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U.S. Fish and Wildlife Service 2003 Amendment to the 2000 Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System

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EXECUTIVE SUMMARY

U.S. FISH AND WILDLIFE SERVICE 2003 AMENDMENT TO THE 2000 BIOLOGICAL
OPINION
ON THE
OPERATION OF THE MISSOURI RIVER MAIN STEM RESERVOIR SYSTEM,
OPERATION AND MAINTENANCE OF THE MISSOURI RIVER BANK STABILIZATION
AND NAVIGATION PROJECT,
AND
OPERATION OF THE KANSAS RIVER RESERVOIR SYSTEM

Introduction

In 1989, the U.S. Army Corps of Engineers (Corps) initiated consultation with the U.S. Fish and Wildlife Service (Service) regarding operation of the Missouri River Main Stem Reservoir System. The species covered were the endangered Interior least tern (*Sterna antillarum*), threatened Northern Great Plains piping plover (*Charadrius melodus*), and the endangered bald eagle (*Haliaeetus leucocephalus*). Subsequently, the pallid sturgeon (*Scaphirhynchus alba*) was listed as endangered in 1990. The bald eagle is now a threatened species proposed for delisting.

Consultation between the Corps and the Service in 2000 covered operations of the Missouri and Kansas Rivers as well as the Missouri River Bank Stabilization and Navigation Project. The 2000 Biological Opinion found that the actions proposed by the Corps would jeopardize the Interior least tern, pallid sturgeon and piping plover, but would not jeopardize the bald eagle. With the intent of precluding jeopardy to the species, the Service provided a Reasonable and Prudent Alternative (RPA).

Because of new data on mortality of terns and plovers, the 2002 designation of critical habitat for the piping plover, and new information on RPA element II, on November 3, 2003, the Corps requested reinitiation of formal consultation. On November 10, 2003, the Service accepted the Biological Assessment and started formal consultation.

In the Biological Assessment, the Corps accepted most elements from the RPA in the 2000 Biological Opinion but proposed replacing the element that required spring and summer flows. In addition, the Corps proposed a modified drought conservation plan, Gavins Point Dam summer releases, accelerated construction of shallow water habitat, pallid sturgeon hatchery improvements, accelerated pallid sturgeon brood stock collection, and adaptive management (including research, monitoring and evaluation, and flow tests).

The Service reviewed the Corps proposed actions, the new information, and the actions in the 2000 Biological Opinion being implemented by the Corps. It was the Service's responsibility to ensure that the proposed actions do not jeopardize the species by appreciably reducing the likelihood of both the survival and recovery of the listed species in the wild. To make the assessment, the Service reviewed the new information, current status of the species, the proposed and ongoing actions, and the adverse and beneficial effects the actions would likely have on the species.

Status of Least Tern

Interior least terns are found over a wide range of the central United States. They nest on a variety of habitats but prefer, and are most successful, on sandbars and islands in rivers. The number of adult least terns has increased since the 2000 Biological Opinion and except for a slight decline in 2002, numbers have increased every year since 1997. In 2003, over 8,000 Interior least terns were counted on the Lower Mississippi River and these terns represent 67% of the total surveyed population. The number of adult terns surveyed on the Arkansas River in Oklahoma, Red River, and Missouri River has increased during the past three years and over 700 terns were using habitat on the Missouri River in 2003. Although a portion of the increase in terns since listing can be attributed to increased survey efforts, in 2003 sufficient habitat existed to support 12,035 terns (a 428 percent increase when compared to 1985).

The Interior Least Tern Recovery Plan set a goal of 7,000 terns maintained for 10 years. While the current estimate of over 12,000 terns greatly exceeds this goal, the recovery plan also set goals for drainages and the number of least terns in all drainage basins has not been reached. The Missouri River recovery goal of 2,100 terns has not been reached.

