

# INITIAL CONSULTATION DOCUMENT

## KINGSLEY DAM PROJECT

FERC No. 1417

*Prepared for:*

**The Central Nebraska  
Public Power and Irrigation District  
Holdrege, Nebraska**

*Prepared by:*

***Kleinschmidt***

Pittsfield, Maine  
[www.KleinschmidtGroup.com](http://www.KleinschmidtGroup.com)

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**THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT**

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**DEFINITIONS OF TERMS, ACRONYMS, AND ABBREVIATIONS**

af	Acre-ft, the amount of water needed to cover 1 acre to a depth of 1 foot.
APE	Area of Potential Effect as pertaining to Section 106 of the National Historic Preservation Act.
Applicant	The Central Nebraska Public Power and Irrigation District
Central	The Central Nebraska Public Power and Irrigation District
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
DO	dissolved oxygen
DOI	US Department of Interior
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information Systems
MW	Megawatt
NDEQ	Nebraska Department of Environmental Quality
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NSHPO	Nebraska State Historical Preservation Office
NRHP	National Register of Historic Places
project area	The area within the project boundary.
project boundary	The boundary line that surrounds those areas needed for operation of the Project.
project vicinity	The general geographic area in which the Project is located.
RM	River mile
RTE	Rare, threatened, endangered and special status species
SHPO	State Historic Preservation Officer
TMDL	Total Maximum Daily Load
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WQC	Water Quality Certificate

## INITIAL CONSULTATION DOCUMENT

### KINGSLEY DAM PROJECT FERC No. 1417

#### THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT

## 1.0 INTRODUCTION

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The Central Nebraska Public Power and Irrigation District (Central or the Applicant) will apply to the Federal Energy Regulatory Commission (FERC or Commission) for a non-capacity license amendment for the Kingsley Dam Project (FERC No. 1417) (Project), a hydroelectric power project, to include the proposed J-2 Regulating Reservoirs Project. Central will request a license amendment for the Project and the Project will undergo a FERC review pursuant to the National Environmental Policy Act (NEPA), including public review and comment.

Specifically, Central proposes to amend the Kingsley Dam Project license<sup>1</sup> to include extending the existing main Supply Canal; constructing, operating, and maintaining two regulating reservoirs (the J-2 Regulating Reservoirs); and adding two new return flow points to the Platte River. The proposed J-2 Regulating Reservoirs Project would improve the ability for Central to effectively manage the water resource for hydropower generation and irrigation deliveries and return water to the river at times and at volumes that are beneficial to the environment.

The proposed J-2 Regulating Reservoirs Project will be located south of the Platte River, in Gosper and Phelps Counties (Figure 1-1). The proposed J-2 Regulating Reservoirs Project would provide hydraulic storage<sup>2</sup> capacity to regulate outflows from the Johnson No. 2 Hydropower Plant, which is part of the Kingsley Dam Project and located in the lower end of Central's Supply Canal. The Johnson No. 2 Hydropower Plant is operated in a hydrocycling mode, whereby Central regulates flow in Johnson Lake and its canal system until sufficient volume is available to operate the Hydropower Plant efficiently, typically resulting in a repeated "on-and-

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<sup>1</sup> FERC issued the license order for the Kingsley Dam Project (FERC No. 1417) on July 28, 1998; FERC issued an order amending the Kingsley Dam Project license on August 2, 2007, to revise the normal maximum water surface elevations of the Kingsley Dam Project reservoirs.

