Missouri River Mainstem Reservoir System
Master Water Control Manual

Environmental Assessment for the Inclusion of Technical Criteria for Spring Pulse Releases from Gavins Point Dam

Missouri River Water Management Division
Northwestern Division
U.S. Army Corps of Engineers

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EXECUTIVE SUMMARY

In 2003 the United States Fish and Wildlife Service (USFWS) issued an Amended Biological Opinion (2003 Amended BiOp) on the United States Army Corps of Engineers' (Corps) Missouri River System regulations. Among other actions, the 2003 Amended BiOp called for bimodal spring pulse releases from Gavins Point Dam for the benefit of the listed pallid sturgeon. Working with the USFWS, Tribes, states, and other basin stakeholders, the Corps has developed technical criteria for the proposed bimodal spring pulse releases which, under the terms of the 2003 Amended BiOp, are to be implemented by March 2006. The Corps is proposing to include these technical criteria as a revision to the Missouri River Mainstem Reservoir System Master Water Control Manual (Master Manual). This Environmental Assessment (EA) addresses the purpose and need for the bimodal spring pulse releases and compares the environmental impacts of this proposal as defined by the technical criteria with a range of alternative spring pulse proposals that were addressed in a prior environmental analysis conducted by the Corps, the Final Environmental Impact Statement, Missouri River Master Manual Water Control Manual, Review and Update (FEIS). This EA is tiered to and linked to that EIS. The analysis contained in this EA compares the impacts of the bimodal spring pulse technical criteria with the impacts of the spring pulse alternatives evaluated in the FEIS. In addition, this EA also includes a comparison of the flow regime resulting from the bimodal spring pulse technical criteria with that of the flow regime since regulation of the System began. Based upon these comparisons the agency concludes that that the environmental impacts of the bimodal spring pulse releases, as defined by the Corps' proposed technical criteria, are within the range of spring pulse alternatives previously considered in the FEIS. In addition, the Corps' review of the flows resulting from the bimodal spring pulse technical criteria shows that they are well within the range of historical operations for the System. Based upon these comparisons, this EA concludes that there are no new significant environmental impacts of the proposed action that have not been evaluated in the FEIS and that warrant the preparation of a Supplemental Environmental Impact Statement before implementation of the bimodal spring pulse.

1. PURPOSE AND NEED FOR ACTION

1.1 Purpose and Need –

The Missouri River Master Water Control Manual (Master Manual) presents the Water Control Plan (WCP) and operational objectives for the integrated regulation of the Missouri River Mainstem Reservoir System (System). First published in 1960 and subsequently revised during the 1970s for flood control criteria changes, the Master Manual was revised again in March 2004 to include more stringent drought conservation measures.

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 to be regulated as an integrated system providing for flood control, navigation, irrigation, hydropower, water supply, water quality, recreation, and fish and wildlife. The Missouri River basin and the reservoir system are depicted in ***Figure 1***. The U.S. Army Corps of Engineers (Corps) operates the System to serve all of the Congressionally authorized purposes. Additionally, the Corps is required to

fulfill its responsibilities to federally recognized American Indian Tribes and comply with other Federal Laws, including the Endangered Species Act (ESA). ***Figure 2*** shows the 13 Tribal reservations located along the Missouri River.

Figure 1. **Missouri River Basin**

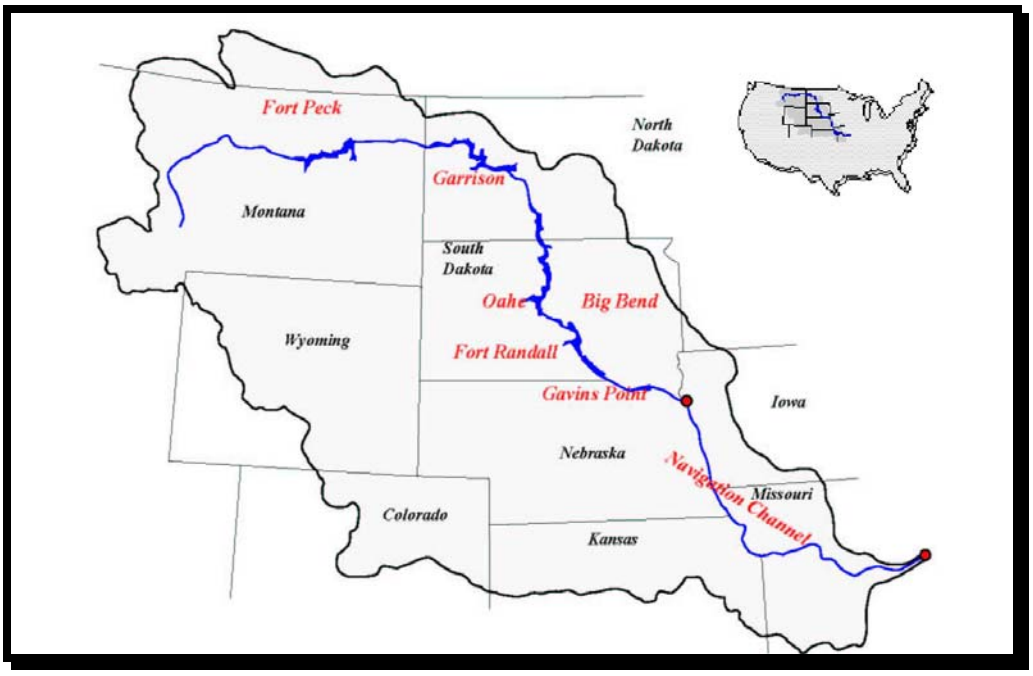
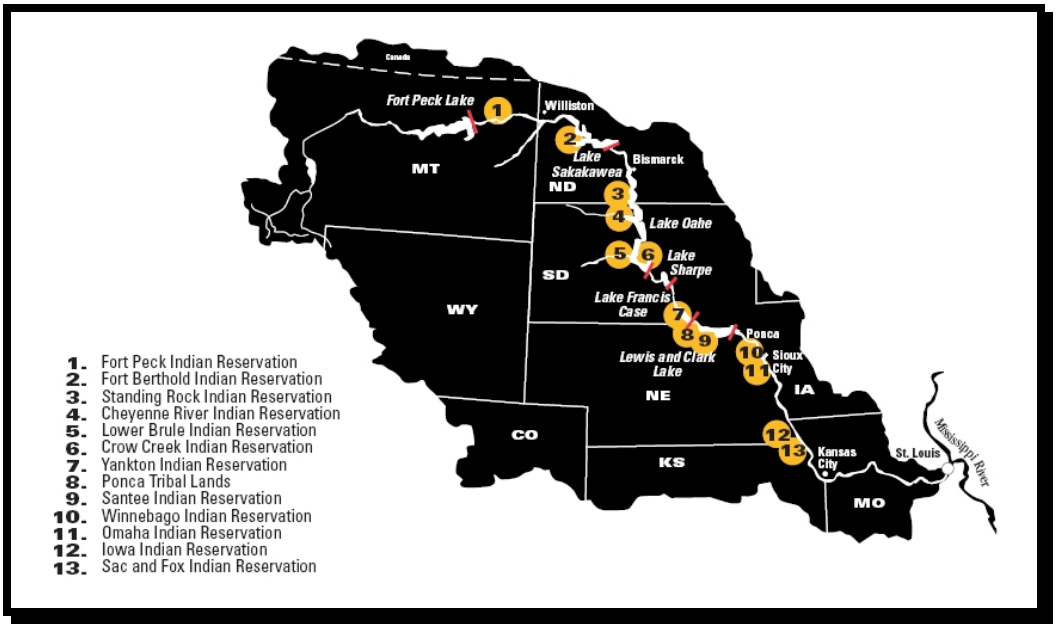


Figure 2. **Tribal Reservations along the Missouri River**



The U.S. Fish and Wildlife Service's (USFWS) 2003 Amended Biological Opinion on the Operation of the Missouri River Mainstem System, Operation and Maintenance of the

Missouri River Bank Stabilization and Navigation Channel, and Operation of the Kansas River Reservoir System (2003 Amended BiOp) presented the USFWS' opinion that the regulation of the System would jeopardize the continued existence of the endangered pallid sturgeon. The USFWS provided a Reasonable and Prudent Alternative (RPA) to avoid jeopardy to the pallid sturgeon that included a provision for the Corps to develop a plan to implement a bimodal 'spring pulse' release from Gavins Point Dam.

The WCP in the current Master Manual does not contain any technical criteria for a spring pulse. Therefore, implementation of the spring pulse elements in 2006 is contingent upon revision of the Master Manual to include the WCP's spring pulse technical criteria.

1.2 Background –

The 2003 Amended BiOp states on page 231:

> "The Corps shall develop and complete studies to establish a long-term flow management plan for flow releases from Gavins Point Dam that will be implemented under the Master Manual. This study will establish, as minimum criteria, flows that provide sufficient magnitude, duration, frequency, and rate of change. The spring pulse shall be a bimodal release from Gavins Point Dam that provides for spawning cues and floodplain connectivity in the later spring and early summer…This flow plan shall be responsive to the hydrologic conditions in the basin based on system storage, winter precipitation, and the future projected precipitation based on probabilities from historic records."

The 2003 Amended BiOp also states on page 235:

> "If the operating year starting on March 1, 2006 is other than a median year, the Corps shall proportionally modify the flow either up or down depending on if runoff is projected to be in the upper quartile water year definition or the lower quartile and within the bounds of human health and safety for the wetter period."

The RPA also includes 'adaptive management' as an approach to preclude jeopardy to pallid sturgeon. The 2003 Amended BiOp states on page 221:

> "The Corps shall adopt adaptive management as one tool to preclude jeopardy to pallid sturgeon. Adaptive management is a process that allows regular modification of management actions in response to new information and changing environmental conditions."

The 2003 Amended BiOp recommended the implementation of a long-term Gavins Point Dam spring pulse plan by 2006. It presented an "initial starting point" (ISP) spring pulse for the 2006 water year if an alternate plan that would meet the life-cycle needs of the pallid sturgeon could not be identified. The ISP presented in the 2003 Amended BiOp was to be implemented assuming near 'median hydroclimatic conditions' and allowed adjustments if conditions were not near 'median'. ***Section 2.2*** of this EA contains the details of the ISP.
The 2003 Amended BiOp states on page 234:

> "If the Corps, with the review and approval of the Service, is unable to determine a suitable flow management plan that incorporates the life history needs of the

pallid sturgeon over all relevant flow frequencies within 2 years the Corps shall operate in the following manner in the operating year that begins on March 1, 2006. This initial starting point shall be subject to annual review and modification based on data collected and evaluated under the adaptive management program. This assumes a median hydroclimatic condition in the basin based on system storage, past precipitation, and projections of future precipitation based on historical probabilities."

2. ALTERNATIVES CONSIDERED

2.1 Range of Alternatives Evaluated in FEIS –

The Final Environmental Impact Statement for the Review and Update of the Missouri River Master Water Control Manual (FEIS) was completed in March 2004.

Multiple analyses of a broad range of spring pulse alternatives were presented and evaluated during the Corps' 15-year National Environmental Policy Act (NEPA) process. These analyses are contained in the:

- Preliminary Draft EIS, May 1993;
- Draft EIS, August 1994;
- Preliminary Revised Draft EIS, August 1998;
- Revised Draft EIS, August 2001; and
- Final EIS, March 2004

These EISs present NEPA analysis for a wide range of Gavins Point Dam spring pulse releases. For example, the 1994 Draft EIS presented a preferred alternative (1994 PA) that included a 20,000 cubic feet per second (cfs), 90-day spring pulse that went from April 1 to the end of June. This alternative was not bimodal; however, it had a duration that lasted as long as the combination of the bimodal pulses included in the 2003 Amended BiOp at a magnitude greater than the May spring pulse.

