NWE-2188-4339

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

December 13, 2023

Re: NorthWestern Energy (NorthWestern) filing Updated Five Year (2024 thru 2028) Missouri River Fisheries Plan per Project 2188 License Articles 414, 416 and 417

Dear Secretary Bose,

The September 27, 2000 Order Issuing New License[1] for the Missouri-Madison Hydroelectric Project (FERC #2188) required a plan for protection, mitigation and enhancement (PM&E) of fisheries resources and habitat in approximately 350 miles of the Missouri River and its tributaries from Hauser Reservoir to Fort Peck Reservoir (92 FERC 61,261. The Plans[2][3][4] that were originally submitted and approved by FERC in December 2001 encompass three segments of the river corridor as listed below with the correlating license articles, is collectively referred as the “Project 2188 Missouri River Fisheries Plan". It has been updated every five years since.

Article 414 – Hauser Dam and Tailwater

Article 416 – Holter Dam and Tailwater

Article 417 – Great Falls Reservoirs and Tailwater

NorthWestern, in consultation with state and federal agencies and conservation groups, has been implementing the current Project 2188 Missouri River Fisheries Plan (2019 thru 2023)(NWE-2188-3621). NorthWestern provides annual funding and employs a formal consultation framework through a voluntary Memorandum of Understanding (MOU) with the resource agencies which supports four Technical Advisory Committees (TACs) that implement fisheries, wildlife, habitat, and water quality PM&E measures. These collaborative efforts have

[1] 92FERC 61,261
[2] 97FERC 62,210
[3] 97FERC 62,211
[4] 97FERC 62,217

resulted in significant fisheries and river habitat conservation projects with local, state and national recognition.

Northwestern provides in Exhibit I an Updated Project 2188 Missouri River Fisheries Plan for the 2024 thru 2028 period. This updated Plan will continue to provide important PM&E measures and coordination with agencies on conservation measures for Missouri River fisheries and habitat resources.

Also included, herein, is Exhibit II, summary progress reports on protection, mitigation and enhancement measures implemented under the past (2019-2023) Project 2188 Missouri River Fisheries Plan.

Northwestern proposes to consult with agencies on the next updated Five Year (2024 thru 2028) Missouri River Fisheries Plan under Articles 414, 416 and 417 and will file with the Commission by December 31, 2028.

Northwestern has consulted with the US Forest Service, US Fish and Wildlife Service, Montana Department of Fish, Wildlife and Parks, and the US Bureau of Land Management on the Updated (2024 thru 2028) Project 2188 Missouri River Fisheries Plan in Exhibit I. Signatures of approval for this Plan from these agencies appear on the following page.

Sincerely,

Mary Gail Sullivan

Director, Environmental and Lands

CC: Andy Welch, NWE
John Tabaracci, NWE
Grant Grisak, NWE
Emily Platt, USFS
Eileen Ryce, MFWP
James Boyd, USFWS
Chris Boone, BLM

Northwestern Energy has consulted with agencies in the preparation and filing of this Updated Five-Year (2024 thru 2028) Project 2188 Missouri River Fisheries Plan per License Articles 414, 416 and 417. As signed below, the following agencies agree with this Updated Plan described above and attached in Exhibit I:

By: Eileen Ryan

Title: Fisheries Division Administrator

Representing Montana Department of Fish, Wildlife and Parks

Date: 10/30/23

By:

Title: Acting Field Supervisor

Representing U.S. Fish and Wildlife Service

Date: 11/21/23

By:

Title: Forest Supervisor

Representing U.S. Forest Service

Date: 11-7-23

By: RUTH MILLER Digitally signed by RUTH MILLER Date: 2023.12.11 14:49:10 -07'00'

Title: Deputy State Director, Resources and Planning

Representing U.S. Bureau of Land Management

Date: December 11, 2023

Exhibit I

Updated Project 2188

Missouri River Fisheries Plan

2024 thru 2028

FERC License 2188
Five Year (2024-2028)
Missouri River Fisheries Plan

Articles 414, 416 and 417

October 2023

NorthWestern® Energy

Delivering a Bright Future

Cover photo by Grant Grisak, 2022. Blue sucker sampled by electrofishing in the Morony Dam section of the Missouri River. Blue suckers are a very long-lived and rare species of fish sampled during annual fish population monitoring surveys conducted by NorthWestern Energy. Numerous research projects are funded to help the species persist in this 200 mile reach of river.

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Figures and Tables

Introduction

Articles 414, 416, and 417 of the FERC Project 2188 License, issued in September 2000, require the licensee to consult with state and federal natural resource management agencies to prepare plans to protect, mitigate and enhance fisheries resources and habitat in approximately 350 miles of the Missouri River and its tributaries from Hauser Reservoir (which impounds to the base of USBR's Canyon Ferry Dam) to Fort Peck Reservoir. This area includes Hauser and Holter reservoirs, a 90-mile section of free-flowing river between Holter Dam and Great Falls, five smaller Great Falls area reservoirs (Black Eagle, Rainbow, Cochrane, Ryan, Morony), and an approximate 250-mile section of free-flowing river from Morony Dam to Fort Peck Reservoir (Figure 1). The original text of the FERC Project 2188 license Articles 414, 416, and 417 appears in Attachment 1 to this document.

A previous licensee (PPL Montana) entered into a 10-year Memorandum of Understanding (MOU) with state and federal resource management agencies in December, 2000 to provide annual funding to implement FERC license requirements for the protection, mitigation and enhancement (PM&E) of fisheries, recreation, and wildlife resources. The MOU established Technical Advisory Committees and ground rules for allocating annual funding for PM&E projects using adaptive management principles. The original MOU was renewed by PPL in 2009. NorthWestern Energy (NWE) acquired PPL's Montana hydro projects in 2014 and the MOU was renewed by NWE for the period 2017-2026.

The Missouri River Fisheries Technical Advisory Committee (MoTAC) is comprised of representatives from the Montana Department of Fish, Wildlife & Parks, the US Forest Service, US Bureau of Land Management, US Fish & Wildlife Service, and NorthWestern Energy. The MoTAC usually meets once each year to review progress, budget status, new project proposals, and determine which projects to fund in the coming year. NWE and MoTAC representatives communicate regularly throughout the year to implement PM&E projects and consider interim proposals and program adjustments. Project sponsors and participants are responsible for providing annual progress reports, which are used to report PM&E program progress to FERC.

Proposed actions to implement fisheries PM&E measures specified in the FERC Project 2188 license for 2024-2028 are detailed in this document. The original Project 2188 license specified these plans should be prepared every three

years. However, State and Federal resource management agencies, the licensee, and FERC have agreed it is acceptable for the fisheries plans to cover five-year periods.

