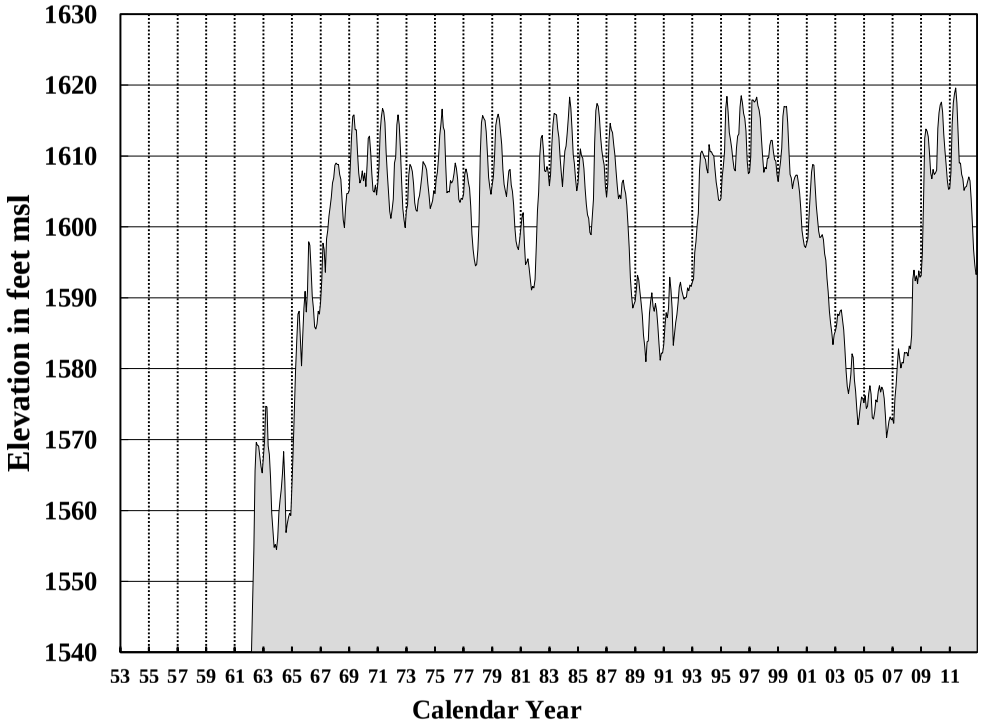
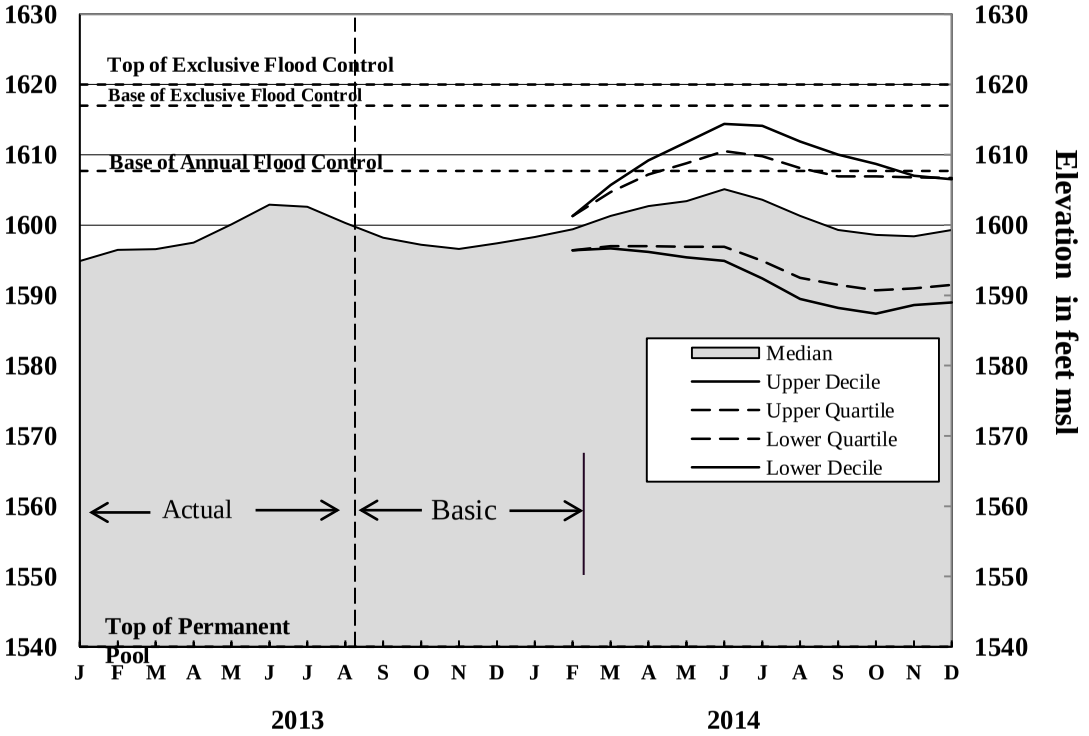