Overall, habitat may not be a limiting factor but on the Missouri River, current suitable least tern nesting habitat is anticipated to decline in quantity and suitability as sandbar habitat converts to woody vegetation unless scouring flows enhance existing sandbars and create new sandbars. Foraging habitat has declined from historical levels and, in the Missouri River, changes in fish community composition has occurred.

Although the level of production (measured by fledglings/breeding pair) necessary to ensure population stability or growth is not established, the level is likely between 0.5 and 1.0 fledglings/breeding pair. Since 1998, the ratio for terns nesting on the Missouri River has exceeded 1.0 fledglings/breeding pair.

Effects Analysis for Least Terns

Fledge ratios and numbers of nesting terns may decline as nesting habitat continues to decline since the 1997 flood. The Corps' proposal to create habitat through mechanical means and clear existing habitat of vegetation may lessen the rate of habitat decline.

On the Missouri River portion of the action area, an effects analysis indicated that the Corps' new proposed RPA elements are likely to be slightly beneficial to least terns. These new proposed elements do not affect the Kansas River system. Most of the proposed new elements may have a slight positive effect to least terns, with the exception of the summer releases out of Gavins Point Dam, which may have negative effects on least terns. The Fort Peck and Gavins Point segments provide nesting habitat for about 3.4 percent of the current estimated interior least tern population. The negative effects will vary annually and will not result in a complete loss of reproductive output from 3.4 percent of the population.

We used a risk assessment to the Interior least terns from a single catastrophic event on two riverine reaches on the Missouri River. We found up to 36 first year terns, or about 0.003 of the

2003 estimated population, could be lost. While it is highly unlikely that such an event will occur, such an event would not imperil the survival and recovery of the species.

Determination for Interior Least Terns

After reviewing the current status of the Interior least tern, the updated environmental baseline for the action area, the effects of the Corps' new proposed RPA elements, the new information, and the cumulative effects, it is the Service's opinion that the 2000 Biological Opinion RPA, modified by the omission of flow changes and the addition of the proposed new RPA elements, will continue to avoid jeopardizing the continued survival and recovery of the Interior least tern.

The following Reasonable and Prudent Measures are important for minimizing take of Interior least terns:

- Monitor, evaluate and adjust operations to minimize take of Interior least terns,
- Design, construct, and manage created sandbars for nesting Interior least terns, and
- Monitor, evaluate and modify created and rehabilitated sandbars.

Status of the Piping Plover

Northern Great Plains Piping Plovers nest on lakes in prairie habitats in the U.S. and Canada, as well as along the Missouri and other rivers in the United States. International census data in 1991, 1996 and 2001 estimated an overall decline of 14.9 percent in the Northern Great Plains piping plover population over this decade. For the portion of the population in the United States, for the same time period, the decline was 2.5 percent. However, on the Missouri River, numbers of piping plovers increased by nearly 68 percent between 1991 and 2001 and by 460 percent from 1996 through 2001. In this dynamic ecosystem, breeding piping plovers move around to different habitat types from year-to-year depending on habitat conditions.

The goal of the recovery plan was to increase the number of birds in the U.S. Northern Great Plains to 1300 pairs and maintain this number for at least 15 years. Included in the overall goals are 425 pairs of adult piping plovers to be maintained on the Missouri River over a period of 15 years. Since 2001, piping plovers on the Missouri River exceeded this recovery goal and over 600 pairs were on the Missouri River in 2003.

Habitat may not be a factor limiting the recovery of piping plovers. On the Missouri River, piping plovers nest on the shores of reservoirs and on islands and sandbars in the river. The river habitat is declining because scouring flows are needed to build sandbars and keep vegetation from dominating the sandbar habitat.

Effects Analysis for Northern Great Plains Piping Plover

The effects of the modified drought conservation plan, unbalancing of the reservoirs, emergent sandbar creation, Gavins Point Reach Fall Test, Fort Randall Reach Fall Rise Test, Gavins Point

Spring Sandbar Habitat Conditioning Flows, and the Fort Peck Flow Tests would have positive effects to the piping plover. These project modifications would result in increased habitat for the piping plover.