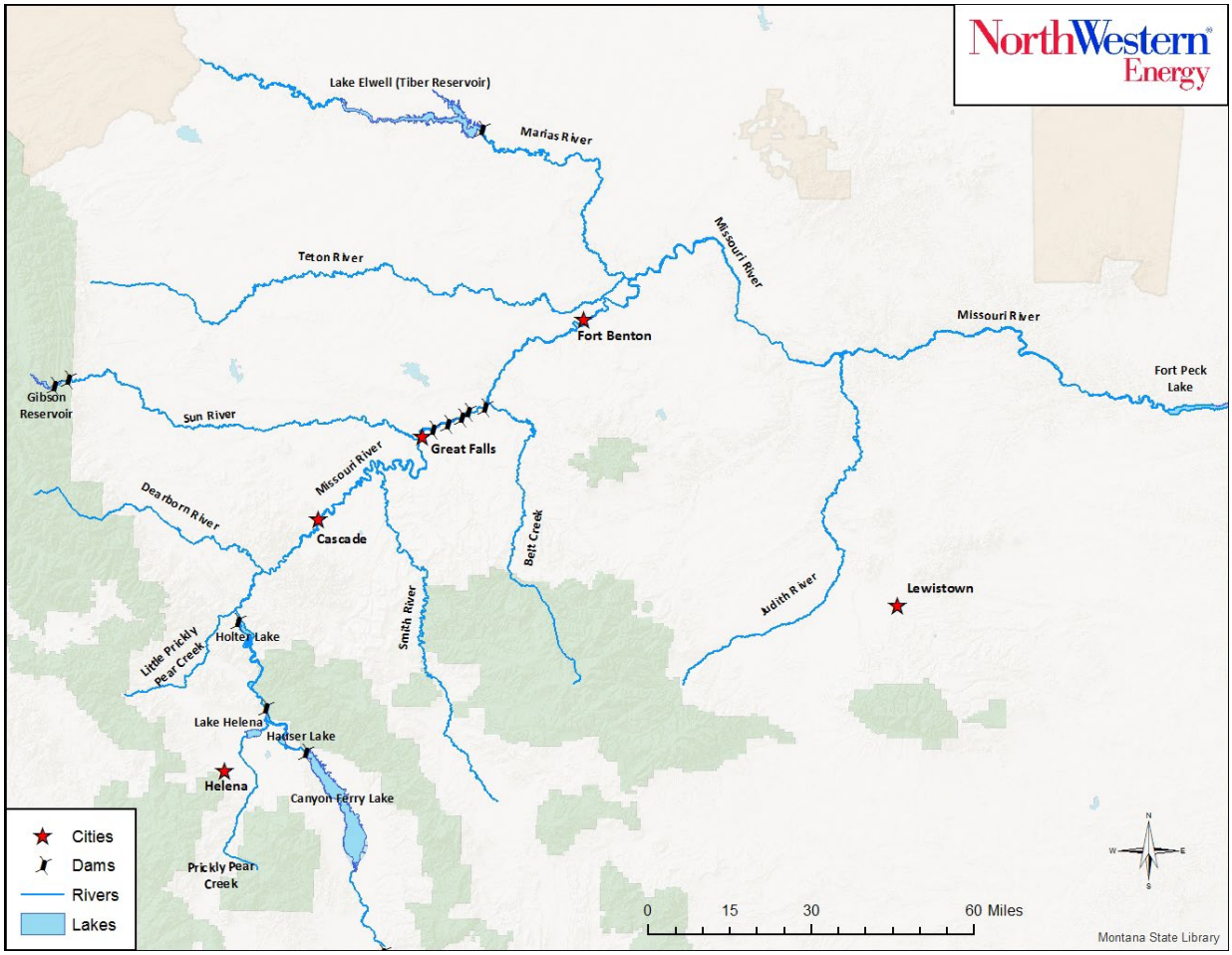

Figure 1. Map of FERC Project 2188 project area on Missouri River from Hauser Reservoir near Helena, MT to the headwaters of Fort Peck Reservoir.

Summary of PM&E Program Progress

During the most recent 2019-2023 5-year planning period, NWE provided funding and assistance for 95 PM&E projects in the 500+ mile Missouri River system (Hauser Reservoir to Fort Peck Reservoir). (Table 1). NWE contributed $3.3 million and the numerous project partners contributed approximately $5.4 million towards the projects, resulting in a total of $8.7 million for fisheries PM&E. The licensee and numerous partners have completed a grand total of 430 PM&E projects since the program began

in 2000, with the licensee contributing approximately $11.9 million, matched by $15.4 million from partners for a total of $27.3 million for natural resource conservation and river stewardship. A total of 89 partners have participated in these projects since program inception, including 17 state and federal agencies and local governments, 11 sporting groups, 11 conservation groups, one private fund, five colleges and universities and 44 private landowners.

Over the license period, fisheries monitoring comprised the largest single cost element in the PM&E program (38%) mainly due to the numerous resource monitoring requirements included in the 2188 License for this extensive river/reservoir system (Table 1). Fisheries monitoring expenses reported in Table 1 also include funds expended in support of pallid sturgeon recovery as required by 2188 License Article 418, and is detailed below. Fisheries studies and habitat enhancement were the next most common projects funded, each comprising 23% of the total licensee contribution since program inception.

Table 1. Summary of projects funded by the licensee to meet FERC Project 2188 fisheries protection, mitigation and enhancement requirements in the Missouri River and reservoirs from Hauser Reservoir to the upstream end of Fort Peck Reservoir during the most recent 5-year planning period and since program inception.

Project type	Most recent period 2019-2023				Since program inception (2000-2023)			
	# Proj	NWE/PPL contrib	Cost share	Total	# Proj	NWE/PPL contrib	Cost share	Total
Fisheries Monitoring	5	$1,234,939	$1,755,886	$2,999,825	30	$4,518,979	$4,022,309	$8,541,288
Fisheries Studies	15	$513,624	$768,446	$1,281,970	112	$2,690,789	$3,117,409	$5,808,098
Equipment & Infrastructure	24	$205,415	$0	$205,415	99	$950,165	$52,278	$1,002,407
Habitat Enhancement	23	$1,044,761	$917,853	$1,962,614	115	$2,800,263	$1,970,952	$4,774,215
Flow Enhancement	9	$42,478	$25,940	$68,418	23	$147,555	$406,447	$554,002
Species Restoration	9	$174,189	$614,963	$787,152	39	$621,518	$1,631,579	$2,251,097

Conservation Easements	0	0	0	0	5	$188,599	$4,248,749	$4,437,348
CRM & Miscellaneous	7	$21,574	0	$21,574	7	$21,574	0	$21,574
TOTAL	95	$3,333,603	$5,426,837	$8,769,340	430	$11,939,442	$15,449,723	$27,390,029

Fisheries studies (112) and habitat enhancement (115) are the categories with the highest numbers of projects funded thus far, representing 26% and 27% of the total, respectively. Many of these projects investigated seasonal fish movements, which provides useful information for targeting habitat improvement projects in this large and diverse river system. Also, several investigations were designed to gather important information for management and determination of status of several fish species of special concern, including sauger, sicklefin chub, sturgeon chub, blue sucker, paddlefish, softshell turtles and three species of dace (Northern Redbelly, Northern Pearl, and Redbelly-Finescale hybrids). In addition, 99 projects have been funded since program inception to acquire critical equipment and infrastructure items to support PM&E program activities.

The amount of habitat improved during the recent 5-year period and during the license period is summarized in Table 2. The 23 habitat enhancement projects completed in the most recent planning period resulted in the restoration of 4.44 miles of habitat in three different sub-drainages. Nearly half of the habitat improvement was conducted in the Holter Reservoir sub drainage and associated with two restorations phases at Beaver Creek that restored 1.2 miles of stream channel and 14 acres of floodplain with over 2 acres of wetland. The other half of habitat improvements occurred in the Holter to Great Falls sub drainage. The restoration of Hardy Creek involved building a floodplain and stream channel to connect with the Missouri River to improve trout spawning. Eight bridges were repaired and two new installed in the North and South Forks of Sheep Creek to reduce vehicle fording and maintain quality habitat in this important spawning tributary for Missouri River trout.

Table 2. Summary of habitat and fish species of special concern restoration and enhancement projects completed in various sub-drainages in the FERC 2188 project area from Hauser Reservoir to the upstream end of Fort Peck Reservoir during the most recent 5-year planning period and since program inception.

Project type	Sub-drainage	Current planning period (2019-2023)	Since program inception (2000 – 2023)

		# Of projects	Miles of habitat restored	# Of projects	Miles of habitat restored
Habitat enhancement	Hauser Reservoir	6	0.02	28	10.67
	Holter Reservoir	5	2.13	7	3.33
	Holter to Gt Falls	12	2.29	39	20.34
	Morony to Ft Peck	0	0	2	3.00
	Total	**23**	**4.44**	**77**	**37.34**
Flow enhancement	Hauser Reservoir	2	7	2	7
	Holter Reservoir	0	0	0	0
	Holter to Gt Falls	0	0	4	39.5
	Morony to Ft Peck	7	28	9	30
	Total	**9**	**35**	**15**	**76.5**
Conservation easements	Hauser Reservoir	0	0	0	0
	Holter Reservoir	0	0	0	0
	Holter to Gt Falls	0	0	3	9.00
	Morony to Ft Peck	0	0	2	14.13
	Total	**0**	**0**	**5**	**23.13**
Restoration of fish species of special concern					
	All sub-drainages	10	3	39	128.05
	Total	**10**	**3**	**39**	**128.05**
	Grand Total	**42**	**42.44**	**136**	**265.22**

About 700 feet of Missouri River bank was stabilized near Cascade. During the most recent period, three 10-year water leases were signed to provide instream flow as fish habitat on Little Belt Creek and the Teton River that total about 28 miles of improved habitat during low water flow months of July and August. The Teton River is an especially important stream for sensitive species like blue sucker, sturgeon chub, pallid sturgeon and a host of other native and non-native sport fish and non-sport fish. Seven projects were funded to support restoration of westslope cutthroat trout (a Species of Special Concern). Two of these involved repair of an existing barrier at Cottonwood Creek and the design and construction of a barrier on Carpenter Creek to protect an historic genetically pure population in about 3 miles of habitat. Annual fish population monitoring is also funded.