A total of eleven spring pulse alternatives were evaluated in the FEIS and together they form the basis for the analysis presented in this EA. Two of the alternatives were among those that were submitted to the Corps for further consideration (Chapters 4 and 5), four were based on one of the alternatives submitted for consideration by the USFWS in its November 2000 Biological Opinion that were evaluated in detail (Chapters 6 and 7), and the other five were presented in limited detail at the end of Chapter 7. All of these alternatives had a single pulse in the May timeframe. The peak magnitudes of the pulses ranged from 15,000 to 30,000 cfs over navigation flows and the durations of the pulses were all over a 4-week period. System storage precludes for eliminating the pulse in droughts ranged from 46 to 31 million acre-feet (MAF). Gavins Point Dam spring pulse downstream flow limits (downstream flow limits) were generally increased by the amount of the peak magnitude of the spring pulse; however, the five alternatives at the end of Chapter 7 of the FEIS looked at the impact of downstream flow limits including the no change, minimum change, two intermediate change and a full

change options. See ***Table 1*** for a comparison of features of alternatives evaluated in the FEIS.

Table 1
COMPARISON OF FEATURES OF ALTERNATIVES CONSIDERED

	Alternative Name	First Pulse (kcfs)	First Pulse (days)	Release Between Pulses	Second Pulse (Added to Nav Flows) (kcfs)	Second Pulse (Added to Nav Flows) (days)	Downstream Flow Limits	Drought Preclude (MAF)	Second Pulse Proration
FEIS Alternatives	2000 BIOP	Nav	0	~CWCP	17.5	14	Full Increase	46	None
	FWS30	Nav	0	~CWCP	30	14	Full Increase	46	None
	GP1528	Nav	0	~CWCP	15	14	Full Increase	46	None
	GP2021	Nav	0	~CWCP	20	14	Full Increase	46	None
	GP1521	Nav	0	~CWCP	15	14	Full Increase	46	None
	GP2028	Nav	0	~CWCP	20	14	Full Increase	46	None
	FWMS	Nav	0	~CWCP	17.5	14	Full Increase	46	None
	FC0	Nav	0	~CWCP	17.5	14	Full Increase	31	None
	FC1	Nav	0	~CWCP	17.5	14	Intermediate High	31	None
	FC2	Nav	0	~CWCP	17.5	14	Intermediate Low	31	None
	FC3	Nav	0	~CWCP	17.5	14	Current	31	None
BiOp	2003 BIOP ISP	At Least 31	7	Not Specified	16	14	Not Specified	Not Specified	Per hydroclimatic conditions
PA	* PA	Nav +5 But not greater than 35	2	CWCP	16	2	Current	** 36.5 / 40	Per storage and projected runoff

Nav – Increase in releases to support Navigation Service. Navigation Service Level determined at March 15 Storage Check.
~CWCP – Similar to Current Water Control Plan
CWCP – Current Water Control Plan
* See Table 3 for details of Preferred Alternative
** 36.5 MAF preclude until first pulse is achieved; 40 MAF after that.

Although the FEIS had a Preferred Alternative that did not include any flow changes for the pallid sturgeon, the Record of Decision for the revisions to the Master Manual dated March 19, 2004 presented the Corps' commitment to identify a spring pulse plan that complied with the provisions of the 2003 Amended BiOp by 2006.

In coordination with the USFWS and with the assistance of the United States Institute for Environmental Conflict Resolution (USIECR), the Corps coordinated with basin Tribes, States, and stakeholders in an attempt to develop a basin consensus for a long-term spring pulse criteria meeting the requirements of the 2003 Amended BiOp. While this process was not successful in developing a basin consensus, it did assist the Corps in developing the proposed spring pulse technical criteria analyzed in this EA. These spring pulse technical criteria were developed from a wide range of criteria developed in the stakeholder process. A

summary of the post-FEIS process used to gather input from basin Tribes, States, and stakeholders is included in ***Section 6***.

2.2 Initial Starting Point Plan –

The 2003 Amended BiOp recommended the implementation of a long-term Gavins Point Dam spring pulse plan by 2006. The ISP presented in the 2003 Amended BiOp called for a bimodal spring pulse in March and May. The March pulse was assumed to follow a winter release of 16,000 cfs or less and was to be at least 31,000 cfs for no less than 7 days. Both of the ascending and descending limbs of the March spring pulse were to be 7 days in duration. The May pulse was to be no less than 16,000 cfs above existing releases for at least 14 days. The ascending limb of the pulse was to be no less than 7 days and no more than 10 days. The descending limb was to be no less than 7 days but could extend longer as required by other project purposes. The ISP spring pulse was to be implemented assuming near median hydroclimatic conditions and allowed adjustments if conditions were not near "median".

2.3 No Action –

The No Action (NA) Alternative, which is continued regulation of the System under the WCP currently in the Master Manual, is not feasible since it does not allow the Corps to comply with the Federal Endangered Species Act (ESA). Section 7 (a) (2) of the ESA requires every Federal agency, in consultation with and with the assistance of the Secretary, to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat.

2.4 Preferred Alternative –

2.4.1 PA Development – The preferred alternative (PA) for a bimodal Gavins Point Dam spring pulse was developed based on the provisions of the 2003 Amended BiOp, including the ISP, input from the 2005 spring pulse Plenary Group and its technical working groups, Tribal consultations/meetings, and public comments received on the draft AOP spring pulse plan presented in the fall of 2005 (see discussion of public involvement in ***Section 6*** of this EA). This PA consists of bimodal pulses as required in the 2003 Amended BiOp. The detailed features of the PA are described below.

2.4.2 Downstream Flow Limits – The magnitude of both the March and May Gavins Point Dam spring pulse releases will be constrained by the downstream flow limits. These downstream flow limits are established at the same locations as the current flood control constraints flow targets discussed in Chapter 7, paragraph 7-04.16 of the Master Manual and shown below in ***Table 2***. The downstream flow limits are the same values as the most conservative flood control constraint flow targets and therefore will provide similar downstream flood control during the spring pulse periods. As an additional precaution, radar-detected precipitation and National Weather Service quantitative precipitation forecasted (QPF) precipitation will be used in forecasting the resultant downstream flows. Gavins Point Dam releases will be adjusted as required during the spring pulse periods based on this forecast.

Table 2
GAVINS POINT DAM SPRING PULSE RELEASES
DOWNSTREAM FLOW LIMITS

Location	Flow Limit in cfs
Omaha	41,000
Nebraska City	47,000
Kansas City	71,000

2.4.3 March Spring Pulse Releases from Gavins Point Dam – For the March spring pulse releases (March pulse) from Gavins Point Dam, the PA includes a preclude based on System storage (March pulse preclude). If the actual System storage as computed on March 1 is at or below the March pulse preclude, a March pulse would not be implemented. The March pulse preclude will initially be 36.5 MAF until the first March pulse is implemented; after the first occurrence of a March pulse, the preclude will change to 40.0 MAF. The magnitude of the March pulse is defined as the combination of the Gavins Point Dam release increase and the contribution of the James River. Assuming that System storage is above the March pulse preclude, the magnitude of the March pulse will be 5,000-cfs and will be implemented the day after System releases reach the level necessary to provide downstream flow support for the beginning of the navigation season. More specifically, the magnitude of the Gavins Point Dam release at the peak of the March pulse will be 5,000 cfs minus the contribution of the James River measured at the Scotland, South Dakota stream gage. Actual releases from Gavins Point Dam will be set to the nearest 500-cfs increment. Also, the total Gavins Point Dam release during the March pulse will not be set any higher than the Gavins Point powerplant capacity (35,000 cfs). The duration of the peak of the March pulse will be 2 days. Following the 2-day peak, the March pulse flows will be reduced each day over the next 5 days until non-spring pulse downstream flow support rates are achieved.

2.4.4 May Spring Pulse Releases from Gavins Point Dam – For the May spring pulse (May pulse) from Gavins Point Dam, the PA will also have a preclude based on an actual System storage as computed on May 1 (May pulse preclude). If the actual System storage on May 1 is at or below the May pulse preclude, a May pulse would not be implemented. The May pulse preclude will also initially be 36.5 MAF until the first time the May spring pulse is implemented. As with the March pulse, once the first May spring pulse has been implemented the May spring pulse preclude will change to 40.0 MAF.

The two-step proration computation to determine the magnitude of the May pulse is as follows:

- First Step. The May pulse magnitude is first computed based on May 1 System storage. The May pulse magnitude is prorated in a straight-line interpolation between 16,000 cfs and 12,000 cfs based on a System storage range between 54.5 and 40 MAF. The May pulse magnitude in this step is limited to 16,000 cfs if System storage is

greater than 54.5 MAF. For the initial occurrence of the May pulse, if System storage is between 36.5 and 40 MAF, the resultant magnitude from this step is 12,000 cfs.

- Second Step. The resultant May pulse magnitude from the first step is then further prorated based on the Corps' May 1, Mainstem Calendar Year (CY) Runoff Forecast for the Missouri River basin above Sioux City, Iowa. The May pulse magnitude computed in the first step could be decreased or increased by as much as 25 percent in this step. The May pulse magnitude resulting from the first step is increased in a straight line interpolation from 0 to 25 percent for a CY runoff forecast that ranges from median to upper quartile. The May pulse magnitude from the first step is decreased in a straight line interpolation from 0 to 25 percent for a May 1 CY runoff forecast that ranges from median to lower quartile runoff. Use of both steps in this computational process produces a potential range of May pulse magnitudes from 9,000 cfs to 20,000 cfs. Actual releases from Gavins Point Dam will be set to the nearest 500-cfs increment.

The magnitude of the May pulse, as is the case for the March pulse, is defined as the combination of Gavins Point Dam release increase and the contribution of the James River. Therefore, the magnitude of the Gavins Point Dam release at the peak of the May pulse will be the result of the two-step proration computation described below minus the contribution of the James River measured at the Scotland, South Dakota stream gage. The total Gavins Point Dam release during the May pulse will not be constrained to the Gavins Point powerplant capacity, as is case for the March pulse.

The initiation of the May pulse will be between May 1 and May 19, depending on Missouri River water temperature measured immediately below Gavins Point Dam. The May pulse will be initiated after the second daily occurrence of a 16 degree Celsius or higher Missouri River water temperature. However, the final decision on the date of the initiation of the May pulse will take into account the potential for "take" of threatened and endangered (T&E) bird species during the pulse period and downstream flow conditions.

Gavins Point Dam releases will be increased at a rate of approximately 6,000 cfs per day from normal downstream flow support releases until the full May pulse magnitude, as calculated above, is achieved. The May pulse magnitude will be maintained for 2 days, after which the spring pulse increment of the releases will be decreased by 30 percent over the following 2 days. The remaining release reductions will be prorated over an additional 8 days until non-spring pulse downstream flow support rates are achieved. This will result in a recession length of 10 days from the peak of the May pulse. The length and magnitude of the recession may also be constrained by the downstream flow limits shown on ***Table 2***.

2.4.5 Comparison of PA to the 2003 Amended BiOp ISP – The spring pulse elements of the PA comply with the provisions of the 2003 Amended BiOp. The potential volume of System storage used for spring pulse releases is less than that of the ISP presented in the 2003 Amended BiOp due to a reduction in the duration of peak releases. For example, the ISP, which was to be implemented under median hydroclimatic conditions, would use

approximately 800,000 acre-feet of storage from the System. With the shorter peak durations included in the bimodal spring pulse releases included in the PA, both spring pulses would use 260,000 acre-feet of System storage at median hydroclimatic conditions. The 2003 Amended BiOp also included a provision that allows for a proration of the magnitude of the May pulse based on hydroclimatic conditions, but did not include any specific proration criteria. This allows a reduction in the magnitude of the May pulse during drought periods to reduce potential negative impacts to authorized System project purposes. Utilizing the proration criteria included in the PA, and assuming median runoff and 40 MAF of water in storage on May 1, both pulses would use 160,000 acre-feet of System storage. This would result in a 0.1-foot to 0.3-foot pool elevation decrease in each of the upper three reservoirs, or a 2-foot pool elevation decrease in Fort Randall reservoir if all of the water were taken from that reservoir to implement the spring pulses. The lower System storage volume required during drought reduces the adverse impacts associated with low reservoir storage levels such as reservoir water intake access and the exposure of historic and cultural resource sites. The shorter peak durations and reduced magnitudes of the May pulse during drought also reduce the risk of interior drainage and high groundwater problems in the reaches downstream from Gavins Point Dam. The bimodal spring pulse releases included in the PA utilized information gained from discussions with the Plenary Group at meetings held in the summer of 2005. The PA was also formulated after detailed and comprehensive discussions with the USFWS.