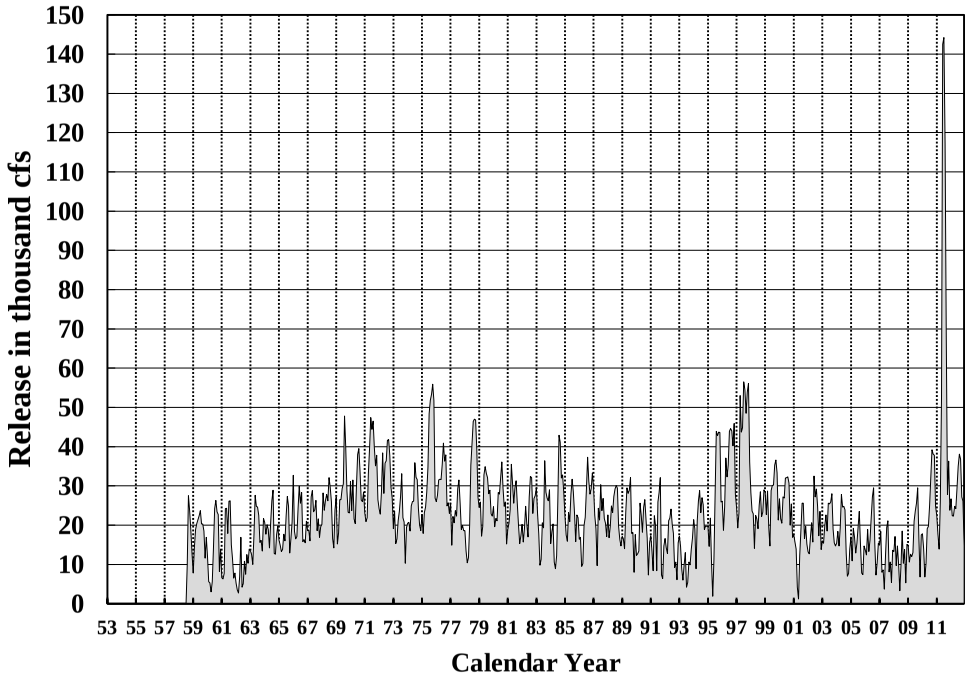
Plate 9

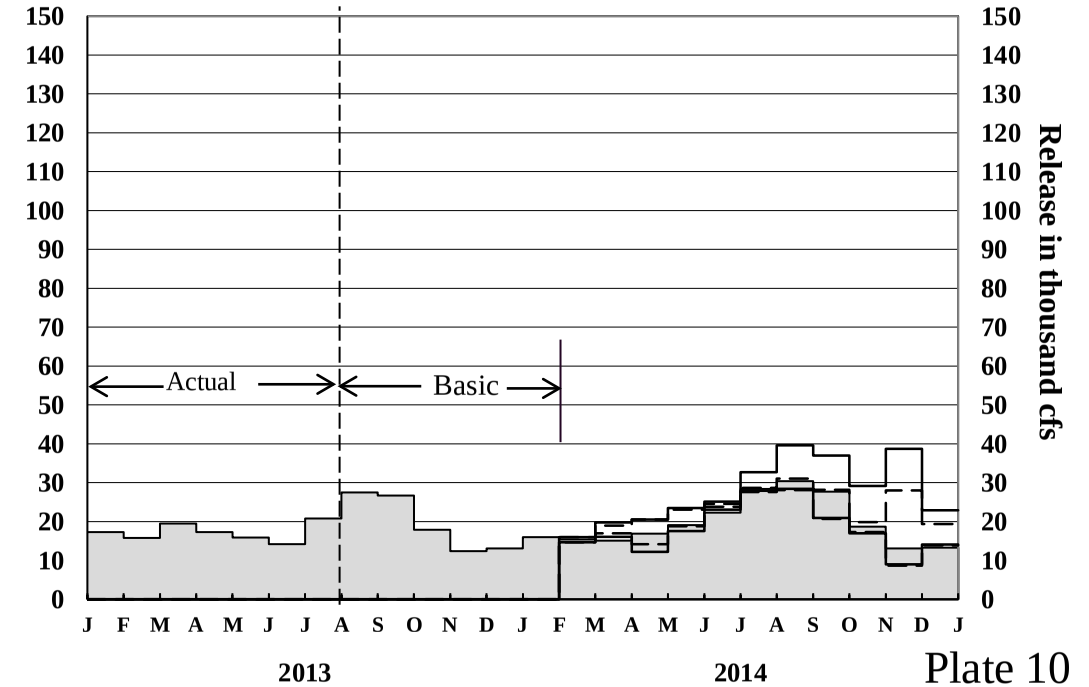
Oahe

Elevations and Releases

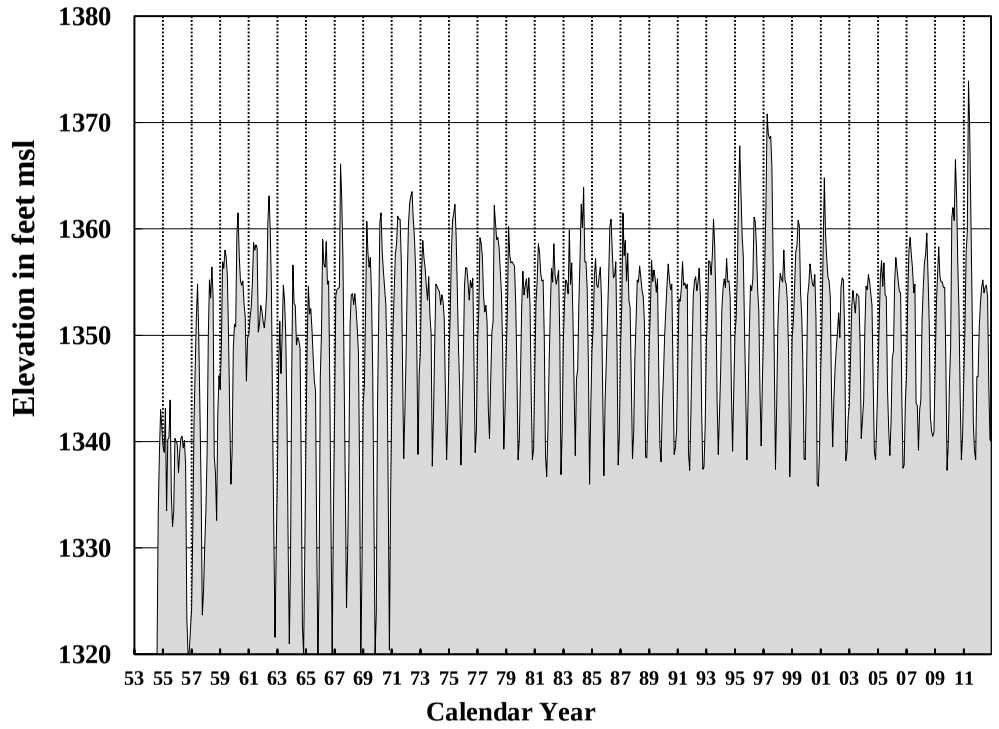


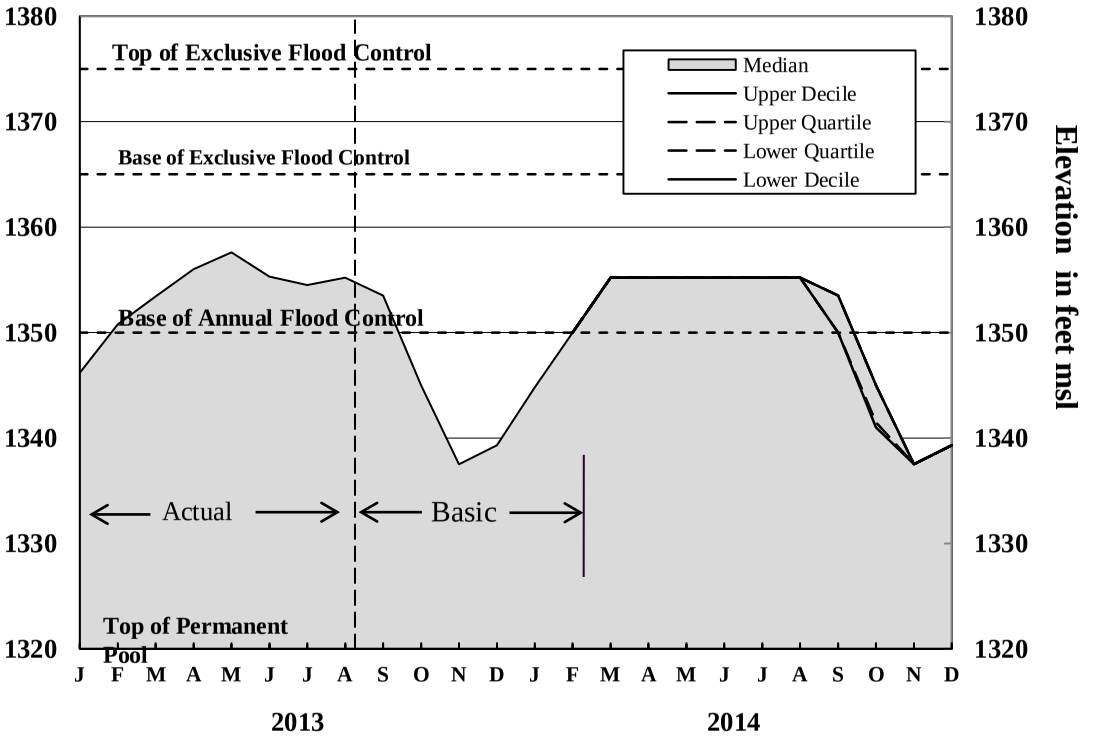


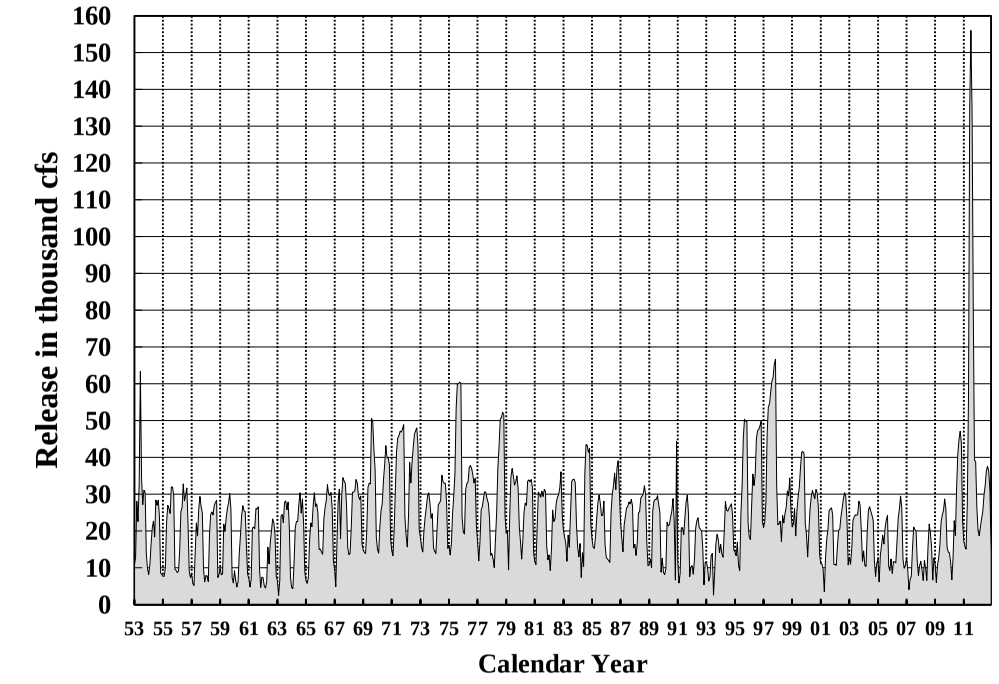




Fort Randall
Elevations and Releases







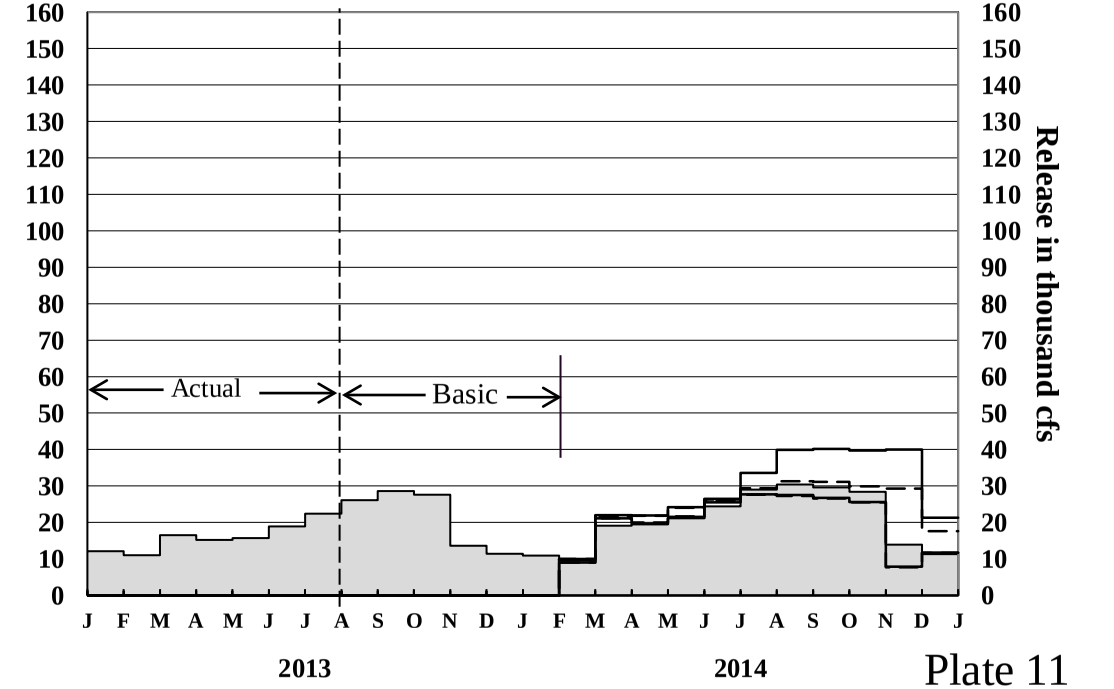
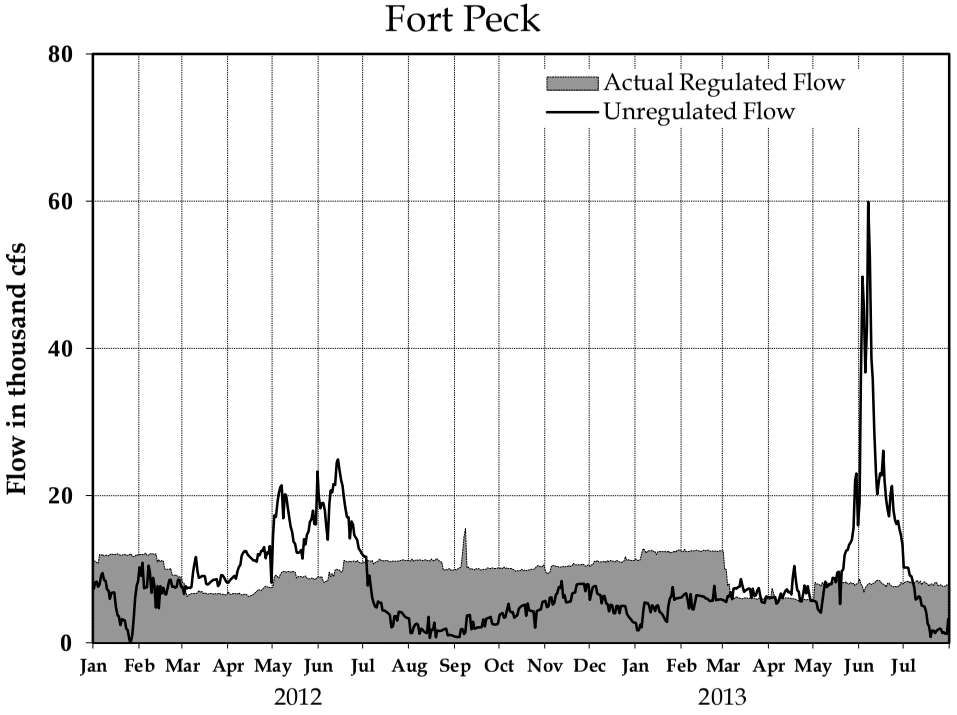
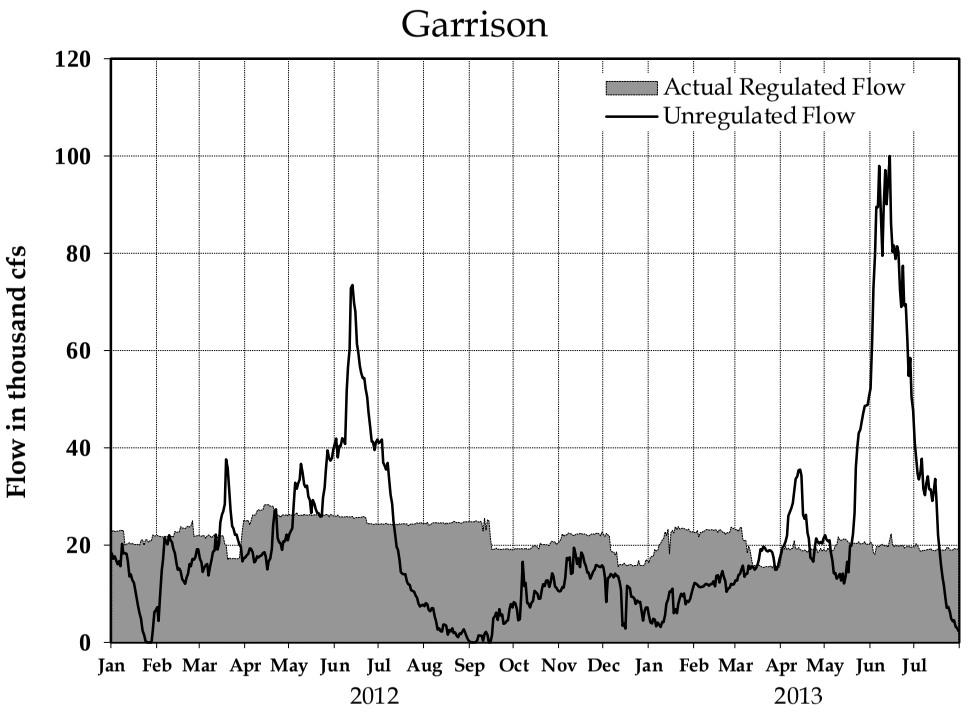
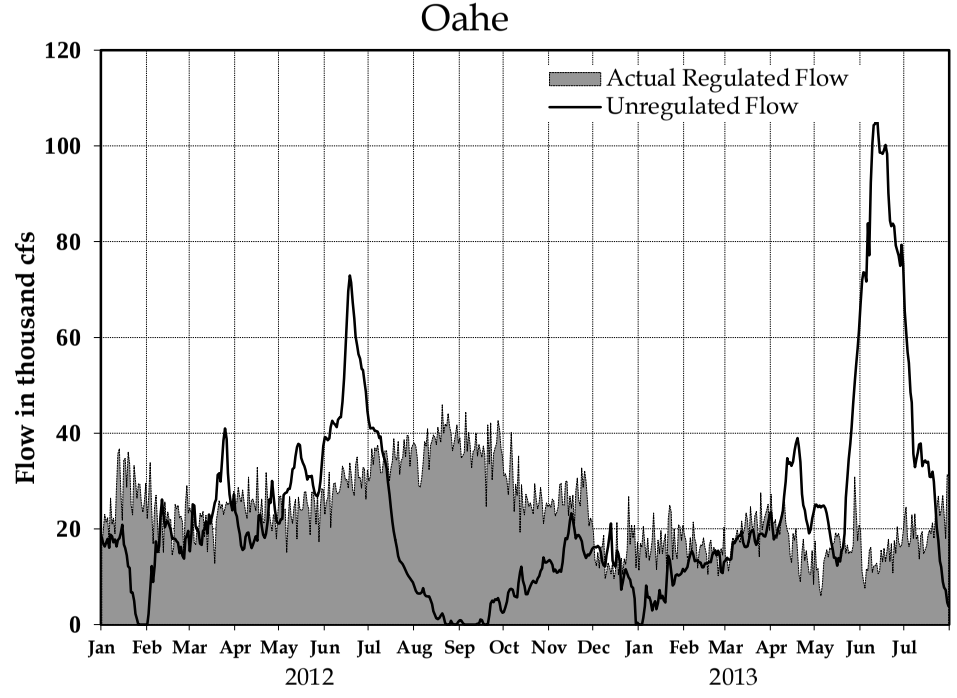