Overall, 136 restoration projects have been completed during the 23 years since the FERC Project 2188 PM&E program began (Table 2). This includes 77 habitat enhancement projects that restored 37.3 miles of habitat on 28 streams, 15 streamflow enhancement projects that improved habitat in 76.5 miles of stream, five conservation easement projects designed to improve 23 miles of stream bank habitat, and 39 projects to restore fish species of concern in 39 streams with 128 miles of habitat. Most of the habitat enhancement projects were located on the river and tributaries in the approximate 90-mile section between Holter Dam and Great Falls, or in the Hauser Reservoir sub-drainage in the Helena area.

Seven projects have been completed thus far to augment streamflows in the project area. One of these projects involves a complex water exchange to prevent a 3-mile section of Prickly Pear Creek near Helena from drying up due to irrigation water withdrawals during the summer months. Two other projects involved replacement of inefficient flood irrigation systems with sprinkler systems on Little Prickly Pear Creek, which is a critically important spawning tributary for rainbow and brown trout that inhabit the Missouri River downstream from Holter Dam. These conversions prevent the removal of up to 30 cubic feet per second of flow (and associated juvenile trout) from this major spawning stream during the summer irrigation season. Cost-share funding was provided for two conservation easements that permanently protect nine miles of Missouri River riparian area between Holter Dam and Great Falls. As stated earlier, three projects involved leasing water rights as instream flow for fish habitat on the Teton River and Little Belt Creek. On the Teton River, nearly 27 miles of stream channel are improved as fish habitat from annual leasing as much as 20.5 cfs (901 acre feet) during critical flow months of July and August. On Little Belt Creek the lease agreement involves allowing no more than 1 cfs diversion, despite the 25 cfs

maximum, and ceasing diversion when stream flow drops below 2.1 cfs. Nearly 1.1 mile of trout habitat is improved with this lease.

Over the license period $3.3 million has been dedicated to 89 projects to recover the pallid sturgeon from endangered species status. Twenty of those projects involve research to understand the biology and behavior of the species totaling $1.2 million. Another 39 projects funded equipment to conduct monitoring and research totaling $430,953. The remaining 30 projects involve annual funding for monitoring totaling $1.7 million. At the beginning of the license term, less than 50 wild pallid sturgeon were known to exist in the reach of river between Morony Dam and Fort Peck Lake. After many years of hatchery production and stocking, an estimated 4,900 pallid sturgeon now live in this reach. Nearly 20 years of effort were dedicated to monitoring the growth, survival and behavior of young hatchery origin pallid sturgeon (HOPS). Beginning around 2014, fish from the oldest year class were becoming sexually mature and are now making attempts to spawn. In 2019 two pallid sturgeon larvae were sampled in the lower reach of the river which indicates successful spawning attempts. The focus of pallid sturgeon research has shifted toward more monitoring of sexually mature fish, spawning ques, pairing of fish during spawning times and extensive sampling for larval fish near suspected spawning areas.

Thirty-five projects to restore fish Species of Special Concern have been completed over the term of the 2188 License thus far. Cost-share funding was provided for several years to establish a new population of Arctic Grayling in the headwaters of the Sun River but this program was largely unsuccessful. Westslope cutthroat trout (WCT) have been petitioned for Endangered Species Act listing in the past. Non-hybridized, genetically pure WCT were present in only 43 miles of streams in northcentral Montana in 2010, which represented less than 4% of historically occupied habitat in the area. NWE funding was used to complete restoration projects on seven streams which added another 59.3 miles of WCT habitat. The annual westslope cutthroat trout monitoring project involves surveys on an average of 26 streams per year (range 15-33) that contain conservation populations or are candidate habitats vital to the stability of this species in central Montana (Table 3). In total, 226.35 miles of stream habitat are maintained as westslope cutthroat trout habitat.

Table 3. Status of westslope cutthroat trout streams in the Missouri drainage that are sampled for conservation and candidate conservation.

Species	Total streams	Miles
WCT	54	226.35
WCT only	37	128.05

WCT & other species	17	98.30
Candidate WCT	26	90.10
Vacant	15	34.30
Non natives only	11	55.80
Total	80	316.45

In 2016 the sicklefin chub and sturgeon chub were petitioned for listing under the Endangered Species Act. The USFWS assigned a 12-month Finding Report completion date of March 2023. On September 20, 2023 the USFWS published a not-warranted 12-month finding for the sturgeon chub and sicklefin chub in the Federal Register (Sicklefin chub docket #FWS-R6-ES-2023-0130 and Sturgeon chub docket #FWS-R6-ES-2023-0131). NWE continues to fund projects and assist in monitoring these species in the Missouri River between Morony Dam and Fort Peck Lake, and in portions of the Teton, Marias and Judith rivers. NWE provides technical review and information to the FWS as a stakeholder to help support the development of the Species Status Assessment due in March 2023. NWE assisted with collection of specimens for the genetic assessment and provided funding for the laboratory analysis. Results of the genetic assessment showed sturgeon chub populations #1.1 and #1.2 were part of an estimated effective population size of 2,734 individuals and sicklefin population #1.1 had an estimated effective population size of 826 individuals (Heist et al. 2022). Based on this information significant historical gene flow has occurred among the sampling locations. Further, the estimated population sizes indicate sturgeon and sicklefin chub populations are currently large enough to avoid inbreeding and loss of adaptive variation which typically occurs in a small population size. This information should help provide an accurate assessment of these species.

2024-2028 5-year Plan

5-year Plan Article 414 – Hauser Dam and Tailwater

The Project 2188 License requires the licensee to "submit for Commission approval a fisheries plan for implementing specific mitigation and enhancement measures and post-licensing evaluation and monitoring for Hauser Lake and the Hauser Dam tailwaters". The plan must address the following tasks:

1. Monitor Hauser Dam and tailwaters for evidence of fish loss (dead, injured or alive) from Hauser Reservoir as a result of impingement, entrainment, or spillage particularly during high flow events.

Monitoring of fish populations in the Hauser Dam tailwater is completed on alternate years using electrofishing equipment. Fish captured during these surveys are examined for evidence of injury and whether the fish have hatchery or wild origins. Hatchery trout are examined for marks to determine where they were stocked. Montana Department of Fish, Wildlife and Parks (MFWP) and NWE staff will also investigate reports of dead or injured fish downstream from Hauser Dam. Such reports have been very rare in past years.

A special research project, funded through the PM&E program, was initiated by Montana State University in 2005 to quantify fish spilled over Hauser Dam and fish entrainment through the turbines. This project was completed in 2010 and included installation of hydroacoustic equipment in spillgates and turbine intakes as well as netting to verify fish species and size composition immediately in front of the dam and near the turbine intakes.

2. Provide $35,000 annually to the Montana DFWP to implement adaptive management practices at Hauser and Holter Dams.

The MOU initially established in 2000 between the licensee and the state and federal resource management agencies established annual funding levels to implement all fisheries PM&E requirements of the FERC Project 2188 license. The annual funding provided by the licensee includes the $35,000 mentioned in the 2188 license for adaptive management on Hauser and Holter. The MoTAC meets annually to consider

and select projects to protect, mitigate and enhance the fisheries of Hauser and Holter reservoirs using adaptive management practices.

