

STUDY 2.0

HYDROCYCLING

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LIST OF ATTACHMENTS

- A RESPONSE TO USFWS FEBRUARY 9, 2009, STUDY REQUESTS
- B RESPONSE TO USFWS JUNE 24, 2009, STUDY REQUESTS

STUDY 2.0 HYDROCYCLING

The Project is located in Nance and Platte counties, where water is diverted from the Loup River and routed through the 35-mile-long Loup Power Canal, which empties into the Platte River near Columbus. The Project includes various hydraulic structures, two powerhouses, and two regulating reservoirs. The portion of the Loup River from the Diversion Weir to the confluence with the Platte River is referred to as the Loup River bypass reach.

Upstream of the regulating reservoirs, the Loup Power Canal and the Monroe Powerhouse operate in a run-of-river mode with no storage capacity. Average daily flow in this reach is 1,610 cubic feet per second (cfs). Maximum flow in the canal is limited to 3,500 cfs by both water rights and hydraulic capacity. The interconnected regulating reservoirs, Lake Babcock and Lake North, accumulate water and build head during a portion of each day. Accumulated water is then released through the Columbus Powerhouse to produce energy during the high demand period of the day as directed by the Nebraska Public Power District (NPPD), the exclusive purchaser of Project power. This sub-daily regulation or manipulation of daily flow at the Columbus Powerhouse is called hydrocycling.

Except during brief ramp-up and ramp-down periods, operating discharge from the Columbus Powerhouse ranges from a minimum of about 1,000 cfs with one turbine operating to a high of about 4,800 cfs with all three turbines operating at high efficiency settings. Water discharged from the Columbus Powerhouse flows down the 5-mile-long Tailrace Canal and enters the Platte River at the Outlet Weir. This weir is located approximately 2 miles downstream of the confluence of the Loup River bypass reach and the Platte River. Tailrace Canal flow is recorded at the Nebraska Department of Natural Resources (NDNR) gage at the 8th Street bridge in Columbus. Including local inflows unrelated to the Project, Tailrace Canal discharge to the Platte River ranges from less than 100 cfs to over 6,300 cfs.

Hydrocycling of Project flows entering the lower Platte River may or may not affect riverine habitat and morphology, including habitat used by the interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), and pallid sturgeon (*Scaphirhynchus albus*). These possible effects are derived from the sub-daily variability, rate of change, and proportion of hydrocycling flows relative to flows already in the Platte River. Therefore, this study will evaluate the physical effects of hydrocycling operations in the lower Platte River.

1. GOALS AND OBJECTIVES OF STUDY

“Describe the goals and objectives of each study proposal and the information to be obtained;” 18 CFR §5.11(d)(1)

The goal of the hydrocycling study is to determine if Project hydrocycling operations benefit or adversely affect the habitat used by interior least terns, piping plovers, and pallid sturgeon in the lower Platte River. The physical effects of hydrocycling will be quantified and compared to alternative conditions.

The objectives of the hydrocycling study are as follows:

1. To compare the sub-daily Project hydrocycling operation values (maximum and minimum flow and stage) to daily values (mean flow and stage). In addition to same-day comparisons, periods of weeks, months, and specific seasons of interest to protected species will be evaluated to characterize the relative degrees of variance between hydrocycling (actual) and alternative conditions in the study area.
2. To determine the potential for nest inundation due to both hydrocycling and alternative conditions.
3. To assess effects, if any, of hydrocycling on sediment transport parameters (see Study 1.0, Sedimentation).
4. To identify material differences in potential effects on habitat of the interior least tern, piping plover, and pallid sturgeon.

2. RELEVANT RESOURCE MANAGEMENT GOALS

“Address any known resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;” 18 CFR §5.11(d)(2)

The U.S. Fish and Wildlife Service (USFWS) is responsible for the conservation and management of migratory, threatened, and endangered fish and wildlife resources under a number of authorities, including the Endangered Species Act of 1973, as amended (16 USC 1531-1544), the Fish and Wildlife Coordination Act, as amended (16 USC 661 et seq.); the Bald and Golden Eagle Protection Act, as amended (16 USC 668a-d); and the Migratory Bird Treaty Act, as amended (16 USC 703-712). Compliance with all of these statutes and regulations is required to be in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321-4347). The mission of USFWS is “working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people” (USFWS, June 15, 1999).

3. BACKGROUND AND EXISTING INFORMATION

“Describe existing information concerning the subject of the study proposal, and the need for additional information;” 18 CFR §5.11(d)(3)

3.1 Project Operations and Hydrocycling

As described in the PAD, the Project operates in a run-of-river mode from the Headworks to the regulating reservoirs. The interconnected regulating reservoirs, Lake Babcock and Lake North, accumulate water and build head during a portion of each day. Accumulated water is then released through the Columbus Powerhouse to produce energy during the high demand period of the day. This sub-daily manipulation of Columbus Powerhouse flow releases is called hydrocycling. Unless prevented from doing so (such as by ice, flooding, or equipment problems), the Project hydrocycles nearly every day of the year. The specific times, durations, and magnitudes of sub-daily Project flow releases are directly related to the power generation requested by NPPD. The original design of the system was based on this sub-daily operation to accommodate the expected demand fluctuations. The facility design would have been different had hydrocycling not been an integral part of the plan.

There is no spillway or alternative bypass flow path at the Columbus Powerhouse. All flow exiting the regulating reservoirs must pass through the three powerhouse turbine units. Daily hydrocycling flows range from near zero (when not generating) to approximately 4,800 cfs when generating with all three turbine units at their best efficiency setting. Except during brief turbine ramp-up and ramp-down periods, the minimum generating discharge from the powerhouse is approximately 1,000 cfs with a single turbine operating. Releasing flows less than 1,000 cfs is possible for short periods. However, it makes inefficient use of the water and increases wear on the generating equipment. Water discharged from the powerhouse flows down the 5-mile-long Tailrace Canal and enters the Platte River at the Outlet Weir. This weir is located approximately 2 miles downstream of the confluence of the Loup and Platte rivers.

Tailrace Canal flow is recorded in as small as 15-minute increments at the NDNR gage at the 8th Street bridge in Columbus approximately 2 miles before discharging into the lower Platte River at the Outlet Weir. Total daily Tailrace Canal discharge to the Platte River ranges from less than 100 cfs to over 6,300 cfs. Minor differences between powerhouse discharge and the total Outlet Weir discharge are due to non-Project canal inflows from the Lost Creek Flood Control Project, local surface drainage inflows, and Project maintenance flows to the Lost Creek Siphon.

3.2 Available Flow Data

Flow data from U.S. Geological Survey (USGS) and NDNR gage stations in the vicinity of the study area will be used for this hydrocycling study. Each gage station is accompanied by the associated rating curves and velocity and cross sectional data used to create the rating curves. Flow data that will be used for this study include:

- USGS Gage 06793000, Loup River near Genoa, NE – Available discharge and gage height data from April 1, 1929, to current includes daily and 30-minute interval data.
- USGS Gage 06792500, Loup River Power Canal near Genoa, NE – Available discharge and gage height data from January 1, 1937, to current includes daily and 30-minute interval data.
- NDNR Gage 00082100, Loup River Power Canal Return [Tailrace Canal] at Columbus, NE – Available discharge and gage height data from October 1, 2002, to current includes daily and 15-minute interval data.
- USGS Gage 06794500, Loup River at Columbus, NE – Available daily discharge and gage height data from April 1, 1934, to October 10, 1978. This gage was restarted by NDNR on September 23, 2008.
- USGS Gage 06774000, Platte River near Duncan, NE – Available discharge and gage height data from May 3, 1895, to current includes daily and 30-minute interval data.
- USGS Gage 06796000, Platte River at North Bend, NE – Available discharge and gage height data from April 1, 1949, to current includes daily and 30-minute interval data.
- USGS Gage 06796500, Platte River at Leshara, NE – Available discharge and gage height data from June 29, 1994, to current includes daily and 30-minute interval data.
- USGS Gage 068010000, Platte River near Ashland, NE – Available discharge and gage height data from September 1, 1928, to current includes daily and 30-minute interval data.
- USGS Gage 06805500, Platte River at Louisville, NE – Available discharge and gage height data from June 1, 1953, to current includes daily and hourly interval data.

3.3 Relevance to Threatened and Endangered Species

3.3.1 Lower Platte River

The lower Platte River begins at the river's confluence with the Loup River in Platte County and continues eastward to its confluence with the Missouri River in Sarpy

County.¹ This portion of the Platte River receives water from the Loup and Elkhorn rivers and has fairly stable flow. The lower Platte River is a mid-size, shallow, braided river. Sandbars and wooded islands are common within the channel. The width in some downstream areas of the lower Platte River has remained relatively constant, with approximately 90 percent of the historical width remaining (Eschner et al., 1983, as cited in Nebraska Game and Parks Commission [NGPC], December 2008). Much of the stream banks are wooded, with cottonwood and eastern red cedar as the dominant species. Commercial sand pits are common along the river and have provided non-river habitat for a variety of species, including interior least terns and piping plovers. Most of the river floodplain is now cropland, though there are scattered wet meadows and marshes (Schneider et al., 2005).

Flow in the Platte River is seasonally influenced. Flows are relatively high in the spring and early summer due to snow melt and weather events, and flows are low during the late summer and fall due to irrigation and infrequent rainfall. The lower Platte River retains many of the important flow characteristics of its historic natural hydrograph. The variable timing of water inputs from upstream sources provides baseflow throughout much of the year. The channel of the lower Platte River still contains a wide range of habitats, from large sandbars to woody islands to shallow sandbars and swift channels (Parham, 2007). The combinations of ample sediment supplies and flows in the effective discharge range maintain the braided morphology and alternatively create transverse bars and then dissect the macroforms into braids, lending support to the development and maintenance of the braided river morphology that is one of the types of habitat used by interior least terns and piping plovers.

Specialized habitats such as backwaters, sloughs, side channels, shoreline, and deep water pools along the edges of sandbars and river banks are examples of the diverse habitat types that occur along the Platte River (NGPC, December 2008). These in-stream features provide year-round habitat for numerous species of plants, invertebrates, amphibians, fish, and reptiles. Emergent sandbar habitat in braided channels is important to a variety of life stages of fish and wildlife, including interior least tern, piping plover, and pallid sturgeon, three species that are Federally listed as threatened or endangered. The long-standing presence of this variety of habitat types is a reflection of the dynamically stable braided river morphology of the lower Platte River.