2.4.6 Effect on System Reservoir Levels – The volume of water drafted from any of the System reservoirs to support the spring pulses will be based on the hydrologic conditions at that time and will take into account any potential impacts to authorized System project purposes. Any disproportionate change in pool levels at any of the System reservoirs would be adjusted back to normal levels as soon as hydrologic conditions permit. As with any intra-System regulation, System pool level adjustments associated with the bimodal spring pulse implementation will be fully coordinated with all the affected interests prior to implementation.

2.4.7 Flexibility for the PA. The Draft Spring Pulse Water Control Plan Technical Criteria that was published for review with the Draft 2005-2006 AOP proposed to include flexibility related to several of the plan criteria. This proposed flexibility was discussed at the fall of 2005 public AOP meetings and at Tribal consultations/meetings in early 2006. One of the criteria under discussion was the spring pulse downstream flow limits. Data analyzed as part of the Plenary Group discussions showed that the frequency of spring pulses as constrained by these downstream flow limits is lower than anticipated in the 2003 Amended BiOp. However, it was also determined that this low frequency is associated with the implementation of spring pulses during non-drought periods, when System releases are set to provide full service. System storage in early 2006 is very low; the likelihood of full service flow support appears to lie several years in the future.

The Corps has had considerable discussion with the USFWS on this issue, and both agencies agree that because of the uncertainty related to the flexibility, and the fact that the spring pulse releases frequency is not an issue during the current extended drought, further study and discussion is appropriate prior to inclusion of that flexibility in the Master

Manual; therefore, none of the proposed flexibility is included in the PA. Information gained through the planned monitoring (***Section 5.5*** of this EA), research, and future studies will reduce the uncertainty relating to the flexibility and frequency issues. The information gained from the monitoring data, associated studies, and any other appropriate sources will be reviewed annually to determine if revisions to the technical criteria are necessary. This process of analysis and assessment of the PA will begin in 2006, whether hydroclimatic conditions are favorable for the spring pulse releases or not, and will be conducted annually thereafter. This process conforms to the adaptive management approach presented in the 2003 Amended BiOp and adopted by the Corps to address potential changes to the technical criteria. Information from all studies, the analysis of this information, and any proposed changes to the Master Manual technical criteria, if required, will be fully coordinated with basin Tribes, states, stakeholders and the public. All comments will be fully considered prior a change in the Master Manual. This will include Consultation with the potentially affected Tribes.

Table 3
TECHNICAL CRITERIA FOR SPRING PULSE RELEASES FROM GAVINS POINT DAM
Preferred Alternative

Criteria Applicable to Both the March and May Spring Pulses	
Downstream Flow Limits	No change from current levels
Criteria Applicable to the March Spring Pulse	
Drought Preclude	Initially 36.5 MAF or below measured on March 1 until this criteria results in a March spring pulse. Thereafter, 40.0 MAF of below measured on March 1
Drought Proration of Pulse	None
Magnitude*	5,000 cfs added to navigation releases, but no greater than 35,000 cfs
Initiation of Pulse	Extend the stepped System release increases that precede the beginning of the navigation season
Rate of Rise before Peak	Approximately 5,000 cfs 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	Initially 36.5 MAF or below measured on May 1 until this criteria results in a May spring pulse. Thereafter, 40.0 MAF or below measure on May 1
Proration of Pulse Magnitude Based On System Storage*	Prorated from 16,000 cfs based on a May 1 System Storage check; 100% at 54.5 MAF; straight line interpolation to 12,000 cfs at 40.0 MAF
Proration of Pulse Magnitude Based On Projected Runoff*	Resultant May pulse magnitude is further prorated based on runoff forecast. Straight-line increase from 0 to 25% for runoff forecast of median to upper quartile. Straight-line decrease from 0 to 25% for runoff forecast from median to lower quartile. Potential range following the two-step computation for the May pulse magnitude is 9,000 to 20,000 cfs.
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 final decision will take into account the potential for 'take' of T&E bird species and downstream flow conditions.
Rate of Rise before Peak	Approximately 6,000 cfs 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 magnitudes will include the contribution of the James River measured at the Scotland, South Dakota, stream gage.

3. AFFECTED ENVIRONMENT

The affected environment is described in Chapter 3 of the FEIS published in March 2004.

4. POTENTIAL IMPACTS OF ALTERNATIVES

4.1 Introduction –

Impact analyses for alternatives evaluated in the FEIS are included in Chapters 5, 7, and 8 of that document.

4.2 Impacts of No Action Alternative – Implementation in 2006 of the No Action Alternative, which is the Current Water Control Plan (CWCP) contained in the 2004 Master Manual, would not be consistent with terms of the 2003 Amended BiOp or provide for the Corps' compliance with the ESA.

4.3 Impacts of Preferred Alternative –

Impacts associated with implementation of the PA are within the range of impacts of the alternatives considered in FEIS that contained spring pulse releases. For details on the impacts of the alternatives, see Chapters 5, 7, and 8 of the FEIS. The PA complies with the provisions of the 2003 Amended BiOp. In general, the PA, in contrast with the ISP contained in the 2003 Amended BiOp, requires lower volume of water annually during drought periods which reduces the adverse impacts associated with low reservoir storage levels such as reservoir water intake access and the exposure of historic and cultural resource sites. The shorter peak durations and reduced magnitudes of the May pulse during drought also lessen the impacts on the upstream reservoir uses and reduces the risk of interior drainage and high groundwater problems in the reaches downstream from Gavins Point Dam associated with the ISP. The PA utilized information gained from discussions with the Plenary Group at meetings held in the summer of 2005. It was also informed by detailed and comprehensive discussions with the USFWS.

4.3.1 Normal Operating Range – The peak releases included in both the March and May spring pulses are well within the normal operating range of Gavins Point Dam. In the Corps' report entitled "Missouri River Main Stem Hydrologic Statistics (RCC Technical Report F-99)," dated February 1999, release probabilities were developed for each of the six mainstem dams. ***Table 4*** summarizes the release frequency determined for Gavins Point Dam. As shown, a maximum annual daily Gavins Point Dam release rate of 38,000 cfs would be expected on average every other year (2-year frequency) and a maximum annual daily release rate of 47,000 cfs would be expected once every 5 years (5-year frequency).

Table 4
GAVINS POINT DAM RELEASE-FREQUENCY RELATIONSHIP

Frequency	Release (cfs)
2-year	38,000
5-year	47,000
10-year	54,000
50-year	72,000
100-year	80,000
500-year	100,000

For the March spring pulse, the maximum release is 5,000 cfs above navigation releases but no more than the power plant capacity of 35,000 cfs, and may be reduced by the downstream flow limits. Historically, releases above power plant capacity are only scheduled during periods of flood water evacuation from the System due to the loss of hydropower generation when releases are made through the spillway rather than the power plant. In years when minimum service navigation support is being provided, releases to support navigation and other downstream purposes generally range between 20,700 and 23,800 cfs at the start of the navigation season as detailed in the report entitled "Missouri River Main Stem Reservoirs, Releases to Support Navigation (RCC Technical Report 2000-A)," dated April 2000. Thus, in years when minimum service flows are being supported, the expected maximum release during the March pulse would be 25,700 to 28,800 cfs. In years when full service navigation support is being provided, the releases to support full service navigation generally range from 26,700 to 29,800 cfs. Thus, in full service years the maximum release during the March pulse 31,700 to 34,800 cfs. Since the System first filled in 1967 there have been 24 years with maximum daily March releases of 25,000 cfs or greater. In 14 of those years, maximum daily releases were 30,000 cfs or greater, and in 4 years the maximum daily release during March was 35,0000 cfs or more. Since 1967, the maximum daily release during March was 42,000 cfs in 1997. Actual releases are rounded to the nearest 500 cfs.

The maximum release during the May pulse is not restricted to the power plant capacity. In years when minimum service navigation support is being provided, releases to support navigation and other downstream purposes generally range between 22,000 and 25,300 cfs during May as described in the above-mentioned report, and between 28,000 and 31,300 cfs in years with full service navigation support. The magnitude of the May pulse ranges between 9,000 and 20,000 cfs above navigation support flows depending on System storage and the May 1 runoff forecast, but may be reduced by the downstream flow limits. Due to the potential for the downstream flow limits to restrict the peak release during the May pulse, the maximum potential release from Gavins Point Dam was estimated to determine how that release would compare with the data shown in ***Table 4*** and historical records since the system first filled in 1967. In this analysis, the downstream flow limits and historical records of incremental flows were used to back-compute a maximum Gavins Point Dam release during the May pulse. Based on the downstream flow limits in ***Table 2***,

the maximum possible Gavins Point Dam release during the May spring pulse would be the Omaha downstream flow limit minus the intervening tributary flows. The Corps' report entitled "Missouri River Incremental Flows Below Gavins Point Dam (RCC Technical Report JY-05)," dated July 2005, indicates that during May, the total incremental flow between Gavins Point Dam and Omaha, in a lower decile type year, would be about 800 cfs based on the 1898-2002 historic record. Thus, in this situation, the maximum release from Gavins Point Dam, which, when combined with the incremental inflow, would still be below the downstream flow limit, 41,000 - 800 = 40,200 cfs. This example would result in a Gavins Point Dam release in the range of the 2- to 5-year frequency. In a more typical year, when incremental inflows are near the median condition of approximately 6,000 cfs, the maximum Gavins Point Dam release would be 41,000 - 6,000 = 35,000 cfs, which is below the release rate that would be expected on average every 2 years. Since the System first filled in 1967 there have been 28 years with maximum daily May releases of 30,000 cfs or greater. In 10 of those years, maximum daily releases were 35,000 cfs or greater, and in 4 years the maximum daily release during May was 40,000 cfs or more. Since 1967, the maximum daily release during May was 60,000 cfs in 1997.

4.3.2 Flood Control – Flood control benefits are calculated as the economic damages prevented by the regulation of the six dams on the Missouri River. Flood control benefits computed for the PA fall within the range of flood control benefits of the spring pulse alternatives evaluated for the FEIS. ***Figure 3*** shows the percent change in flood control benefits from the Previous Water Control Plan (PWCP) for the FEIS spring pulse alternatives, the Current Water Control Plan (CWCP), and the PA. To clarify, the PWCP is the water control plan that was in place prior to the 2004 revision of the Master Manual and is the plan that was used for comparison purposes in all previous EISs. The CWCP is the plan that is currently in the 2004 Master Manual. The baseline (0.0) in the figure depicts the flood control benefits provided for the PWCP. The MAX bar indicates the maximum percent change from the benefits provided with the PWCP for the spring pulse alternatives evaluated in the FEIS. Correspondingly, the MIN bar indicates the minimum percent change. Flood control benefits under the CWCP did not change from the PWCP. While the relative change in benefits provides the best comparison of alternatives, the absolute values are provided in ***Table 5*** at the end of ***Section 4*** of this EA.

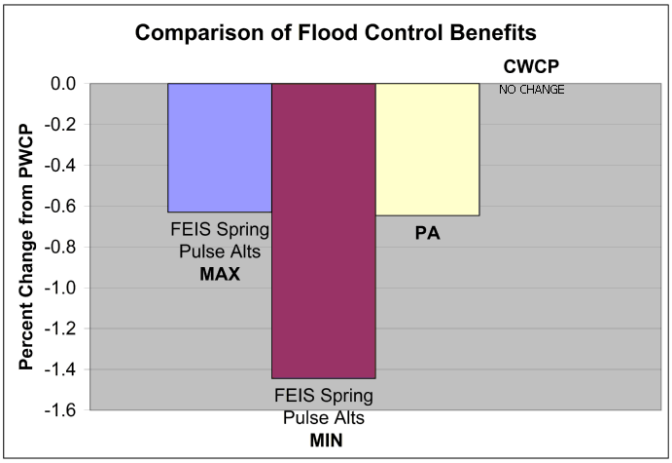


Figure 3 Flood Control

4.3.3 Hydropower – Hydropower benefits are computed for the capacity provided and the energy generated by the hydropower units at the six Missouri River dams. The benefits represent the cost savings provided by generating the electricity at the dams versus building additional generating facilities in the basin. ***Figure 4*** shows the percent change in hydropower benefits from the PWCP. The percent change in hydropower benefits from the PWCP for the PA are similar to those of the CWCP.