3. Propose additional measures to mitigate for avoidable and unavoidable impacts.

Additional mitigation measures and proposals are determined at annual MoTAC meetings. These measures may include but will not be limited to:

1. Spawning habitat enhancement projects in the reservoir and its tributaries
2. Monitoring fish production in spawning tributaries
3. Evaluation and adjustment of fish stocking program
4. Enhancement of native fish species in reservoir and tributaries
5. Monitor reservoir fish populations and trends to develop and maintain long-term database that can be used to identify impacts of reservoir operations
6. Determine impacts of introduced species, including aquatic nuisance species and implement measures to limit impacts
7. Use of hydroacoustic technology and vertical gillnets to monitor pelagic fish species.

4. Evaluate the effect of short term flow fluctuations on the resident fish community in the tailwaters.

Tailwater trout populations are monitored by electrofishing within a 4.6-mile section of Missouri River downstream from Hauser Dam during the fall (October) on alternate years. Trout population levels in years with unusual flow fluctuations will be compared to the long-term database to identify and evaluate effects. A 1.7 mile section between Hauser Powerhouse and the mouth of Beaver Creek defines the electrofishing section.

5. Evaluate the impact of fish spilled from Hauser Reservoir on the resident fish populations in Holter Reservoir.

Reservoir fish populations are monitored annually in spring and fall using experimental floating and sinking gillnets set at standardized locations on Hauser and Holter reservoirs. This netting series has been conducted by MFWP annually since 1986 and is the best indicator of fish population change and impacts of fish from upstream sources. Biological data collected includes number caught by species; length and weight characteristics; age composition of selected species; hatchery vs. wild origin (if

known); food habits of selected species; disease information; and impacts of spilled fish from upstream areas on resident reservoir fish populations.

Summer and winter weekend creel surveys have been conducted on the reservoirs in standardized fashion since 1986. These data provide valuable fish trend information that corroborates information gathered by other methods. Creel survey information is also useful to verify or refute reservoir user perceptions. Creel data provides continuous seasonal data on fish growth, condition, and food habits not obtained with other more discrete sampling methods. Creel surveys also enhance sample sizes for biological fish data, particularly in years when net catches are low. Surveys are done April through October and January through March.

6. Monitor gas supersaturation in the water and gas bubble trauma in the fish in the Hauser tailwater during powerhouse rehabilitation.

This measure was completed during the powerhouse rehabilitation project in 2003.

7. Propose measures to minimize gas supersaturation during powerhouse rehabilitation and to mitigate for avoidable and unavoidable impacts related to gas bubble trauma.

This measure was completed during the powerhouse rehabilitation project in 2003.

8. Monitor the effects of project operations on Hauser Reservoir fish populations.

Reservoir fish populations are monitored annually in spring and fall using experimental floating and sinking gillnets set at standardized locations on Hauser Reservoir. This netting series has been conducted by MFWP annually since 1986 and is the best indicator of fish population changes that may be caused by project operations. Biological data collected includes number caught by species; length and weight characteristics; age composition of selected species; hatchery vs. wild origin (if known); food habits of selected species; disease information; and impacts of spilled fish from upstream areas on resident reservoir fish populations.

Summer and winter weekend creel surveys have been conducted on Hauser reservoir in a standardized fashion since 1986. These data provide valuable fish trend information that corroborates information gathered by other methods. Creel survey information is also useful to verify or refute reservoir user perceptions. Creel data provides continuous seasonal data on fish growth, condition, and food habits not obtained with other more discrete sampling methods. Creel surveys also enhance sample sizes for biological fish data, particularly in years when net catches are low. Surveys are done April through October and January through March.

9. Evaluate the potential to enhance tributary spawning to increase the contribution to natural reproduction to the Hauser Reservoir fishery.

There is excellent potential to enhance Hauser Reservoir tributary spawning due to the presence of a significant network of tributary streams flowing directly into the reservoir. These tributaries include Spokane Creek, Prickly Pear Creek, Tenmile Creek, Silver Creek, Merritt Spring Creek, and Trout Creek. Twenty-two tributary habitat enhancement projects have been completed in the Hauser Reservoir sub-drainage thus far, resulting in approximately 17.9 miles of improved aquatic habitat on five tributary streams. Reservoir netting and creel survey results can be used to monitor and estimate changes in tributary recruitment.

Tributary enhancements will include, but will not be limited to:

1. Riparian fencing and habitat restoration
2. Channel restoration, including re-meandering
3. Removal of fish barriers
4. Improvement of fish passage
5. Leasing or purchasing water rights or contracting water for streamflow enhancement
6. Improved livestock grazing management in riparian areas
7. Wetland restoration
8. Screening of irrigation diversions
9. Removal or replacement of undersized or poorly designed/installed culverts

5-year Plan Article 416 – Holter Dam & Tailwater

Article 416 of the Project 2188 License requires the licensee to "submit for Commission approval a fisheries plan for implementing specific mitigation and enhancement measures and post-licensing evaluation and monitoring for Holter Lake and the Holter Dam tailwaters". The plan must address the following tasks:

1. Monitor Holter Dam and tailwaters for evidence of fish loss (dead, injured or alive) from Hauser Lake as a result of impingement, entrainment, or spillage (particularly during high flows).

Monitoring of fish populations within a 3-mile section immediately downstream from Holter Dam is completed in the fall (October) on alternate years using electrofishing equipment. A 2.3 mile section between Holter Dam Public Safety Warning Cable and the Wolf Creek Bridge defines the electrofishing section. Fish captured during these surveys are examined for evidence of injury and origin (hatchery or wild). Hatchery trout are examined for marks to determine (when possible) where they were stocked. MFWP and NWE staff will investigate reports of dead or injured fish downstream from Holter Dam. Such reports have been very rare in past years.

2. Provide $35,000 annually to the Montana DFWP to implement adaptive management practices at Hauser and Holter Dams.

The MOU initially established in 2000 between the licensee and the state and federal resource management agencies established annual funding levels to implement all fisheries PM&E requirements of the FERC Project 2188 license. The annual funding provided by the licensee includes the $35,000 mentioned in the 2188 license for adaptive management on Hauser and Holter. The MoTAC meets annually to consider and select projects to protect, mitigate and enhance the fisheries of Hauser and Holter reservoirs using adaptive management practices.

3. Propose additional measures to minimize fish loss and to mitigate for avoidable and unavoidable impacts.

Additional mitigation measures and proposals are determined at annual MoTAC meetings. These measures may include but will not be limited to:

1. Spawning and rearing habitat enhancement projects in the reservoir and in tributaries to the reservoir and tailwaters
2. Monitoring fish production in spawning tributaries
3. Evaluation and adjustment of fish stocking program
4. Enhancement of native fish species in reservoir and tributaries
5. Monitor reservoir fish populations and trends to develop and maintain long-term database that can be used to identify impacts of reservoir operations
6. Determine impacts of introduced species, including aquatic nuisance species, and implement measures to limit impacts
7. Use of hydroacoustic technology and vertical gillnets to monitor pelagic fish species

4. Evaluate the effect of short-term flow fluctuations on the resident fish community in the tailwaters.

Annual trout population estimates are made in two long-term monitoring sections of the Missouri River downstream from Holter Dam. The upper section is referred to as the Craig section and is 5.6 miles long, beginning at Wolf Creek Bridge and ending at the Craig Bridge. The lower section is referred to as the Cascade section and is 4.1 miles long, beginning at the powerline that crosses the river upstream of Hardy Creek and ending at the Fiehrer irrigation pump station. . The Pelican Point Fishing Access Site is the midpoint of this section. Brown trout estimates are made in the springtime (April/May) and rainbow trout estimates are made in the fall (October) to avoid potential biases caused by spawning migrations of the respective species. There is an excellent long-term database because MFWP has conducted annual trout population estimates in these sections for approximately 40 years. Trout population levels in years with unusual flow fluctuations will be compared to the long-term database to identify and evaluate effects.

Fish populations are also monitored in the 2.3 mile section between Holter Dam Public Safety Warning Cable and the Wolf Creek Bridge by electrofishing in the fall (October) on alternate years. The main purpose of this monitoring is to evaluate the impact of fish spilled from Holter Reservoir, but the data can also be used for evaluating effects of short-term flow fluctuations on the tailwater fish community.

5. Evaluate the impact of fish spilled from Holter on the resident fish populations downstream.

Fish population monitoring in the river sections below Holter Dam will aid in evaluating potential impacts of fish spilled from Holter Reservoir.