¹ The lower Platte River is defined in several different ways by various resource agencies, for the purposes of the Loup River Hydroelectric Project relicensing, the lower Platte River is defined as the reach from the confluence with the Loup River down to the confluence with the Missouri River.

3.3.2 Interior Least Terns and Piping Plovers

Interior least terns are a migratory bird species and spend approximately 4 to 5 months at their nesting sites. These birds winter in South America, where little is known about their wintering habits and habitats, and they reproduce in the summer months in North America. The interior least tern breeding range extends from Texas to Montana and from eastern Colorado and New Mexico to southern Indiana (USFWS, September 1990). After conducting the first range-wide census of the interior least tern, Lott (2006) found that the lower Mississippi River is the most important breeding area for this species, with more than 62 percent of all interior least terns surveyed occurring on the lower Mississippi. Four additional river systems accounted for 33.3 percent of the remaining interior least terns, with 11.6 percent on the Arkansas River system, 10.4 percent on the Red River system, 6.9 percent on the Missouri River system, and 4.4 percent on the Platte River system. Lesser numbers of terns were counted on the Ohio River system, the Trinity River system in Texas, the Rio Grande/Pecos River system in New Mexico and Texas, the Wabash River system, two reservoirs in east Texas, and the Kansas River system. Many of these river systems, including some of the most populated such as the Missouri, Red, and Arkansas, have power or flood control facilities that practice varying degrees of hydrocycling.

Interior least terns typically arrive in Nebraska in mid-May to establish feeding and nesting territories. Ziewitz et al. (1992) found interior least terns initiating nesting on the Platte River from May 19 to June 23; however, nest initiation can occur as late as the first two weeks of July (Jorgensen, 2007). Kirsch (1990 and 1992, as cited in Sidle, 1992) found that interior least tern nest initiation dates during 1986 to 1990 on the lower Platte River ranged from May 20 to July 11, with a mode of June 5.

Piping plovers are also a migratory bird species and spend approximately 3 to 4 months on their breeding sites. These birds winter along the southern Atlantic coast in the U.S., the Gulf of Mexico coast in the U.S. and Mexico, and the Caribbean islands, and they reproduce in the summer months in the northern U.S. and Canada. The piping plover breeding range includes the Northern Great Plains from Alberta to Manitoba and south to Nebraska; the Great Lakes beaches; and Atlantic coastal beaches from Newfoundland to North Carolina. The results of the most recent International Piping Plover Breeding Census found that 57.6 percent of birds were found in the U.S. and Canada Northern Great Plains and Prairie Canada regions. The U.S. Northern Great Plains made up 36.6 percent of the total population of piping plovers, with 15.6 percent of the total population being found along the Missouri River (Montana, North Dakota, South Dakota, and Nebraska).

Piping plovers begin arriving at their Nebraska breeding areas in late April and early May (Sharpe et al., 2001). Nest initiation varies depending on local conditions and may begin by late April and continue until early July (USACE, 1998, as cited in USFWS, June 16, 2006). Egg laying typically begins the second or third week of

May (USFWS, November 30, 2000). Kirsch (1990 and 1992, as cited in Sidle, 1992) found that piping plovers initiated nests from May 19 to July 4, with a mode of June 8.

Interior least terns and piping plovers breed, forage, and nest on the Elkhorn, Loup, Missouri, Niobrara, and Platte rivers in Nebraska. Sandbar habitat in the Loup and lower Platte rivers is used by interior least terns and piping plovers for breeding, nesting, loafing, and foraging. Sandpit habitat adjacent to these two river systems has also been used extensively by these birds for nesting and foraging, perhaps more successfully. Lingle (1993) found that hatching rates were much higher on sandpit sites than on riverine sites and Wilson et al (1993) found that during a flood event only 3 percent of nests were lost on sandpits compared to 37 percent on the river.

Physical habitat requirements of the interior least tern and piping plover are difficult to describe. Nesting habitats tend to be ephemeral in quality and abundance. Beaches, sand and gravel spoil piles, sandbars, peninsulas, or other open sandy areas or exposed flats are the principal breeding and nesting habitats of these species (USFWS, June 16, 2006).

Historic Interior Least Tern and Piping Plover Use of the Lower Platte River

Very limited information exists regarding the historic use of the lower Platte River by interior least terns and piping plovers prior to the 1980s. The little information that does exist does not describe much about the exact location of the sightings, nesting on- or off-river, or the historic density of these birds on the lower Platte river. Furthermore, it does not provide information on the type, density, physical aspects, or other characteristics of the sandbars and channel systems or on the “value” of the habitat during times of use.

The first documented sighting of an interior least tern along the lower Platte River was in The Paul Wilhelm Journey (1823, as cited in Ducey, 2000). The first documented sighting of a piping plover along the lower Platte River was near Columbus in 1938. In 1941, interior least terns were recorded near Columbus (Ducey, 1985). At Merritt’s Beach near Plattsmouth, Nebraska, an off-river site, one interior least tern nest and one piping plover nest were observed in 1943 (Heinemann, 1944).

Current Interior Least Tern and Piping Plover Use of the Lower Platte River

Presently, interior least terns and piping plovers nest on sandpits adjacent to the lower Platte River as well as on sandbars located in the river. Kirsch (1996) studied interior least tern use of natural riverine sandbars and human-created sandpits along the lower Platte River downstream of Columbus and found that interior least terns showed no preference of riverine sandbars over sandpits or vice versa. Productivity and mortality of young also did not differ between these two habitat types, and it was

suggested that interior least terns may not perceive sandbars and sandpits as different (Kirsch, 1996).

Since 1987, NGPC has coordinated and conducted a standardized interior least tern and piping plover survey on the lower Platte River system. The Tern and Plover Conservation Partnership began participating in this survey in 1999. The survey area extends 103 river miles, from near Columbus in Platte County to near Plattsmouth in Cass County (Brown and Jorgensen, 2008). Dates on which the survey is conducted vary based on weather conditions and river flow. The survey consists of counting nesting colonies, adult birds, nests, and chicks on both the river and at associated sand and gravel mines (Jorgensen, 2007).

Exhibits 1-1 and 1-2 (Brown and Jorgensen, 2008) illustrate the total number of interior least terns and piping plovers recorded on the lower Platte River system (both sandbars and sandpits) during the annual mid-summer survey from 1987 to 2008. In reviewing these graphs, it appears that interior least tern numbers have remained fairly stable, while piping plover numbers were much higher in the late 1980s but have steadily fluctuated since. During this time period, the only change to Project operations has been the suspension of dredging activities (including discharge to the North and South Sand Management Areas) during the nesting season for interior least terns and piping plovers. This operational change was implemented in cooperation with NGPC, USFWS, and the Tern and Plover Conservation Partnership. The 2008 numbers show a slight increase from 2007 for piping plovers, but a relatively large decrease for interior least terns. Potential reasons for this decrease in interior least tern numbers could be attributed to low site fidelity or emigration. Lingle (1993) found that only 29 percent of adult interior least terns returned to nest at the site where they were banded and only 26 percent of chicks returned to their natal site, indicating that there is fairly low site fidelity and high emigration rates.

Exhibit 1-1. Total Number of Interior Least Terns Recorded on the Lower Platte River System, 1987-2008

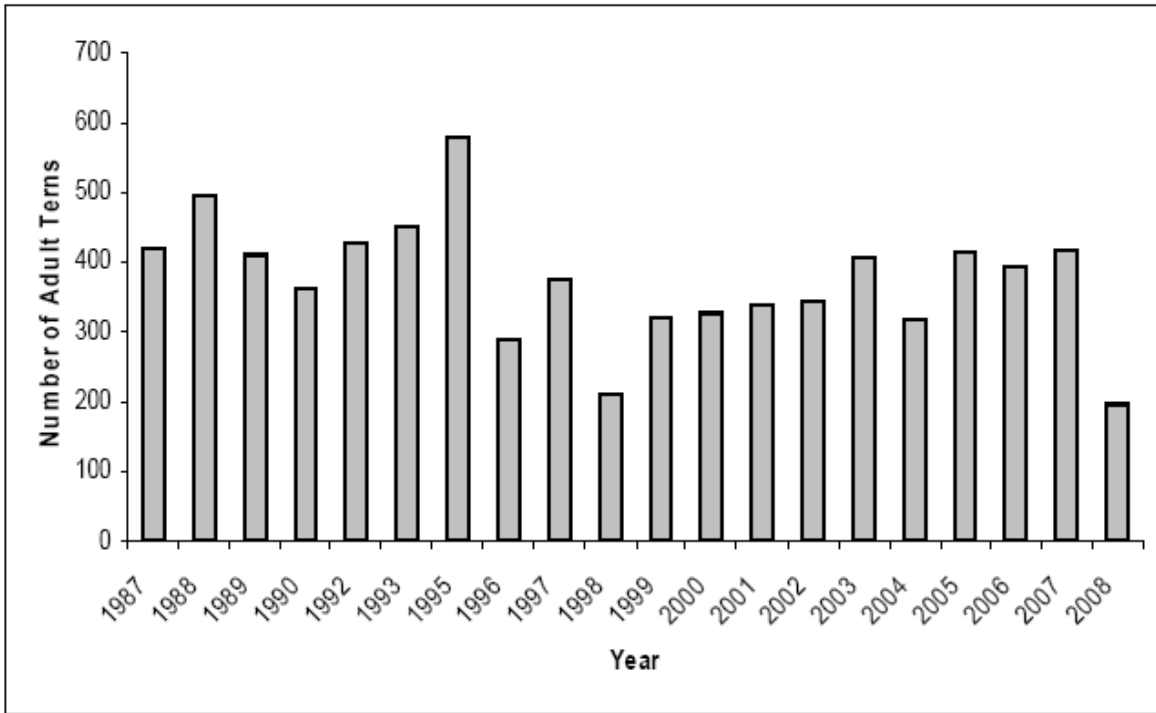
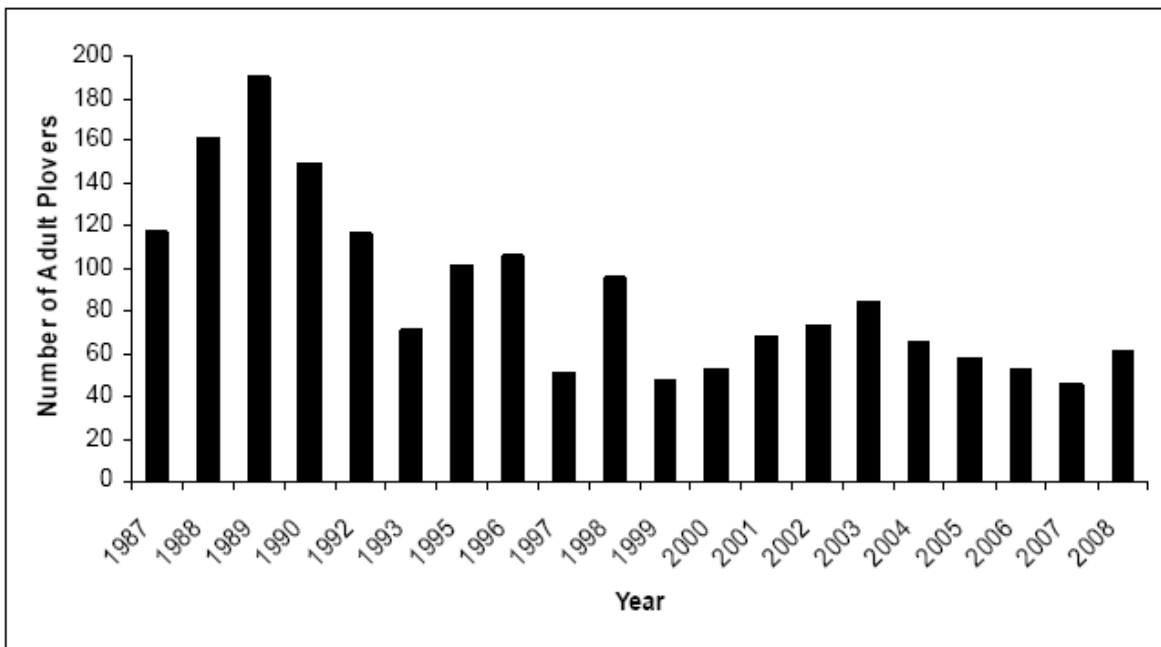