The creation of emergent sandbar habitat should benefit the piping plover by providing nesting and foraging habitat in areas where habitat is decreasing. Impacts of the Corps' alternative RPA elements will be greatest in the reach of the Missouri River below Gavins Point Dam. Summer releases from Gavins Point will result in either a loss of nesting habitat or a loss of nests, eggs, and fledglings. The collective effects should be slightly beneficial to nesting piping plovers.

We also used risk assessment of an unexpected catastrophic event occurring for the Northern Great Plains piping plover that would equally affect four riverine reaches. Up to 49 piping plovers first year terns could be lost, or about 0.017 of the 2001 estimated population. While such an event is highly unlikely and has never been documented, we found that such an event would not imperil the survival and recovery of the species.

Determination for Piping Plovers

After reviewing the current status of the Northern Great Plains population of piping plovers, the updated environmental baseline for the action area, the effects of the Corps' new proposed RPA elements, the new information, and the cumulative effects, it is the Service's opinion that the 2000 Biological Opinion RPA, modified by the omission of flow changes and the addition of the proposed new RPA elements, will continue to avoid jeopardizing the survival and recovery of the Northern Great Plains population of piping plovers.

The following Reasonable and Prudent Measures are important for minimizing take of Northern Great Plains piping plovers:

- Coordinate system monitoring and evaluation with the Service to minimize take of piping plovers,
- Evaluate and implement actions to reduce predation on piping plover nests, chicks, and adults,
- Design, construct, and manage created sandbar habitat in a manner that will be most beneficial for the biological and ecological needs of piping plovers, and
- Develop and implement a program to monitor and evaluate the effectiveness of created sandbars as nesting habitat for piping plovers.

Status of Pallid Sturgeon

The pallid sturgeon is native to the Missouri and Mississippi Rivers and is adapted to the free-flowing, warmwater, turbid habitats that are in a constant state of change. Floodplains, backwaters, chutes, sloughs, islands, sandbars and main channel waters formed the large-river ecosystem that provided habitat for all life stages of pallid sturgeon.

Evidence of reproduction of wild origin pallid sturgeon is lacking. The species is being maintained through artificial propagation programs, particularly in the Upper Missouri River where the sub-population below Fort Peck Dam is predicted to be extirpated by 2018. The status of the species in the Lower Mississippi River is unknown. However, hybridization with the closely related shovelnose sturgeon in the Lower Missouri River and Mississippi River is increasing.

Pallid sturgeon are threatened by many factors, including hybridization, habitat loss and degradation, commercial fishing, and pollution. Entrainment due to dredging operations and towboats may represent a significant threat to the species. The presence of exotic Asian carp has increased dramatically in the Missouri and Mississippi Rivers. These species compete with native river fish for food and habitat and may present a significant long-term threat to the pallid sturgeon.

Effects Analysis for Pallid Sturgeon

Destruction and alteration of big river ecological functions and habitat that was once provided by the Missouri and Mississippi Rivers is believed to be the primary cause of declines in reproduction, growth, and survival of pallid sturgeon. Implementation of the Corps' proposed action will continue to have ongoing, adverse impacts to the pallid sturgeon. In the Upper Missouri River, continued operation of Fort Peck Dam as proposed will continue to significantly impair the reproduction and recruitment of pallid sturgeon in this reach. These same factors affect the production of forage fish which are important to the overall survival of pallid sturgeon.

The Lower Missouri River is impacted by reduced sediment inputs that are important to creating and maintaining the diversity of habitats important for pallid sturgeon reproduction and survival. In addition, the reduction of turbidity has highly altered the river environment, impacting pallid sturgeon capability to forage successfully, increasing competition with other species and making the species more susceptible to predation. The reach of the Lower Missouri River from Gavins Point Dam to Ponca State Park has good habitat for pallid sturgeon. However, the hydrograph in this reach is significantly impacted by the Corps' operations. The lack of a bimodal spring rise in the hydrograph virtually eliminates the possibility of pallid sturgeon spawning and rearing young in this reach.