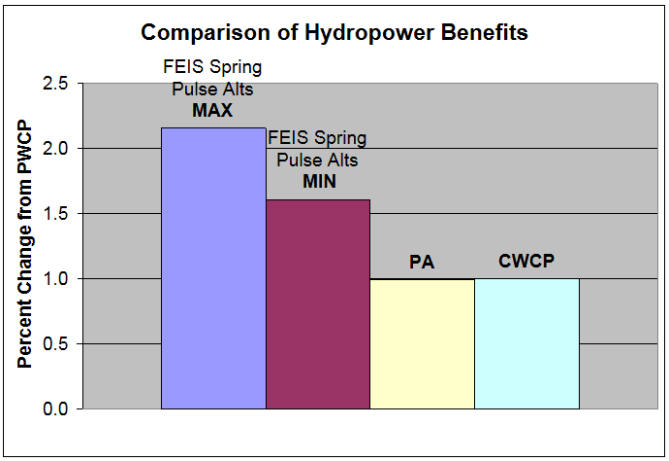


Figure 4 Hydropower

4.3.4 Water Supply – Water supply benefits are computed based on costs for water supply facilities that depend on the Missouri River and the six reservoirs as a direct source of water. Increased costs occur when the users must increase efforts to ensure that the water intakes maintain access as water levels in the reservoirs and river drop, typically due to drought conditions. Powerplants that rely on Missouri River water for cooling also have costs associated with maintaining access and meeting discharge requirements as warmer water is returned to the river. Intake and discharge limitations due to low water levels can result in reduced power generation. The cost of providing replacement power is included in the calculation of water supply benefits. The PA provides water supply benefits that fall within the range of the FEIS spring pulse alternatives, and these benefits are slightly less than those for the CWCP. ***Figure 5*** shows the comparison of the percent change from the PWCP for the FEIS spring pulse alternatives, the PA, and the CWCP.

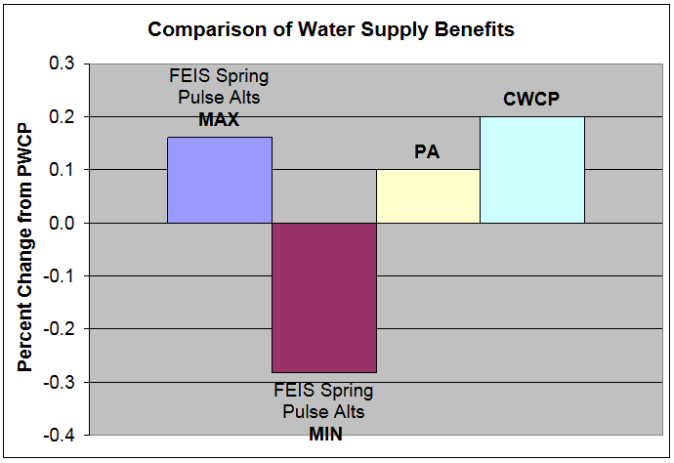


Figure 5 Water Supply

Low reservoir levels during the current drought have contributed to both intake access and water quality problems for intakes on Garrison and Oahe reservoirs, including several Tribal intakes. Problems have also occurred at intakes located on river reaches between and below the System dams due to reduced releases. The problems associated with these intakes are primarily related to intake elevations or river access, rather than inadequate water supply. If the drought continues, reservoir pool levels and releases may continue to fall below their previous historic lows creating the potential for additional intake access

and water quality problems at both river and reservoir intakes. In emergency situations, short-term adjustments to protect human health and safety would be considered to keep intakes operational. The Corps is utilizing a Comprehensive Monitoring Plan to track the access to water at these intakes, see ***Section 5.5*** of this EA.

The potential volume of System storage used for spring pulses in the PA is less than that of the ISP presented in the 2003 Amended BiOp, because of a reduction in the duration of peak releases. For example the ISP, which was to be implemented under median hydroclimatic conditions, would use a net amount of approximately 800,000 acre-feet of storage from the System. With the shorter peak durations included in the PA, both spring pulses would use a net amount of less than 260,000 acre-feet of System storage at median hydroclimatic conditions. The 2003 Amended BiOp also included a provision that allows for a proration of the magnitude of the May pulse based on hydroclimatic conditions, but did not include any specific proration criteria. This allows a reduction in the magnitude of the May pulse during drought periods to reduce potential negative impacts to authorized System project purposes.

4.3.5 Recreation – Recreation benefits are based on the value of various forms of recreation provided on the Missouri River and its six reservoirs. The value is generally based on the amount of money the users are willing to spend to travel to the recreation facilities. Benefits fluctuate as visitation varies. Generally, costs increase during extreme events such as extended droughts and very wet conditions. ***Figure 6*** shows that the percent change from the PWCP for the PA is within the range of FEIS spring pulse alternatives evaluated.

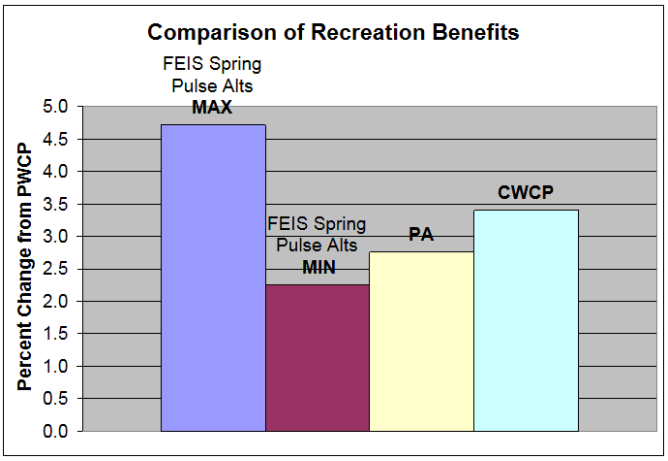


Figure 6 Recreation

4.3.6 Navigation – Navigation benefits on the Missouri River are based on the cost savings of transporting the commodities by barge over the next least costly form of transportation for that commodity. The navigation benefits for the PA do not fall within the range for the FEIS spring pulse alternatives; however, they are positive compared to the PWCP navigation benefits. The navigation benefits for the PA are slightly more than those for the CWCP, as shown in ***Figure 7***.

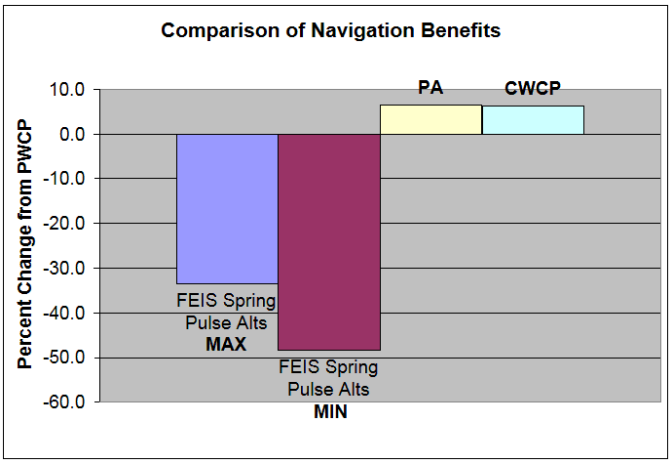


Figure 7 Navigation

4.3.7 Total National Economic Development (NED) – Total NED benefits are a summation of the benefits computed for the five economic uses of flood control, hydropower, water supply, recreation, and navigation. The percent change from the PWCP for the PA is within the range of values calculated for the FEIS spring pulse alternatives. The percent change from the PWCP for the PA is less than that for the CWCP (***Figure 8***).

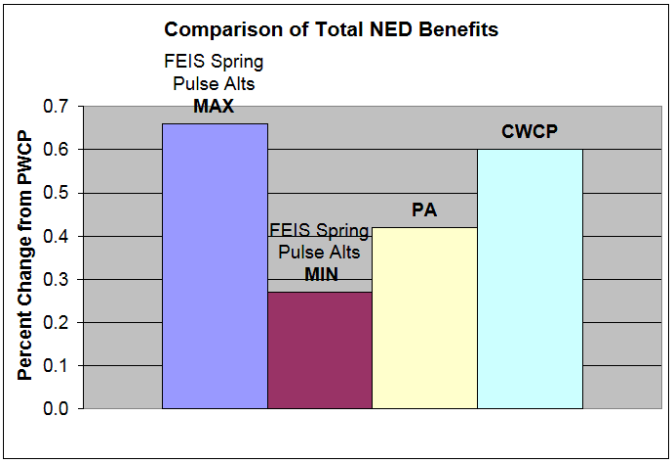


Figure 8 Total NED

4.3.8 Young-of-Year Reservoir Fish Production – The success of young-of-year fish production is a measure of the appropriateness of habitat for reservoir fish. To conduct this analysis, various species of game and forage fish were selected for each reservoir. Details of the method and model used to conduct this analysis can be found in the FEIS. As shown in ***Figure 9***, the percent change from the PWCP in benefits for young-of-year reservoir fish production for the PA is between the maximum and minimum changes calculated for the FEIS spring pulse alternatives and about the same as those for the CWCP.

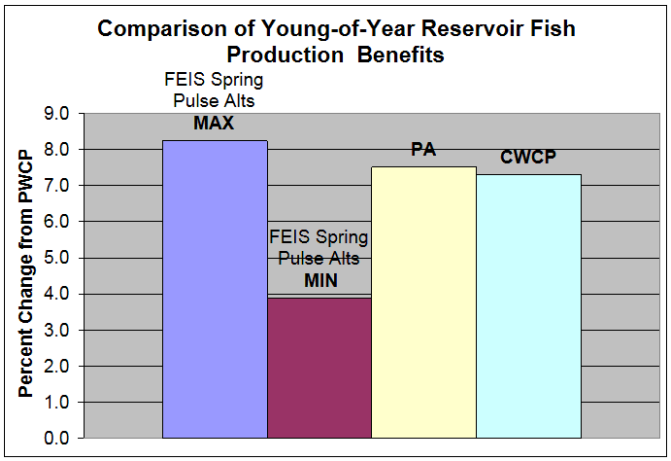


Figure 9 Young-of-Year Reservoir Fish

4.3.9 Reservoir Coldwater Fish Habitat – Reservoir coldwater fish habitat, or cold storage, is the volume of habitat in MAF that meets the temperature and oxygen requirements of the coldwater species in the four larger Missouri River reservoirs (behind Fort Peck, Garrison, Oahe, and Fort Randall Dams). The percent change in benefits from the PWCP for the PA is lower than the values calculated for the FEIS spring pulse alternatives. Therefore, as shown in ***Figure 10***, the impacts of the PA on coldwater reservoir fish habitat is less significant for the PA than for those spring pulse alternatives evaluated for the FEIS.

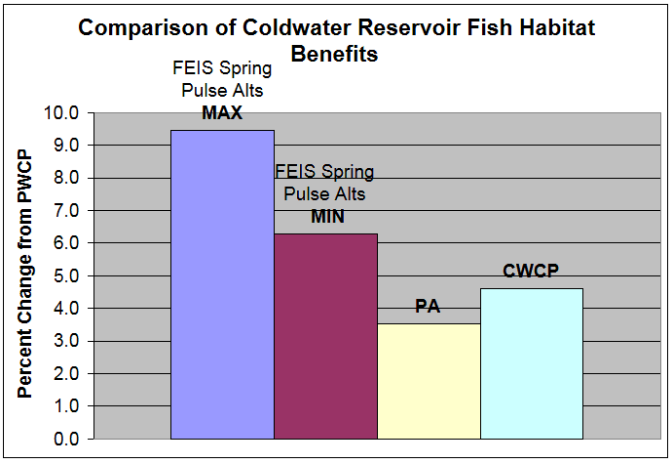


Figure 10 Coldwater Reservoir Fish Habitat

4.3.10 Coldwater River Fish Habitat – Riverine coldwater fish habitat is the number of miles meeting specified temperature and dissolved oxygen requirements extending downstream from Fort Peck and Garrison Dams. ***Figure 11*** shows that impacts of the PA (as a percent change from the benefits of the PWCP) on riverine coldwater fish habitat is less significant than under those spring pulse alternatives evaluated in the FEIS.