Exhibit 1-2. Total Number of Piping Plovers Recorded on the Lower Platte River System, 1987-2008



Critical Habitat

Critical habitat is defined as the specific areas that contain physical or biological features essential to the conservation of the species that may require special management considerations or protection under the Endangered Species Act of 1973, as amended (National Research Council, 2005). Critical habitat has not been designated for the interior least tern.

Critical habitat was designated for the northern Great Plains breeding population of the piping plover by USFWS on September 11, 2002 (67 FR 57638-57717). Included were approximately 106,030 acres largely associated with lakes in Minnesota, Montana, and North Dakota; about 440 miles associated with rivers in Nebraska; and 77,370 acres and 768 miles (438 miles associated with reservoir habitat and 330 miles associated with riverine habitat) on the Missouri River in Montana, North Dakota, South Dakota, and Nebraska. The final rule reported that for piping plovers breeding on the northern Great Plains in the United States, about 69 percent used the lake habitat and the remaining 31 percent were found on habitat associated with Missouri River reservoirs, tributaries to the Missouri River (such as the Platte and Niobrara rivers), and the Missouri River. Critical habitat was not designated for northern Great Plains piping plovers breeding in Canada.

The critical habitat designation in Nebraska included the Platte River from Lexington, Nebraska, to the confluence of the Platte with the Missouri River (252 miles), the Loup River (68 miles), and the eastern portion of the Niobrara River (120 miles). The shoreline of Lake McConaughy was excluded because USFWS maintained that it was adequately managed under plans developed by the Central Nebraska Public Power and Irrigation District. USFWS also excluded sand pits because they do not meet the physical and biological requirements of critical habitat (National Research Council, 2005).

On February 14, 2003, the Nebraska Habitat Conservation Coalition filed a lawsuit against USFWS before the U.S. District Court in Nebraska. The lawsuit was filed to invalidate the designation of critical habitat for piping plovers in Nebraska. On October 13, 2005, the Nebraska Habitat Conservation Coalition was awarded the case against USFWS. U.S. District Judge Lyle Strom vacated and remanded all critical habitat designations on the Platte, Loup, and Niobrara rivers. The critical habitat designation on the Missouri River along the Nebraska/South Dakota border still stands. Judge Strom ordered USFWS to re-conduct the economic analysis and re-assess the critical habitat designation for the piping plover in Nebraska (U.S. District Court for the District of Nebraska, October 13, 2005). Because of this decision, there is currently no Federally designated critical habitat for piping plover within the state of Nebraska and in the vicinity of the Project.

River Habitat

Climatic conditions that influence river hydrology are a major factor influencing the braided river morphology, which translates to the distribution, abundance, and quality of nesting habitat. Riverine habitat is constantly changing and is formed and maintained by the hydrology of the river and the supply and movement of its alluvial bed material (USFWS, June 16, 2006). Riverine nesting areas of interior least terns and piping plovers consist of sparsely vegetated sand and gravel bars within a wide unobstructed river channel. Nesting locations are usually at higher elevations and away from the water's edge. Interior least terns and piping plovers have been observed to nest on sandbar habitats with less than 25 percent vegetative cover and an abundance of bare or sparsely vegetated sand and gravel (Sidle and Kirsch, 1993) with an average area of 1.45 hectares and at an average height of 0.49 meter (Ziewitz et al., 1992).

In a preliminary assessment of river nesting habitat, Brown and Jorgensen (2008) assessed nine sandbars with nesting interior least tern colonies and fifteen sandbars without nesting colonies from June 28 to July 3, 2008. The goal of this study was to assess the amount and quality of sandbar habitat available to the birds in the lower Platte River. The researchers systematically measured the physical characteristics of sandbars with nesting birds and sandbars without nesting birds.

This assessment was conducted on the lower Platte River from River Mile 57 (near Fremont, Nebraska) downstream to the confluence of the Platte and Missouri rivers (near Plattsmouth). Sandbar surface area and elevation above the water line were measured and used to determine sandbar "size." River flow measurements from gage stations were used to show the relationship between flow changes and whether a sandbar and the nests on it were inundated or remain dry. This study followed a period of very high flows on the Platte River. On May 31, 2008, the average daily discharge was 96,000 cfs at the USGS gage at Louisville, Nebraska, which is in the top 10 of daily peak discharges for the period of record (1953 to 2009). In addition, the flow volume during that period was approximately 150 percent of normal at Louisville. This higher-than-average event may have caused certain outcomes to be different than a normal flow year.

The results of this assessment showed that average sandbar area and height, with and without nests, were relatively similar. Throughout the study, no interior least tern nests were inundated, despite notable river rises due to weather conditions. One piping plover nest at a relatively low elevation was inundated.

Non-River Habitat

Operating sand and gravel pits provide a barren to sparsely vegetated substrate suitable for nesting habitat (Sidle, 1993). Kirsch (1996) characterized sandpit sites as expansive areas of sand with large surface areas of water. Sidle (1993) identified 32 sandpits and the District's Sand Management Area as suitable for nesting interior least terns and piping plovers. Sidle found that most sandpits examined ranged in size from 0.6 to 79.6 hectares (ha) and averaged 23 ha with the District's Sand Management Area being an outlier at 200.8 ha. The sand and gravel component of sandpits ranged from 0.2 to 37.3 ha, and the water component ranged from 0.4 to 42.3 ha. The District's Sand Management Area was approximately 172.2 ha of sand and gravel and 28.6 ha of water (Sidle, 1993).

Due to recent trends in management of interior least terns and piping plovers, including directing nest sites, monitoring, vegetation control, and predator exclusion and management, many commercial sandpits and sandpit lakeshore housing developments are successfully being used by these species. Brown et al. (2008) reported a steady increase in both interior least terns and piping plovers nesting at non-river habitat over the past 20 years. Jenniges and Plettner (2008) found that productivity at managed sandpits was significantly higher than at unmanaged pits during the same time frame, indicating that management is effective in improving productivity of interior least terns.

The District's North Sand Management Area has provided consistent habitat for nesting interior least terns and piping plovers for a number of years and continually has the largest documented nesting colony of interior least terns and piping plovers located along the Loup River system (NGPC, 2009). Current management practices at the District's North Sand Management Area have used a combination of directing nest sites, protective sand berms, redirecting dredge discharge flow, and interior least tern and piping plover nest monitoring. These management practices, developed in conjunction with the North Sand Management Area Adaptive Management Plan, have helped to increase bird awareness and to allow these species to successfully coexist with the dredging and sand operations (Tern and Plover Conservation Partnership, July 30, 2008).

3.3.3 Pallid Sturgeon

The pallid sturgeon is considered to be a large turbid river species. The habitat used by different life stages of this species varies widely. Historically, most rivers comprising the range of the pallid sturgeon were characterized by shallow channels with shifting sandbars. The lower Platte River still retains this type of habitat over most of its length. Pallid sturgeon in the lower Platte River use areas associated with the downstream ends of sandbars and in deeper channels along the edge of sandbars (Peters and Parham, 2008; Swigle, 2003).

Between 2001 and 2004, pallid sturgeon in the Platte River were caught in sampling gear as early as April 2 and as late as September 25. From this group, individuals implanted with radios all exited the Platte River by June 9 (Peters and Parham, 2008; Swigle, 2003). Of 25 hatchery-reared pallid sturgeon juveniles implanted and released in the Platte River during April 1998 and April 1999, six individuals either remained in the Platte throughout the year or returned to the Platte from the Missouri River the spring following their release (Snook, 2001, as cited in Peters and Parham, 2008).

Pallid sturgeon have been found to use the deepest water available in the Platte River, using depths ranging from 0.33 to 1.27 meters, with average column velocities in the range of 0.52 to 0.82 meters per second (Peters and Parham, 2008). Many studies have noted the preponderance of use of sand substrate by pallid sturgeon. In the Platte River, average percentages of sand, silt, and gravel at pallid sturgeon telemetry contacts were 99.9 percent, 0.4 percent, and 0 percent, respectively (Peters and Parham, 2008).

4. PROJECT NEXUS

“Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied;” 18 CFR §5.11(d)(4)

The Columbus Powerhouse is operated in a sub-daily hydrocycling mode to generate power as requested by NPPD. Project flow releases enter the Platte River from the Tailrace Canal near Columbus. This hydrocycling operation may result in impacts, whether adverse or beneficial, on habitat used by interior least terns, piping plovers, and pallid sturgeon. Because the braided river morphology provides that habitat, this hydrocycling study focuses on assessing impacts of Project operations on the river morphology.