Plate 11

Reservoir Release and Unregulated Flow







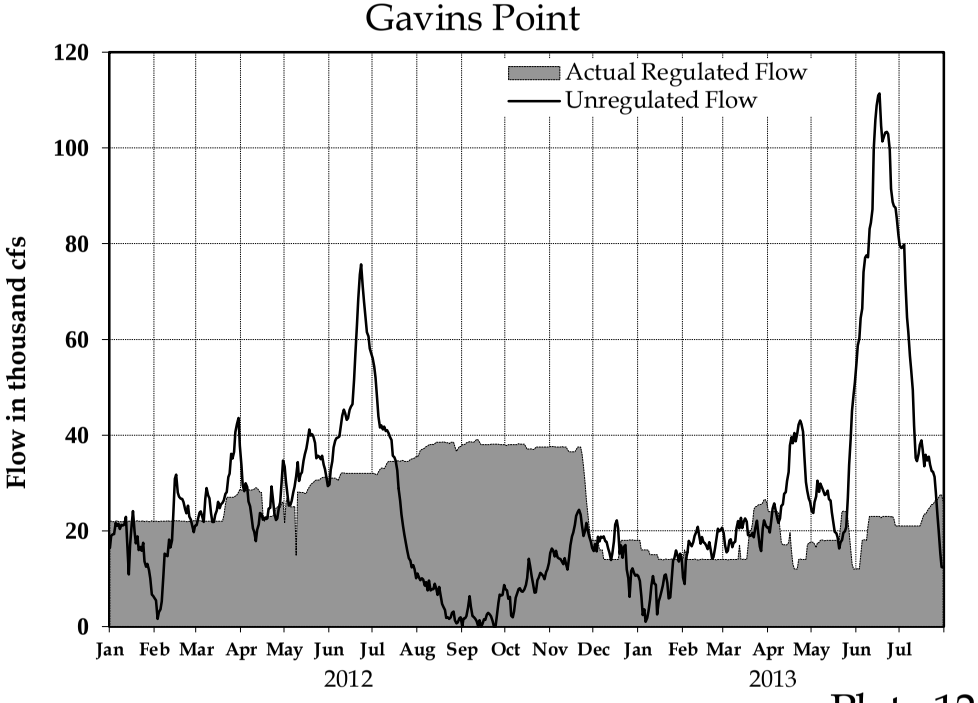


Plate 12

System Gross Capability and Average Monthly Generation

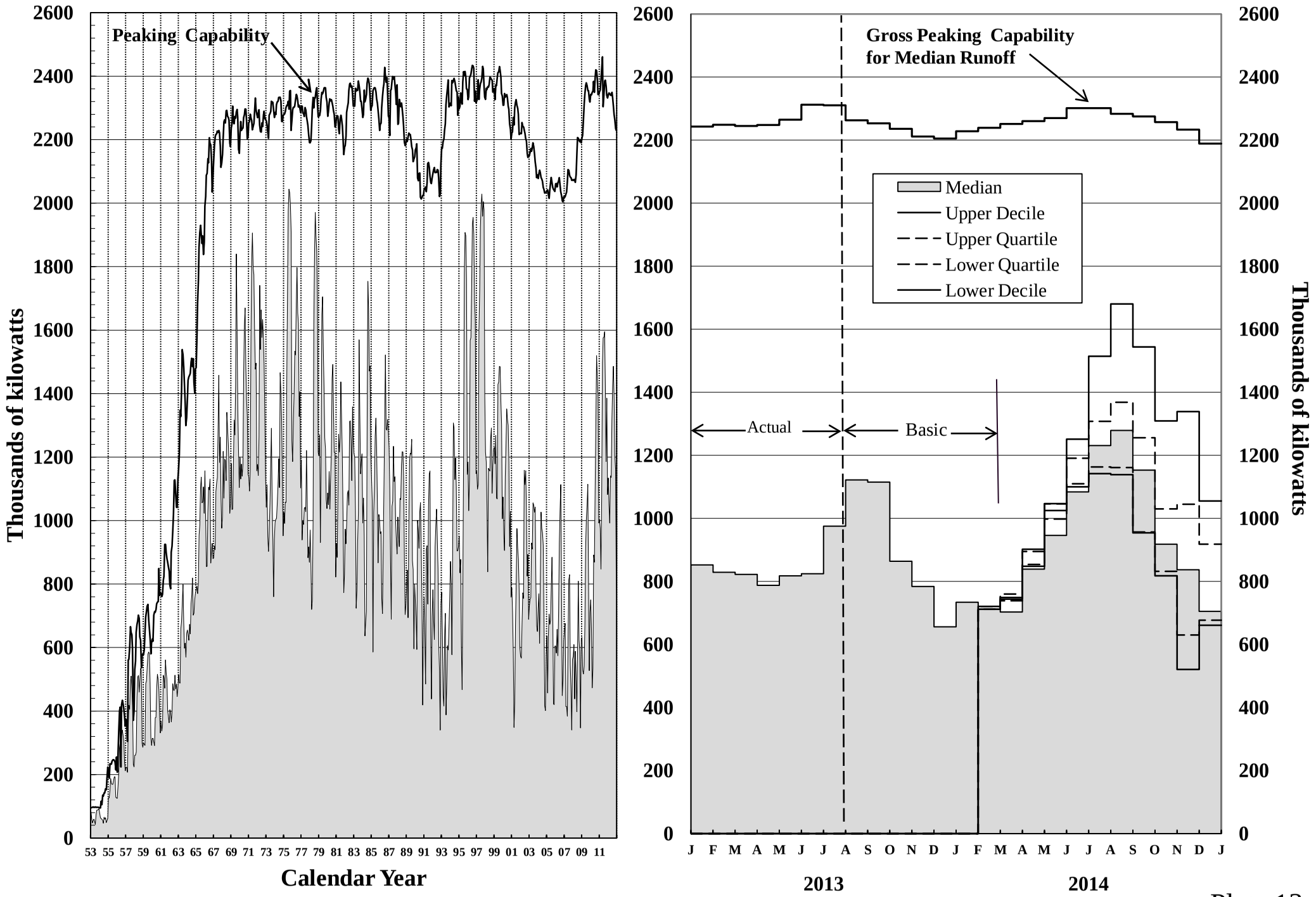
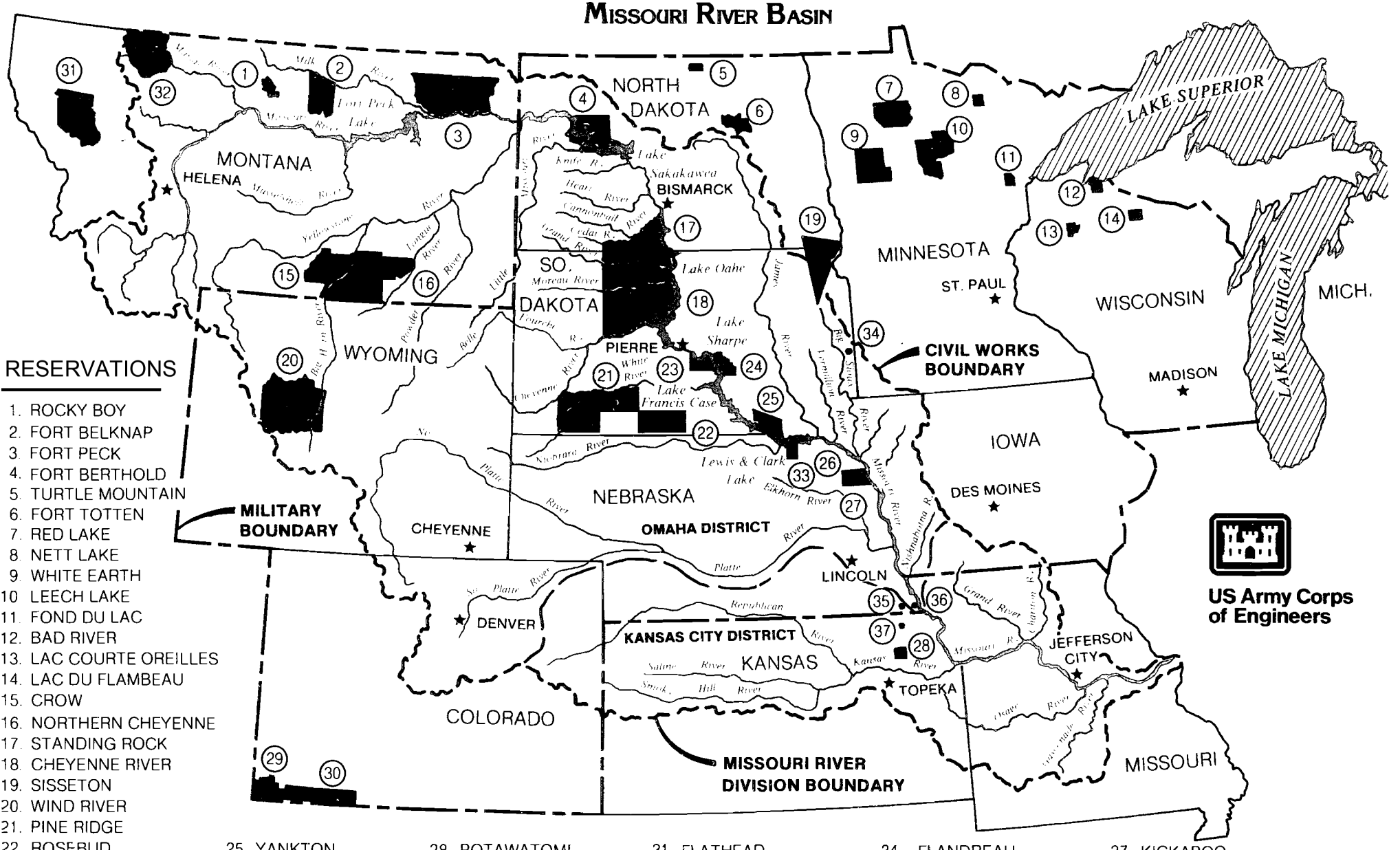


Plate 13

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

31JUL13		2013						2014	
INI-SUM	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--									
NAT INFLOW 2127	300	270	310	155	72	83	265	312	360
DEPLETION -586	14	-68	-48	-43	-20	-23	-135	-156	-108
EVAPORATION 374	77	96	83	38	18	20	43		
MOD INFLOW 2339	209	242	275	160	75	85	357	468	468
RELEASE 2791	492	475	307	149	69	79	400	430	389
STOR CHANGE -452	-283	-233	-32	11	5	6	-43	38	79
STORAGE 13211	12928	12696	12663	12674	12680	12686	12643	12680	12759
ELEV FTMSL 2226.2	2224.7	2223.4	2223.2	2223.3	2223.3	2223.4	2223.1	2223.3	2223.8
DISCH KCFS 8.0	8.0	8.0	5.0	5.0	5.0	5.0	6.5	7.0	7.0
POWER									
AVE POWER MW	106	105	66	66	66	66	86	92	92
PEAK POW MW	155	154	154	154	154	154	154	154	154
ENERGY GWH 445.4	78.9	75.8	49.0	23.7	11.1	12.7	63.7	68.5	62.0
--GARRISON--									
NAT INFLOW 2417	500	360	420	160	75	85	200	261	356
DEPLETION -585	123	-150	-33	-130	-60	-69	-121	-91	-54
CHAN STOR 10		0	30			0	-15	-5	
EVAPORATION 447	92	115	100	45	21	24	51		
REG INFLOW 5356	777	870	691	393	184	210	654	777	799
RELEASE 7357	1168	1048	861	417	194	222	1107	1230	1111
STOR CHANGE -2002	-391	-177	-170	-23	-11	-12	-453	-452	-312
STORAGE 17306	16915	16737	16568	16544	16534	16521	16069	15616	15304
ELEV FTMSL 1836.1	1834.7	1834.1	1833.6	1833.5	1833.4	1833.4	1831.8	1830.2	1829.1
DISCH KCFS 19.2	19.0	17.6	14.0	14.0	14.0	14.0	18.0	20.0	20.0
POWER									
AVE POWER MW	233	215	171	170	170	170	217	238	236
PEAK POW MW	458	456	454	453	453	453	447	441	437
ENERGY GWH 1075.0	173.4	154.7	126.9	61.3	28.6	32.7	161.4	177.3	158.8
--OAHE--									
NAT INFLOW 369	70	90	52	27	13	14	1	12	90
DEPLETION 203	122	30	-11	1	0	1	13	18	29
CHAN STOR -4	1	6	16			0	-18	-9	
EVAPORATION 419	88	108	92	41	19	22	48		
REG INFLOW 7100	1029	1006	847	401	187	214	1029	1215	1172
RELEASE 7993	1691	1591	1099	500	269	197	807	987	853
STOR CHANGE -893	-662	-586	-251	-99	-82	17	222	228	319
STORAGE 17201	16539	15953	15702	15603	15521	15538	15761	15989	16308
ELEV FTMSL 1602.6	1600.3	1598.2	1597.2	1596.8	1596.5	1596.6	1597.4	1598.3	1599.4
DISCH KCFS 20.8	27.5	26.7	17.9	16.8	19.4	12.4	13.1	16.0	15.4
POWER									
AVE POWER MW	343	329	219	205	236	152	160	197	190
PEAK POW MW	670	659	654	652	651	651	655	659	665
ENERGY GWH 1190.9	255.1	237.1	162.8	73.9	39.6	29.1	119.4	146.5	127.3
--BIG BEND--									
EVAPORATION 97	20	25	22	10	5	5	11		
REG INFLOW 7896	1671	1566	1077	490	264	192	795	987	853
RELEASE 7901	1676	1566	1077	490	264	192	795	987	853
STORAGE 1626	1621	1621	1621	1621	1621	1621	1621	1621	1621
ELEV FTMSL 1420.1	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS 19.8	27.3	26.3	17.5	16.5	19.0	12.1	12.9	16.0	15.4
POWER									
AVE POWER MW	128	125	86	83	96	61	65	79	74
PEAK POW MW	509	517	538	538	538	538	538	538	529
ENERGY GWH 463.4	95.0	89.8	64.0	29.9	16.1	11.7	48.6	58.7	49.5
--FORT RANDALL--									
NAT INFLOW 155	30	30	4	3	1	1	12	25	49
DEPLETION 34	15	7	1	1	0	1	3	3	3
EVAPORATION 107	25	31	24	9	4	4	9		
REG INFLOW 7915	1666	1558	1055	483	261	189	795	1009	899
RELEASE 8281	1607	1702	1694	796	372	215	698	669	527
STOR CHANGE -365	59	-144	-639	-313	-111	-26	97	340	372
STORAGE 3366	3425	3281	2642	2329	2218	2192	2289	2629	3001
ELEV FTMSL 1354.5	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.3	1344.8	1350.0
DISCH KCFS 22.4	26.1	28.6	27.6	26.7	26.8	13.6	11.4	10.9	9.5
POWER									
AVE POWER MW	220	239	221	202	196	99	84	83	76
PEAK POW MW	356	350	319	296	287	285	293	319	339
ENERGY GWH 800.1	163.6	172.3	164.5	72.8	33.0	19.0	62.3	61.6	51.0
--GAVINS POINT--									
NAT INFLOW 680	90	90	96	47	22	25	80	100	130
DEPLETION 28	10	-5	2	5	2	3	10	1	
CHAN STOR 24	-7	-5	2	1	0	25	4	1	3
EVAPORATION 32	6	8	7	3	2	2	4		
REG INFLOW 8925	1674	1784	1783	836	390	260	769	769	659
RELEASE 8923	1660	1761	1783	836	390	260	769	769	694
STOR CHANGE 2	14	23							-35
STORAGE 325	339	362	362	362	362	362	362	362	327
ELEV FTMSL 1205.9	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS 23.2	27.0	29.6	29.0	28.1	28.1	16.4	12.5	12.5	12.5
POWER									
AVE POWER MW	92	102	101	98	98	58	44	44	44
PEAK POW MW	115	117	117	117	117	117	117	117	114
ENERGY GWH 376.2	68.8	73.3	75.3	35.4	16.5	11.1	33.0	33.0	29.6
--GAVINS POINT - SIOUX CITY--									
NAT INFLOW 564	140	94	78	35	16	19	50	40	92
DEPLETION 127	37	25	11	6	3	3	13	14	15
REGULATED FLOW AT SIOUX CITY									
KAF 9360	1763	1830	1850	865	404	276	806	795	771
KCFS	28.7	30.8	30.1	29.1	29.1	17.4	13.1	12.9	13.9
--TOTAL--									
NAT INFLOW 6312	1130	934	960	427	199	227	608	750	1077
DEPLETION -779	321	-161	-78	-159	-74	-85	-217	-211	-115
CHAN STOR 30	-6	2	48	1	0	25	-29	-13	3
EVAPORATION 1476	308	383	328	146	68	77	167		
STORAGE 53035	51767	50650	49558	49133	48935	48920	48744	48897	49320
SYSTEM POWER									
AVE POWER MW	1122	1115	864	825	862	606	656	734	712
PEAK POW MW	2263	2253	2236	2211	2200	2198	2205	2228	2239
ENERGY GWH 4351.0	834.8	803.0	642.5	297.0	144.9	116.3	488.4	545.8	478.2
DAILY GWH	26.9	26.8	20.7	19.8	20.7	14.5	15.8	17.6	17.1