6. Monitor the effects of project operation on Holter Lake fish populations.

Reservoir fish populations are monitored annually in spring and fall using experimental floating and sinking gillnets set in standardized locations on Holter Reservoir. This netting series has been conducted by MFWP annually since 1986 and is the best indicator of fish population changes that may be caused by project operations. Biological data collected includes number caught by species; length and weight characteristics; age composition of selected species; hatchery vs. wild origin (if known); food habits of selected species; disease information; and impacts of spilled fish from upstream areas on resident reservoir fish populations.

Summer and winter weekend creel surveys have been conducted on Holter reservoir in a standardized fashion since 1986. These data provide valuable fish trend information that corroborates information gathered by other methods. Creel survey information is also useful to verify or refute reservoir user perceptions. Creel data provides continuous seasonal data on fish growth, condition, and food habits not obtained with other more discrete sampling methods. Creel surveys also enhance sample sizes for fisheries trend data gathered using other techniques, particularly in years when net catches are low. Surveys are done April through October and January through March.

7. Evaluate the potential to enhance tributary spawning to increase the contribution of natural reproduction to the Holter Reservoir fishery.

Opportunities to enhance Holter tributary spawning are more limited than on Hauser because Holter has substantially fewer tributaries. In addition, the Holter tributaries are also not as impacted by human and livestock grazing activities because they are mostly located on National Forest and State of Montana Wildlife Management Area lands. Migratory fish passage is problematic due to high concentrations of beaver dams in the lower reaches of most of the tributary streams. The main spawning tributaries are Beaver Creek, Willow/Elkhorn creeks, Cottonwood Creek, and approximately 4 miles of the Missouri River from Hauser Dam to the headwaters of Holter Reservoir. Projects to restore native westslope cutthroat trout have been completed on Cottonwood and Elkhorn creeks and there are some opportunities for

habitat improvement in other areas of the Holter tributary system. MoTAC will continue to search for and implement Holter tributary spawning and habitat enhancement projects and westslope cutthroat trout population expansion when they are identified and determined feasible.

5-year Plan - Article 417 – Great Falls Reservoirs & Tailwater

Article 417 of the Project 2188 License requires the licensee to "submit for Commission approval a fisheries plan for implementing specific mitigation and enhancement measures and post-licensing evaluation and monitoring for the five Great Falls reservoirs and their tailwaters". The plan should include a schedule for implementing the following tasks:

1. Monitor the relative abundance of the most abundant fish species in the Great Falls reservoirs and the Missouri River downstream of Morony Dam.

Missouri River Downstream of Morony Dam

The Missouri River supports a productive and diverse warm and coolwater fishery downstream from the natural barrier falls in the Great Falls area. More than 50 species of fish have been found in this reach and approximately 20 species found below the falls do not exist in the upper river due to the natural barrier created by the falls. The high diversity of fish species and habitat in the river below Morony Dam requires use of a variety of sampling methods to effectively monitor fish populations.

Electrofishing. Annual fall electrofishing will be used to monitor fish populations in five standard long-term study areas in the approximate 230-mile reach of Missouri River between Morony Dam and Fort Peck Reservoir. Each monitoring section is 4-6 miles long and they are located in the Morony Dam, Fort Benton, Coal Banks, Judith Landing, and Fred Robinson Bridge areas. A total of approximately 10 hours of electrofishing effort will be completed in each trend area. These surveys were first initiated by MFWP in the late 1970's and have been conducted annually since 2001. Biological data collected will include catch per unit effort by species and length and weight of fish captured.

Trammel Netting. Sampling with drifting trammel nets has been conducted on alternate years in the Fort Benton, Coalbanks and Judith Landing areas and annual sampling in the Robinson Bridge section. Due to changes in fish abundance and behavior alternate year sampling will continue in the Fort Benton and Judith Landing sections and the Coal Banks section will be sampled annually along with the Robinson Bridge section. A total of 20 drifts will be attempted in each area during the mid-summer. Trammel nets are effective at sampling large fish living in deepwater areas that are not sampled effectively with electrofishing gear. The primary target species are shovelnose sturgeon, pallid sturgeon and blue sucker. Biological data collected includes catch per effort by species, and length and weight of captured fish.

Seining. Seining will be used to sample shallow shoreline areas annually during late July thru mid-August. This method provides useful trend information on the abundance of minnow species (especially the primary target species flathead chubs, emerald shiners and western silvery minnows) and production of juvenile game fish (primarily smallmouth bass). An intensive comparison of mini-fyke nets and seining completed in 2012 in the five river monitoring sections from Morony to Fort Peck indicated that seining was the most effective method for monitoring minnow abundance. Project personnel worked closely with fisheries scientists at Montana State University during 2013 to refine the seining program protocols. The new protocol requires 20 seine hauls in 10-mile subsections of each of the five long-term fisheries monitoring sections between Morony Dam and Fort Peck Reservoir. Sampling at this intensity requires assistance from NWE staff.

Creel Survey. A creel survey will be performed every 4 years to monitor angler use levels, exploitation of fish populations, and changes in fish species abundance. The next creel survey is scheduled to occur in 2027. Angler interviews will be conducted in the entire 230-mile section of river between Morony Dam and Fort Peck Reservoir during May through September. The creel survey will be coordinated with the MFWP statewide mail survey, which generates fishing pressure estimates. Ground survey results may be integrated with pressure estimates from the mail survey to generate rough harvest estimates for the main species harvested by anglers. Survey data gathered will include: angler origin; fishing methods; target species; catch and harvest by species; length and weight of harvested fish; and other information.

Great Falls Reservoirs

The five reservoirs in the Great Falls area (Black Eagle, Rainbow, Cochrane, Ryan and Morony) are quite small, ranging from 126 - 402 surface acres. Due to their small volume relative to river inflows, they have very high flushing rates and exceedingly short water retention times. Average annual water retention times range from 2.2 hours in Rainbow Reservoir (the smallest) to 24.2 hours in Morony (the largest). Even in September, the lowest inflow month, average retention time in Morony is 34 hours and retention in Rainbow is only 3 hours. Short retention times limit aquatic productivity because much of the plankton and juvenile fish community is rapidly flushed out, particularly during the normally productive spring and early summer months. This limits the development of functional and productive food webs within the reservoirs. The Missouri River in the Great Falls area is also transitional between coldwater and warmwater fish habitat, which also tends to limit fish numbers due to unsuitable thermal regimes and habitat. Fish species diversity in the river above the falls is also relatively low. Nearly 20 species of fish commonly found in the river below the falls did not naturally exist upstream due to the natural barrier created by the falls. The combination of all these factors results in low fish populations in the Great Falls reservoirs.

Fisheries monitoring needs on the Great Falls reservoirs are not as extensive as in other areas because of their limited fisheries resources, limited access, and consequent limited recreational use. Gill netting is the standard method for monitoring fish populations in area reservoirs but severe clogging of gill nets by algae in past surveys has rendered this method ineffective on the uppermost two reservoirs (Black Eagle and Rainbow). Electrofishing has also been attempted on these two reservoirs with limited success. Consequently, fish populations on the lower three reservoirs (Cochrane, Ryan, and Morony) will be monitored annually or on alternate years when conditions allow using standard overnight sets of 6x125-foot sinking experimental-mesh gillnets.

2. Implement adaptive management practices to mitigate fisheries impacts associated with dewatering 0.5 miles of the Missouri River below Rainbow Dam.

Several projects have been completed to mitigate fisheries impacts associated with dewatering below Rainbow Dam. Eggs were collected from wild Missouri River sauger, raised in the MFWP hatchery at Miles City, and progeny were stocked during 2001-2005 in an unsuccessful attempt to establish populations in Cochrane, Ryan and Morony Reservoirs. New or improved fishing opportunities have been created in the Great Falls area via dredging projects to deepen the fishing pond located near the

MFWP Giant Springs fish hatchery and Wadsworth Pond, located on the outskirts of Great Falls. Both of these areas are popular fishing spots, particularly for local youth. The MoTAC will continue to search for projects to improve fish habitat, fish populations, and fishing opportunities in the Missouri River and its tributaries in the Great Falls area.