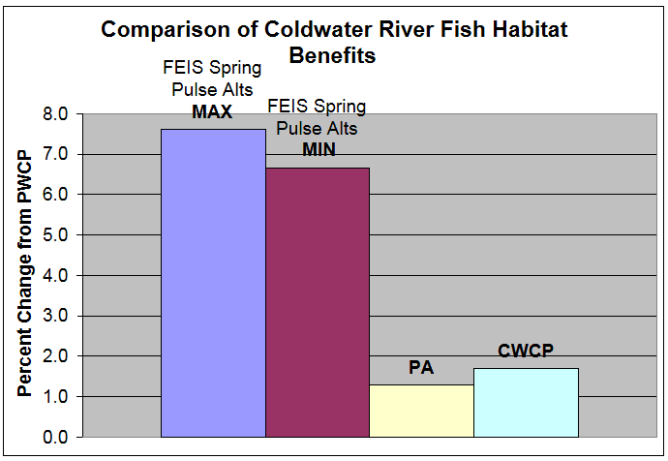


Figure 11 Coldwater River Fish Habitat

4.3.11 River Warmwater Fish Habitat – Warmwater fish habitat is the number of miles of riverine habitat that meet the temperature and oxygen requirements for warmwater fish species. As seen in ***Figure 12***, the impact of the PA on riverine warmwater fish habitat (as a percent change from the benefits of the PWCP) is less significant than that calculated for the FEIS spring pulse alternatives.

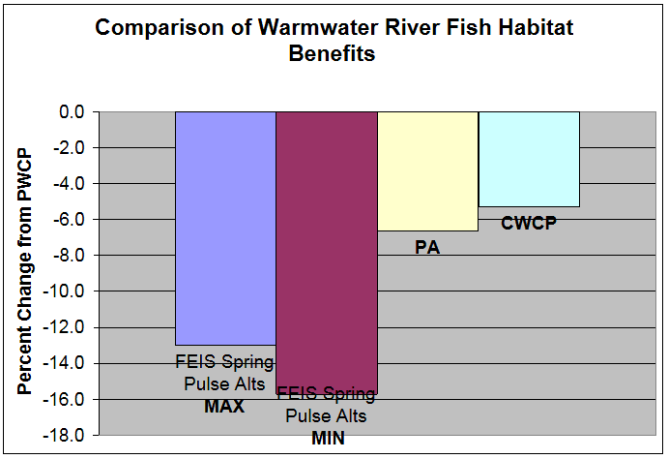


Figure 12 Warmwater River Fish Habitat

4.3.12 Riverine Native Fish Physical Habitat – The success of native riverine fish to produce and recruit was compared using the method described in the FEIS. ***Figure 13*** shows that the percent change in habitat benefits from the PWCP for the PA is within the range calculated for the FEIS spring pulse alternatives.

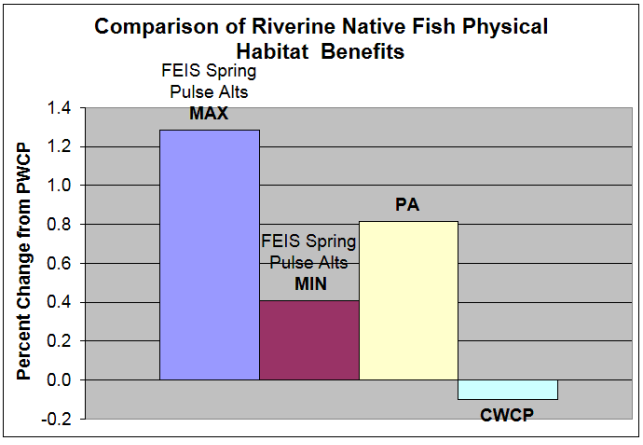


Figure 13 Riverine Native Fish Physical Habitat

4.3.13 Riverine Tern and Plover Habitat – Changes in the availability of bare sandbar habitat for use by the T&E bird species was computed. Details of the calculations used can be found in the FEIS. ***Figure 14*** shows that the percent change in benefits from the PWCP for the PA is less than that calculated for the FEIS spring pulse alternatives. Therefore, the impact of the PA on Tern and Plover habitat benefits is less significant than those spring pulse alternatives modeled in the FEIS.

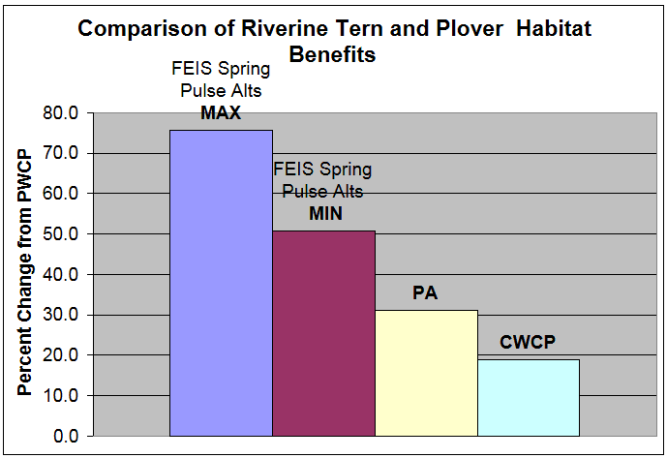


Figure 14 Tern and Plover Habitat

4.3.14 Wetland Habitat – Wetland habitats are representative of the range of vegetation that grows in areas identified as wetlands along the river reaches and the deltas of each reservoir. The impact of the PA on wetland habitat benefits (as a percent change from the benefits of the PWCP) is within the range of impacts calculated for the FEIS spring pulse alternatives, as shown on ***Figure 15***.

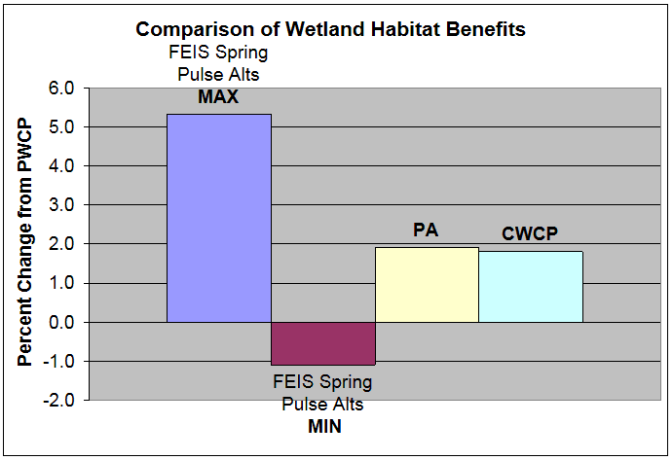


Figure 15 Wetland Habitat

4.3.15 Riparian Habitat – Riparian habitats are representative of the range of vegetation that grows in areas identified as riparian along the river reaches and the deltas of each reservoir. The percent change in riparian habitat benefits from the PWCP for the PA is within the range calculated for the FEIS spring pulse alternatives, as shown in ***Figure 16.***

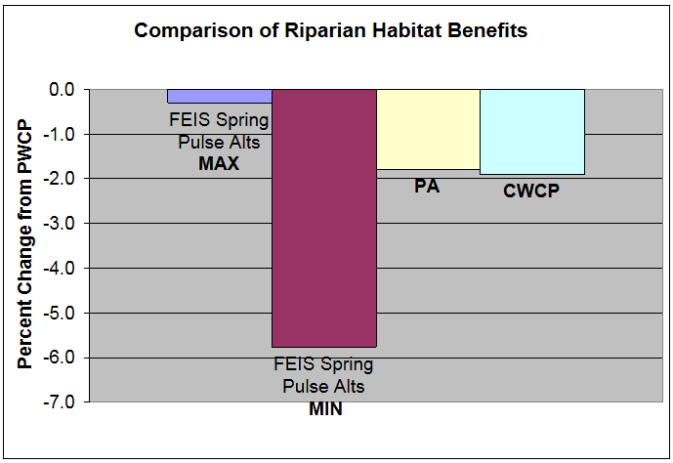


Figure 16 Riparian Habitat Benefits

4.3.16 Historic and Cultural Properties – The effect of reservoir levels on the known historic, cultural, and prehistoric sites around each of the upper three reservoirs was computed based on the potential for erosion of each site. The percent change from the PWCP in impacts to these sites from the PA is less than the change calculated for the FEIS spring pulse alternatives, as shown in ***Figure 17***.

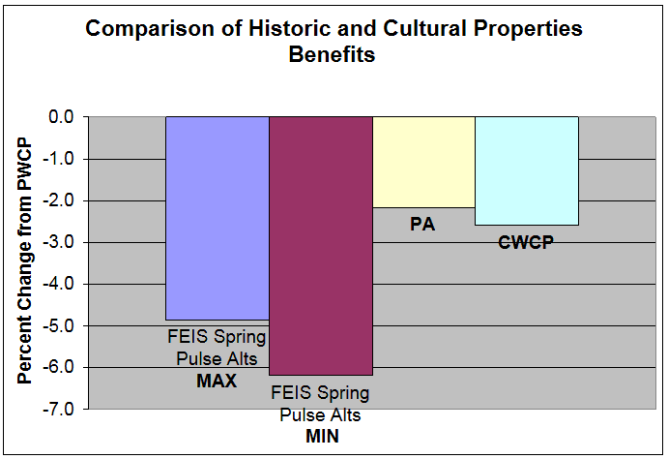


Figure 17 Historic and Cultural Properties

Table 5
IMPACTS OF ALTERNATIVES EVALUATED
Average Annual Values for Modeling Period (1898 – 1997)

Alternative	Flood Control *($Mil)*	Navigation *($Mil)*	Hydro Power *($Mil)*	Water Supply *($Mil)*	Recreation *($Mil)*	Total NED *($Mil)*	YOY *Index*	Cold Reservoir *MAF*
PWCP	410.3	8.80	668.0	610.1	84.7	1781.9	2.00	9.9
CWCP	410.2	9.35	674.3	611.3	87.4	1792.5	2.13	10.3
2000 BIOP	407.2	5.75	679.1	608.6	86.6	1787.2	2.10	10.7
FWS30	406.7	5.46	679.2	608.4	87.7	1787.4	2.08	10.6
GP1528	405.8	5.78	682.4	611.1	88.5	1793.6	2.14	10.7
GP2021	407.7	5.62	678.8	608.5	86.6	1787.2	2.13	10.8
GP1521	406.3	5.86	679.2	608.6	86.6	1786.6	2.13	10.8
GP2028	405.4	5.46	681.7	611.0	88.7	1792.2	2.13	10.7
FWMS	406.2	5.68	682.1	611.1	88.7	1793.7	2.11	10.5
FC0	405.1	4.98	679.5	610.5	88.1	1788.2	2.11	10.6
FC1	404.8	4.90	680.8	610.5	87.8	1788.8	2.12	10.7
FC2	404.4	4.83	681.3	610.7	88.1	1789.4	2.13	10.7
FC3	406.0	4.56	681.7	610.8	88.1	1791.3	2.17	10.8
PA	407.6	9.37	674.6	607.7	87.0	1786.3	2.15	10.2

Table 5
Continued

Alternative	Cold River *Miles*	Warm River *Miles*	Physical Habitat *Index*	T&P Habitat *Acres*	Wetland Habitat *1000 Acres*	Riparian Habitat *1000 Acres*	Historic Cultural *Index*
PWCP	183.6	52.9	81.5	220.5	156.1	108.1	5015
CWCP	185.9	50.4	81.4	304.9	157.6	107.8	4905
2000 BIOP	197.3	45.3	82.2	387.5	154.4	103.1	4722
FWS30	197.6	44.9	82.5	368.1	155.5	101.9	4727
GP1528	196.4	45.3	82.2	356.4	157.5	103.3	4704
GP2021	196.4	44.7	82.1	384.7	158.4	103.6	4739
GP1521	196.3	44.6	81.9	370.0	158.5	103.9	4739
GP2028	197.4	44.6	82.4	353.1	158.4	102.5	4707
FWMS	197.3	46.0	82.3	332.3	157.3	103.0	4771
FC0	196.3	45.6	82.5	373.0	164.4	101.9	4759
FC1	195.9	45.4	82.3	374.4	159.9	102.7	4731
FC2	195.8	44.9	82.1	381.0	161.0	102.9	4743
FC3	196.7	44.6	81.8	387.1	158.1	104.1	4719
PA	185.9	49.4	82.1	289.3	159.1	106.1	4907

5.0 CONSULATION AND COORDINATION

5.1 Plenary Group Process –

In an attempt to develop a bimodal spring pulse plan as required by the 2003 Amended BiOp, the Corps enlisted the assistance of USIECR, a Federal agency with a great amount of experience in similar endeavors. USIECR invited Tribal representatives and members, State representatives, and a wide range of stakeholders to participate in the collaborative spring pulse plan identification process. However, these meetings did not constitute consultation under 36 CFR Part 800, the Programmatic Agreement, or Executive Order 13175 with the 28 affected Tribes. A first step in the collaborative process was to select a contractor to facilitate the discussions and lead the participants to develop a recommendation for the Corps to use in the establishment of a spring pulse plan. The USIECR invited a representative number of participants to help select the facilitators for the process. They unanimously recommended selection of CDR Associates (CDR) to fill that role.