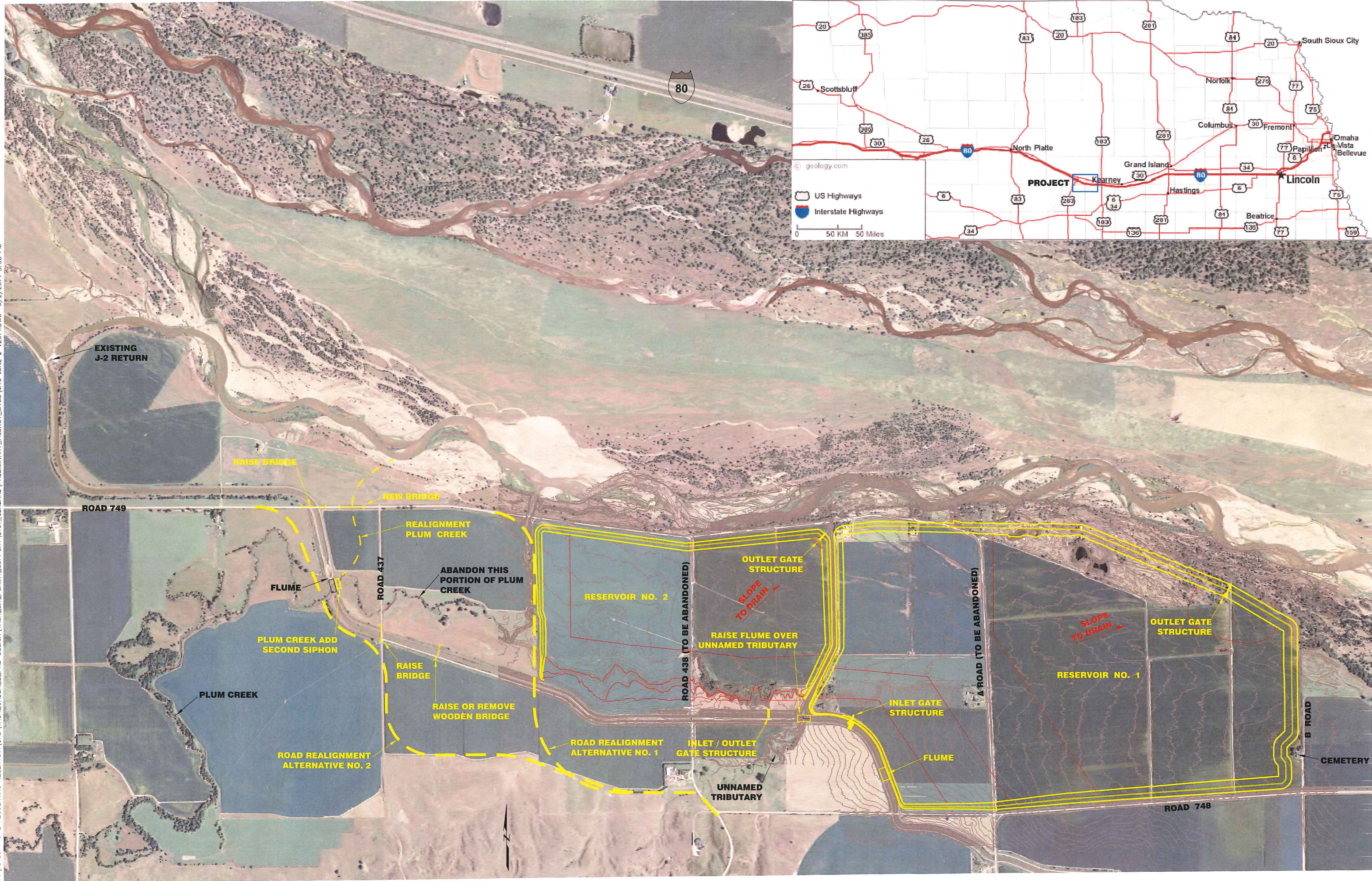
<sup>2</sup> Storage, as used in this ICD, refers to any reservoir active pool volume capacity, and is not the same as used in case of storage appropriations and storage use appropriations in Nebraska water law.

off" cycle of 24 hours or more. This operational mode is limited at times by (1) agreement between Central and the U.S. Fish and Wildlife Service (USFWS) to address USFWS concerns about hydropower generating pulse flows into the Platte River, and (2) the need for relatively steady flows in the irrigation season. The J-2 Regulating Reservoirs Project would allow for Central's preferred hydropower generation operating regime, while eliminating the pulse flow returns to the Platte River and maintaining steady flows for irrigation water delivery.

Furthermore, in accordance with the existing FERC license, Central is responsible to return flows to the Platte River to meet various environmental goals. These goals include flow requirements related to endangered and threatened species in and along the North Platte and Platte Rivers. The J-2 Regulating Reservoirs Project would better enable Central to provide these flows.

Central, a political subdivision of the State of Nebraska is a public power and irrigation district established for the purpose of delivering irrigation water and generating hydropower in south-central Nebraska. Because the proposed J-2 Regulating Reservoirs Project does not involve the installation of hydropower facilities, no Public Utility Regulatory Policies Act benefits are being sought.







## 2.0 CONSULTATION

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### 2.1 INITIAL CONSULTATION

Central has engaged in over 15 years of consultation with federal, state, and local agencies and stakeholders regarding hydropower and irrigation operations and threatened and endangered species on the Platte River.

On May 15, 1998, Central filed with the FERC the Offer of Settlement in the relicensing proceedings for the Kingsley Dam and the North Platte/Keystone Projects. The Settlement Agreement incorporates aspects of the larger Platte River Recovery and Implementation Program (Platte River Program)<sup>3</sup>, which among other things, includes flow regulation projects in the states of Colorado, Wyoming, and Nebraska, including Central's Kingsley Dam<sup>4</sup>. Operational flows and storage goals are required under the Settlement Agreement to ensure that specific characteristics of the existing hydrograph are maintained (VanNess, 1998). In addition to Central, signatories to the Settlement included Nebraska Public Power District, U.S. Department of the Interior (DOI), the State of Colorado, the State of Wyoming, the National Audubon Society, the Platte River Whooping Crane Critical Habitat Maintenance Trust, American Rivers, the Nebraska Wildlife Federation, the Sierra Club, and Nebraska Water Users, Inc. The Settlement Agreement will remain in effect until 2038, the duration of the current FERC license for the Kingsley Dam Project (VanNess, 1998).