5. STUDY AREA AND STUDY SITES

The proposed study area includes the Tailrace Canal and the lower Platte River from the Project Outlet Weir to the USGS gage on the lower Platte River at Louisville, shown in Figure 2-1. Stream gage information from upstream locations on both the Loup River and central Platte River will be used in development of total flow information at the Outlet Weir location. Existing stream gage locations on the lower Platte River will serve as study sites for analyses.

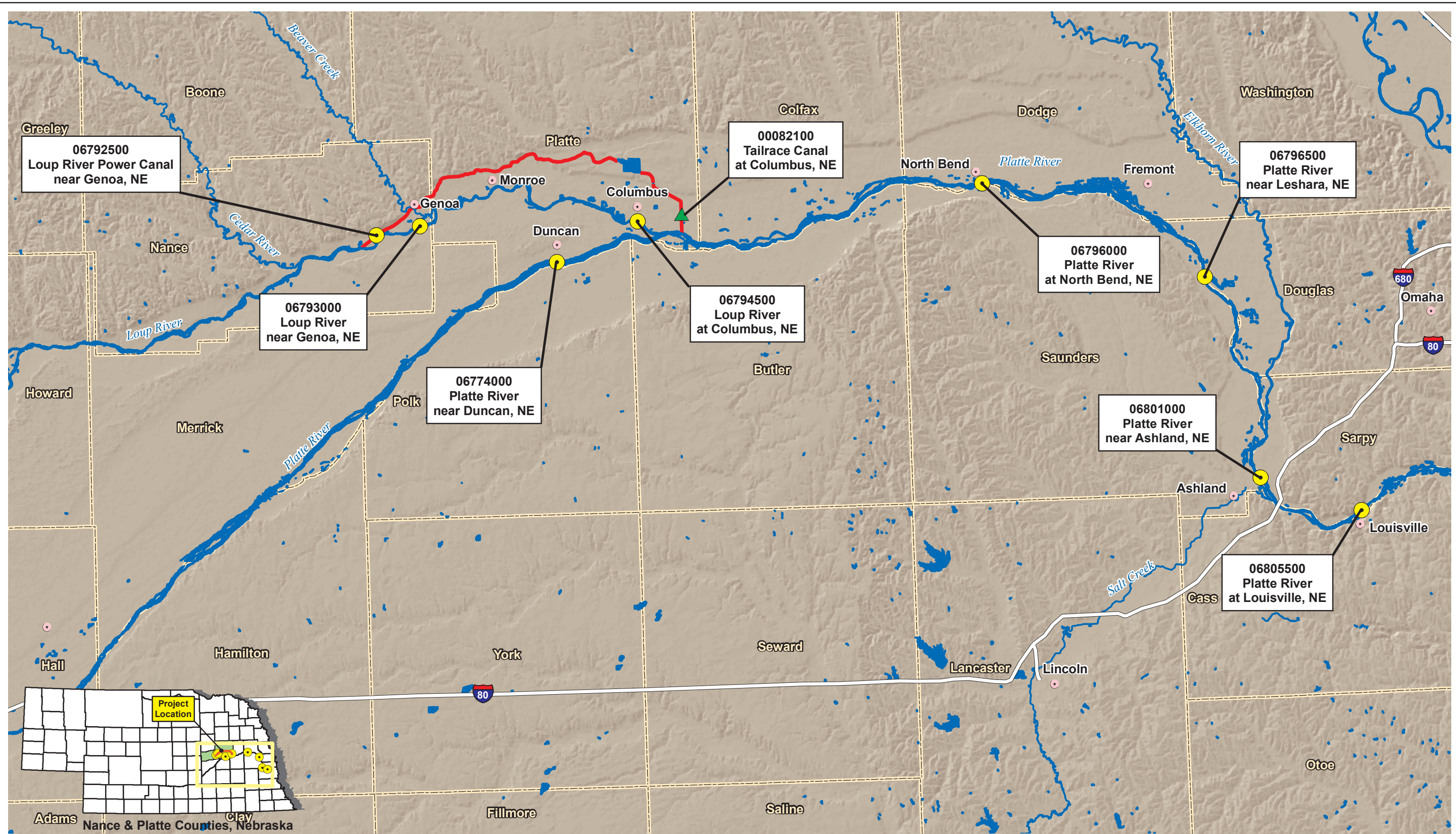
At the April 11 and May 27-28, 2009, Study Plan Meetings, USFWS requested that the study area for all studies related to the pallid sturgeon be extended to include the Platte River from the Elkhorn River confluence to the Loup River confluence (thereby extending the reach for analysis to include the reach upstream of the Elkhorn River). This request was based on the capture of a single pallid sturgeon upstream of the Elkhorn River confluence, near Leshara, Nebraska, by researchers from the

University of Nebraska-Lincoln on March 31, 2009. The District is not proposing to extend the study area for the following reasons:

- The accepted reach of the pallid sturgeon is the Platte River from the confluence of the Elkhorn River to the confluence with the Missouri River, as documented in the Pallid Sturgeon Recovery Plan (USFWS, 1993) and the National Research Council of the National Academies publication *Endangered and Threatened Species of the Platte River* (National Research Council, 2005).
- This reach is validated by a 2001 to 2004 research/sampling effort conducted by Peters and Parham (2008) that included the lower Platte River from the confluence with the Loup River to the confluence with the Missouri River. The sampling resulted in the capture of 15 pallid sturgeon from the lower Platte River below the Elkhorn River confluence (Peters and Parham, 2008). The study failed to capture any pallid sturgeon above the Elkhorn River confluence.

Until the March 31, 2009, capture at Leshara, there had never been a documented occurrence of pallid sturgeon in the lower Platte River above the Elkhorn River confluence. Although this capture represents an interesting scientific finding, the single and isolated nature of this occurrence does not represent a dataset sufficient to expand the currently accepted reach of the pallid sturgeon reach in the lower Platte River.

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Loup River Power Canal
near Genoa, NE

06793000
Loup River
near Genoa, NE

06774000
Platte River
near Duncan, NE

06794500
Loup River
at Columbus, NE

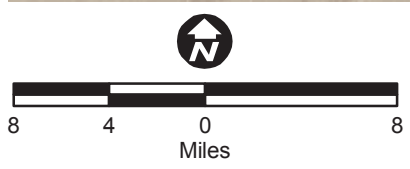
00082100
Tailrace Canal
at Columbus, NE

06796000
Platte River
at North Bend, NE

06796500
Platte River
near Leshara, NE

06801000
Platte River
near Ashland, NE

06805500
Platte River
at Louisville, NE



- Legend**
- City
 - ▲ NDNR Gaging Station
 - USGS Gaging Station
 - Interstate
 - Stream/River
 - Loup Power Canal
 - Waterbody
 - County



Hydrocycling Study Area

Loup River Hydroelectric Project
FERC Project No. 1256
Proposed Study Plan

DATE	July 2009
FIGURE	2-1

Source: Stream Gage, Nebraska Department of Natural Resources; Streams/Waterbodies, 2000 Tiger Files

6. PROPOSED METHODOLOGY

“A detailed description of the study and the methodology to be used;” 18 CFR §5.11(b)(1)

“Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers any known tribal interests;” 18 CFR §5.11(d)(5)

The methodology for the hydrocycling study includes six tasks designed to meet the four objectives presented in Section 1, Goals and Objectives of Study. These objectives are repeated below, and the tasks that will be conducted to meet each objective follow. Task 1, Data Collection, is required prior to initiation of the other tasks and is not associated with one specific objective.

Task 1 Data Collection

Flow and gage height data will be collected for each USGS and NDNR gage listed in Section 3.2, Available Flow Data, for the respective periods of record.

Objective 1: To compare the sub-daily Project hydrocycling operation values (maximum and minimum flow and stage) to daily values (mean flow and stage). In addition to same-day comparisons, periods of weeks, months, and specific seasons of interest to protected species will be evaluated to characterize the relative degrees of variance between hydrocycling (actual) and alternative conditions in the study area.

Task 2 Gage Analysis

A gage analysis will be performed using existing USGS and NDNR flow and stage data from the listed study sites to accurately determine the timing, frequency, rate of change, travel time, conveyance losses or gains, and magnitude of sub-daily flow and stage changes attributable to Project hydrocycling. The period of analysis for this task will be the time period during which the NDNR gage of flows in the Tailrace Canal at the 8th Street bridge in Columbus has been in operation.

The results of this analysis will provide basic hydrologic information for use in subsequent tasks.

Task 3 Hydrographs for the Project versus Alternative Conditions

Historical hydrographs for each Platte River study site as well as the Tailrace Canal will be plotted for periods of weeks, months, and specific seasons of interest to protected species. Daily maximum, minimum, and mean flows will be plotted for each time interval. The overall time period that will be used to create these plots will be the time period during which the NDNR gage at the 8th Street bridge in Columbus

has been in operation. A synthetic hydrograph will be developed and plotted for the existing flow record downstream of the Tailrace Canal return for current Project operations. Conveyance losses or gains will be estimated for the current operations and applied appropriately for testing alternative conditions.

Then, synthetic hydrographs will be developed for alternative conditions. The conveyance losses or gains from actual operations will be applied appropriately for the Tailrace Canal return synthetic hydrograph. The synthetic hydrographs for each study site will be plotted for periods of weeks, months, and specific seasons of interest to protected species for the period of analysis. Maximum, minimum, and mean flow will be plotted. The results of this analysis will be reviewed in context with the life requisites of the pallid sturgeon and its use of the lower Platte River below the confluence with the Elkhorn River.

Objective 2: To determine the potential for nest inundation due to both hydrocycling and alternative conditions.

Task 4 Nesting Season Sandbar Inundation Heights

Historical flow data and synthetic hydrographs developed in Task 3 will be used along with the USGS rating curves to compare theoretical instances of nest inundation under hydrocycling and alternative conditions. This will be accomplished by identifying the theoretical highest flow (benchmark flow) during the time period between theoretical arrival of the species, assumed to be April 25 for piping plovers and May 15 for interior least terns, and when eggs are laid; the benchmark flow will then be compared to subsequent flows during the theoretical initial incubation and fledging period to determine the number of times the benchmark flow was exceeded. The analysis will be completed for historical hydrographs, which include Project hydrocycling, and for synthetic hydrographs developed to represent alternative conditions. The number of times theoretical inundation (exceedance of the benchmark) occurs under each condition will be compared to determine if Project hydrocycling operations increase or decrease the likelihood of nest inundation.