CDR subsequently established a "Plenary Group" that was comprised of more than 50 members, including Tribal representatives and Tribal members, State representatives, and stakeholders. The Plenary Group chose to establish four technical working groups to provide technical assistance in support of its efforts: Socio-Economic; Historical/Cultural/Burial Site; Hydrology/Water Quality; Pallid Sturgeon/Fish and Wildlife. The Plenary Group met four times over a 3-month period in June through August 2005. Meetings of the technical working groups were also held periodically during this period. Issues considered by the plenary and technical working groups included, but were not limited to the following: impacts of a spring pulse on water intakes, water quality, human health, historic and cultural resources, interior drainage, groundwater, flood risk, and erosion; the biological needs of the species; and the need for monitoring historic and cultural resources, biological response, and socio-economic impacts of the spring pulse. Even though the Plenary Group was unable to reach consensus on a total spring pulse plan, it and the technical working groups provided valuable input through CDR and USIECR to the Corps and USFWS related to many of the factors that comprise the PA. ***Attachment 1*** contains lists of Plenary Group members, Technical Working Group members, and schedules of meetings

5.2 Tribal Consultations / Meetings –

American Indian Tribes have a unique relationship with the Federal Government. The Tribes are considered "dependent sovereign nations" and have a government-to government relationship with the Corp and USFWS. The Corps and USFWS also have a "Trust" responsibility to American Indian Tribes to protect Tribal resources. The proposed inclusion of technical criteria in the Master Manual for bimodal spring pulse releases from Gavins Point Dam requires the Corps to conduct government-to-government consultation with basin Tribes and to consider its Trust responsibilities.

The Corps is also required to comply with numerous statutes regarding protection of cultural resources, including the National Historic Preservation Act and Native American Grave Repatriation Act. Construction and Operation of the Missouri River Mainstem Reservoir

System has and will continue to have a negative impact to cultural resources with or without bimodal spring pulse releases from Gavins Point Dam. As referenced in the March 2004 Record of Decision for the Master Manual, the primary vehicle for compliance with impacts to cultural resources is the April 2004 Programmatic Agreement for the regulation and management of the System. This agreement was drafted in consultation with many basin Tribes, the Advisory Council on Historic Preservation, the National Trust for Historic Preservation, and other interested parties. The terms of the Programmatic Agreement stipulates (Stipulation 17) that the Corps consult on AOPs.

While Tribal members and representatives participated in the Plenary Group facilitated process for the bimodal pulse releases conducted by the USIECR and CDR, this process did not fulfill the Corps consultation requirements. In an effort to fulfill consultation requirements, three consultation/ meetings were held to conduct a dialogue on the 2005-2006 AOP and the proposed technical criteria for spring pulse releases from Gavins Point Dam. These meeting were held on January 11, 2006 in Rapid City, South Dakota, January 26, 2006 in Pierre, South Dakota, and on February 23, 2006 in Rapid City, South Dakota. Transcripts of these meetings are available upon request. Tribal concerns regarding the bimodal spring pulse releases center around impacts to water supply, water quality, and impacts to cultural resources and sacred burial sites.

Implementation of the proposed spring pulse technical criteria fall within the historic range of the Corps' regulation of the System and impacts to cultural resources will occur irrespective of the spring pulse releases. This emphasizes the continued importance of following the terms of the Programmatic Agreement. The Corps recognizes that consultation with American Indian Tribes is a process rather than an event and the stringent time constraints for the consultation/ meetings for this PA in order to meet the timeframe established in the 2003 Amended BiOp. Over the next year, the Corps will work collaboratively with basin Tribes to develop an effective consultation processes for the AOP.

5.3 FEIS Public Involvement Process –

5.3.1 Background – Careful consideration was given to the overall public interest and the economic, social, cultural, and environmental effects throughout the 15-year history of the development of the FEIS. A detailed history of public involvement throughout the process can be found in the FEIS, which was completed in March 2004.

5.3.2 Recent History of Public Involvement – On August 31, 2001, the Corps published a Revised Draft Environmental Impact Statement (RDEIS) on the Review and Update of the Master Manual. A 6-month public comment period on the RDEIS began on September 1, 2001, and concluded on February 28, 2002. Twenty Tribal and public workshops and hearings were held at numerous locations throughout the Missouri River basin and at several locations in the Mississippi River basin. Oral, written, and electronic comments were taken until February 28, 2002. Nearly 54,000 comment documents (letters, postcards, faxes, and e-mails) were received. Appendix D of the FEIS contains transcripts of all public hearings and comments received from Tribes, federal agencies, state agencies,

local and municipal entities, non-governmental organizations, businesses, and private citizens. Responses to all comments were included in the FEIS published in March 2004.

Subsequent to the RDEIS, the Corps conducted several additional analyses in order to respond to the numerous comments received and to further analyze impacts to some key resources and uses. The Corps considered the following in the decision process for selection of the FEIS PA:

- Public and Tribal RDEIS comments;
- Tribal input received during government-to-government consultation;
- Additional studies on the Missouri River navigation industry;
- Effects of alternatives on Mississippi River resources;
- Impacts to power rates and thermal generating capacity at risk;
- Results of the new tern and plover habitat modeling for Garrison and Oahe;
- NEPA documentation;
- The National Academy of Sciences (NAS) report entitled "The Missouri River Ecosystem: Exploring the Prospects for Recovery" published in January 2002; and
- USFWS's 2003 Amended BiOp.

To ensure that the FEIS PA was in compliance with the ESA, the Corps and the USFWS reinitiated consultation under Section 7 of the ESA in November 2003. On December 16, 2003, the USFWS provided the Corps the 2003 Amended BiOp, which is an amendment to its November 2000 BiOp on the Missouri River Mainstem Reservoir System, Missouri River Bank Stabilization and Navigation Project and Kansas River Reservoir System. Following publication of the FEIS, interested parties were invited to submit written and electronic comments during the 30-day comment period. Following the comment period and after consideration of the 2003 Amended BiOp and comments received, the Corps issued a Record of Decision (ROD), a revised Master Manual, and began implementation of the new Water Control Plan (which is now referred to as the CWCP).

5.4 Summary of Comments

5.4.1 Introduction – The Draft 2005-2006 AOP and Draft Spring Pulse Water Control Plan Technical Criteria for spring pulses from Gavins Point Dam were released for Tribal and public review and comment on October 24, 2005. Public meetings were held throughout the Missouri River basin the week of November 13, 2005 and the comment period for both the Draft AOP and draft technical criteria extended until December 16, 2005. Key comments on the bimodal spring pulse releases will be discussed in the following paragraphs, with the Corps' response provided within the paragraph.

5.4.2 Potential for Adverse Impacts to Historic and Cultural Properties – There were several comments received on this topic:

5.4.2.1 Lack of Data – One commenter made the point that the FEIS had very little data concerning cultural site preservation and that the data to do the proper analysis is still not available. The signing of the Programmatic Agreement describes the plan to get to the point of compliance with the National Historic Preservation Act (NHPA). By complying with the stipulations in the Programmatic Agreement the Corps will

obtain compliance with NHPA and be able to avoid, minimize or mitigate adverse effects on historic and cultural properties. In addition the commenter stated that sites are eroding daily into the lake with no consideration on how to avoid, minimize or mitigate the adverse impacts. Looking at the data that is available allows for very basic evaluations of impacts to cultural sites. Site locations and horizontal and vertical coordinates are currently based on site inventory hand sketches and contour lines rather than Geographic Positioning System (GPS) coordinates. Several site monitoring and inventory activities have been completed or are underway to provide more accurate GPS location data. One of the objectives of the monitoring plan (***Section 5.5***) is to supplement these efforts and obtain more accurate location coordinates. Therefore the Corps acknowledges that the data used to determine adverse impacts on cultural sites is not as sophisticated as it could be and is working through contracts with Tribal, state and private entities to improve those data. While this process is ongoing the impact analysis that has been done meets minimum standards.

5.4.2.2 Lack of Consultation – Several commenters mentioned that consultation under the Programmatic Agreement, 36 CFR Part 800 or Executive Order 13175, had not been completed for the technical criteria or the AOP. The Corps recognizes it has a responsibility to consult under the Programmatic Agreement, 36 CFR Part 800 and Executive Order 13175. The consultation/meeting process was started late, but began in early January in Rapid City, South Dakota. It was continued at the end of January in Pierre, South Dakota and again in February in Rapid City, South Dakota. The Corps understands that consultation/meeting is an ongoing process and has committed to continue consulting/meeting. In the January meetings, the Corps committed to the pre-decisional involvement of the Tribes in a consultation process that would involve the Tribes early in the AOP development.

5.4.2.3 Avoid Adverse Impacts to Cultural Sites – One commenter mentioned that the Corps needs to look at ways to avoid adverse impacts to cultural sites. This comment was in response to a Corps statement that there was no way to avoid impacting cultural sites while regulating the System. The Corps agrees that it, along with Tribal representatives, needs to investigate and discuss possible ways of avoidance in addition to the minimization and mitigation alternatives. This will be discussed in the consultation process that will be developed and followed for future AOPs.

5.4.2.4 Need Plan to Address Cultural Sites – A commenter mentioned that the Corps does not have a plan on how it will address the adverse impacts to cultural sites and that one is needed before a Spring Pulse could be implemented. The Corps, through the Programmatic Agreement process with input from the Tribes, has developed a draft 5-year plan that is currently being followed. The 5-year plan contains goals and objectives for the program as well as a specific listing of activities that need to be accomplished to bring the Corps into compliance with the Programmatic Agreement and the National Historic Preservation Act. Activities listed include inventory, testing, evaluation and mitigation. The information in the 5-year plan comes directly from the Cultural Resource Management Plans developed for each one of the six System reservoirs. The Corps, in collaboration with the Programmatic Agreement signatories,

is annually reviewing this plan and making modifications as activities are accomplished or conditions change. The monitoring program mentioned in this EA will supplement and assist in accomplishing some of the objectives in the 5-year plan. The Corps acknowledges that the activities in the 5-year plan may not be completed prior to the implementation of the PA but believe that the approach documented is sound and achievable.

5.4.3 Potential for Increased Flooding – Generally, stakeholders downstream of Gavins Point Dam expressed concern over the potential for increased flooding, particularly of agricultural lands. Reduction in flood control benefits was addressed in the FEIS on page 7-101 where it states, "Two alternatives were evaluated in detail to determine the primary factors causing the reduction in flood control benefits. These two alternatives are GP2021 and GP2028 (both with 20,000 cfs spring pulses for a 2-week peak). Even though the spring rise is one of those factors, it was the sole factor in only 1 year … was also a secondary factor in 2 or 3 other years …". The analysis was based on 100 years of data from modeling the period 1898 to 1997 and assumed a full 20,000 cfs increase in the downstream flow limits. While the potential for reduced flood control benefits exists, additional damages occur in relatively few years (4 or less years out of 100) due to the spring pulse. An analysis completed in November 2005 to determine how often the spring pulse would be a factor for increased flood damages found that, with no increase in the downstream flow limits, the spring pulse releases were a factor in no years out of 107 years (1898 – 2004) in the Nebraska City and Hermann reaches and in 1 year in the St. Joseph and Boonville reaches. The spring pulse evaluated was a 20,000 cfs, 2-day peak spring pulse in median System storage years prorated down to 10,000 cfs in years with 31 MAF of System storage or less (about equal to the magnitude of pulses included in the PA). An analysis based on 107 years of data addresses an extremely wide range of situations; however, the Corps acknowledges that there could be a situation that occurs in the future that has not occurred in the 107 years modeled.