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

VALUES IN 1000 AF EXCEPT AS INDICATED

31JUL13		2013						2014	
INI-SUM	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--									
NAT INFLOW 2552	360	324	372	186	87	99	318	374	432
DEPLETION -615	-49	-115	-74	-22	-10	-12	-107	-135	-91
EVAPORATION 259	58	73	64	15	7	8	34		
MOD INFLOW 2908	351	366	382	193	90	103	391	509	523
RELEASE 2804	492	385	307	149	76	87	430	461	417
STOR CHANGE 104	-141	-18	75	44	14	16	-39	48	106
STORAGE 13211	13070	13052	13126	13170	13184	13200	13160	13208	13315
ELEV FTMSL 2226.2	2225.4	2225.3	2225.7	2225.9	2226.0	2226.1	2225.9	2226.1	2226.7
DISCH KCFS 8.0	8.0	6.5	5.0	5.0	5.5	5.5	7.0	7.5	7.5
POWER									
AVE POWER MW	106	86	66	67	73	73	93	100	100
PEAK POW MW	156	156	156	156	156	156	156	156	157
ENERGY GWH 451.1	79.0	61.8	49.5	24.0	12.3	14.1	69.3	74.2	67.1
--GARRISON--									
NAT INFLOW 2900	600	432	504	192	90	102	240	313	427
DEPLETION -559	98	-131	-6	-125	-58	-66	-119	-96	-56
CHAN STOR 5		15	15		-5	0	-15	-5	
EVAPORATION 308	69	87	76	18	8	10	39		
REG INFLOW 5961	924	876	756	447	211	246	735	865	900
RELEASE 7437	1168	980	861	417	194	222	1138	1291	1166
STOR CHANGE -1476	-244	-104	-105	31	16	24	-403	-426	-267
STORAGE 17306	17062	16959	16854	16885	16901	16925	16523	16097	15830
ELEV FTMSL 1836.1	1835.2	1834.9	1834.5	1834.6	1834.7	1834.8	1833.4	1831.9	1831.0
DISCH KCFS 19.2	19.0	16.5	14.0	14.0	14.0	14.0	18.5	21.0	21.0
POWER									
AVE POWER MW	233	202	171	171	171	172	225	253	251
PEAK POW MW	460	459	457	458	458	458	453	448	444
ENERGY GWH 1094.0	173.6	145.3	127.6	61.7	28.8	32.9	167.5	188.1	168.6
--OAHE--									
NAT INFLOW 442	84	108	62	33	15	17	1	14	108
DEPLETION 203	122	30	-11	1	0	1	13	18	29
CHAN STOR -8	1	11	11			0	-20	-11	
EVAPORATION 289	67	82	70	17	8	9	37		
REG INFLOW 7379	1064	986	874	431	201	230	1069	1276	1245
RELEASE 7751	1654	1551	1065	477	258	185	783	962	816
STOR CHANGE -372	-589	-565	-191	-45	-57	45	286	315	429
STORAGE 17201	16612	16047	15856	15811	15754	15799	16085	16400	16829
ELEV FTMSL 1602.6	1600.5	1598.5	1597.8	1597.6	1597.4	1597.6	1598.6	1599.8	1601.3
DISCH KCFS 20.8	26.9	26.1	17.3	16.0	18.6	11.7	12.7	15.6	14.7
POWER									
AVE POWER MW	336	322	213	196	228	143	157	193	183
PEAK POW MW	671	660	657	656	655	656	661	667	675
ENERGY GWH 1159.6	249.7	231.6	158.3	70.7	38.2	27.5	116.6	143.9	123.1
--BIG BEND--									
EVAPORATION 66	15	19	16	4	2	2	9		
REG INFLOW 7685	1639	1533	1049	473	256	183	774	962	816
RELEASE 7690	1644	1533	1049	473	256	183	774	962	816
STORAGE 1626	1621	1621	1621	1621	1621	1621	1621	1621	1621
ELEV FTMSL 1420.1	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS 19.8	26.7	25.8	17.1	15.9	18.5	11.5	12.6	15.6	14.7
POWER									
AVE POWER MW	125	122	84	80	93	58	64	77	71
PEAK POW MW	509	517	538	538	538	538	538	538	529
ENERGY GWH 451.0	93.2	87.9	62.4	28.8	15.6	11.2	47.3	57.2	47.4
--FORT RANDALL--									
NAT INFLOW 186	36	36	5	3	1	2	14	30	59
DEPLETION 34	15	7	1	1	0	1	3	3	3
EVAPORATION 74	19	24	18	4	2	2	7		
REG INFLOW 7768	1646	1538	1035	471	256	183	778	989	872
RELEASE 8134	1587	1682	1674	784	367	209	682	649	500
STOR CHANGE -365	59	-144	-639	-313	-111	-26	97	340	372
STORAGE 3366	3425	3281	2642	2329	2218	2192	2289	2629	3001
ELEV FTMSL 1354.5	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.3	1344.8	1350.0
DISCH KCFS 22.4	25.8	28.3	27.2	26.4	26.4	13.2	11.1	10.5	9.0
POWER									
AVE POWER MW	217	237	218	199	194	96	82	80	72
PEAK POW MW	356	350	319	296	287	285	293	319	339
ENERGY GWH 786.2	161.6	170.3	162.5	71.8	32.5	18.5	60.8	59.8	48.4
--GAVINS POINT--									
NAT INFLOW 816	108	108	115	57	26	30	96	120	156
DEPLETION 28	10	-5	2	5	2	3	10	1	
CHAN STOR 24	-7	-5	2	2	0	25	4	1	3
EVAPORATION 21	5	6	5	1	1	1	3		
REG INFLOW 8925	1674	1784	1783	836	390	260	769	769	659
RELEASE 8923	1660	1761	1783	836	390	260	769	769	694
STOR CHANGE 2	14	23							-35
STORAGE 325	339	362	362	362	362	362	362	362	327
ELEV FTMSL 1205.9	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS 23.2	27.0	29.6	29.0	28.1	28.1	16.4	12.5	12.5	12.5
POWER									
AVE POWER MW	92	102	101	98	98	58	44	44	44
PEAK POW MW	115	117	117	117	117	117	117	117	114
ENERGY GWH 376.2	68.8	73.3	75.3	35.4	16.5	11.1	33.0	33.0	29.6
--GAVINS POINT - SIOUX CITY--									
NAT INFLOW 677	168	113	94	42	20	22	60	48	110
DEPLETION 127	37	25	11	6	3	3	13	14	15
REGULATED FLOW AT SIOUX CITY									
KAF 9473	1791	1849	1866	872	407	279	816	803	789
KCFS	29.1	31.1	30.3	29.3	29.3	17.6	13.3	13.1	14.2
--TOTAL--									
NAT INFLOW 7573	1356	1121	1152	512	239	273	729	899	1292
DEPLETION -782	233	-189	-77	-134	-62	-71	-187	-195	-100
CHAN STOR 21	-6	22	27	1	-5	25	-31	-15	3
EVAPORATION 1017	232	290	250	59	27	31	128		
STORAGE 53035	52129	51321	50462	50178	50040	50099	50040	50316	50922
SYSTEM POWER									
AVE POWER MW	1110	1070	854	812	857	601	665	748	721
PEAK POW MW	2267	2259	2244	2221	2212	2211	2219	2245	2258
ENERGY GWH 4318.2	825.9	770.2	635.5	292.4	144.0	115.3	494.4	556.3	484.2
DAILY GWH	26.6	25.7	20.5	19.5	20.6	14.4	15.9	17.9	17.3