3. Implement adaptive management practices to mitigate fisheries impacts associated with Cochrane Reservoir and Morony Reservoir fluctuations in conjunction with peaking operations at the Cochrane and Ryan developments.

Projects listed in #2 above also serve to mitigate impacts associated with reservoir fluctuations. The MoTAC will continue to search for projects to improve fish habitat, fish populations, and fishing opportunities in the Missouri River and its tributaries in the Great Falls area.

4. Protect and provide for the recovery of threatened and endangered fish species and other aquatic species of special concern in the Great Falls reservoirs and below Morony Dam.

One federally listed endangered species (pallid sturgeon), two under petition for ESA listing (sicklefin chub, sturgeon chub), and several aquatic species of special concern are found in the Missouri River below Morony Dam. The sicklefin chub, sturgeon chub, blue sucker, paddlefish, sauger, and Iowa darter have been found in the river downstream from Morony and are listed as fish species of special concern by the State of Montana. Spiny softshell turtles (*Apalone spinifera*) are also listed as a Montana species of special concern and are commonly found in the river between Morony Dam and Fort Peck Reservoir. Westslope cutthroat trout were once abundant in the river downstream from Morony but are now restricted to isolated headwater tributaries in the area. Measures to protect and provide for the recovery of these species are listed below.

<u>Pallid Sturgeon</u>

The main emphasis of the interagency pallid sturgeon recovery effort in the Missouri River upstream from Fort Peck Dam in recent years has been to: 1) determine the survival and optimum stocking strategies for hatchery-origin juveniles; 2) monitor the

population and movements of the few remaining wild adult fish in the area; 3) collect gametes from the remaining wild adult fish to maximize the genetic diversity of hatchery stocks; and 4) determine spawning behavior and reproductive success of HOPS that are now beginning to attain sexual maturity.

A large portion of the oldest year class (1997 year-class) of HOPS are now sexually mature and a 2005-year class HOPS as a sexually mature male in 2022. The increasing number of reproductively-active HOPS necessitates shifting partial focus from survival and growth of stocked fish to monitoring reproductive attempts and success of adult sexually mature fish.

Monitoring of the longitudinal distribution and abundance of HOPS will be accomplished by drifting trammel nets on alternate years in two survey areas from Fort Benton to the Judith River area as described in #1 above. Results from a variety of surveys in past years indicate that wild adult and HOPS tend to concentrate in an approximate 18-mile reach of river near Fred Robinson Bridge, which is located 25-50 miles (depending on reservoir water level) upstream from Fort Peck Reservoir. In addition the Coal Banks area is trammel net friendly and in recent years generally yields new candidate fish for radio tagging. Mature fish tend to reside in this reach when they are not conducting spawning migrations. A standardized survey involving 50 timed drifts of trammel nets has been conducted in the Fred Robinson area each fall by MFWP since 1994. Initially, the survey was designed to monitor the wild adult fish population, but it now provides useful trend information on HOPS that have been stocked in the river since 1998. Adding the Coal Banks section to annual monitoring should provide more descriptive information on adult fish. This survey will be continued annually in addition to the alternate-year trammel net surveys in the Fort Benton and Judith areas mentioned above.

A standardized setline survey conducted in an approximate 55-mile reach of river from Grand Island to Fort Peck Reservoir in early spring each year since 2008 has been very effective for monitoring the population density and survival of hatchery-raised pallid sturgeon. This survey, consisting of 90 standardized setline sets, will be continued annually to help generate statistically reliable growth and survival rates for HOPS in this area.

Larval fish sampling occurs frequently at various locations of the Marias River and Missouri River to evaluate reproductive success. Trawling surveys are designed provide a measure of sturgeon survival from larval stages to the next stage of early life.

Sicklefin & Sturgeon Chubs

Population trends of sicklefin and sturgeon chubs have been determined by benthic trawl hauls in the reach between Cow Island and Fort Peck Reservoir. Trawl hauls also provide incidental information on young-of-year production of other species including shovelnose sturgeon and channel catfish. Biological data collected includes catch per unit effort by species and length information on captured fish. Trawl sampling is confined to the downstream of the Cow Island area because large rocks in upstream areas prevent effective use of trawling equipment.

For each trawl haul, 10 random individual fish from each species and lifestage (young-of-year [YOY], juvenile, and adult) are measured and the rest counted, except for target species where all individuals are measured. All unknown YOYs were classified as minnow (Cyprinidae and Leuciscidae), sucker (Catostomidae excluding *Ictiobus spp.* and river carpsucker), buffalo/river carpsucker (*Ictiobus spp.* and *Carpiodes carpio*) and are counted (e.g., YOY Minnow, N = 15). Trawl CPUE is expressed in number of individuals caught per 100 square meters of substrate trawled. Two different protocols have been followed over the last 19 years and the differences are described below:

From 2001 to 2018 the standard beam trawling effort consisted of three subsamples (Left, Middle, and Right) conducted at 34 randomly selected river miles (from a pool of 0.2 mile increments) between river mile 1913 and 1883. The duration of the trawls was limited to two minutes and no extra tows were done at sites with a YOY sturgeon capture.

In 2018, experimental trawling was conducted and used to inform changes to the trawl protocol. It was hypothesized that sicklefin chub (*Macrohybosis meeki*) and sturgeon chub (*Macrohybosis gelida*) catch rates would be higher if an additional 30 river miles (extend up to the top of Cow Island; RM 1943) upstream of the original trawling area was included in the location protocol. Results from the experimental effort supported the hypothesis as increased catch rates were observed.

In 2019, the trawl protocol was refined to include the above mentioned area and divided the area into four 15-mile sections. Sampling sites changed from random river miles to five bends within each section and habitat specific subsamples from the outside bend (OSB), inside bend (ISB), and crossover (CHXO) at the bends. Fixed sites were chosen based on Grisak (1996) and previous areas with high catch rates for target species. The entire reach was sampled on four trips rather than the single trip previously utilized.

Within each of the 15-mile sections, one or two fixed sites were selected (Grisak Thesis sites and FWP “hotspots”) and three or four random sites were selected from the remaining bends in the section. A new set of random bends from the available set was selected each trip. The intent of sampling random bends was to find locations of high catch rates that would later become fixed sampling locations. Some fixed sites could be removed from the sample location list if the target species was not consistently captured in the location or trawling is not feasible at that location. Trawling duration was changed in 2019 from two-minute to four-minute trawls.

Population health was evaluated with genetic assessments in 2022 which show significant historical gene flow has occurred and there remain sufficient population sizes to maintain genetic diversity within the population (Heist et al. 2022). The estimated population sizes are currently large enough to avoid inbreeding and loss of adaptive variation due to small population size. A Species Status Assessment conducted by the USFWS in response to a petition to list these species under the Endangered Species Act determined listing protections were not warranted for these two species. The TAC will continue to search for opportunities to improve population numbers.

Blue Suckers

Blue suckers will be sampled by electrofishing or trammel netting during the spring in known staging areas. A total of 15 hours (3 days) of electrofish sampling will be completed on even years so that a large enough sample size for size structure analysis and age inference can be performed. This effort has revealed a size distribution that is slowly shifting towards older and larger fish, with very little evidence for frequent successful recruitment (i.e., presence of fish >600 mm). Other methods for monitoring blue suckers will be evaluated during this 5-year period. Blue suckers will be PIT tagged to help evaluate their life history. The lack of evidence of successful reproduction of this species for many years requires increased attention. During the previous 5-year period (2017-2023) analysis of telemetry movement data from 62 radio tagged fish over a nine year period described movements and aggregations during the typical spawning season and the importance of discharge, water temperature and flood pulsing to these movements (Tornabene et al. 2020). In 2023, focus shifted to determining population age structure and genetic fitness by collecting data from 20 and 50 individuals for these purposes, respectively. TAC partners have also considered investigating propagation techniques. Age structure and genetic

results from 2023 will help dictate the direction of efforts going forward. The TAC will continue to search for opportunities to improve blue sucker population numbers.