Although interior least terns and piping plovers are often nesting associates, the two species have slightly different nesting periods in Nebraska. Because of these differences, the potential for nest inundation will be evaluated separately for each species. Additionally, each species is known to attempt a second and sometimes third egg-laying if their initial clutch is unsuccessful due to inundation, predation, weather-related damages or human disturbance; potential second and third nesting periods will also be evaluated using the historical and synthetic hydrographs and the previously identified methodology.

The dates to be used to evaluate initial, second, and third nesting periods for each species will be coordinated with NGPC, USFWS, and the Tern and Plover Conservation Partnership during conduct of the study.

Objective 3: To assess effects, if any, of hydrocycling on sediment transport parameters.

Task 5 Effects of Hydrocycling on Sediment Transport Parameters

Effects of hydrocycling on sediment transport parameters, which are a reflection of the river morphology, will be evaluated using methodologies outlined for Study 1.0, Sedimentation. Sediment transport indicators (effective discharge and total sediment transported) will be determined for Project and alternative condition sub-daily hydrographs. The effective discharge and total sediment transported will be calculated for a series of representative days with hydrocycling. The results will be compared to alternative conditions for the same series of representative days. If the effective discharge and total sediment transport values do not materially differ between current and alternative conditions, then it can be concluded that hydrocycling operation does not impact sediment transport and thereby does not impact morphology. If the effective discharge and total sediment transport values do materially differ between current and alternative conditions, then an assessment of the potential impact on the braided river morphology will be conducted, possibly followed by development of potential mitigation measures in coordination with the agencies.

Objective 4: To identify material differences in potential effects on habitat of the interior least tern, piping plover, and pallid sturgeon.

Task 6 Effects of Hydrocycling on Interior Least Tern, Piping Plover, Pallid Sturgeon, and Isolation of Backwaters and Side Channels

The effects of hydrocycling/pulsing operations on interior least tern, piping plover, and pallid sturgeon habitat, such as backwaters and side channels, on other rivers outside of the Project Boundary will be examined and compared to conditions on the lower Platte River resulting from Project operations. This comparison will be used to determine if Project operations contribute to habitat conditions outside the spectrum of habitat used by these species on other river systems. River reaches used for comparison may include, but are not limited to, the Arkansas River below Keystone Dam, the Fort Randall reach of the Missouri River, the Missouri River reach below Gavins Point Dam, the Niobrara River, the Red River below Denison Dam, and the Yellowstone River below Intake, Montana. These river reaches were chosen based on respective population census numbers and frequency of occurrence for the interior least tern, piping plover, and pallid sturgeon.

Habitat characteristics of the interior least tern, piping plover and pallid sturgeon associated with hydrocycling/pulsing operations on these other rivers will be identified for comparative analysis. This comparative analysis will identify any similarities or differences between Project operations and hydrocycling/pulsing operations on these other rivers to see if the habitat characteristics or species usage that result from the respective operation are similar or different and if so, why. If differences are noted that could be acting to reduce interior least tern and piping plover habitat on the lower Platte River below the Tailrace Canal confluence and/or pallid sturgeon habitat on the lower Platte River below the Elkhorn River confluence, a determination will be made as to whether these limitations are the result of Project hydrocycling or other factors. If any limitations could be the result of Project hydrocycling, then alternative conditions will be examined to determine if any of these limitations might be reduced.

The Platte River Recovery Implementation Program (PRRIP) is currently undertaking a study of the lower Platte River below the Elkhorn (PRRIP study) to evaluate the effects of PRRIP water management activities on water stage and the effect of those stage changes on physical parameters thought to be important to the pallid sturgeon (depth, velocity, temperature, turbidity, and bedforms). It is anticipated that this work will be completed in December 2009. The results of the PRRIP study will be used to the extent possible to evaluate the effects, if any, of hydrocycling. Because the PRRIP study has a completion date that allows it to be useful to the relicensing of the Project, no other similar in-river studies are proposed or needed. The District believes that the PRRIP study will suffice in supplementing the understanding of river impacts needed at this level of detail (detailed micro-evaluation of sandbars within a typical reach assuming a rigid bed stream).

7. CONSULTATION WITH AGENCIES, TRIBES, AND OTHER STAKEHOLDERS

This study plan has been developed based on discussions with agencies prior to submittal of the PAD and during multiple study plan meetings that followed the submittal of the Proposed Study Plan.

The District presented an overview of the goals, objectives, and activities associated with Study 2.0, Hydrocycling, at the Study Plan Meeting held on April 21, 2009. Additionally, the goals and objectives for aquatic resources studies, including Study 2.0, were discussed in detail. The meeting was attended by representatives of FERC, NGPC, Nebraska Department of Environmental Quality, USFWS, and National Park Service, as well as others. During this meeting, minor comments related to the wording of the study objectives as well as differentiating study objectives versus study activities were received and are incorporated as a result of this meeting.

The District conducted an additional Study Plan Meeting on May 27-28, 2009, to discuss in more depth the specific activities associated with multiple studies, including Study 2.0, Hydrocycling. Most of the attendees at the April 21, 2009,

meeting (listed above) also attended this meeting. Discussion specific to this hydrocycling study ultimately resulted in the following revisions to the study plan:

- Objective 2 and Objective 4 have been streamlined to focus on the objective and to not call out associated activities.
- Specific dates/benchmark events have been established for each species for the nest inundation analysis associated with Objective 2.

The discussions from both meetings were documented in meeting transcripts, which are available on the District’s relicensing website (<http://www.loup.com/relicense/html/agencymeetingsresources.html>).

USFWS provided comments related to Study 2.0, Hydrocycling, in its February 9, 2009, and June 24, 2009, comment letters. The District’s responses to these comments are included in Attachments B and C, respectively.

8. WORK PRODUCTS

“Provisions for periodic progress reports, including the manner and extent to which information will be shared; and sufficient time for technical review of the analysis and results;” 18 CFR §5.11(b)(3)

The intended work product for the hydrocycling study is a study report. The study report will document the physical magnitude, if any, of impacts of Project hydrocycling in the lower Platte River. Along with the study report, a database of the data gathered and used in the analysis will be available.

Updates regarding the hydrocycling study will be included in the study progress reports to be submitted to FERC in December 2009, March 2010, and June 2010.

9. LEVEL OF EFFORT AND COST

“Describe considerations of level of effort and cost, as applicable.” 18 CFR §5.11(d)(6)

It is estimated that the hydrocycling study will cost approximately \$230,000. This work will be completed by qualified water resources engineers and biologists.

10. SCHEDULE

“A schedule for conducting the study;” 18 CFR §5.11(b)(2)

“The potential applicant's proposed study plan must also include provisions for the initial and updated study reports and meetings provided for in §5.15.” 18 CFR §5.11(c)

The hydrocycling study is scheduled to begin in the fourth quarter of 2009 and to be completed in the third quarter of 2010. The Hydrocycling study report will be available in the third quarter of 2010. In addition, the District will prepare a consolidated Initial Study Report for Studies 1.0 through 12.0 that describes progress

and results (as appropriate) for each study. In accordance with the District’s Process Plan and Schedule, the Initial Study Report will be available in August 2010, and a study meeting will be held within 15 days, per 18 CFR §5.15(c)(2). An Updated Study Report will be available in August 2011 to provide information on progress and results for second season studies (as needed).

11. REFERENCES

- 67 FR 57637-57717. September 11, 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Great Plains Breeding Population of the Piping Plover; Final Rule. Department of the Interior, Fish and Wildlife Service.
- 16 USC 661 et seq. Fish and Wildlife Coordination Act, as amended.
- 16 USC 668a-d. Bald and Golden Eagle Protection Act, as amended.
- 16 USC 703-712. Migratory Bird Treaty Act, as amended.
- 16 USC 1531-1544. Endangered Species Act of 1973, as amended.
- 42 USC 4321-4347. National Environmental Policy Act of 1969, as amended.
- Brown, M.B., and J.G. Jorgensen. 2008. 2008 Interior Least Tern and Piping Plover Monitoring, Research, Management, and Outreach Report for the Lower Platte River, Nebraska. Joint Report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission.
- Brown, M.B., J.G. Jorgensen, and S.E. Rehme. 2008. Endangered species responses to natural habitat declines: Nebraska’s interior least terns (*Sternula antillarum athalassos*) and piping plovers (*Charadrius melodus*) nesting in a human-created habitat. *The Nebraska Bird Review*. 76(2):72-81.
- Ducey, J. 1985. The historic breeding distribution of the least tern in Nebraska. *Nebraska Bird Review*. 54(4): 72-73.
- Ducey, J. 2000. *Birds of the untamed west: the history of birdlife in Nebraska, 1750 to 1875*. Making History, Omaha, Nebraska.
- Heinemann, L.D. 1944. Nesting of the piping plover and least tern. *Nebraska Bird Review*. 12:9-10.
- Jenniges, J.J., and R.G. Plettner. 2008. Least tern nesting at human created habitats in central Nebraska. *Waterbirds*. 31(2):274-282.
- Jorgensen, J.G. 2007. Lower Platte River least tern and piping plover nesting survey. Nebraska W-15-R report. Nebraska Game and Parks Commission, Lincoln, Nebraska.
- Kirsch, E.M. 1996. Habitat selection and productivity of least terns on the lower Platte River, Nebraska. *Wildlife Monograph no. 132*.

- Lingle, G.R. 1993. Causes of nest failure and mortality of least terns and piping plovers along the central Platte River. *In Proceedings, the Missouri River and its tributaries: piping plover and least tern symposium.* South Dakota State University, Brookings, South Dakota.
- Lott, C.A. 2006. Distribution and abundance of the interior population of the least tern (*Sternula antillarum*), 2005. U.S. Army Corps of Engineers. ERDC/EL TR-06-13.
- National Research Council. 2005. *Endangered and Threatened Species of the Platte River.* Washington, D.C.: The National Academies Press.
- NGPC. December 2008. Assessment of the Pallid Sturgeon, Least Tern, and Piping Plover in the Lower Platte River. Nebraska Game and Parks Commission Report, Lincoln, Nebraska.
- NGPC. 2009. Data provided under the “Nebraska Game and Parks Commission Nongame Bird Program Data Use Agreement” between NGPC and HDR, signed on June 24, 2009.
- Parham, James E. 2007. “Hydrologic Analysis of the Lower Platte River from 1954-2004, with special emphasis on habitats of the Endangered Least Tern, Piping Plover, and Pallid Sturgeon.” Nebraska Game and Parks Commission.
- Peters, Edward J., and James E. Parham. 2008. “Ecology and Management of Sturgeon in the Lower Platte River, Nebraska.” Nebraska Technical Series No. 18. Nebraska Game and Parks Commission. Lincoln, Nebraska.
- Schneider, Rick, Mark Humpert, Kristal Stoner, and Gerry Steinauer. 2005. *The Nebraska Natural Legacy Project: A Comprehensive Wildlife Conservation Strategy.* Nebraska Game and Parks Commission, Lincoln, Nebraska. Available online at <http://www.ngpc.state.ne.us/wildlife/programs/legacy/review.asp>.
- Sharpe, R.S., W.R. Silcock, and J.G. Jorgensen. 2001. *The Birds of Nebraska: Their distribution and temporal occurrence.* University of Nebraska Press, Lincoln.
- Sidle, J.G. 1992. Flooding, Mortality, and Habitat Renewal for Least Terns and Piping Plovers. *Colonial Waterbirds.* 15(1):132-136.
- Sidle, J.G. 1993. Least tern and piping plover use of sand and gravel pits along the Platte and Loup rivers, Nebraska. *In Proceedings, the Missouri River and its tributaries: piping plover and least tern symposium.* South Dakota State University, Brookings, South Dakota.
- Sidle, John G., and Eileen M. Kirsch. 1993. “Least Tern and Piping Plover Nesting at Sand Pits in Nebraska.” *Colonial Waterbirds.* 16(2):139-148.