Central has been working jointly with the Platte River Program, which was born from a joint Environmental Impact Statement (EIS) by the USFWS and the U.S. Bureau of Reclamation, to identify projects that will reduce constraints on operation of Central's hydropower facilities and assist the Platte River Program in achieving their goal to support the recovery of four threatened or endangered species: interior least tern (*Sternula antillarum*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), and pallid sturgeon (*Scaphirhynchus albus*) within the Platte River corridor. Among the plans for recovery is a water program that would provide an opportunity to return water to the Platte River at times and volumes that benefit these species.

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<sup>3</sup> The Platte River Program is a cooperative effort by Nebraska, Wyoming, Colorado, and the U.S. Department of Interior, Platte Basin water-user stakeholders, and conservation groups to provide defined benefits for threatened and endangered species (specifically whooping cranes, interior least terns, piping plovers, and pallid sturgeon) along the Platte River in Nebraska.

<sup>4</sup> Environmental Account in Lake McConaughy and operating rules for the FERC Project.

Many alternatives have been studied extensively by Central, the Platte River Program, and other stakeholders (Olsson Associates, 2012). In July 2013, after several years of feasibility studies and preliminary design work, the J-2 Regulating J-2 Regulating Reservoirs Project proposal was selected as the best alternative and a water service agreement was finalized between Central, the Nebraska Community Foundation (which represents the Platte River Program), and the State of Nebraska (CNPPID, 2013).

## **2.2 AMENDMENT APPLICATION CONSULTATION**

This Initial Consultation Document (ICD) is provided to the agencies and stakeholders for review and comment. Agency and public meetings will be held following filing of the ICD and the three-stage consultation process for the amendment application will be undertaken.

Agency consultation efforts will be ongoing and associated primarily with the required state and federal permits and FERC approval of the license amendment. Implementation of the J-2 Regulating Reservoirs Project will be a collaborative effort between Central, the Platte River Program, the State, and three Platte River Basin Natural Resources Districts (NRDs), including the Tri-Basin NRD, Central Platte NRD, and Twin Platte NRD.

## **2.3 REFERENCES**

Central Nebraska Public Power and Irrigation District (CNPPID). 2013. J-2 Regulating Reservoirs. November 2013.

Olsson Associates. 2012. Final CNPPID J-2 Regulating Reservoir Feasibility Report. May, 2012.

VanNess Feldman (VanNess). 1998. Offer of Settlement. Central Nebraska Public Power and Irrigation District (Project No. 1417) and Nebraska Public Power District (Project No. 1835). May 15, 1998.