Sauger

The standardized electrofishing surveys described in #1 above for five areas of the river between Morony Dam and Fort Peck Reservoir are the primary tool for monitoring sauger population trends. The periodic creel survey provides supplemental information on sauger because they are a preferred species targeted by anglers. Standardized seining and trammel net surveys, described in #1 above, provide some limited supplemental information on young-of-year sauger production

Paddlefish

Paddlefish reside in Fort Peck Reservoir for most of the year and migrate upstream into the Missouri River in early spring to spawn before returning to the reservoir in late spring or early summer. A special paddlefish research project funded by the licensee in cooperation with MFWP was conducted by University of Idaho personnel during 2006-2010. The objectives of the project were to: 1) characterize the physical characteristics of sites (depth, current velocity, temperature, turbidity) utilized by adult migratory paddlefish in the Missouri River above Fort Peck Dam prior to, during and after spawning; 2) determine direction and rates of movement of adult migratory paddlefish in relation to river discharge, water temperature, and turbidity; 3) compare the inter-annual distance of ascent of radio-tagged adults in relation to flow, temperature, and turbidity; 4) investigate if sex-specific differences in migratory periodicity and migration distances exist, and 5) identify and characterize egg deposition (spawning) sites. Movements of a total of 109 migratory adult paddlefish were monitored using radio telemetry during 2006-2010. Upstream spawning migrations were closely related to springtime river discharge, with the greatest upstream migrations occurring in years with sustained high spring flows. The largest upstream movements occurred in 2010, when the average maximum upriver movement was to River Mile 1959, which is 37 miles upstream from Fred Robinson Bridge and 25 miles downstream from the Judith River confluence. NWE dams on the Missouri River have relatively small reservoirs and are operated as run-of-the-river facilities. Hence, these dams have negligible effects on springtime flow patterns in the

Missouri River, which are largely determined by snowmelt and spring rains and, by the operation of US Bureau of Reclamation storage reservoirs. These include Canyon Ferry Reservoir on the mainstem Missouri, Gibson Reservoir on the Sun River, and Tiber Reservoir on the Marias River. Given the long period of juvenile development for paddlefish, changes in a year class may be undetectable for 15-20 years. To reduce risk of population impact when paddlefish enter the Missouri River to spawn, more restrictive angler harvest and catch-and-release management programs have increased over the past 25 years. The evaluation of these programs and other potential impacts continues.

Westslope Cutthroat Trout

Westslope cutthroat trout were originally the only native trout species in the Great Falls area of the Missouri River. This species has been extirpated from approximately 95% of its original range in northcentral Montana due to habitat degradation and the introduction of competing non-native trout species (rainbow, brook and brown trout). A number of remnant genetically-pure native westslope cutthroat trout populations have been discovered in isolated headwater areas of tributaries to Belt and Highwood creeks, which flow into the Missouri River shortly downstream from Morony Dam.. MoTAC has funded seven cutthroat trout restoration projects and will continue to seek opportunities to protect and restore populations of this rare native fish. Opportunities to restore westslope cutthroat in the mainstem Missouri River are not feasible due to changes in the river habitat, the presence of high numbers of non-native trout, and other competing or predatory fish species. Hence, westslope cutthroat restoration projects will most likely occur in isolated areas on small headwater tributaries. Projects in other tributary drainages such as the Dearborn, Smith, Sun, Teton, Marias, and Judith rivers will be considered on a case-by-case basis.

Spiny Softshell Turtles

The licensee provided manpower and equipment in cooperation with MFWP, the US Fish & Wildlife Service, and the US Bureau of Reclamation to conduct the first-ever comprehensive inventory of the distribution and abundance of spiny softshell turtles (SST) in the approximate 250-mile reach of river from Morony Dam to Fort Peck Reservoir. The standardized survey involved setting baited traps for three consecutive nights at 2-mile intervals along the river during 2006-2008. The licensee also provided field assistance and funding (through the Madison-Missouri Wildlife TAC) for a cooperative study with the US Bureau of Reclamation using radio telemetry to determine seasonal movements and habitat selection by SST in the river below Morony Dam. This study was conducted in the approximate 43-mile river reach

between Fort Benton and Coalbanks Landing during 2007-2009. More recently, the licensee joined with USFWS, BLM, and USBR to fund a project to determine seasonal SST movements, habitat preferences, and nesting behavior in an approximate 50-mile reach between Fred Robinson Bridge and Stafford Ferry. This project was conducted by Montana State University personnel during 2009-2012 and the resulting MS thesis was completed in 2014.

The 2019-2023 5-year plan recommended conducting an actual population estimate of SST in a representative river section to establish solid baseline data on this unique aquatic species of special concern. Information from past studies was used to develop an experimental protocol/design in spring, 2017 (Leathe 2017) and a population estimate experiment was conducted in a representative 10-mile section downstream from the Judith River confluence during 24 July – 3 August 2017. Data were compiled and sent to Dr. Jay Rotella (MSU, Bozeman) who used a variety of statistical models to estimate turtle population size. Results were better than expected and very accurate estimates were obtained for SST population size, especially for females, which are the most important component of the SST population due to their key role in nesting and reproduction. One very important and surprising outcome was that 16 of the 156 individual females handled during the 2017 survey had been tagged in the area 5-10 years ago during previous surveys. Growth rates for recaptured females >300mm long (suspected size at first maturity) were quite consistent and remarkably slow (average 1.6mm per year). Age and growth projections strongly suggest the largest females in the population (>400mm) may be well over 80 years old. These findings suggest this species may be less productive and more vulnerable to population declines due to various influences than anticipated. Results of the population estimate experiment indicate that the turtle population can be estimated/monitored with good accuracy in the Judith section using a crew of only two people (preferably one from NWE and one from FWP) for two weeks during late July/early August. This survey should be repeated annually or on alternate years if time allows to build a good baseline dataset and gather more documentation regarding the longevity question.

Seasonal Movements of Aquatic Species of Special Concern

Over the past several years, the licensee has cooperated with MFWP, Western Area Power Administration, and the US Bureau of Reclamation to purchase approximately

12 LOTEK radio-telemetry base stations and hundreds of radio transmitters to track the seasonal movements of adult and juvenile pallid sturgeon, sauger, blue suckers, paddlefish, and spiny softshell turtles. The base stations have been deployed at strategic locations along the 200+ mile stretch of river from Carter Ferry to Fort Peck Reservoir and have also been operated on tributaries including the Marias, Teton and Judith rivers. Telemetry studies to determine seasonal movements of some of these species will continue for several years. A major goal of the telemetry work is to determine the influence of spring discharge patterns from Canyon Ferry and Tiber reservoirs on spawning migrations and reproductive success of pallid sturgeon and other fish species of special concern in the Missouri River. NWE increased funding for PIT tag, detection stations and satellite interfaces to uplink real time data on the Marias, Teton and Judith rivers. This has proven to be a low-cost high-volume passive monitoring tool to evaluate migrations, spawning timing and age of tagged fish. Intraperitoneal tagging of pallid sturgeon with 134 kHz HDX tags was approved by the FWS in 2020. Since that time hundreds of juvenile pallids have been tagged to increase movement detections. In 2020, MoTAC funded analysis and publication of nine years of data from 62 radio tagged blue suckers which concluded river discharge and water temperature were the two most influential factors in movement and spawning (Tornabene 2020). In 2022, MoTAC funded analysis and report on 15 years of data from 198 radio tagged shovelnose sturgeon. Once again, discharge and water temperature were closely related to sturgeon movements, especially tributary entrance timing during spawning (Tornabene et al. *In Prep*).

5. Provide assistance to the FWS and Montana DFWP for ongoing evaluation of pallid sturgeon in the Missouri River downstream of Morony Dam.

Under the terms of the fish population monitoring agreement with MFWP, the licensee provides approximately $140,000 per year to MFWP for fisheries PM&E work in the middle Missouri River and the Great Falls area. A substantial portion (68%) of this funding is used to implement the pallid sturgeon monitoring and restoration work outlined in #4 above. In addition, NWE funds equipment expenses and provides field assistance to MFWP and other agencies in pallid sturgeon evaluation efforts downstream of Morony Dam.

6. Evaluate the potential to enhance tributary spawning to increase the contribution of natural reproduction to the Great Falls reservoirs fisheries.