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

TIME OF STUDY 08:21:42 3.0 KCFS BLW FS 2ND HALF / NAV SEAS SHRT 0 DAYS STUDY NO 3
VALUES IN 1000 AF EXCEPT AS INDICATED

31JUL13		2013							2014
INI-SUM	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--									
NAT INFLOW	1702	240	216	248	124	58	66	212	250	288
DEPLETION	-373	48	-65	-46	-28	-13	-15	-93	-96	-65
EVAPORATION	464	96	119	103	46	22	25	54		
MOD INFLOW	1611	96	162	191	106	49	56	251	346	353
RELEASE	2583	492	358	277	134	62	71	369	430	389
STOR CHANGE	-972	-396	-196	-86	-28	-13	-15	-117	-84	-36
STORAGE	13211	12815	12619	12533	12505	12492	12477	12359	12275	12239
ELEV FTMSL	2226.2	2224.1	2223.0	2222.5	2222.4	2222.3	2222.2	2221.6	2221.1	2220.9
DISCH KCFS	8.0	8.0	6.0	4.5	4.5	4.5	4.5	6.0	7.0	7.0
POWER										
AVE POWER MW		106	79	59	59	59	59	79	91	91
PEAK POW MW		154	153	153	153	153	153	152	151	151
ENERGY GWH	410.4	78.9	57.2	44.1	21.3	9.9	11.3	58.4	68.0	61.3
--GARRISON--									
NAT INFLOW	1934	400	288	336	128	60	68	160	209	285
DEPLETION	-328	166	-91	5	-115	-54	-61	-88	-57	-33
CHAN STOR	10		20	15				-15	-10	
EVAPORATION	555	115	143	123	55	26	29	63		
REG INFLOW	4300	611	615	500	322	150	172	538	686	707
RELEASE	7061	1168	953	799	387	180	214	1076	1199	1083
STOR CHANGE	-2761	-558	-339	-300	-65	-30	-43	-538	-513	-376
STORAGE	17306	16748	16410	16110	16045	16014	15972	15434	14921	14545
ELEV FTMSL	1836.1	1834.2	1833.0	1832.0	1831.8	1831.6	1831.5	1829.6	1827.7	1826.3
DISCH KCFS	19.2	19.0	16.0	13.0	13.0	13.0	13.5	17.5	19.5	19.5
POWER										
AVE POWER MW		233	195	157	156	156	162	208	229	226
PEAK POW MW		456	452	448	447	447	446	439	432	427
ENERGY GWH	1021.1	173.0	140.1	116.9	56.3	26.3	31.1	154.9	170.3	152.2
--OAHE--									
NAT INFLOW	296	56	72	42	22	10	11	1	10	72
DEPLETION	203	122	30	-11	1	0	1	13	18	29
CHAN STOR	-3	1	13	13			-2	-18	-9	
EVAPORATION	517	111	134	113	50	23	27	58		
REG INFLOW	6634	992	874	752	357	167	196	988	1182	1126
RELEASE	8347	1728	1687	1200	517	278	207	831	1012	889
STOR CHANGE	-1713	-736	-813	-447	-160	-111	-11	157	170	237
STORAGE	17201	16465	15652	15205	15045	14934	14923	15081	15251	15488
ELEV FTMSL	1602.6	1600.0	1597.0	1595.3	1594.7	1594.3	1594.2	1594.9	1595.5	1596.4
DISCH KCFS	20.8	28.1	28.3	19.5	17.4	20.0	13.0	13.5	16.5	16.0
POWER										
AVE POWER MW		350	348	237	210	240	157	163	199	194
PEAK POW MW		668	653	645	642	640	640	643	646	650
ENERGY GWH	1232.8	260.5	250.2	176.3	75.5	40.4	30.1	121.2	148.0	130.6
--BIG BEND--									
EVAPORATION	121	24	31	27	12	6	7	14		
REG INFLOW	8226	1704	1656	1173	505	272	200	816	1012	889
RELEASE	8231	1709	1656	1173	505	272	200	816	1012	889
STORAGE	1626	1621	1621	1621	1621	1621	1621	1621	1621	1621
ELEV FTMSL	1420.1	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0	1420.0
DISCH KCFS	19.8	27.8	27.8	19.1	17.0	19.6	12.6	13.3	16.5	16.0
POWER										
AVE POWER MW		130	132	94	85	98	64	67	81	77
PEAK POW MW		509	517	538	538	538	538	538	538	529
ENERGY GWH	482.6	96.8	94.9	69.6	30.7	16.5	12.2	49.9	60.2	51.6
--FORT RANDALL--									
NAT INFLOW	124	24	24	3	2	1	1	10	20	39
DEPLETION	34	15	7	1	1	0	1	3	3	3
EVAPORATION	134	31	39	31	12	5	5	12		
REG INFLOW	8187	1686	1633	1144	494	268	196	812	1029	925
RELEASE	8553	1628	1777	1783	807	379	222	715	689	553
STOR CHANGE	-366	59	-144	-639	-314	-111	-26	97	340	372
STORAGE	3366	3425	3281	2642	2328	2217	2191	2288	2628	3000
ELEV FTMSL	1354.5	1355.2	1353.5	1345.0	1340.0	1338.0	1337.5	1339.3	1344.8	1350.0
DISCH KCFS	22.4	26.5	29.9	29.0	27.1	27.3	14.0	11.6	11.2	10.0
POWER										
AVE POWER MW		223	250	232	205	200	102	86	85	80
PEAK POW MW		356	350	319	296	287	285	293	319	339
ENERGY GWH	826.1	165.7	179.8	172.9	73.9	33.5	19.6	63.7	63.5	53.5
--GAVINS POINT--									
NAT INFLOW	544	72	72	77	38	18	20	64	80	104
DEPLETION	28	10	-5	2	5	2	3	10	1	
CHAN STOR	23	-8	-6	2	3	0	25	4	1	2
EVAPORATION	40	8	10	9	4	2	2	5		
REG INFLOW	9052	1674	1838	1851	839	392	262	769	769	659
RELEASE	9050	1660	1815	1851	839	392	262	769	769	694
STOR CHANGE	2	14	23							-35
STORAGE	325	339	362	362	362	362	362	362	362	327
ELEV FTMSL	1205.9	1206.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1207.5	1206.0
DISCH KCFS	23.2	27.0	30.5	30.1	28.2	28.2	16.5	12.5	12.5	12.5
POWER										
AVE POWER MW		92	104	104	99	99	58	44	44	44
PEAK POW MW		115	117	117	117	117	117	117	117	114
ENERGY GWH	380.0	68.8	74.8	77.3	35.5	16.6	11.2	33.0	33.0	29.6
--GAVINS POINT - SIOUX CITY--									
NAT INFLOW	451	112	75	62	28	13	15	40	32	74
DEPLETION	127	37	25	11	6	3	3	13	14	15
REGULATED FLOW AT SIOUX CITY										
KAF	9374	1735	1865	1902	861	402	274	796	787	753
KCFS		28.2	31.3	30.9	28.9	28.9	17.2	12.9	12.8	13.6
--TOTAL--									
NAT INFLOW	5051	904	747	768	341	159	182	487	601	862
DEPLETION	-309	398	-99	-38	-130	-61	-69	-142	-117	-51
CHAN STOR	30	-7	26	30	3	0	23	-29	-19	2
EVAPORATION	1831	385	476	406	180	83	95	205		
STORAGE	53035	51414	49945	48473	47906	47640	47546	47145	47058	47220
SYSTEM POWER										
AVE POWER MW		1134	1107	883	815	853	603	647	730	712
PEAK POW MW		2259	2243	2220	2193	2181	2178	2182	2203	2211
ENERGY GWH	4353.0	843.7	797.1	657.0	293.2	143.2	115.7	481.2	543.0	478.8
DAILY GWH		27.2	26.6	21.2	19.5	20.5	14.5	15.5	17.5	17.1

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

VALUES IN 1000 AF EXCEPT AS INDICATED

28FEB14		2014										2015				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--																	
NAT INFLOW	9450	341	159	205	825	1400	2355	1205	440	385	480	288	134	153	350	310	420
DEPLETION	592	-5	-2	-3	-6	303	590	265	-7	-114	-69	-21	-10	-11	-106	-127	-86
EVAPORATION	316							21	67	83	72	17	8	9	38		
MOD INFLOW	8542	346	161	208	831	1097	1765	919	380	416	477	291	136	155	418	437	506
RELEASE	7071	179	83	107	476	615	714	738	738	552	430	208	97	111	676	707	639
STOR CHANGE	1471	168	78	100	355	482	1051	181	-357	-136	46	82	38	44	-258	-270	-133
STORAGE	13315	13482	13560	13661	14016	14498	15549	15730	15372	15236	15283	15365	15403	15447	15189	14919	14786
ELEV FTMSL	2226.7	2227.6	2228.0	2228.5	2230.2	2232.6	2237.5	2238.4	2236.7	2236.1	2236.3	2236.7	2236.9	2237.1	2235.9	2234.6	2234.0
DISCH KCFS	7.5	6.0	6.0	6.0	8.0	10.0	12.0	12.0	12.0	9.3	7.0	7.0	7.0	7.0	11.0	11.5	11.5
POWER																	
AVE POWER MW		80	80	80	107	135	160	162	161	127	96	96	96	96	149	154	153
PEAK POW MW		157	158	158	159	161	165	165	164	164	164	164	164	164	163	162	
ENERGY GWH	1153.5	28.8	13.5	17.4	77.4	100.3	114.9	120.3	120.1	91.7	71.5	34.6	16.2	18.5	110.8	114.6	103.1
--GARRISON--																	
NAT INFLOW	14000	530	247	318	1355	1840	3460	2715	835	570	645	248	116	132	260	315	415
DEPLETION	1108	20	9	12	-141	75	963	735	96	-135	-21	-124	-58	-66	-115	-88	-56
CHAN STOR	-41	15			-20	-20	-20			26	22			0	-39	-5	
EVAPORATION	365							24	78	97	84	20	9	11	43		
REG INFLOW	19557	703	321	413	1952	2360	3191	2694	1399	1187	1035	559	261	298	969	1105	1110
RELEASE	17646	536	250	321	1369	1660	1726	1783	1783	1490	1291	625	278	317	1291	1537	1388
STOR CHANGE	1911	168	71	91	583	700	1465	910	-384	-304	-256	-65	-17	-19	-322	-432	-279
STORAGE	15830	15998	16069	16160	16743	17443	18908	19819	19435	19131	18875	18810	18793	18774	18452	18020	17741
ELEV FTMSL	1831.0	1831.6	1831.8	1832.2	1834.2	1836.5	1841.2	1843.9	1842.8	1841.9	1841.1	1840.9	1840.8	1840.8	1839.8	1838.4	1837.5
DISCH KCFS	21.0	18.0	18.0	18.0	23.0	27.0	29.0	29.0	29.0	25.0	21.0	21.0	20.0	20.0	21.0	25.0	25.0
POWER																	
AVE POWER MW		215	216	216	277	330	362	368	369	318	266	266	253	253	265	313	311
PEAK POW MW		446	447	449	456	465	482	499	496	484	481	480	480	480	476	471	468
ENERGY GWH	2666.2	77.5	36.2	46.7	199.8	245.2	260.3	273.7	274.9	228.9	197.8	95.6	42.5	48.6	197.2	232.7	208.7
--OAHE--																	
NAT INFLOW	3900	569	265	341	510	390	710	310	125	185	145	118	55	63	15	10	90
DEPLETION	721	25	12	15	50	74	154	186	125	30	-12	1	0	1	13	19	29
CHAN STOR	-16	13			-20	-16	-8			15	16		4	0	-4	-16	
EVAPORATION	367							26	80	98	83	19	9	10	42		
REG INFLOW	20442	1092	504	648	1808	1961	2274	1881	1703	1562	1381	722	327	369	1248	1512	1449
RELEASE	18606	391	285	288	726	1082	1376	2013	2435	2199	1795	887	448	614	1407	1463	1196
STOR CHANGE	1835	701	219	360	1083	878	898	-132	-732	-636	-415	-165	-122	-245	-160	49	253
STORAGE	16829	17530	17749	18109	19191	20070	20968	20836	20104	19468	19053	18888	18766	18522	18362	18411	18664
ELEV FTMSL	1601.3	1603.7	1604.5	1605.7	1609.2	1611.8	1614.4	1614.1	1611.9	1610.0	1608.7	1608.2	1607.8	1607.0	1606.5	1606.7	1607.5
DISCH KCFS	14.7	13.2	20.5	16.1	12.2	17.6	23.1	32.7	39.6	37.0	29.2	29.8	32.3	38.7	22.9	23.8	21.5
POWER																	
AVE POWER MW		166	260	206	158	231	307	436	523	483	380	386	417	496	294	306	278
PEAK POW MW		688	692	698	717	731	744	742	731	721	714	712	709	705	703	703	708
ENERGY GWH	2935.4	59.7	43.7	44.5	113.7	171.9	221.1	324.3	389.0	348.0	282.5	138.9	70.0	95.3	218.9	227.3	186.5
--BIG BEND--																	
EVAPORATION	71							5	15	19	16	4	2	2	9		
REG INFLOW	18536	391	285	288	726	1082	1376	2008	2420	2180	1779	883	447	612	1399	1463	1196
RELEASE	18536	391	285	288	726	1082	1376	2008	2420	2180	1779	883	447	612	1399	1463	1196
STORAGE	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621
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	14.7	13.2	20.5	16.1	12.2	17.6	23.1	32.7	39.4	36.6	28.9	29.7	32.2	38.6	22.7	23.8	21.5
POWER																	
AVE POWER MW		62	96	75	57	82	108	153	184	173	141	148	160	191	114	117	103
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	1073.8	22.4	16.1	16.3	41.1	61.3	77.9	113.7	137.0	124.9	105.1	53.3	26.9	36.7	84.8	86.7	69.4
--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	19876	540	354	377	1162	1303	1519	2064	2456	2250	1800	879	445	609	1406	1460	1253
RELEASE	19876	260	210	377	1162	1303	1519	2064	2456	2394	2439	1192	556	635	1309	1120	881
STOR CHANGE	0	280	144				0	0	0	-144	-639	-313	-111	-26	97	340	372
STORAGE	3001	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2289	2629	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	1339.3	1344.8	1350.0
DISCH KCFS	9.0	8.7	15.1	21.1	19.5	21.2	25.5	33.6	39.9	40.2	39.7	40.1	40.0	40.0	21.3	18.2	15.9
POWER																	
AVE POWER MW		72	128	179	165	179	215	282	328	327	310	289	277	273	156	138	126
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	288	285	293	319	339
ENERGY GWH	1919.5	26.1	21.4	38.6	119.1	133.4	155.1	209.9	243.9	235.1	230.4	104.2	46.6	52.4	115.8	102.7	84.9
--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	-15	1	-12	-12	3	-3	-8	-15	-12	-1	1	-1	0	0	35	6	4
EVAPORATION	23							1	5	6	5	1	1	1	3		
REG INFLOW	21974	372	250	432	1440	1611	1732	2214	2595	2522	2583	1250	583	666	1420	1230	1076
RELEASE	21974	372	250	432	1440	1611	1732	2214	2583	2499	2583	1250	583	666	1420	1230	1111
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	12.5	12.5	18.0	24.2	24.2	26.2	29.1	36.0	42.0	42.0	42.0	42.0	42.0	42.0	23.1	20.0	20.0
POWER																	
AVE POWER MW		44	62	83	83	89	99	114	114	115	116	116	116	116	78	70	69
PEAK POW MW		114	114	114	114	114	114	114	115	116	116	116	116	116	78	78	76
ENERGY GWH	820.8	15.8	10.5	17.9	59.7	66.6	71.1	84.8	84.9	83.1	86.5	41.8	19.5	22.3	57.7	52.0	46.6
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	3400	189	88	113	470	890	550	290	225	165	85	50	23	27	60	35	140
DEPLETION	276	7	3	4	23	36	32	39	38	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	25098	553	334	541	1887	2465	2250	2465	2770	2639	2657	1293	603	690	1466	1250	1236
KCFS		18.6	24.1	30.3	31.7	40.1	37.8	40.1	45.0	44.4	43.2	43.5	43.5	43.5	23.8	20.3	22.3
--TOTAL--																	
NAT INFLOW	34500	1890	882	1133	3880	5080	7475	4805	1860	1535	1545	768	358	409	790	775	1315
DEPLETION	2891	48	23	29	-65	516	1775	1282	277	-192	-88	-131	-61	-70	-181	-177	-95
CHAN STOR	-70	29	-12	-12	-37	-39	-36	-15	-12	41	39	-1	4	-1	-7	-15	4
EVAPORATION	1222							83	262	326	279	65	30	34	141		
STORAGE	50922	52239	52751	53303	55323	57383	60798	61758	60297	59100	57836	57374	57164	56918	56275	55962	56140
SYSTEM POWER																	
AVE POWER MW		640	842	840	848	1047	1251	1514	1680	1544	1309	1301	1320	1426	1055	1097	1040
PEAK POW MW		2274	2277	2284	2312	2336	2370	2386	2371	2353	2332	2307	2296	2289	2252	2272	2282
ENERGY GWH	10569.2	230.3	141.4	181.4	610.7	778.8	900.4	1126.7	1249.7	1111.7	973.9	468.5	221.7	273.8	785.2	816.0	699.1
DAILY GWH		15.4	20.2	20.2	20.4	25.1	30.0	36.3	40.3	37.1	31.4	31.2	31.7	34.2	25.3	26.3	25.0
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB

VALUES IN 1000 AF EXCEPT AS INDICATED

	28FEB14	2014										2015				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--																	
NAT INFLOW	8650	310	144	186	755	1285	2155	1105	405	350	440	263	123	140	320	285	385
DEPLETION	541	-5	-2	-3	-6	303	590	261	1	-109	-91	-30	-14	-16	-116	-136	-87
EVAPORATION	313							21	66	82	72	17	8	9	38		
MOD INFLOW	7796	315	147	189	761	982	1565	823	338	377	459	275	128	147	398	421	472
RELEASE	6333	179	83	107	446	523	625	646	646	511	400	193	90	103	553	646	583
STOR CHANGE	1463	136	63	82	315	459	940	178	-307	-134	60	81	38	43	-155	-225	-111
STORAGE	13315	13451	13514	13596	13911	14370	15310	15488	15180	15046	15106	15187	15225	15269	15114	14889	14778
ELEV FTMSL	2226.7	2227.4	2227.7	2228.1	2229.7	2232.0	2236.4	2237.3	2235.8	2235.2	2235.5	2235.9	2236.1	2236.3	2235.5	2234.5	2234.0
DISCH KCFS	7.5	6.0	6.0	6.0	7.5	8.5	10.5	10.5	10.5	8.6	6.5	6.5	6.5	6.5	9.0	10.5	10.5
POWER																	
AVE POWER MW		80	80	80	101	115	142	143	143	117	89	89	89	89	123	142	142
PEAK POW MW		157	158	158	159	161	164	165	164	163	163	164	164	164	163	163	162
ENERGY GWH	1040.6	28.8	13.5	17.4	72.5	85.3	102.2	106.5	106.4	84.6	66.2	32.1	15.0	17.1	91.8	105.9	95.3
--GARRISON--																	
NAT INFLOW	12750	482	225	289	1230	1675	3200	2475	760	520	555	215	100	115	235	295	380
DEPLETION	1077	20	9	12	-141	132	915	726	107	-135	-37	-129	-60	-69	-122	-92	-60
CHAN STOR	-30	15			-15	-10	-20			19	20				-24	-15	
EVAPORATION	364							24	77	96	84	20	9	11	43		
REG INFLOW	17612	655	298	384	1802	2056	2890	2371	1222	1088	928	518	242	276	843	1018	1023
RELEASE	15707	536	250	321	1250	1414	1488	1476	1476	1285	1168	565	264	294	1230	1414	1277
STOR CHANGE	1905	120	49	62	552	641	1402	895	-254	-197	-240	-48	-22	-17	-387	-396	-254
STORAGE	15830	15949	15998	16060	16613	17254	18656	19551	19297	19100	18860	18812	18790	18772	18385	17989	17735
ELEV FTMSL	1831.0	1831.4	1831.6	1831.8	1833.7	1835.9	1840.4	1843.1	1842.4	1841.8	1841.0	1840.9	1840.8	1840.7	1839.5	1838.3	1837.5
DISCH KCFS	21.0	18.0	18.0	18.0	21.0	23.0	25.0	24.0	24.0	21.6	19.0	19.0	19.0	18.5	20.0	23.0	23.0
POWER																	
AVE POWER MW		215	215	216	253	280	311	304	305	274	241	240	240	234	252	288	286
PEAK POW MW		446	446	447	454	462	479	498	490	483	481	480	480	480	476	471	468
ENERGY GWH	2370.4	77.4	36.2	46.6	182.1	208.6	223.9	226.1	227.3	197.4	179.0	86.5	40.4	44.9	187.8	214.0	192.1
--OAHE--																	
NAT INFLOW	3200	457	213	274	430	310	640	250	95	150	120	95	44	51	-10		80
DEPLETION	721	25	12	15	50	74	154	186	125	30	-12	1	0	1	13	19	29
CHAN STOR	-8	13			-12	-8	-8	4		9	10			2	-6	-12	
EVAPORATION	350							24	75	92	80	19	9	10	42		
REG INFLOW	17828	981	452	581	1617	1642	1966	1519	1371	1323	1231	640	299	336	1159	1383	1328
RELEASE	15999	423	299	303	845	1155	1414	1764	1910	1679	1224	569	301	445	1190	1359	1121
STOR CHANGE	1829	558	153	278	773	487	552	-244	-539	-356	6	72	-2	-109	-31	25	208
STORAGE	16829	17387	17539	17817	18590	19077	19629	19385	18846	18490	18496	18568	18566	18457	18426	18450	18658
ELEV FTMSL	1601.3	1603.2	1603.8	1604.7	1607.2	1608.8	1610.5	1609.8	1608.1	1606.9	1606.9	1607.2	1607.2	1606.8	1606.7	1606.8	1607.5
DISCH KCFS	14.7	14.2	21.5	17.0	14.2	18.8	23.8	28.7	31.1	28.2	19.9	19.1	21.7	28.0	19.4	22.1	20.2
POWER																	
AVE POWER MW		179	272	215	182	243	310	375	403	363	257	246	279	360	249	284	260
PEAK POW MW		685	688	693	707	715	724	720	711	705	705	706	706	704	704	704	708
ENERGY GWH	2499.6	64.4	45.7	46.5	131.3	181.1	223.2	278.7	299.7	261.7	190.9	88.7	46.9	69.2	185.4	211.4	174.9
--BIG BEND--																	
EVAPORATION	71							5	15	19	16	4	2	2	9		
REG INFLOW	15929	423	299	303	845	1155	1414	1759	1895	1660	1208	565	299	443	1182	1359	1121
RELEASE	15929	423	299	303	845	1155	1414	1759	1895	1660	1208	565	299	443	1182	1359	1121
STORAGE	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621
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	14.7	14.2	21.5	17.0	14.2	18.8	23.8	28.6	30.8	27.9	19.6	19.0	21.5	27.9	19.2	22.1	20.2
POWER																	
AVE POWER MW		67	101	79	66	88	111	134	144	132	96	95	108	139	97	108	97
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	922.3	24.3	16.9	17.1	47.9	65.4	80.1	99.6	107.3	95.2	71.7	34.3	18.1	26.8	71.8	80.6	65.0
--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	16969	545	356	376	1191	1331	1542	1810	1927	1704	1199	557	296	439	1178	1351	1168
RELEASE	16968	265	212	376	1191	1331	1542	1810	1927	1848	1838	870	407	465	1081	1011	796
STOR CHANGE	0	280	144					0	0	-144	-639	-313	-111	-26	97	340	372
STORAGE	3001	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2289	2629	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	1339.3	1344.8	1350.0
DISCH KCFS	9.0	8.9	15.3	21.1	20.0	21.6	25.9	29.4	31.3	31.1	29.9	29.3	29.3	29.3	17.6	16.4	14.3
POWER																	
AVE POWER MW		74	129	178	169	183	219	248	264	260	239	221	214	212	129	125	114
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	287	285	293	319	339
ENERGY GWH	1669.5	26.6	21.7	38.5	122.0	136.2	157.4	184.4	196.1	186.9	178.1	79.5	36.0	40.7	95.9	92.8	76.7
--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	-11	0	-12	-11	2	-3	-8	-7	-4	1	2	1	0	0	22	2	4
EVAPORATION	23							1	5	6	5	1	1	1	3		
REG INFLOW	18820	372	250	429	1428	1599	1720	1943	2053	1963	1968	925	432	493	1174	1107	965
RELEASE	18820	372	250	429	1428	1599	1720	1943	2041	1940	1968	925	432	493	1174	1107	1000
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	12.5	12.5	18.0	24.0	24.0	26.0	28.9	31.6	33.2	32.6	32.0	31.1	31.1	31.1	19.1	18.0	18.0
POWER																	
AVE POWER MW		44	62	82	82	89	98	105	109	109	108	106	106	106	67	64	63
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	774.1	15.8	10.5	17.8	59.2	66.1	70.7	77.8	80.9	78.3	80.6	38.3	17.9	20.4	50.2	47.3	42.4
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	2800	165	77	99	390	730	435	240	180	135	70	43	20	23	50	30	115
DEPLETION	276	7	3	4	23	36	32	39	38	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	21344	529	323	523	1795	2293	2123	2144	2183	2050	2027	961	449	513	1210	1122	1100
KCFS		17.8	23.3	29.3	30.2	37.3	35.7	34.9	35.5	34.4	33.0	32.3	32.3	32.3	19.7	18.2	19.8
--TOTAL--																	
NAT INFLOW	30600	1643	766	985	3395	4475	6780	4325	1650	1345	1330	673	314	359	685	700	1175
DEPLETION	2809	48	23	29	-65	573	1727	1269	296	-187	-126	-145	-68	-77	-198	-190	-100
CHAN STOR	-49	28	-12	-11	-26	-21	-36	-3	-4	29	33	1	0	1	-8	-25	4
EVAPORATION	1200							81	256	319	275	65	30	34	141		
STORAGE	50922	52016	52424	52846	54486	56074	58968	59796	58708	57900	57087	56879	56782	56672	56197	55940	56119
SYSTEM POWER																	
AVE POWER MW		659	860	851	854	998	1191	1308	1368	1256	1030	998	1037	1141	918	1011	962
PEAK POW MW		2271	2272	2278	2299	2317	2346	2362	2345	2336	2323	2301	2292	2288	2252	2272	2282
ENERGY GWH	9276.5	237.3	144.5	183.9	614.9	742.8	857.5	973.2	1017.7	904.1	766.6	359.4	174.3	219.1	682.8	752.0	646.5
DAILY GWH		15.8	20.6	20.4	20.5	24.0	28.6	31.4	32.8	30.1	24.7	24.0	24.9	27.4	22.0	24.3	23.1