The proposed accelerated habitat restoration program in the Lower Missouri River will have little benefit to the pallid sturgeon without a concurrent or subsequent change in operations to provide a more normalized hydrograph to (1) provide the spawning cues that are critical for pallid sturgeon reproduction and (2) allow larvae and juveniles to move into shallow water habitat. The reach below Gavins Point Dam is critical for pallid sturgeon reproduction. Without a change in the hydrograph, pallid sturgeon are restricted in the amount of area available for spawning in the Lower Missouri River

Determination for Pallid Sturgeon

The Corps' proposed actions do not provide the more normalized hydrograph and temperature regime critical to pallid sturgeon reproduction and reproductive success in the reaches below Fort Peck and Gavins Point Dams. For this reason, the Corps' actions continue to appreciably reduce the likelihood of both survival and recovery of the species, thus jeopardizing the continued existence of the pallid sturgeon in the wild.

To remove jeopardy to the species, the Service proposed new elements to the Reasonable and Prudent Alternative:

- Conduct, and complete before 2006, a Study to determine the appropriate flow management plan out of Gavins Point Dam to achieve a bimodal spring pulse and summer habitat flow, determine impediments to achieving this flow regime, and develop mitigation measures for these impediments,
- Ensure that the Master Manual and the corresponding NEPA document provide the latitude for the eventual implementation of the appropriate flow management plan out of Gavins Point Dam and Fort Peck Lake,
- During the 2004 Annual Operation period, implement a summer habitat flow at or below 25 Kcfs out of Gavins Point Dam during the July period,
- Use the water savings achieved by implementing a summer habitat flow to begin filling Fort Peck Lake to enable quicker achievement of other critical elements of this RPA,
- Absent the Corps developing a flow management plan, implement the prescribed plan in 2006.
- Implement flow enhancements out of Fort Peck Lake at the first opportunity that system storage and lake level allow,
- Complete a Feasibility Study for constructing a Fort Peck Water Temperature Control Device and implement as appropriate, and
- Determine the necessary habitat components to maximize habitat value under a range of flow regimes.

Summary Comparison of 2000 Reasonable and Prudent Alternative with 2003 Reasonable and Prudent Alternative for Pallid Sturgeon

Pallid Sturgeon Issue / Risk / Hurdle	Conclusions from 2003 Amendment *	Conclusions from 2000 Opinion including differences between opinions
Flow tests at Fort Peck are precluded when reservoir is less than full. The issue is perceived delay in implementation.	Water savings resulting from low flows from Gavin's Point Dam in '04 and '05 should be transferred to Ft. Peck Reservoir to step-up the starting point. We identified Fort Peck Reservoir as the first to receive the benefits of system-unbalancing because we could potentially accelerate the first of the tests.	Recommended long-term flow changes at Fort Peck Dam. These changes were tied to reservoir storage without a timeline for starting.
Long-term water temperature management at Fort Peck Dam. New issue identified through our analysis in 2003.	We recommended that the Corps conduct a feasibility analysis and implement an alternative to address the issue.	Not addressed
Corps B.A. did not support long-term implementation of flow changes at Fort Peck Dam	We recommended that the Corps ensure implementation via long-term NEPA coverage and changes to the Master Manual.	Not as specific in the requirements to modify the Master Manual. The Services understanding was that the 2000 opinion would shape the ultimate selection of the preferred alternative for the Master Manual.
Lack of suitable habitat/flows between Lake Sakakawea and Fort Randall Dam	No recommendation to Corps for any substantial change in management in these reaches	No recommendation to Corps for any substantial change in management in these reaches
Propagation of Pallid Sturgeon. Issue is the perceived long-term reliance on this approach.	We believed that in 2004 and 2005, with the Corps current commitment, we will have an increased ability to meet our short-term needs for pallid stocking. We have expressed our concerns regarding long-term reliance on this option.	Recommended Corps increase commitment to propagation program. Over a ten year period.
Corps removed long-term flow changes from B.A.	Explicitly directs the Corps to modify regulatory underpinnings with Master	Not as specific in the requirements to modify the Master Manual. The Services