5.4.4 Interior Drainage will be Adversely Affected – Commenters noted that the spring pulse evaluated in the FEIS indicated a 23 to 36 percent increase in interior drainage crop damages in the Nebraska City reach. The analysis documented in the FEIS was based on a spring pulse with a longer duration (2 transitional weeks and 2 weeks at full magnitude) and higher downstream flow limits (15,000 to 20,000 cfs higher than those under the no-increase criterion included in the PA). The shorter duration of the spring pulse included in the PA in combination with the downstream flow limits in Table 1 would have much less impact on interior drainage. To further address this issue, a drainage impedance analysis was completed in November 2005. This analysis looked at the number of years a threshold stage was exceeded at five locations along the river below Gavins Point Dam (Omaha, Nebraska City, St. Joseph, Boonville, and Hermann). The threshold stage was provided for the Omaha reach during testimony on the AOP in Omaha in November and the threshold stage for the other four locations was provided at the Plenary Group meeting in Omaha in July. The number of years these stages (converted to flows for the analysis) were exceeded was determined for the 2004 Master Manual WCP and three alternatives, one with no increase in downstream flow limits, one with a minimum increase, and one with a full increase (as was modeled for most of the FEIS spring pulse alternatives). For

the no-increase alternative, the analysis showed that the threshold stage would occur from 1 year less than the 2004 Master Manual WCP at Hermann to 7 years more at Omaha and St. Joseph. An increase of 1 foot over the threshold stage occurred in zero years for Omaha, Boonville, and Hermann to 7 years at Nebraska City. An increase of 2 feet over the threshold stage occurred in 1 year less at Boonville to 3 years more at Hermann. This analysis was also based on 107 years of data.

5.4.5 Coverage for Crop Insurance – A new concern surfaced during the Draft AOP and spring pulse technical criteria comment period. The Department of Agriculture had responded to an inquiry regarding the coverage for flood insurance during the spring pulse. The Corps has been working with representatives from that agency to help them better understand the regulation of the System to serve the Congressionally authorized project purposes, fulfill the Corps' Tribal Trust and Treaty obligations, and comply with ESA so that they can make an informed decision about how crop insurance coverage may or may not be affected by the spring pulse.

5.4.6 Crop Damages – One landowner commented with a description of how a spring pulse in 2005 would have adversely affected him. He had crop damage without the spring pulse; however, up to 400 acres could have been damaged in his estimation with a spring pulse. The above analysis determined that there will be occurrences such as the one described by the commenter; however, they are expected to be relatively infrequent, as demonstrated with the results presented in the previous paragraph.

5.4.7 Increase in Downstream Flow Limits – Some comments pointed out a misunderstanding about the flexibility included in the draft technical criteria. One commenter pointed out that the minimum increase of the downstream flow limits by 8,000 cfs really would be 28,000 cfs for a 20,000 cfs spring pulse. This is not the case, if the PA had included the flexibility to minimally increase the downstream flow limits, which it did not, it would have only been an increase of 8,000 cfs. However, the modeling for most of the FEIS alternatives did assume an increase in the downstream flow limits equal to the full magnitude of the spring pulse. In other words, a 20,000 cfs spring pulse FEIS alternative included the assumption that the downstream flow limits will be increased by 20,000 cfs. The PA does not increase the downstream flow limits at all, even though the magnitude of the May spring pulse could range from 9,000 to 20,000 cfs, depending on System storage and forecasted runoff on May 1.

5.4.8 Impacts Modeling should use Daily Data – Another comment indicated that impacts modeling should be based on daily data not average monthly data or some normal period set of data. Most of the modeling that was conducted to better understand impacts associated with the spring pulses utilized either 100 years (1898-1997) or 107 years (1898-2004) of daily data. For example, the flood control and drainage impediment studies discussed above were based on 107 years of daily data. The data presented in the 2005-2006 AOP on river flows, reservoir levels, power generation, etc. is based on monthly and semi-monthly normalized data to provide some perspective on a range of potential runoffs and associated System regulation for 2006.

5.4.9 Stage Increases – Another commenter questioned information provided by the Corps regarding stage changes. The commenter stated that a 1.3-foot change at Hermann at "normal" river flows would not be less at higher flows near or above flood stage due to the impingement of the channel on one side by the bluff line and a levee close to the river on the other side. Review of the Hermann gage data showed that a 20,000 cfs increase in flow at two different base levels would result in different stage increases. For an increase from 50,000 to 70,000 cfs, the stage difference would be 3.0 feet. For an increase from 150,000 to 170,000 cfs, the stage difference would be 1.6 feet.

5.4.10 Draft Flexibility Criteria – Some of the comments focused on the draft flexibility criteria released with the Draft AOP. The PA does not include provisions for future flexibility.

5.4.11 Impacts to Navigation – Concerns for adverse navigation impacts were raised in some comments, associated with the potential for shorter season length. The additional water released for the spring pulse may result in a slightly shorter navigation season in some years, but in many years would not impact the season length at all. For example, in the 2005-2006 AOP the addition of the spring pulse reduces the navigation season length one additional day for the upper quartile and upper decile runoff conditions, but does not change the navigation season length under median runoff conditions. This potential for a minimal change in season length should have a minimal effect on navigation on both the Missouri and Mississippi Rivers. One individual raised the concern that the high water would be an impediment to navigation. The current downstream flow limits constrain the magnitude of the spring pulse releases; therefore, adverse impacts to navigation due to high river flows will be minimal or non-existent. Master Manual FEIS modeling for navigation indicated additional benefits for some releases greater than full service to Missouri River navigation during the spring pulse periods.

5.4.12 Need for Monitoring – The need for various types of monitoring surfaced in many of the comments. Extensive monitoring is being conducted for the 2006 spring pulses, as discussed in ***Section 5.5*** of this EA.

5.4.13 "Take" of Protected Birds – Potential "take" of the two listed bird species, the piping plover and the interior least tern, has been identified as a concern by several commenters. The PA includes a provision that the timing of the May spring pulse will be set after consideration of potential take. This may mean that the timing cannot be based solely on river temperature downstream of Gavins Point Dam, as some commenters suggested.

5.4.14 Questions on Science – One commenter questioned the need for a spring pulse for pallid sturgeon based on information on successful pallid sturgeon recruitment (making it from the egg and subsequent larval stage to the next year/s). The comment stated that there is no spring rise in flows on the Mississippi River and yet recruitment occurs. The 2003 Amended BiOp states on page 232 that "The Service has determined restoration of a normalized river hydrograph below Gavins Point Dam is still necessary to avoid jeopardizing the continued existence of the pallid sturgeon."

5.4.15 Reservoir Levels – Generally, upper basin commenters were concerned over the potential for even lower reservoir levels following the additional releases for the spring pulses. One commenter acknowledged that the annual decline will be as low as 1 inch if the full spring pulse effect is distributed among the upper three reservoirs, but that even 1 inch can be critical when the potential for adverse water intake access can occur. The Corps will be closely monitoring the critical intakes during drought times. Adjustments in the levels of the upper three, large reservoirs may be possible to limit adverse effects to intakes. Due to the proration of the spring pulse, the volume of water used for the bimodal spring pulses during drought times could be less than the 160,000 acre-feet that was used to calculate the 1-inch value. Staging water in Fort Randall is also being considered to limit any adverse effects to water intakes.

5.4.16 Magnitude of Spring Pulse Releases in Wet Years – One comment questioned why the greatest spring pulses were to occur in the wettest years. The greatest magnitude spring pulse would be planned in years when the amount of water in System storage is at "normal" levels and a large upper basin runoff is forecasted. The magnitude could be as high as 20,000 cfs above full service for the May pulse in this situation. This release would not be made, however, if the lower basin were also very wet. In this case, the downstream flow limits would prevent implementation of the spring pulse. Spring pulse releases would be reduced or eliminated if the Missouri River flow forecast, which includes radar-detected and forecasted precipitation, indicates that any of the downstream flow limits were to be exceeded.

5.4.17 NEPA Documentation – The need for additional EIS documentation was raised by many commenters. This EA is the appropriate environmental impacts documentation for the changes currently being made to the Master Manual for the bimodal spring pulse releases included in the PA.

5.4.18 Comments in Support of Bimodal Spring Pulse – Many comments, including the majority of the email comments, were received in support of the Gavins Point Dam spring pulse releases. Several commenters said that the spring pulse included in the Draft 2005-2006 AOP and draft spring pulse technical criteria was a good start towards understanding the benefits of the spring pulses. The PA includes the provisions for bimodal Gavins Point Dam spring pulse releases, but does not include the flexibility proposed in the draft spring pulse technical criteria.

5.5 Monitoring Plan –

5.5.1 Introduction – The Plenary Group and its technical working groups recognized the importance of monitoring and evaluation of the spring pulse releases and made several recommendations to the Corps and USFWS in that regard. The Corps, with the assistance of the technical working groups, have developed a comprehensive plan to monitor and evaluate the spring pulse releases included in the PA. The plan addresses three areas of concern:

- Biological Impacts,
- Potential Impacts to Historic and Cultural Properties, and

- Effects of the Spring Pulse on Internal Drainage/Groundwater.

The results from these monitoring efforts will be analyzed at the conclusion of each spring pulse period and used, along with other pertinent information, to determine the effectiveness of the PA. All information collected and the accompanying analyses will be made available to interested parties.

5.5.2 Biological Monitoring Activities – To evaluate the physical and biological responses to spring pulse releases, the Corps established a group of subject-matter experts to develop the study design. The group developed a 2006 study plan that will assess pallid sturgeon and habitat responses to the planned flow event. The plan addresses the priorities of the Plenary Group's technical working groups and the research priorities identified in "Research and Assessment Needs for Pallid Sturgeon Recovery in the Missouri River", prepared by the Ruckelshaus Institute of Environment and Natural Resources. Through the adaptive management process the biological monitoring plan for the spring pulse releases will be reviewed and updated annually or as needed.

The plan will assess sturgeon movement, staging, and spawning through the use of telemetry, mark recapture and site specific monitoring. Physiological information will be collected from captured sturgeon to assess reproductive stage and provide information regarding potential linkages to temperature and other environmental characteristics. Egg and larvae sampling will occur at sites identified by telemetry and site-specific sampling crews to assess the success of potential spawning.

Habitat use and availability will be assessed using hydro-acoustic mapping techniques that capture depth, velocity, and substrate information at sites identified as potential staging and spawning sites by the telemetry and site-specific crews. Sediment transport, water quality information, and substrate quality information will also be gathered to improve the understanding of the affects of flow change on habitat and water quality.

5.5.3 Historic and Cultural Properties Monitoring – As acknowledged in the 2004 Programmatic Agreement for the Operation and Management of the Missouri River Mainstem System (Programmatic Agreement), fluctuation of water levels in the reservoirs has erosive effects under normal operating conditions. With the recent drought conditions, additional cultural, historical, and burial sites have become exposed in the reservoirs as the waters have receded.

5.5.3.1 Programmatic Agreement – The Programmatic Agreement was undertaken to provide a process to address "…the potential adverse effects of complex projects or multiple undertakings…" The intent of the Programmatic Agreement is to collaboratively develop a preservation program that would avoid, minimize, and/or mitigate the adverse effects of the System regulation. Forecasts for the next several years indicate that System storage will be below normal levels and pool elevation at the upper three reservoirs will remain low, continuing to expose cultural sites along the shorelines.

5.5.3.2 Monitoring Plan – To accomplish the monitoring effort the Corps plans to conduct real-time monitoring of cultural sites that have the potential to be impacted by the implementation of the Gavins Point Dam spring pulse. The 2006 monitoring plan for implementation is contained in the draft Monitoring and Enforcement Plan, dated April 2005. To complete the activities listed in the plan the Corps will follow a three step process.

- Phase 1, Monitor Training – First the personnel that have been identified to participate in this effort will complete a monitor training class.