The Sun River is a major tributary that enters the upstream end of Black Eagle Reservoir in Great Falls. There is substantial potential for enhancement of trout spawning habitat in the Sun River and its tributaries. Increased natural recruitment from the Sun River drainage would enhance fisheries in the Missouri River and reservoirs in the Great Falls area. Recent fish movement investigations have shown that rainbow trout inhabiting the Missouri River near Great Falls have migrated 60-80+ miles up the Smith River to spawn in tributary streams including Sheep and Tenderfoot creeks. Brown trout from the Great Falls area have also been found migrating into Hound Creek, a tributary that joins the Smith River about 24 miles upstream from the Missouri/Smith confluence. The MoTAC will continue to search for opportunities to implement projects to enhance trout production from the Sun and Smith river drainages as these drainages can provide spawning and rearing habitat for fish that inhabit or drift into the Great Falls reservoirs. Only one small tributary (Box Elder Creek) enters the lower four Great Falls reservoirs (Rainbow, Cochrane, Ryan, Morony). This stream is intermittent and does not offer significant spawning and rearing possibilities for reservoir fish.

7. Evaluate the impact of reservoir drawdowns on spawning success in Cochrane, Ryan, and Morony reservoirs.

Due to high flushing rates and the other factors described in #1 above, fisheries resources and spawning success in Cochrane, Ryan and Morony reservoirs are limited. The dominant influence of high flushing rates tends to mask any effects reservoir drawdowns might have on spawning success. Annual or biannual netting of these three Great Falls Reservoirs will be used to evaluate drawdown impacts on reservoir fisheries. If problems are identified, PM&E measures will be identified and implemented to address them.

8. Evaluate the possibilities of regulating drawdowns of the Cochrane and Ryan reservoirs during the spring and early summer to minimize potential impacts on the reproductive activities of game species.

As mentioned in #1 and #7 above, fishery resources in the Great Falls reservoirs are very limited and are primarily controlled by the effects of high flushing rates. If monitoring per #7 above indicates significant impacts of reservoir drawdowns, PM&E measures will be identified and implemented either on-site or in adjacent waters to offset impacts.

Attachment 1

Text of FERC Project 2188 License Articles #414, 416 & 417

Article 414. Within one year of the date of issuance of the license, and every three years thereafter, the Licensee shall submit for Commission approval a fisheries plan for implementing specific mitigation and enhancement measures and post-licensing evaluation and monitoring for Hauser Lake and the Hauser Dam tailwaters. The plan should include a schedule for implementing the following tasks: (1) monitor Hauser Dam and tailwaters for evidence of fish loss (dead, injured or alive) from Hauser Lake as a result of impingement, entrainment, or spillage (particularly during high flows); (2) provide $35,500 annually to the Montana DFWP to implement adaptive management practices at Hauser and Holter dams; (3) propose additional measures to mitigate for avoidable and unavoidable impacts; (4) evaluate the effect of short-term flow fluctuations on the resident fish community in the tailwaters; (5) evaluate the impact of fish spilled from Hauser on the resident fish populations in Holter Lake; (6) monitor gas supersaturation in the water and gas bubble trauma in the fish in the Hauser tailwater during powerhouse rehabilitation; (7) propose measures to minimize gas supersaturation during powerhouse rehabilitation and to mitigate for avoidable and unavoidable impacts related to gas bubble trauma; (8) monitor the effects of project operations on Hauser Lake fish populations; and (9) evaluate the potential to enhance tributary spawning to increase the contribution of natural reproduction to the Hauser Lake fishery.

The Licensee shall prepare the plan in consultation with the FWS, Montana DFWP, Montana DEQ and other interested entities. The plan shall include a schedule for implementation of the program, for reporting and consultation with the agencies concerning the annual results of the program, and for filing the results, agency comments, and the Licensee's response to agency comments with the Commission. The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

At the end of three years, the Licensee shall submit to the Commission a summary of the measures implemented and an evaluation (conducted in consultation with the agencies) of the need for additional measures.

Article 416. Within one year of the date of issuance of the license, and every three years thereafter, the Licensee shall submit for Commission approval a fisheries plan for implementing specific mitigation and enhancement measures and post-licensing evaluation and monitoring for Holter Lake and the Holter Dam tailwaters. The plan should include a schedule for implementing the following tasks: (1) monitor Holter Dam and tailwaters for evidence of fish loss (dead, injured, or alive) from Hauser Lake as a result of impingement, entrainment, or spillage (particularly during high flows); (2) provide $35,500 annually to Montana DFWP to implement adaptive management practices to protect impoundment fisheries at Holter and Hauser Dams; (3) propose additional measures to minimize fish loss and to mitigate for avoidable and unavoidable impacts; (4) evaluate the effect of short-term flow fluctuations on the resident fish community in the tailwaters; (5) evaluate the impact of fish spilled from Holter on the resident fish populations downstream; (6) monitor the effects of project operations on Holter Lake fish populations; and (7) evaluate the potential to enhance tributary spawning to increase the contribution of natural reproduction to the Holter Lake fishery.

The Licensee shall prepare the plan in consultation with FWS, Montana DFWP, Montana DEQ and other interested entities. The plan shall include a schedule for implementation of the program, for reporting and consultation with the agencies concerning the annual results of the program, and for filing the results, agency comments, and the Licensee's response to agency comments with the Commission. The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

At the end of three years, the Licensee shall submit to the Commission a summary of the measures implemented and an evaluation (conducted in consultation with the agencies) of the need for additional measures.

Article 417. Within one year of the date of issuance of the license, and every three years thereafter, the Licensee shall submit for Commission approval a fisheries plan for implementing specific mitigation and enhancement measures and post-licensing evaluation

and monitoring for the five Great Falls reservoirs and their tailwaters. The plan should include a schedule for implementing the following tasks: (1) monitor the relative abundance of the most abundant fish species in the Great Falls reservoirs and in the Missouri River downstream of Morony Dam; (2) implement adaptive management practices to mitigate fisheries impacts associated with dewatering 0.5 mile of the Missouri River below Rainbow Dam; (3) implement adaptive management practices to mitigate fisheries impacts associated with Cochrane Reservoir and Morony Reservoir fluctuations in conjunction with peaking operations at the Cochrane and Ryan developments; (4) protect and provide for the recovery of threatened and endangered fish species and other aquatic species of special concern in the Great Falls reservoirs and below Morony Dam; (5) provide assistance to the FWS and Montana DFWP for ongoing evaluation of pallid sturgeon in the Missouri River downstream of Morony Dam; (6) evaluate the potential to enhance tributary spawning to increase the contribution of natural reproduction to the Great Falls reservoirs fisheries; (7) evaluate the impact of reservoir drawdowns on spawning success in Cochrane, Ryan, and Morony reservoirs; and (8) evaluate the possibilities of regulating drawdowns of the Cochrane and Ryan reservoirs during the spring and early summer to minimize potential impacts on the reproductive activities of game species.

The Licensee shall prepare the plan in consultation with FWS, Montana DFWP, Montana DEQ and other interested entities. The plan shall include a schedule for implementation of the program, for reporting and consultation with the agencies concerning the annual results of the program, and for filing the results, agency comments, and the Licensee's response to agency comments with the Commission. The Licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

At the end of three years, the Licensee shall submit to the Commission a summary of the measures implemented and an evaluation (conducted in consultation with the agencies) of the need for additional measures.

References

Grisak, G. G. 1996. The status and distribution of the sicklefin chub in the middle Missouri River, Montana. Masters thesis. Montana State University, Bozeman.

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Tornabene, Brian J.,Troy W. Smith, Anne E. Tews, Robert P. Beattie, William M. Gardner, and Lisa A. Eby. 2020. Trends in River Discharge and Water Temperature Cue Spawning Movements of Blue Sucker *Cycleptus elongatus* in an Impounded Great Plains River. Copeia. 108: 151-162.

Tornabene, B., L. Holmquist, D. Ritter, T. Smith, M. Webb, L. Eby, A. Zale and G. Grisak. *In Prep.* 15 Years of Shovelnose Sturgeon Monitoring in the Missouri River, Montana: Water Temperature and River Discharge Cue Spawning Movement and Tributary Entrance.

Exhibit II

Summary Progress Reports on PM&E Measures

2019 thru 2023