- Swigle, B.D. 2003. Movements and Habitat Use by Shovelnose and Pallid Sturgeon in the Lower Platte River, Nebraska. M.S. Thesis, University of Nebraska, Lincoln.
- Tern and Plover Conservation Partnership. July 30, 2008. Personal communication between Mary Bomberger Brown, Program Coordinator, Tern and Plover Conservation Partnership, and Melissa Marinovich, Environmental Scientist, HDR.
- U.S. District Court for the District of Nebraska. October 13, 2005. Nebraska Habitat Conservation Coalition (P) v. U.S. Fish and Wildlife Service (D). Case: 4:03-cv-03059-LES-DLP. Document #: 53. Date Filed: 10/13/05.
- USFWS. September 1990. “Recovery Plan for the Interior Population of the Least Tern (*Sterna antillarum*).” Twin Cites, MN: U.S. Fish and Wildlife Service.
- USFWS. 1993. “Pallid Sturgeon (*Scaphirhynchus albus*) Recovery Plan.” Bismarck, ND: U.S. Fish and Wildlife Service.
- USFWS. June 15, 1999. National Policy Issuance #99-01, Mission Statement. Retrieved on February 27, 2009. http://www.fws.gov/policy/npi99_01.html.
- USFWS. November 30, 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. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota.
- USFWS. June 16, 2006. Biological Opinion on the Platte River Recovery Implementation Program. U.S. Fish and Wildlife Service, Grand Island, Nebraska.
- Wilson, E.C., W.A. Hubert, and S.H. Anderson. 1993. Nesting and foraging of least terns on sand pits in central Nebraska. *The Southwestern Naturalist*. 38(1):9-14.
- Ziewitz, J.W., J.G. Sidle, and J.J. Dinan. 1992. “Habitat Conservation for Nesting Least Terns and Piping Plovers on the Platte River, Nebraska.” *Prairie Naturalist*. 24(1):1-20.

Attachment A – Response to USFWS February 9, 2009, Study Requests

STUDY 2.0 HYDROCYCLING RESPONSE TO USFWS FEBRUARY 9, 2009, STUDY REQUESTS

Based on the discussion to follow, the District proposes that certain additional studies or study modifications recommended by USFWS are not reasonable; and/or can be accomplished by alternative means; and/or are inconsistent with generally accepted practice in the field. They were therefore not included in the District's study plan.

USFWS STUDY REQUESTS

In response to the District's Pre-Application Document (PAD) (Loup Power District, October 16, 2008) and FERC Scoping Document 1 (FERC, December 12, 2008), USFWS issued comments on these documents on February 9, 2009.

On pages 3 and 4 of its comment letter, USFWS recommends that the District and FERC perform the following studies in association with the relicensing process:

- "...study the quantity and quality (i.e., height, size, juxtaposition, and distribution) of the sandbars in the lower Platte River in relation to the fluctuation in river height and erosion due to hydrocycling in Study Number 2."
- "...review Auer (1996) and develop a similar addition to Study Number 2 to evaluate the affects of hydrocycling on pallid sturgeon on the lower Platte River."

DISTRICT RESPONSES TO STUDY REQUESTS

Request to Study Quantity and Quality of Sandbars in Lower Platte River

USFWS does not include in its request any specific details regarding its proposed study scope, methods, or desired outputs.

The requested study was not included in the District's study plan because the approach is not consistent with generally accepted practice in the field. It is estimated that a study of such magnitude (approximately 110 river miles and thousands of continually shifting sand bars) would require a minimum of 5 years to collect and analyze a meaningful sample for the lower Platte River. Even if that could be accomplished, it would be extremely problematic to use sandbar measurements to differentiate sub-daily Project flow effects from natural flow effects and other flow altering externalities. Furthermore, the requested study concept would not allow for consistent comparison of alternative conditions because of variability in natural flow conditions.

The effective discharge method proposed by the District and detailed in Study 2.0, Hydrocycling, has been successfully used in the Platte River previously. Using established sediment rating curves and USGS stage and flow information for various

river segments, the effective discharge method will address sandbar evolution on a systemic basis.

In addition, the effective discharge method will allow for comparison of alternative conditions for any specific gaged river segment or reasonable time period.

Request to Develop a Pallid Sturgeon Study Similar to the Lake Sturgeon Study by Auer

The District evaluated the scope and methods of the referenced study by Nancy Auer (1996) and determined that a similar study could not be designed for the lower Platte River because many of the basic methods and elements of the Auer study do not apply at the District's Project location or cannot be adapted to pallid sturgeon (*Scaphirhynchus albus*) in the lower Platte River.

The Auer study was performed at an established lake sturgeon (*Acipenser fulvescens*) spawning site on the Sturgeon River in Michigan. The 3.29-km study reach was immediately downstream of the Prickett dam and hydroelectric facility. A 6-year study period was coordinated with a scheduled repowering of the two-unit, 2.2 MW project powerhouse. The multi-year repowering procedure allowed for comparison of three different project tailwater flow scenarios (peaking, intermediate, and near run-of-river) on lake sturgeon numbers and spawning activity in the study reach.

Key differences between the Prickett Project (PP) in the Auer study and the District's Loup River Project (LP) include the following:

- The Sturgeon River is narrow, well defined, and rocky, whereas the lower Platte River is very wide, actively braided, and has a sand bed.
- Sturgeon River water is clear and with little suspended sediment, thereby easily facilitating observation, whereas Platte River water is turbid with significant suspended sediment.
- The approximately 2-mile-long PP study reach is immediately below the project, whereas the approximately 33-mile-long LP study reach would begin 69 miles downstream of the Project at the Elkhorn River confluence.
- The PP includes a barrier dam and reservoir with essentially total control of flow in the study reach, whereas there are numerous tributaries and flow influences by others between the LP and the sturgeon habitat reach (below the Elkhorn River confluence).
- The PP has two well-defined spawning sites located within 1.6 miles downstream of the powerhouse, whereas the LP has an unknown number of potential, but entirely unidentified, spawning sites believed to be located 69 to 108 miles downstream of the Project Outlet Weir.
- The PP and lower Sturgeon River have a population of lake sturgeon that are easily located, captured, and monitored, whereas the LP and lower

Platte River have a very small number of pallid sturgeon that are seldom found and difficult to capture and monitor.

- The PP has a statistically meaningful and concentrated lake sturgeon population to study, whereas the LP has no statistically meaningful or concentrated pallid sturgeon population to study.
- Lake sturgeon spawning preferences and behaviors are well understood and known active spawning sites have been located, whereas limited knowledge exists regarding pallid sturgeon spawning preferences and behaviors and active spawning sites are unknown.
- The PP had a 6-year repowering period resulting in three distinct flow regimes to study, whereas the LP was recently repowered and is bound by a long-term contract to operate in a daily hydrocycling mode.

The differences between the two rivers, hydropower projects, sturgeon species, study areas, external flow influences, spawning preferences, and evidence of project impacts are such that it is not reasonable to consider a similar study for the District's Project. Moreover, since the District's Project has recently been repowered, there is no similar opportunity for multiple-year comparisons of different flow scenarios.

REFERENCES

- Auer, N.A. 1996. "Response of spawning lake sturgeons to change in hydroelectric facility operation." *Transactions of American Fisheries Society*. 125:66-77.
- FERC. December 12, 2008. Scoping of Environmental Issues for Relicensing the Loup River Hydroelectric Project. Office of Energy Projects. Washington D.C.
- Loup Power District. October 16, 2008. Pre-Application Document. Volume 1. Loup River Hydroelectric Project. FERC Project No. 1256.

Attachment B – Response to USFWS June 24, 2009, Study Requests

STUDY 2.0 HYDROCYCLING RESPONSE TO USFWS JUNE 24, 2009, STUDY COMMENTS

INTRODUCTION

In a letter dated June 24, 2009, the U.S. Fish and Wildlife Service (USFWS) provided comments on the District's Proposed Study Plan (PSP) for the Project, as revised at the May 27-28, 2009, Study Plan Meeting. The District identified two general themes in USFWS's comment letter that the District believes merit a general discussion. These are listed below and are discussed in detail in the sections that follow:

- USFWS provided a number of recommendations for changing the District's proposed methodology. The District maintains that these changes are inconsistent with the National Environmental Policy Act of 1969 (NEPA).
- USFWS provided a number of recommendations for including cumulative effects analysis. The District maintains that these recommendations are inconsistent with NEPA guidance and USFWS's Endangered Species Act of 1973 (ESA) procedures.

USFWS Recommended Changes to Proposed Methodology that are Inconsistent with CEQ's NEPA Guidance

Neither NEPA nor the ESA requires a specific methodology to analyze impacts. The standard for both laws is to conduct an analysis that is adequate for the Federal agency's decision. Whatever methodology is used, it must provide an accurate and complete analysis. The Council on Environmental Quality (CEQ) guidance specifically states that the methodology and information used must avoid speculation about potential impacts and be the best information available. The District maintains that its PSP meets both of these criteria.

Specifically, the District proposes to indirectly analyze impacts on threatened and endangered (T&E) species and the aquatic resources of the Loup River bypass reach and the lower Platte River by evaluating geomorphic stability of these reaches. This will be accomplished by determining if Project operations and alternate operating conditions impact this stability. This methodology is based on the fact that habitat is a direct function of geomorphic conditions. This analysis coupled with the hydrocycling analysis will provide FERC with an analysis of Project operations and alternative conditions that is adequate for its decision.