- Phase 2, Real Time Monitoring – Upon completion of this training the on-site monitoring will take place. An initial contingent of ten people will begin monitoring at strategic locations throughout the basin. It is expected that the initial group will include both Corps personnel and Tribal monitors. At approximately the implementation of the second Spring Pulse, additional personnel will be brought on to the team to monitor secondary and accumulative effects of the Pulse and/or the normal regulation of the System. It is expected that a total of 25 people will be scheduled to complete this effort, which is expected to last until September 2006. In September, the crew will be reduced to the initial ten people that began in the spring. The requirements of this ten-member crew will be to continue the data collection through a full cycle of the AOP implementation and then begin data dissemination and preparation for analysis.

- Phase 3, Impact Analysis – The final phase of will be impact determination. It is planned that this phase would not begin until Fiscal Year 2007 where geomorphologic analysis, data modeling, and report writing would be completed.

Through the adaptive management process the historic and cultural properties monitoring plan for the spring pulse will be reviewed and updated annually or as needed.

5.5.4 Interior Drainage – Interior drainage monitoring and evaluation will be conducted in 2006 to further assess potential impacts that the spring pulse releases may have on interior drainage below Gavins Point Dam. The study will cover the entire river reach from Gavins Point Dam to the mouth of the Missouri River at St. Louis. The intent of the study is to supplement existing information on potential impacts to interior drainage from the increased water levels resulting from the spring pulse releases.

Data will be collected along both banks of the river at various areas. The data will include:

- Upstream and downstream flow lines of drainage structures,
- River stage conditions prior to, during, and after the spring pulse releases, and
- Aerial photography prior to, during, and following the spring pulse releases.

The collected information will be entered into a database and validated by survey. As additional information is collected, it will be added to the database in an effort to create a

comprehensive listing of all interior drainage structures between Gavins Point Dam and St. Louis. This information will be used for future monitoring efforts and will also provide for more precise predictions of the results of future events.

The Corps is currently working with the U.S. Geological Survey to install continuous data collectors at an existing well at each of five locations. These wells were installed as part of the Master Manual FEIS groundwater impacts studies.

Through the adaptive management process the interior drainage monitoring plan for the spring pulse will be reviewed and updated annually or as needed.

6.0 CONCLUSION

This Environmental Assessment (EA) has addressed the purpose and need for the bimodal spring pulse releases and compares the environmental impacts of the technical criteria included in the PA with a range of alternative spring pulse proposals that were addressed in a prior environmental analysis conducted by the Corps, the Final Environmental Impact Statement, Missouri River Master Manual Water Control Manual, Review and Update (FEIS). This EA is tiered to and linked to the FEIS. The analysis contained in this EA compares the impacts of the bimodal spring pulse technical criteria identified with the PA to the impacts of the spring pulse alternatives evaluated in the FEIS. The comparative analysis in this EA show that the impacts of the PA fall well within the impacts for those spring rise alternatives included in the FEIS including but not limited to flood control, hydropower, Tribal cultural and religious sites, recreation, navigation, water supply, and NED benefits. In addition, this EA also includes a comparison of the PA flow regime resulting from the bimodal spring pulse technical criteria with that of the flow regime since regulation of the System began. Based upon these comparisons the agency concludes that that the environmental impacts of the PA are within the range impacts shown for the spring pulse alternatives previously considered in the FEIS. In addition, the Corps' review of the flows resulting from the bimodal spring pulse technical criteria shows that they are well within the range of historical operations for the System. Based upon these comparisons and the analysis performed in the EA, no significant adverse impacts to the natural or human environment beyond those previously presented in the FEIS for the spring rise alternatives will result from implementation of the PA. Therefore, this EA concludes that there are no new significant environmental impacts of the proposed action that have not been evaluated in the FEIS and that warrant the preparation of a Supplement to the Final Environmental Impact Statement prior to implementation of the proposed action.

/ Signed /

Gregg F. Martin
Brigadier General, U.S. Army
Division Commander

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2000 Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Banki Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System, U.S. Fish and Wildlife Service, 2000

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Attachment 1

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Source: U.S. Institute for Environmental Conflict Resolution

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Plenary Group Meeting Dates and Locations (2005)

Meeting	Dates	Location
Plenary Group Meeting I	June 1 (1:00 pm - 6:00 pm) June 2 (8:00 am - 3:00 pm)	*Missouri Western State University Student Union* *4525 Downs Dr.* *St. Joseph, MO 64507*
Plenary Group II	June 29 (1:00 pm - 5:30 pm) June 30 (8:00 am - 4:00 pm)	*100 N. Bismarck Expressway* *Bismarck, ND 58501*
Plenary Group Meeting III (with Technical Group report out)	July 26 (9:00 am - 5:00 pm) July 27 (8:00 am - 5:00 pm) July 28 (8:00 am - 4:00 pm)	*National Park Service* *Mid-West Regional Office* *601 Riverfront Drive* *Omaha, NE 68102*
Plenary Group Meeting IV	August 19 (8:00 am - 5:00 pm)	*Best Western Ramkota Hotel Sioux Falls* *3200 W. Maple* *Sioux Falls, SD 57107*

Technical Working Group Meeting Dates and Locations (2005)

Meeting	Dates	Location
Technical Group Meeting I	June 8 (1:00 pm - 5:30 pm) June 9 (8:00 am - 3:00 pm)	*Federal Building at Ft. Snelling,* *1 Federal Dr.* *Ft. Snelling, MN 55111*
Technical Group Meeting II	June 28 (8:00 am - 5:30 pm) June 29 (8:00 am - noon) (immediately preceding Plenary Group Meeting)	*North Dakota Fish & Game* *100 N. Bismarck Expressway* *Bismarck, ND 58501*
Technical Group Meeting III	July 20 (9:00 am - 5:00 pm) July 21 (9:00 am - 4:00 pm)	*Hilton Omaha* *1001 Cass Street* *Omaha, NE 68102*

Technical Working Groups

Hydrology and Water Quality Issues

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- Bob Riehl, Western Area Power Administration
- Bruce Englehardt, North Dakota State Water Commission
- Carlyle Ducheneaux, Cheyenne River Sioux Tribe
- Dave Busse, US Army Corp of Engineers
- David Barfield, Kansas Division of Water Resources
- Deb Madison, Assiniboine & Sioux Tribes of Fort Peck
- Don Jorgenson, Missouri River Technical Group
- Jeff Shafer, Nebraska Department of Natural Resources
- Jim Stone, Yankton Sioux Tribe
- Joan Stemler, US Army Corps of Engineers
- Jody Farhat, US Army Corps of Engineers
- Joe Gibbs, Missouri Levee & Drainage District Association
- John Childs, South Dakota, City of Pierre
- John Drew, Missouri Department of Natural Resources
- John Shadle, Nebraska Public Power District
- Mark Rath, South Dakota Department of Environment and Natural Resources
- Mike LeValley, US Fish & Wildlife Services
- Mike Sauer, North Dakota Health Dept
- Paul Danks, Three Affiliated Tribes
- Rick Inglis, National Park Service
- Robert L. Pearce, US Army Corps of Engineers, ret. (unconfirmed)
- Roger Collins, US Fish and Wildlife Service
- Roy McAllister, US Army Corps of Engineers
- Tom Christensen, Basin Electric Power Corp.
- Tyler Cole, National Park Service
- Wayne Nelson-Stastny, South Dakota Game, Fish & Parks
- Wayne Stancill, US Fish & Wildlife Services

Resources to the Working Group

- Robb Jacobson, US Geological Survey
- Dr. David Galat, US Geological Survey
- Dale Blevins, US Geological Survey

Pallid Sturgeon / Fish and Wildlife

- Bill Beacom, Passenger Vessel Association
- Brian Canaday, Missouri Department of Conservation
- Cliff Johnson, Yankton Sioux Tribe
- Craig Fleming, US Army Corps of Engineers
- Deb Madison, Assiniboine & Sioux tribes of Fort Peck
- Don Jorgenson, Missouri River Technical Group
- Doug C. Latka, US Army Corps of Engineers
- Gene Zuerlein, Nebraska Game & Parks
- Gerald Mestl, Nebraska Game & Fish
- Jane Ledwin, US Fish & Wildlife Service
- Jason Skold, The Nature Conservancy
- Jerry Big Eagle, Cheyenne River Sioux Tribe
- Jim Jennings, Nebraska Public Power District
- John Shadle, Nebraska Public Power District
- Karen Rouse, Missouri Department of Natural Resources
- Mark Drobish, US Army Corps of Engineers
- Mark Wildhaber, US Geological Survey
- Mike Ruggles, Montana Fish, Wildlife & Parks
- Nick Stas, Western Area Power Administration
    - *Alternate:* Dirk Shulund, Western Area Power Administration
- Pat Cassidy, Kansas City Board of Public Utilities
- Paul Danks, Three Affiliated Tribes
- Rocky Plettner, Nebraska Public Power District
- Steve Krentz, US Fish & Wildlife Service
- Stephen Wilson, National Park Service
- Tracy Hill, US Fish & Wildlife Service
- Wyatt Doyle, US Fish & Wildlife Service

Resources to the Working Group

- Mike Parsley, US Geological Survey
- Aaron DeLonay, US Geological Survey
- Dr. David Galat, US Geological Survey
- Mike Mac, US Geological Survey
- Mike Olson, US Fish & Wildlife Service
- Patrick Braaten, US Geological Survey
- Robb Jacobson, US Geological Survey

Socio-Economic Issues

- Bill Jackson, Agri-Services
- Bob Bacon, Coalition to Protect the Missouri River
- Carl Fourstar, Assiniboine & Sioux Tribes of Fort Peck
- Darla Helms, Western Area Power Administration
- David Sieck, Iowa Corn Growers Association
- Deb Madison, Assiniboine & Sioux Tribes of Fort Peck
- Don (Skip) Meisner, Sioux City
- Ed Ravington, Cheyenne River Sioux Tribe
- Garland Erbele, South Dakota Department of Environment and Natural Resources
- Jim Peterson, Missouri River Bank Stabilization Association
- Joe Gibbs, Missouri Levee & Drainage District Association
- Mike Swenson, US Army Corps of Engineers
- Nick Stas, Western Area Power Administration
- Pat Fridgen, North Dakota State Water Commission
- Paul Danks, MHA NationThree Affiliated Tribes
- Paul Gross, Missouri Corn Growers Association
- Rebecca Kidder, Cheyenne River Sioux Tribe
- Roy McAllister, US Army Corps of Engineers
- Seth Meyer, Food and Agricultural Policy Research Institute, University of Missouri
- Stan Swellenbach, City of Pierre
- Tim Owens, Nebraska Public Power District
- Tom Christensen, Basin Electric Power Corp.
- Tom Graves, Mid-West Electric Consumers Association
- Wayne Nelson-Stastny, South Dakota Department of Environment and Natural Resources
- Wayne Werkmeister, National Park Service

Historical/Cultural and Burial Sites Issues

- Albert LeBeau, Cheyenne River Sioux Tribe
- Antoine Provost, Omaha Tribe of Nebraska
- Byron Olson, Standing Rock Sioux Tribe
- Carl Fourstar, Assiniboine & Sioux Tribes of Fort Peck
- Dave Kluth, Western Area Power Administration
- Dawnette Owens, Mni-Sose Intertribal Water Rights Coalition, Inc.
- Don Stevens, National Park Service
- Elgin Crows Breast, Three Affiliated Tribes
- Fern Swenson, North Dakota Historic Preservation Division
- Jay Vogt, South Dakota State Historic Preservation Office
- Jim Berkley, Environmental Protection Agency
- Joe Gibbs, Missouri Levee & Drainage District Association
- Joel Ames, US Army Corps of Engineers
- Larry Janis, US Army Corps of Engineers (unconfirmed)
- Merl Paaverud, North Dakota State Historic Preservation Office
- Paige Hoskinson, South Dakota Review & Compliance
- Pemina Yellow Bird, MHA Nation
- Scott Jones, Lower Brule Sioux Tribe
- Stan Wilmoth, Montana State Historic Preservation Office
- Stephen Rogers, South Dakota State Historic Preservation Office
- Terrance Veo, Cheyenne River Sioux Tribe
- Terry Steinacher, Nebraska State Historic Preservation Office
- Tex Hall, Three Affiliated Tribes
- TBD, IA State SHPO
- TBD, KS State SHPO
- TBD, MO State SHPO