VALUES IN 1000 AF EXCEPT AS INDICATED

	28FEB14	2014												2015			
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--																	
NAT INFLOW	7200	227	106	136	560	1145	1830	840	365	290	385	205	96	109	295	260	350
DEPLETION	496	4	2	3	50	296	475	229	-6	-126	-43	-33	-15	-17	-108	-132	-83
EVAPORATION	425							26	81	102	89	40	19	22	47		
MOD INFLOW	6279	223	104	134	510	849	1355	585	290	314	339	197	92	105	356	392	433
RELEASE	5630	179	83	107	417	523	536	553	553	416	307	149	69	103	523	584	528
STOR CHANGE	649	45	21	27	93	326	819	32	-264	-102	32	48	23	2	-166	-192	-95
STORAGE	12759	12804	12825	12851	12945	13271	14091	14122	13858	13757	13788	13837	13859	13861	13695	13503	13408
ELEV FTMSL	2223.8	2224.0	2224.1	2224.3	2224.7	2226.5	2230.6	2230.8	2229.5	2229.0	2229.1	2229.4	2229.5	2229.5	2228.6	2227.7	2227.2
DISCH KCFS	7.0	6.0	6.0	6.0	7.0	8.5	9.0	9.0	9.0	7.0	5.0	5.0	5.0	6.5	8.5	9.5	9.5
POWER																	
AVE POWER MW		79	79	79	93	113	121	121	121	94	67	67	67	87	114	127	127
PEAK POW MW		154	155	155	155	157	160	160	159	159	159	159	159	158	158	158	157
ENERGY GWH	911.4	28.5	13.3	17.1	66.7	83.9	86.8	90.3	90.1	67.7	50.0	24.2	11.3	16.8	84.9	94.5	85.2
--GARRISON--																	
NAT INFLOW	10900	479	223	287	780	1300	3120	2100	580	480	445	180	84	96	180	255	310
DEPLETION	1078	28	13	17	46	167	785	646	105	-155	-51	-132	-61	-70	-120	-85	-55
CHAN STOR	-26	10			-10	-15	-5			20	20			-15	-20	-10	
EVAPORATION	495							30	96	120	104	46	22	25	53		
REG INFLOW	14931	640	294	378	1140	1640	2865	1977	932	951	720	414	193	230	750	914	893
RELEASE	14160	476	222	286	1071	1230	1369	1353	1353	1122	984	476	222	254	1168	1353	1222
STOR CHANGE	771	164	72	92	69	411	1497	624	-420	-171	-264	-62	-29	-24	-419	-439	-329
STORAGE	15304	15468	15540	15632	15701	16111	17608	18233	17812	17642	17377	17315	17286	17262	16843	16405	16075
ELEV FTMSL	1829.1	1829.7	1830.0	1830.3	1830.5	1832.0	1837.1	1839.1	1837.7	1837.2	1836.3	1836.1	1836.0	1835.9	1834.5	1833.0	1831.9
DISCH KCFS	20.0	16.0	16.0	16.0	18.0	20.0	23.0	22.0	22.0	18.9	16.0	16.0	16.0	16.0	19.0	22.0	22.0
POWER																	
AVE POWER MW		189	190	190	214	239	280	274	274	234	198	198	197	197	233	267	264
PEAK POW MW		440	441	442	443	448	467	474	469	467	464	463	463	462	457	452	447
ENERGY GWH	2089.5	68.1	31.9	41.1	154.0	177.6	201.5	203.8	204.2	168.7	147.5	71.1	33.2	37.9	173.1	198.3	177.6
--OAHE--																	
NAT INFLOW	2300	259	121	155	405	220	625	170	70	95	45	45	21	24	-15	-10	70
DEPLETION	721	25	12	15	50	74	154	186	125	30	-12	1	0	1	13	19	29
CHAN STOR	-8	17			-8	-8	-12	4		13	12				-13	-13	0
EVAPORATION	456							29	89	110	94	42	20	22	49		
REG INFLOW	15274	728	331	426	1418	1367	1827	1312	1208	1091	959	478	223	255	1078	1311	1263
RELEASE	14636	430	270	270	1008	1171	1326	1744	1871	1646	1152	533	284	207	818	1037	867
STOR CHANGE	638	298	61	156	410	196	501	-432	-663	-556	-193	-56	-61	47	260	274	396
STORAGE	16308	16606	16667	16823	17233	17429	17930	17498	16835	16279	16086	16030	15969	16017	16277	16550	16946
ELEV FTMSL	1599.4	1600.5	1600.7	1601.3	1602.7	1603.4	1605.1	1603.6	1601.3	1599.3	1598.6	1598.4	1598.2	1598.4	1599.3	1600.3	1601.7
DISCH KCFS	15.4	14.4	19.5	15.1	16.9	19.1	22.3	28.4	30.4	27.7	18.7	17.9	20.5	13.1	13.3	16.9	15.6
POWER																	
AVE POWER MW		180	242	189	213	240	283	359	381	343	231	221	251	161	164	209	195
PEAK POW MW		671	672	675	683	686	695	687	675	665	661	660	659	660	665	670	677
ENERGY GWH	2212.6	64.6	40.7	40.8	153.1	178.8	203.5	267.3	283.6	246.8	172.0	79.4	42.2	30.9	122.3	155.7	131.0
--BIG BEND--																	
EVAPORATION	103							6	20	25	22	10	5	5	11		
REG INFLOW	14533	430	270	270	1008	1171	1326	1738	1852	1622	1130	523	280	202	807	1037	867
RELEASE	14533	430	270	270	1008	1171	1326	1738	1852	1622	1130	523	280	202	807	1037	867
STORAGE	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621
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	15.4	14.4	19.5	15.1	16.9	19.1	22.3	28.3	30.1	27.3	18.4	17.6	20.1	12.7	13.1	16.9	15.6
POWER																	
AVE POWER MW		68	91	71	79	89	104	132	141	129	90	89	101	64	66	83	75
PEAK POW MW		517	509	509	509	509	509	509	509	517	538	538	538	538	538	538	529
ENERGY GWH	839.8	24.6	15.3	15.3	57.1	66.4	75.1	98.4	104.9	93.0	67.1	31.9	17.0	12.4	49.3	61.7	50.3
--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	115							8	25	31	24	9	4	4	9		
REG INFLOW	15238	549	326	342	1164	1327	1449	1782	1872	1618	1105	508	273	195	794	1024	909
RELEASE	15237	269	182	342	1164	1327	1449	1782	1872	1762	1744	821	384	221	698	684	537
STOR CHANGE	0	280	144					0	0	-144	-639	-313	-111	-26	97	340	372
STORAGE	3001	3281	3425	3425	3425	3425	3425	3425	3425	3281	2642	2329	2218	2192	2289	2629	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	1339.3	1344.8	1350.0
DISCH KCFS	9.5	9.0	13.1	19.1	19.6	21.6	24.4	29.0	30.4	29.6	28.4	27.6	27.7	13.9	11.3	11.1	9.7
POWER																	
AVE POWER MW		75	111	162	166	183	206	244	256	248	227	209	203	102	84	85	77
PEAK POW MW		350	356	356	356	356	356	356	356	350	319	296	287	285	293	319	339
ENERGY GWH	1509.4	27.0	18.6	35.0	119.3	135.9	148.1	181.6	190.6	178.3	169.2	75.1	34.0	19.6	62.2	63.1	51.9
--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	-2	1	-8	-12	-1	-4	-5	-9	-3	2	2	1	0	25	5	0	3
EVAPORATION	34							2	6	8	7	3	2	2	4		
REG INFLOW	16588	372	222	391	1303	1470	1595	1832	1943	1856	1857	872	407	273	769	769	659
RELEASE	16588	372	222	391	1303	1470	1595	1832	1931	1833	1857	872	407	273	769	769	694
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	12.5	12.5	16.0	21.9	21.9	23.9	26.8	29.8	31.4	30.8	30.2	29.3	29.3	17.2	12.5	12.5	12.5
POWER																	
AVE POWER MW		44	56	75	75	82	91	100	105	105	104	102	102	61	44	44	44
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	689.0	15.8	9.3	16.3	54.2	61.0	65.8	74.7	77.9	75.4	77.5	36.7	17.1	11.7	33.0	33.0	29.6
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	1800	162	76	97	280	345	190	165	130	110	60	30	14	16	25	25	75
DEPLETION	276	7	3	4	23	36	32	39	38	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	18112	527	294	484	1560	1779	1753	1958	2023	1918	1906	895	418	286	780	779	754
KCFS		17.7	21.2	27.1	26.2	28.9	29.5	31.8	32.9	32.2	31.0	30.1	30.1	18.0	12.7	12.7	13.6
--TOTAL--																	
NAT INFLOW	24600	1350	630	810	2330	3340	6075	3445	1295	1105	1055	513	239	273	565	605	970
DEPLETION	2765	65	30	39	178	601	1482	1157	287	-224	-92	-151	-70	-80	-188	-179	-91
CHAN STOR	-35	28	-8	-12	-20	-28	-23	-5	-3	35	34	1	0	11	-28	-23	3
EVAPORATION	1629							101	318	395	340	151	70	80	173		
STORAGE	49320	50107	50404	50679	51252	52185	55002	55226	53890	52941	51877	51494	51316	51315	51087	51070	51379
SYSTEM POWER																	
AVE POWER MW		635	769	766	839	946	1084	1231	1279	1153	918	885	922	673	705	815	782
PEAK POW MW		2247	2247	2251	2260	2270	2301	2301	2283	2275	2257	2233	2223	2221	2189	2214	2226
ENERGY GWH	8251.7	228.6	129.2	165.6	604.4	703.5	780.8	916.1	951.3	829.8	683.2	318.4	154.8	129.2	524.8	606.3	525.6
DAILY GWH		15.2	18.5	18.4	20.1	22.7	26.0	29.6	30.7	27.7	22.0	21.2	22.1	16.1	16.9	19.6	18.8

INI-SUM 15MAR 22MAR 31MAR 30APR 31MAY 30JUN 31JUL 31AUG 30SEP 31OCT 15NOV 22NOV 30NOV 31DEC 31JAN 28FEB

VALUES IN 1000 AF EXCEPT AS INDICATED

	28FEB14	2014												2015			
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--																	
NAT INFLOW	5950	201	94	120	460	945	1510	645	290	240	320	168	78	89	240	240	310
DEPLETION	620	10	5	6	82	201	383	251	63	-68	-56	-6	-3	-3	-89	-95	-60
EVAPORATION	486							30	94	117	101	46	21	24	53		
MOD INFLOW	4844	191	89	115	378	744	1127	364	133	191	275	128	60	68	276	335	370
RELEASE	5497	179	83	107	417	492	536	553	553	425	338	164	76	87	492	523	472
STOR CHANGE	-653	13	6	8	-39	252	591	-190	-420	-234	-64	-36	-17	-19	-216	-188	-102
STORAGE	12239	12252	12258	12265	12227	12479	13070	12881	12460	12227	12163	12127	12110	12091	11876	11688	11586
ELEV FTMSL	2220.9	2221.0	2221.0	2221.1	2220.9	2222.2	2225.4	2224.4	2222.1	2220.9	2220.5	2220.3	2220.2	2220.1	2218.9	2217.9	2217.3
DISCH KCFS	7.0	6.0	6.0	6.0	7.0	8.0	9.0	9.0	9.0	7.1	5.5	5.5	5.5	5.5	8.0	8.5	8.5
POWER																	
AVE POWER MW		78	78	78	91	104	119	119	118	93	72	72	72	71	103	109	109
PEAK POW MW		151	151	151	151	153	156	155	153	151	151	151	151	150	149	148	147
ENERGY GWH	867.1	28.2	13.1	16.9	65.7	77.7	85.4	88.6	88.0	67.2	53.3	25.8	12.0	13.7	77.0	81.4	73.2
--GARRISON--																	
NAT INFLOW	9150	404	189	242	640	1150	2600	1700	475	395	395	160	75	85	150	210	280
DEPLETION	1178	27	12	16	60	155	691	610	137	-121	-3	-117	-55	-62	-87	-53	-32
CHAN STOR	-16	10			-10	-10	-10			19	17		0	0	-26	-5	0
EVAPORATION	571							35	111	138	119	54	25	28	61		
REG INFLOW	12882	566	259	334	986	1477	2434	1608	781	822	634	387	181	207	642	780	784
RELEASE	13559	461	215	277	982	1383	1309	1291	1291	1028	922	446	208	238	1107	1261	1139
STOR CHANGE	-676	105	44	57	4	93	1125	317	-510	-205	-289	-59	-28	-31	-465	-480	-354
STORAGE	14545	14650	14695	14751	14756	14849	15974	16291	15780	15575	15286	15227	15200	15168	14703	14223	13869
ELEV FTMSL	1826.3	1826.7	1826.9	1827.1	1827.1	1827.5	1831.5	1832.6	1830.8	1830.1	1829.1	1828.8	1828.7	1828.6	1826.9	1825.1	1823.8
DISCH KCFS	19.5	15.5	15.5	15.5	16.5	22.5	22.0	21.0	21.0	17.3	15.0	15.0	15.0	15.0	18.0	20.5	20.5
POWER																	
AVE POWER MW		180	180	180	192	261	259	252	251	205	178	177	177	177	210	236	234
PEAK POW MW		429	429	430	430	431	446	450	444	441	437	436	436	436	429	423	418
ENERGY GWH	1924.4	64.8	30.3	39.0	138.3	194.4	186.7	187.3	186.9	147.9	132.2	63.7	29.7	33.9	156.4	175.8	157.1
--OAHE--																	
NAT INFLOW	1350	177	82	106	285	130	315	110	50	55	15	13	6	7	-35	-15	50
DEPLETION	721	25	12	15	50	74	154	186	125	30	-12	1	0	1	13	19	29
CHAN STOR	-4	18			-4	-27	2	4		17	11				-14	-12	
EVAPORATION	512							32	99	123	106	48	22	26	56		
REG INFLOW	13671	631	286	368	1212	1413	1472	1187	1117	947	854	410	191	219	989	1215	1160
RELEASE	14487	483	295	340	1220	1420	1464	1700	1727	1235	1065	507	98	138	852	1057	887
STOR CHANGE	-816	148	-9	28	-8	-7	8	-512	-610	-287	-212	-97	93	81	137	158	273
STORAGE	15488	15636	15627	15655	15647	15640	15648	15135	14526	14238	14027	13930	14023	14104	14241	14399	14672
ELEV FTMSL	1596.4	1597.0	1596.9	1597.0	1597.0	1597.0	1597.0	1595.1	1592.7	1591.5	1590.7	1590.3	1590.6	1591.0	1591.5	1592.2	1593.2
DISCH KCFS	16.0	16.2	21.3	19.0	20.5	23.1	24.6	27.6	28.1	20.7	17.3	17.0	7.1	8.7	13.9	17.2	16.0
POWER																	
AVE POWER MW		198	259	232	250	281	300	334	336	246	205	200	84	103	164	204	190
PEAK POW MW		653	653	653	653	653	653	644	632	626	622	620	622	623	626	629	635
ENERGY GWH	2105.7	71.3	43.5	50.1	180.1	209.3	215.7	248.8	249.7	177.2	152.3	72.2	14.0	19.7	122.1	151.7	128.0
--BIG BEND--																	
EVAPORATION	129							8	24	31	27	12	6	7	14		
REG INFLOW	14359	483	295	340	1220	1420	1464	1692	1702	1204	1038	494	92	131	838	1057	887
RELEASE	14359	483	295	340	1220	1420	1464	1692	1702	1204	1038	494	92	131	838	1057	887
STORAGE	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621
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	16.0	16.2	21.3	19.0	20.5	23.1	24.6	27.5	27.7	20.2	16.9	16.6	6.7	8.3	13.6	17.2	16.0
POWER																	
AVE POWER MW		77	100	89	96	108	115	129	130	97	84	84	34	42	69	85	77
PEAK POW MW		517	509	509	509	509	509	509	509	529	538	538	538	538	538	538	529
ENERGY GWH	830.4	27.7	16.7	19.2	69.1	80.4	82.9	95.8	96.4	69.8	62.8	30.1	5.7	8.0	51.2	62.9	51.5
--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	14590	559	331	385	1296	1476	1562	1699	1681	1159	989	475	85	121	813	1034	924
RELEASE	14589	278	187	385	1296	1476	1562	1699	1681	1583	1570	686	102	121	716	694	552
STOR CHANGE	1	281	144					0	0	-424	-581	-211	-17	0	97	340	372
STORAGE	3000	3281	3425	3425	3425	3425	3425	3425	3425	3001	2420	2209	2192	2192	2289	2629	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	1339.3	1344.8	1350.0
DISCH KCFS	10.0	9.4	13.5	21.6	21.8	24.0	26.3	27.6	27.3	26.6	25.5	23.1	7.3	7.7	11.6	11.3	9.9
POWER																	
AVE POWER MW		78	114	183	184	203	222	233	230	220	199	171	54	56	86	86	79
PEAK POW MW		350	356	356	356	356	356	356	356	339	303	286	285	285	293	319	339
ENERGY GWH	1442.8	27.9	19.1	39.4	132.7	150.9	159.5	173.3	171.5	158.2	148.1	61.4	9.1	10.8	63.8	63.9	53.4
--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	-1	1	-8	-16	0	-4	-4	-3	1	1	2	5	29	-1	-7	1	3
EVAPORATION	42							2	8	10	9	4	2	2	5		
REG INFLOW	15732	372	222	425	1416	1593	1684	1740	1734	1659	1666	732	150	143	769	769	659
RELEASE	15732	372	222	425	1416	1593	1684	1740	1722	1636	1666	732	150	143	769	769	694
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	12.5	12.5	16.0	23.8	23.8	25.9	28.3	28.3	28.0	27.5	27.1	24.6	10.8	9.0	12.5	12.5	12.5
POWER																	
AVE POWER MW		44	56	82	82	88	96	96	96	96	95	86	38	32	44	44	44
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	658.4	15.8	9.3	17.6	58.7	65.8	69.3	71.6	71.3	68.8	70.6	31.1	6.5	6.2	33.1	33.0	29.6
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	1100	121	56	73	145	185	115	100	80	65	35	23	11	12	10	20	50
DEPLETION	276	7	3	4	23	36	32	39	38	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	16556	486	275	493	1538	1742	1767	1801	1764	1676	1690	748	157	151	765	774	729
KCFS		16.3	19.8	27.6	25.8	28.3	29.7	29.3	28.7	28.2	27.5	25.1	11.3	9.5	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	2989	69	32	42	224	494	1296	1143	388	-132	-57	-110	-51	-58	-136	-110	-45
CHAN STOR	-21	29	-8	-16	-15	-41	-12	2	1	38	29	5	30	-1	-48	-16	3
EVAPORATION	1878							118	367	456	391	174	81	92	200		
STORAGE	47220	47767	47952	48044	48002	48340	50065	49680	48152	47024	45879	45476	45508	45538	45092	44922	45075
SYSTEM POWER																	
AVE POWER MW		654	787	844	895	1046	1110	1163	1161	957	832	790	458	481	677	764	733
PEAK POW MW		2215	2213	2214	2214	2217	2235	2228	2208	2203	2168	2148	2148	2150	2114	2135	2144
ENERGY GWH	7828.7	235.6	132.1	182.3	644.6	778.4	799.5	865.5	863.8	689.1	619.2	284.2	76.9	92.3	503.5	568.8	492.8
DAILY GWH		15.7	18.9	20.3	21.5	25.1	26.6	27.9	27.9	23.0	20.0	18.9	11.0	11.5	16.2	18.3	17.6
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB

VALUES IN 1000 AF EXCEPT AS INDICATED

	28FEB14	2014										2015				
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB
--FORT PECK--																	
NAT INFLOW	5300	194	90	116	440	850	1180	595	260	230	310	145	68	77	220	230	295
DEPLETION	577	10	5	6	82	201	383	239	60	-68	-50	-23	-11	-12	-97	-88	-59
EVAPORATION	471							29	91	113	98	44	21	24	51		
MOD INFLOW	4252	184	86	110	358	649	797	327	109	185	262	124	58	66	266	318	354
RELEASE	5575	179	83	107	476	523	536	553	553	435	338	164	76	95	461	523	472
STOR CHANGE	-1323	5	2	3	-118	126	261	-227	-445	-251	-76	-40	-19	-29	-195	-205	-118
STORAGE	12239	12244	12247	12250	12132	12258	12520	12293	11849	11598	11522	11482	11463	11434	11239	11035	10917
ELEV FTMSL	2220.9	2221.0	2221.0	2221.0	2220.3	2221.0	2222.5	2221.2	2218.8	2217.4	2216.9	2216.7	2216.6	2216.4	2215.3	2214.1	2213.4
DISCH KCFS	7.0	6.0	6.0	6.0	8.0	8.5	9.0	9.0	9.0	7.3	5.5	5.5	5.5	6.0	7.5	8.5	8.5
POWER																	
AVE POWER MW		78	78	78	104	110	117	118	117	94	71	70	70	77	95	107	107
PEAK POW MW		151	151	151	151	151	153	152	149	147	147	147	147	146	145	144	143
ENERGY GWH	868.9	28.2	13.1	16.9	74.9	82.2	84.6	87.4	86.7	67.7	52.5	25.3	11.8	14.7	71.0	79.9	71.9
--GARRISON--																	
NAT INFLOW	7400	382	178	229	580	1100	2165	935	325	215	385	150	70	80	140	195	270
DEPLETION	1048	27	12	16	60	155	591	537	105	-126		-108	-50	-57	-66	-32	-16
CHAN STOR	-16	10			-21	-5	-5			17	19		0	-5	-16	-11	0
EVAPORATION	551							35	108	133	115	51	24	27	59		
REG INFLOW	11360	545	249	320	975	1462	2104	917	666	661	627	370	173	200	593	739	758
RELEASE	12845	446	208	268	952	1199	1220	1199	1199	1031	922	446	208	246	1076	1168	1055
STOR CHANGE	-1486	98	41	53	23	263	885	-282	-533	-371	-295	-77	-36	-46	-483	-429	-297
STORAGE	14545	14643	14684	14737	14760	15024	15908	15626	15093	14722	14427	14351	14315	14269	13786	13357	13060
ELEV FTMSL	1826.3	1826.7	1826.9	1827.0	1827.1	1828.1	1831.3	1830.3	1828.4	1827.0	1825.9	1825.6	1825.5	1825.3	1823.4	1821.8	1820.6
DISCH KCFS	19.5	15.0	15.0	15.0	16.0	19.5	20.5	19.5	19.5	17.3	15.0	15.0	15.0	15.5	17.5	19.0	19.0
POWER																	
AVE POWER MW		174	174	175	186	227	242	232	230	202	174	173	173	178	200	214	212
PEAK POW MW		429	429	430	430	434	445	442	435	430	426	425	424	423	417	410	406
ENERGY GWH	1802.5	62.7	29.3	37.7	134.1	169.1	174.3	172.7	171.0	145.7	129.5	62.4	29.1	34.3	148.7	159.4	142.6
--OAHE--																	
NAT INFLOW	1150	169	79	102	200	110	305	105	40	45	5	8	4	4	-45	-20	40
DEPLETION	721	25	12	15	50	74	154	186	125	30	-12	1	0	1	13	19	29
CHAN STOR	2	20		0	-4	-16	-5	5		10	11			-2	-10	-7	
EVAPORATION	496							31	96	119	103	46	22	25	54		
REG INFLOW	12781	611	276	355	1098	1219	1366	1091	1018	938	848	406	190	222	954	1122	1066
RELEASE	14431	506	305	353	1220	1445	1494	1714	1747	1244	1043	279	107	142	867	1067	897
STOR CHANGE	-1651	105	-30	2	-122	-226	-128	-623	-729	-306	-195	127	83	80	87	55	169
STORAGE	15488	15593	15564	15565	15443	15218	15090	14466	13738	13431	13236	13363	13446	13526	13613	13668	13838
ELEV FTMSL	1596.4	1596.8	1596.7	1596.7	1596.2	1595.4	1594.9	1592.4	1589.5	1588.2	1587.4	1587.9	1588.3	1588.6	1589.0	1589.2	1589.9
DISCH KCFS	16.0	17.0	22.0	19.8	20.5	23.5	25.1	27.9	28.4	20.9	17.0	9.4	7.7	9.0	14.1	17.4	16.1
POWER																	
AVE POWER MW		207	268	241	249	284	303	333	334	244	197	109	90	105	165	203	189
PEAK POW MW		652	652	652	649	645	643	631	616	610	605	608	610	612	614	615	618
ENERGY GWH	2073.1	74.5	45.0	52.0	179.4	211.6	217.9	247.7	248.5	175.4	146.4	39.3	15.1	20.1	122.5	150.8	127.1
--BIG BEND--																	
EVAPORATION	129							8	24	31	27	12	6	7	14		
REG INFLOW	14302	506	305	353	1220	1445	1494	1707	1722	1214	1016	267	101	136	853	1067	897
RELEASE	14302	506	305	353	1220	1445	1494	1707	1722	1213	1016	267	101	136	853	1067	897
STORAGE	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621	1621
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	16.0	17.0	22.0	19.8	20.5	23.5	25.1	27.8	28.0	20.4	16.5	9.0	7.3	8.5	13.9	17.4	16.1
POWER																	
AVE POWER MW		81	103	93	96	110	118	130	131	98	83	45	37	43	70	85	77
PEAK POW MW		517	509	509	509	509	509	509	509	529	538	538	538	538	538	538	529
ENERGY GWH	826.6	29.0	17.3	20.0	69.1	81.8	84.6	96.7	97.5	70.4	61.6	16.4	6.2	8.3	52.1	63.5	52.1
--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	138							10	32	38	28	10	4	5	12		
REG INFLOW	14433	572	336	393	1301	1486	1577	1704	1691	1164	962	245	92	124	818	1039	929
RELEASE	14432	291	192	393	1301	1486	1577	1704	1691	1588	1575	441	92	125	721	699	557
STOR CHANGE	1	281	144					0	0	-424	-613	-196	0	0	97	340	372
STORAGE	3000	3281	3425	3425	3425	3425	3425	3425	3425	3001	2388	2192	2192	2192	2289	2629	3001
ELEV FTMSL	1350.0	1353.5	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1355.2	1350.0	1341.0	1337.5	1337.5	1337.5	1339.3	1344.8	1350.0
DISCH KCFS	10.0	9.8	13.9	22.0	21.9	24.2	26.5	27.7	27.5	26.7	25.6	14.8	6.6	7.9	11.7	11.4	10.0
POWER																	
AVE POWER MW		81	117	186	185	204	224	234	232	220	199	110	49	58	86	87	80
PEAK POW MW		350	356	356	356	356	356	356	356	339	300	285	285	285	293	319	339
ENERGY GWH	1429.3	29.2	19.7	40.2	133.1	151.9	161.0	173.8	172.5	158.6	148.2	39.6	8.2	11.1	64.2	64.4	53.8
--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	-1	0	-8	-16	0	-4	-4	-2	0	2	2	20	15	-2	-7	1	2
EVAPORATION	42							2	8	10	9	4	2	2	5		
REG INFLOW	15475	372	222	425	1416	1593	1684	1740	1734	1659	1666	500	125	143	769	769	659
RELEASE	15475	372	222	425	1416	1593	1684	1740	1722	1636	1666	500	125	143	769	769	694
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	12.5	12.5	16.0	23.8	23.8	25.9	28.3	28.3	28.0	27.5	27.1	16.8	9.0	9.0	12.5	12.5	12.5
POWER																	
AVE POWER MW		44	56	82	82	88	96	96	96	96	95	59	32	32	44	44	44
PEAK POW MW		114	114	114	114	114	114	114	115	117	117	117	117	117	78	78	76
ENERGY GWH	647.6	15.8	9.3	17.6	58.7	65.8	69.3	71.6	71.3	68.8	70.6	21.4	5.4	6.2	33.0	33.0	29.6
--GAVINS POINT - SIOUX CITY--																	
NAT INFLOW	700	87	41	52	90	120	65	70	40	30	30	18	8	9	5	15	20
DEPLETION	276	7	3	4	23	36	32	39	38	25	11	7	3	3	14	15	15
REGULATED FLOW AT SIOUX CITY																	
KAF	15899	452	259	473	1483	1677	1717	1771	1724	1641	1685	511	130	149	760	769	699
KCFS		15.2	18.7	26.5	24.9	27.3	28.9	28.8	28.0	27.6	27.4	17.2	9.4	9.4	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	2816	69	32	42	224	494	1196	1058	353	-137	-48	-117	-55	-62	-123	-82	-28
CHAN STOR	-16	31	-8	-16	-25	-25	-14	2	0	29	32	20	15	-10	-33	-17	2
EVAPORATION	1827							115	358	444	379	169	78	90	194		
STORAGE	47220	47710	47868	47926	47709	47873	48891	47759	46064	44735	43556	43371	43399	43404	42910	42671	42762
SYSTEM POWER																	
AVE POWER MW		665	796	854	902	1025	1100	1142	1139	954	818	568	451	493	661	741	710
PEAK POW MW		2214	2212	2212	2210	2210	2221	2203	2180	2171	2133	2119	2121	2121	2085	2104	2111
ENERGY GWH	7648.1	239.3	133.7	184.4	649.4	762.4	791.8	849.8	847.6	686.6	608.7	204.3	75.7	94.6	491.5	551.0	477.1
DAILY GWH		16.0	19.1	20.5	21.6	24.6	26.4	27.4	27.3	22.9	19.6	13.6	10.8	11.8	15.9	17.8	17.0
	INI-SUM	15MAR	22MAR	31MAR	30APR	31MAY	30JUN	31JUL	31AUG	30SEP	31OCT	15NOV	22NOV	30NOV	31DEC	31JAN	28FEB