In a number of comments (noted in specific responses provided below), USFWS criticizes the District's proposed methodology based on the fact that it assesses impacts using an indirect measure rather than a direct measure. The District maintains that determining impacts via indirect methods using many years of historical data is the most appropriate method because the District is not proposing any changes to Project operations as part of the license application. Furthermore, the

District notes that the use of historical data provides the ability to evaluate alternatives under identical conditions, eliminating the effects of externalities in methods proposed by USFWS.

USFWS Made Recommendations on Cumulative Effects that are Inconsistent with CEQ's NEPA Guidance and USFWS's ESA Procedures

In its comment letter, USFWS frequently explains that the District's analysis should not be based on current hydrology, but should be based on projected hydrology derived from reasonably foreseeable effects on the hydrograph. The District's main concern with this comment relates to USFWS's position on how this projected hydrology should be determined.

Per CEQ guidance, the standard methodology for evaluating cumulative effects is to use a historic baseline; to add the effects of past, present, and reasonably foreseeable future actions to that baseline; and then to add the incremental impacts of the proposed action to that total.

Alternatively, it is acceptable to use the existing baseline as representing the cumulative effects of past and present actions, then to add the effects of reasonably foreseeable future actions to that, and then to add the incremental effects of the proposed action to that total. The latter of these two approaches is the one the District has proposed to use. None of the accepted methodologies uses USFWS's recommendation of a projected baseline.

Allied with this concern is USFWS's position for determining what constitutes a reasonably foreseeable future action. CEQ's guidance states that the future action must have progressed far enough in its implementation to have some degree of certainty that it will be implemented. These future actions are to have a specific description and some existing evaluation.

Some of the examples that CEQ's guidance provides to make this judgment of certainty include identified or allocated funding, regulatory applications or approvals, and environmental clearance applications or approvals. The intent of CEQ's guidance is to make sure that future actions that are too speculative to have a high degree of certainty that they will be implemented are not included in the cumulative effects analysis.

USFWS's ESA procedures for determining reasonably foreseeable future actions are even more restrictive. The ESA procedures require that only actions that have completed Section 7 consultation be identified as reasonably foreseeable future actions. The stated rationale for this position is that under the ESA, any future action that could have an impact on a listed species must complete Section 7 consultation before it can be implemented. Therefore, any future action that has not completed Section 7 consultation has not met the reasonably foreseeable definition of certainty.

The District is concerned that USFWS's comments may not be consistent with either CEQ's NEPA guidance or its own ESA guidance because of its recommendation to use a baseline based on future conditions. On the surface, this recommendation appears to be inconsistent with CEQ's baseline and reasonably foreseeable future action guidance as well as USFWS's ESA guidance.

Organization of This Document

USFWS organized its comments by study objective and provided specific comments related to the following seven study criteria, as presented in 18 CFR §5.9(b):

- (1) Describe the goals and objectives of each study proposal and the information to be obtained;
- (2) If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
- (3) If the requester is a not resource agency, explain any relevant public interest considerations in regard to the proposed study; **(USFWS is a resource agency; therefore, USFWS did not comment on this study criteria.)**
- (4) Describe existing information concerning the subject of the study proposal, and the need for additional information;
- (5) Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
- (6) Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed [sic] season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
- (7) Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

This response is also organized by study objective and study criteria. Individual USFWS comments are presented in *italic* font exactly as received. Each comment is followed by the District's response.

USFWS COMMENTS AND DISTRICT RESPONSES

Objective 1: To compare the sub-daily Project hydrocycling operation values (maximum and minimum flow and stage) to daily values (mean flow and stage). In addition to same-day comparisons, periods of weeks, months, and specific seasons of interest to protected species will be evaluated to characterize the relative degrees of variance between hydrocycling (actual) and alternative conditions in the study area.

Study Criteria 1 – Goals and Objectives

USFWS Comment

The Service supports the current Objective 1 as revised in the May 28 and 29 study plan meeting.

District Response

The District appreciates USFWS review and support.

Study Criteria 2 – Relevant Agency Resource Management Goals

USFWS Comment

The Service supports the inclusion of this study because potential Project effects to: a) least tern and piping plover nesting sandbar habitat in the Platte River; b) pallid sturgeon habitat in the Platte River; and c) fish community habitat in the Platte River.

District Response

The District appreciates USFWS review and support.

Study Criteria 4 – Existing Information and Need for Additional Information

USFWS Comment

The Service recommends additional information to supplement the PSP. Results from the Bypass Reach Objective 2 would be needed to account for reasonably foreseeable effects to the hydrograph that would apply toward all action alternatives.

District Response

The District is unsure which Study Objective 2 USFWS is referencing. However, the District intends to analyze reasonably foreseeable future actions within the standard

for cumulative effects analysis for the National Environmental Policy Act of 1969 (NEPA) and the Endangered Species Act of 1973 (ESA).

Study Criteria 5 – Project Nexus, Study Results, and License Requirements

USFWS Comment

The Project has a direct effect on subdaily streamflow of the Platte River. Project effects to the Platte River hydrograph are cumulative to reasonably foreseeable non-Project effects to the hydrograph.

District Response

As stated in its response to USFWS comments on Objective 1, Study Criteria 4, above, the District intends to analyze reasonably foreseeable future actions within the standard for cumulative effects analyses for NEPA and the ESA.

Study Criteria 6 – Proposed Methodology

USFWS Comment

This PSP evaluation should not be based on current hydrologic baseline, but on projected hydrology derived from reasonably foreseeable effects to the hydrograph using results from Water Temperature in the Bypass Reach Objective 2.

District Response

The District does not understand USFWS's comment or how hydrocycling relates to a flow and water temperature relationship in the Loup River bypass reach. In Study 4.0, Water Temperature in the Loup River Bypass Reach, Objective 2 is "To describe and quantify the relationship, if any, between diversion of water into the Loup Power Canal and water temperature in the Study Reach of the Loup River bypass reach."

However, as stated in its response to USFWS comments on Objective 1, Study Criteria 4, above, the District intends to analyze reasonably foreseeable future actions within the standard for cumulative effects analyses for NEPA and the ESA.

Study Criteria 7 – Level of Effort and Cost

USFWS Comment

Service proposed recommendations to Study Criteria 4 and 6 would only require additional work associated with Flow Depletion and Flow Diversion Objective 3.

District Response

The District does not understand USFWS's reference to "Flow Depletion and Flow Diversion Objective 3" when "Bypass Reach Objective 2" was referenced under Study Criteria 4 and "Water Temperature in the Bypass Reach Objective 2" was referenced under Study Criteria 6. In addition, the District does not believe that USFWS's generalized statement regarding level of effort satisfies the intent of the cost and level of effort factors identified in Study Criteria 7 as provided in 18 CFR §5.9(b). That is, USFWS does not quantify level of effort or associated cost with its proposed analysis.

Objective 2: To determine the potential for nest inundation due to both hydrocycling and alternative conditions.

Study Criteria 1 – Goals and Objectives

USFWS Comment

The Service supports the current Objective 2 as revised in the May 28 and 29 study plan meeting.

District Response

The District appreciates USFWS review and support.

Study Criteria 2 – Relevant Agency Resource Management Goals

USFWS Comment

The Service supports the inclusion of this study because potential Project effects to least tern and piping plover nesting sandbar habitat in the Platte River.

District Response

The District appreciates USFWS review and support.

Study Criteria 4 – Existing Information and Need for Additional Information

USFWS Comment

Current information USGS streamgauge information identified in the PSD is sufficient to fully address Objective 2.

District Response

The District appreciates USFWS review and support.

Study Criteria 5 – Project Nexus, Study Results, and License Requirements

USFWS Comment

The Project has a direct effect on subdaily streamflow in the Platte River. Project effects to the Platte River hydrograph are cumulative to reasonably foreseeable non-Project effects to the hydrograph.

District Response

As stated in its response to USFWS comments on Objective 1, Study Criteria 4, above, the District intends to analyze reasonably foreseeable future actions within the standard for cumulative effects analyses for NEPA and the ESA.

Study Criteria 6 – Proposed Methodology

USFWS Comment

This PSP evaluation should not be based on current hydrologic baseline, but on projected hydrology derived from reasonably foreseeable effects to the hydrograph using results from Water Temperature in the Bypass Reach Objective 2. It is recommended that FERC subdivide the evaluation of potential for nest inundation using the following time periods: a) prenesting from April 25 to May 31, and b) renesting is from June 1 through July 15.

District Response

The District does not understand the first sentence of USFWS's comment or how hydrocycling relates to a flow and water temperature relationship in the Loup River bypass reach, which is Study 4.0, Water Temperature in the Loup River Bypass Reach, Objective 2.

The District notes the recommendation in the second sentence of USFWS's comment and will adopt the prenesting and renesting dates requested by USFWS as applicable for each species.

Study Criteria 7 – Level of Effort and Cost

USFWS Comment

The only require additional work associated with Service proposed recommendations to Study Criteria 4 and 6 would be associated with Flow Depletion and Flow Diversion Objective 3. Restructuring the analysis to consider prenesting and renesting time periods would provide better insight regarding potential Project effects to nest inundation.

District Response

The District concurs that consideration of prenesting and renesting time periods would provide insight to potential Project effects, and notes that this analysis was included as part of the District's Proposed Study Plan and is included in the Revised Study Plan.

However, the District does not believe that USFWS's generalized statement regarding level of effort satisfies the intent of the cost and level of effort factors identified in Study Criteria 7 as provided in 18 CFR §5.9(b). That is, USFWS does not quantify level of effort or associated cost with its proposed analysis.

Objective 3: To assess effects, if any, of hydrocycling on sediment transport parameters (see Study 1.0, Sedimentation).

Study Criteria 1 – Goals and Objectives

USFWS Comment

The Service supports the current Objective 3 as revised in the May 28 and 29 study plan meeting.

District Response

The District appreciates USFWS review and support.

Study Criteria 2 – Relevant Agency Resource Management Goals

USFWS Comment

The Service supports the inclusion of this study because potential Project effects to: a) least tern and piping plover nesting sandbar habitat in the Platte River; b) pallid sturgeon habitat in the Platte River; and c) fish community habitat in the Platte River.

District Response

The District appreciates USFWS review and support.

Study Criteria 4 – Existing Information and Need for Additional Information

USFWS Comment

Current information USGS stream gage identified in the PSD is sufficient to fully address Objective 3.