	Manual and subsequent NEPA process to include ability to change up to 20kcfs over full service navigation and as low as 21kcfs during summer months. Master Manual and NEPA must ensure implementation of flow change	understanding was that the 2000 opinion would shape the ultimate selection of the preferred alternative for the Master Manual.
Uncertainty with starting point with spring pulse piece	Two step process: 1) Recognizing uncertainty, we provided the Corps the opportunity to work with us to shape the starting point and 2) Absent #1, we prescribed a starting point which included a bimodal rise. Our recommendation also tracks available basin hydrology not the 1 in 3 year pulse recommended in 2000	2000 opinion identified higher peak (51 kcfs), no bimodal rise recommendation, Rise targeted as once every 3 years on average based on available hydrology. Present system storage would preclude a spring rise in '04.
Starting point for summer habitat flow	25 kcfs no less than 30 days beginning as early as June 15th. Corps must document why flows must be increased following 30 days. Recommendation must occur in '04 and '05 or until 1,200 acres of habitat are developed between Sioux City and Omaha. (benefits are fish-focused). This should increase shallow water habitat by 25-30% over existing conditions. Corps ability to implement this flow was demonstrated by flows in '02 and '03.	Stair-stepped flows from 25 to 21 kcfs for 60 days. Annual recommendation. (benefits were bird-focused). Increase in shallow water habitat comparable based on information provided by Dr's Galat and Jacobson.
Risk associated with delayed timing	We recognized that there was extremely limited reproduction occurring. Greater potential for continuity from Missouri River and Mississippi River population. We recognized that if conditions allowed in 2005, a test could proceed prior to completion of a final flow management plan.	2003 starting point for flow change OR when hydrologic conditions allowed. Change may prove to be inconsequential.

Habitat diversity and relationship to flows	Flows and habitat are coupled. The best available science indicates that larvae produced below Gavins Point Dam are adversely impacted by limited habitat between Sioux City and the mouth of the Platte River and associated flows. So Service recommended habitat restoration target Sioux City to Platte reach.	Habitat restoration recommended across the lower river without prioritization of where to restore it first.
Habitat Acres and Corps B.A. description of accelerated development.	Corps proposing to meet prescribed performance standard at the 30 acre figure from 2000 B.O. RPA and implementation schedule therefore no credit given for acceleration	20-30 acres per mile with performance standards identified at 30 acres per mile
Uncertainty associated with implementation of adaptive management as described in the Corps B.A.	Framework pieces of adaptive management developed. Specifically, we described how adaptive management should be framed and how the Corps must seek outside experts to help them transition from the starting point experiments to the eventual Missouri River Recovery Implementation Program process.	Generalized discussion of value of adaptive management. Only items mandated were formation of agency coordination team and collection of additional information.

* details are described in the RPA.

Designated Critical Habitat for the Northern Great Plains Piping Plover

Status of Critical Habitat

In September 2002, critical habitat was designated for the United States portion of the northern Great Plains piping plover breeding population. Critical habitat was not designated in Canada. Critical habitat was designated for about 106,030 acres of habitat on lakes, mostly alkali lakes, in Montana, South Dakota, and North Dakota. About 440 miles of river habitat was designated in Nebraska. On the Missouri River, 77,370 acres associated with Fort Peck Reservoir were designated as were about 438 miles of reservoir habitat and 330 miles of riverine habitat.