District Response

The District appreciates USFWS review and support.

Study Criteria 5 – Project Nexus, Study Results, and License Requirements

USFWS Comment

The Project has a direct effect on: a) least tern and piping plover nesting sandbar habitat in the Platte Rivers; b) pallid sturgeon habitat in the Platte River; and c) fish community habitat in the Platte Rivers.

District Response

The District disagrees with this comment that the Project has a direct effect on the above-listed species because the analysis in the study plan is intended to provide information to make that determination. Under NEPA, the District proposes to analyze habitat impacts as well as species impacts. However, under the ESA, the standard is to analyze impacts on the species and not their habitat unless it has been officially designated as critical habitat. To date, none of the listed species have officially designated critical habitat within the Loup River bypass reach and the lower Platte River.

Study Criteria 6 – Proposed Methodology

USFWS Comment

This PSP evaluation should not be based on current hydrologic baseline, but on projected hydrology derived from reasonably foreseeable effects to the hydrograph using results from Water Temperature in the Bypass Reach Objective 2. Service recommendations for Sedimentation Objective 1 (i.e., Effective discharge calculations should include an evaluation of sub-daily discharge effects to sediment transport for

nodes downstream of the Project tailrace) would also help to identify effects of hydrocycling on sediment transport parameters.

District Response

As stated in its response to USFWS comments on Objective 2, Study Criteria 6, above, the District does not understand the first sentence of USFWS's comment or how hydrocycling relates to a flow and water temperature relationship in the Loup River bypass reach, which is Study 4.0, Water Temperature in the Loup River Bypass Reach, Objective 2. Further, sub-daily analysis is proposed as part of the District's Study 2.0, Hydrocycling, Objective 3.

Study Criteria 7 – Level of Effort and Cost

USFWS Comment

The only additional work associated with Service proposed recommendations to Study Criteria 4 and 6 would be associated with Flow Depletion and Flow Diversion Objective 3.

District Response

The District does not believe that USFWS's generalized statement regarding level of effort satisfies the intent of the cost and level of effort factors identified in Study Criteria 7 as provided in 18 CFR §5.9(b). That is, USFWS does not quantify level of effort or associated cost with its proposed analysis.

<p>Objective 4: To identify material differences in potential effects on habitat of the interior least tern, piping plover, and pallid sturgeon.</p>
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Study Criteria 1 – Goals and Objectives

USFWS Comment

The Service proposes modifications to Objective 4. Please review Service General Comment 3 [provided below] for additional information.

Comment 3. The Service proposes modifications to Hydrocycling Objective 4 to include hydrocycling affects to fish community habitat.

District Response

The District does not intend to modify Objective 4 because effects on fish community habitat are addressed in Study 2.0, Hydrocycling, Task 6.

Study Criteria 2 – Relevant Agency Resource Management Goals

USFWS Comment

The Service supports the inclusion of this study because potential Project effects to least tern and piping plover nesting sandbar habitat in the Platte River. The Service also recognizes the potential Project effects to habitats for the pallid sturgeon and fish community.

District Response

The District appreciates USFWS review and support.

Study Criteria 4 – Existing Information and Need for Additional Information

USFWS Comment

The Service recommends additional information to supplement the PSP. The Service recommends that FERC include several study sites located at several locations from above the Project tailrace to Plattsmouth. Proposed study sites include reaches with documented least tern and piping plover nesting history near USGS streamgage sites. Proposed study sites include: a) the Platte River below the Loup River confluence and above the Project tailrace; b) immediately downstream of the Project tailrace; c) near the North Bend streamgage [River Mile 80 to 85]; d) near the Leshara streamgage [River Mile 35 to 41]; and e) near the Louisville streamgage [River Mile 7 to 13]. Configuration of survey transects and data collection within each study segment should be similar to that of the Platte River Recovery Implementation Program's stage change study (HDR 2008). Habitat parameters collected across each transect should include: flow quantity, depth, velocity, sandbar elevation, and bed forms (HDR 2008). Data collected within each study segment should be able to quantify parameters of least tern and piping plover nesting suitability including: a) area of bare sand per unit area; b) size distribution of sandbars; and c) position of sandbars [i.e., point bars or mid-channel bars]; d) depth and velocity (Kirsch 1996; Ziewitz et al. 1992).

District Response

The District does not intend to implement these recommendations and provides the following discussion in support of this decision.

Implementation of the District's proposed study would result in sufficient data collection, and associated analysis, to address Objective 2 and provide FERC with adequate Project-required NEPA and ESA analyses. No such additional comparative assessments, other than those already planned, are required.

The District notes that a comparative approach of geomorphic indices, such as channel width, velocity, and cumulative depth distributions, has already been completed by Ginting and Zelt (2008) for the lower Platte River from the North Bend gage downstream to the mouth.

Further, the use of long-term records, such as the period of record analyzed by the U.S. Geological Survey (USGS), which covered decades, provides a better baseline for analysis than short-term observations of cross sections and velocity measurements. Such measurements taken once in time, or even on a few occasions over 1 or 2 years, would not provide sufficient data to defensibly define any relationships among the measurements and nesting. Therefore, the District maintains that it is unnecessary to collect additional cross-sectional data.

Study Criteria 5 – Project Nexus, Study Results, and License Requirements

USFWS Comment

Project hydrocycling may have a direct effect on erosion of least tern and piping plover nesting sandbars by saturating the bars and banks during the daily high, increasing positive pore-water stresses on the material, then reducing the confining pressure during the daily low, causing the material slough (Jason Alexander, USGS-Lincoln, personal communication, 2009). Project hydrocycling has a direct effect on pallid sturgeon and fish community habitat as a result of the intraday changes in river stage. Project effects to the Platte River hydrograph are cumulative to reasonably foreseeable non-Project effects to the hydrograph.

District Response

The District notes that the Project has a potential effect on habitat and that ESA criteria are specific to species impact unless critical habitat has been designated. The District further notes that only reasonably foreseeable future actions that meet the strict NEPA standard for reasonably foreseeable and that have completed Section 7 consultation should be evaluated in accordance with the ESA.

The District's study plan includes assessments, regardless of cause, of potential hydrocycling impacts on channel morphology (that is, habitat), which is considered adequate to satisfy the necessary and sufficient requirements to address these concerns pursuant to NEPA and the ESA. The District also references the earlier responses about limited availability of hourly records of discharge and the existence of natural intraday fluctuations in discharge and stage.

Study Criteria 6 – Proposed Methodology

USFWS Comment

*The Service recommends additional information to supplement the PSP. Additional methods should include the ability to collect and analyze data in Study Criteria 4. Configuration of survey transects and data collection within each study segment should be similar to that of the Platte River Recovery Implementation Program's stage change study (HDR 2008). Time frames for data collection would include: a) 1st week March, b) 1st week May, c) 1st week July, and d) 1st week August. Habitat parameters collected across each transect should include the following at a minimum: flow quantity, depth, velocity, sandbars, and bed forms (HDR 2008). Service also recommends that the PSP document changes to mesohabitat similarly to that of Peters and Parham (2008), HDR (2009) **and provide a means to directly measure intraday effects of Project operations on pallid sturgeon and fish community habitat. Data collection should occur several times within a day to capture intraday effects of hydrocycling peaks and troughs** [emphasis added]. Collected information should evaluate: a) intraday Project hydrocycling effects to fish habitat at the microscale [i.e., depth and velocity] or mesoscale; b) intraday Project hydrocycling effects to least tern and piping plover suitability criteria; c) longitudinal effects of Project hydrocycling to fish habitat as the hydrocycle attenuates downstream; and d) longitudinal effects of Project hydrocycling on sandbar erosion as the hydrocycle attenuates downstream.*

District Response

The District does not concur with the USFWS recommendation on this matter and references its response to Study 2.0, Hydrocycling, Objective 4, Study Criteria 4, above. The intraday fluctuation in stage and discharge is collected at USGS gaging stations and has been applied to microhabitats related to fisheries by Ginting and Zelt (2008). As stated in the District's study plan, this data will be used to analyze effects on pallid sturgeon and fish community habitat. In addition, the sedimentation and hydrocycling analyses proposed in the District's study plan will evaluate the stability of the morphology within each of the study reaches, which is directly related to the habitat. Therefore, as stated above, it is not necessary to collect additional data.

Study Criteria 7 – Level of Effort and Cost

USFWS Comment

Current USGS stream gage information identified in the PSD is insufficient to address Objective 4 because all proposed methods provide an indirect measure of

hydrocycling effects to least tern, piping plover, pallid sturgeon, and fish community habitat. Service recommends that the PSP apply microhabitat and mesohabitat similarly to that of Peters and Parham (2008), HDR (2009) and provide a means to directly measure intraday effects of Project operations on pallid sturgeon and fish community habitat. Similar methods have been implemented in the lower Platte River by the Project's consultant (HDR 2008; HDR 2009). Proposed Service methods also provide a means to assess longitudinal effects of least tern and piping plover sandbar erosion. In absence of Service proposed methods, there is no means to directly measure direct effects of Project hydrocycling to habitat.

District Response

The District does not intend to implement these recommendations and provides the following discussion in support of this decision.

First, NEPA does not prescribe a specific methodology. Under NEPA, quantification of indirect impacts, if accurate, are an acceptable means to determine project effects. The District maintains that its proposed study methodologies will provide adequate NEPA and ESA analyses for FERC to use in its relicensing decision.

USFWS provides a method to assess longitudinal effects of interior least tern and piping plover sandbar erosion. However, it does not provide a method to assess effects of Project operations or alternative conditions. It is noted that the lower Platte River stage change study currently being prepared by HDR does not provide a direct measure of intraday effects.

The District's proposed study includes steps that will provide this measure. As proven above, the morphology is the habitat, and impacts on the morphology will be directly measured by the effective discharge method.

The District also references its responses to USFWS comments on Objective 4, Study Criteria 4 and 6, above.

REFERENCES

18 CFR §5.9(b). Content of study request.

16 USC 1531-1544. Endangered Species Act of 1973, as amended.

42 USC 4321-4347. National Environmental Policy Act of 1969, as amended.

Ginting, Daniel, and Ronald B. Zelt. 2008. "Temporal Differences in Flow Depth and Velocity Distributions and Hydraulic Microhabitats Near Bridges of the Lower Platte River, Nebraska, 1934-2006." USGS Scientific Investigations Report 2008-5054. Available online at <http://pubs.usgs.gov/sir/2008/5054/pdf/sir2008-5054.pdf>.