An over-riding primary constituent element was the dynamic ecological process that creates and maintains piping plover habitat. This process includes local weather, hydrological conditions and cycles, and geological processes. The reservoir habitat and riverine habitat on the Missouri River had different primary constituent elements. For reservoirs, the primary constituent elements included sparsely vegetated shoreline beaches, peninsulas, and islands composed of sand, gravel or shale, and their interface with the water bodies. On the river, the primary constituent elements were sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and the interface with the river. Overall, the status of critical habitat on the Missouri River is similar to its condition when designated.

Effects Analysis for Critical Habitat

The consultation for critical habitat included the ongoing actions as a result of implementation of the Current Water Control Plan, the actions required by the 2000 Biological Opinion, and the actions proposed by the Corps as a substitute element of the RPA. The Corps' actions were determined to not have an effect on the 106,030 acres of lake habitat. Effects on the critical habitat on rivers in Nebraska would either not effect or slightly beneficial effect the habitat.

The direct effects of the ongoing CWCP actions and the proposed actions were limited to critical habitat designated on 77,370 acres associated with Fort Peck Reservoir, on 438 miles associated with reservoirs along the Missouri River, and on 330 miles of Missouri River habitat. Overall, the ongoing Current Water Control Plan operations are having an adverse effect on the primary constituent elements associated with the river reaches of the Missouri River. Ongoing operations have attenuated the river flows and as a result, there is a lack of sandbar inundation and scouring, which causes a loss of the primary constituent element of sparsely vegetated channel sandbars. Ongoing operations result in flows that erode sandbars. While there is some beneficial effect of lesser magnitude through the movement of sediment and formation and rehabilitation of sandbars, the overall effect is an adverse effect on the primary constituent element of sand and gravel channel sandbars.

The Corps noted that historically, over 98 percent of the least tern and piping plover habitat within the Missouri River has occurred on Lake Sakakawea and Lake Oahe. On the average, these reservoirs and two riverine stretches, provide nesting habitat for about 85 percent of the piping plovers nesting on the Missouri River. We found that the ongoing CWCP actions of reservoir inundation, reservoir flooding, and reservoir unbalancing will have a beneficial effect

on the reservoir primary constituent elements, especially by maintaining sparsely vegetated shorelines.

Except for the long-term drought conservation measures, which were judged to have an overall small adverse impact on primary constituent elements on the riverine stretches, the actions proposed by the Corps in their 2003 Biological Assessment were assessed as being either beneficial or of no effect to designated critical habitat. Of special note were the Corps' proposed actions to create and rehabilitate over 3,000 acres of habitat, primarily in the riverine stretches and in Lewis and Clark Lake. This action has great potential to create piping plover nesting and foraging habitat.

Determination for Critical Habitat

The determination of destruction or adverse modification of designated critical habitat is based on whether the action is likely to destroy or adversely modify critical habitat to the extent that the value of critical habitat is appreciably diminished for the survival and recovery of the species. The Service determined that the adverse effects of the Corps' ongoing and proposed actions would primarily affect the primary constituent elements of maintaining sparsely vegetated channel sandbar habitat in the 330 miles of riverine habitat on the Missouri River. We also concluded that the proposed habitat creation actions would benefit habitat on portions of the riverine stretches.

Critical habitat occurs on some portion of the 330 miles of riverine habitat. The Corps ongoing and proposed actions will both benefit and adversely impact the riverine critical habitat. The Service found that critical habitat on some portion of the 438 miles of reservoir habitat and on the 77,370 acres on Fort Peck Reservoir will, overall, benefit from the Corps ongoing and proposed actions.

The Service concluded that the ongoing CWCP actions, the actions included in the Service's 2000 Biological Opinion that are being implemented by the Corps, and the actions proposed in the Corps' November 2003 Biological Assessment will not destroy or adversely modify critical habitat to the extent that the value of designated critical habitat is appreciably diminished for the survival and recovery of northern Great Plains piping plovers that occur in the United States and Canada.