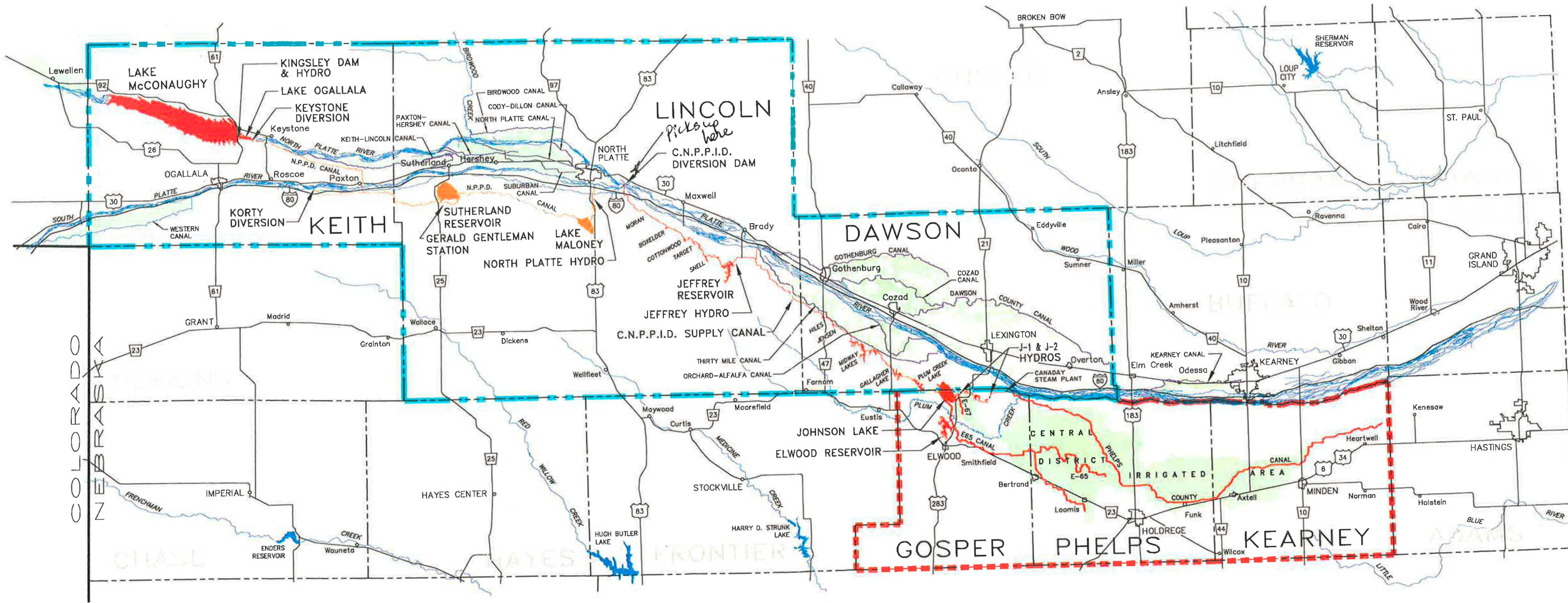
## **3.0 PROJECT DESCRIPTION**

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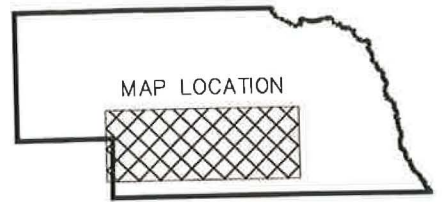
### **3.1 EXISTING PROJECT FACILITIES**

The existing 86.34 MW Kingsley Dam Project is owned and operated by Central and includes 29 dams and reservoirs, one canal (Supply Canal aka Tri-County Canal), and four powerhouses. The Kingsley Dam Project primarily parallels portions of the North Platte and Platte Rivers. The Kingsley Dam portion is located on the North Platte River north of Ogallala, Nebraska. The Supply Canal is to the south of and roughly parallels the Platte River and Interstate 80 in central Nebraska. The Kingsley Project is located within five counties (Garden, Keith, Lincoln, Dawson, and Gosper) across approximately 150 miles, and includes approximately 45,000 acres within the project boundary (FERC, 1998a; FERC, 2004; CNPPID, 2007a). Figure 3-1 shows the Kingsley Dam Project and highlights the location of the J-2 Regulating J-2 Regulating Reservoirs Project.





Pick up here



0 10 Mi

= SURFACE IRRIGATION



### 3.1.1 DAMS AND IMPOUNDMENTS

Located on the North Platte River in Keith and Garden Counties, Kingsley Dam impounds Lake McConaughy, which is 21 miles long, 3.5 miles wide at the dam, and has a surface area of 30,500 acres. The Kingsley Hydropower Plant (Kingsley Hydro) is located downstream of the right abutment of Kingsley Dam. Just below Kingsley Dam is the 1.5-mile-long Lake Ogallala, which was formed by excavation of the sand and gravel materials used in the downstream outer shell of the dam (FERC, 1998a; CNPPID, 2007a).

The Central (Tri-County) Diversion Dam is located approximately 50 miles downstream of Kingsley Dam at the confluence of the North and South Platte Rivers. The Tri-County Diversion Dam diverts the river flow into the Supply Canal (CNPPID, 2007a).

There are an additional 27 dams and impoundments located along the Supply Canal as listed in Table 3-1. Among these are the Jeffrey Regulating Reservoir Dam and the Johnson Regulating Reservoir Dam. The Jeffrey Regulating Reservoir Dam is 1,034 ft long and 70 ft high. The dam creates the 575 acre Jeffrey Regulating Reservoir with a storage capacity of approximately 11,500 acre-feet (at normal maximum surface elevation of 2,760 feet msl). The Johnson Regulating Reservoir Dam is comprised of the 4,985 ft long, 47 ft high main dam, the 3,350 ft-long west dike and the 12,233 ft-long east dike. The dam creates the regulating Johnson Reservoir with a maximum surface area of 2,266 acres and a storage capacity of 52,200 acre-feet (at a maximum surface elevation of 2,621 ft msl) (FERC, 2007).

**TABLE 3-1. DAMS AND IMPOUNDMENTS OF THE SUPPLY CANAL**

Miles Below Diversion	Dam/Reservoir	Crest Height (ft.)	Crest Length (ft.)	Crest Width (ft.)	Approximate Freeboard (ft.)	Approximate Surface Area (acres) (1)	Normal Maximum Surface Elevation (ft msl) (2)
<b>Jeffrey Section</b>							
0.0	Diversion Dam	8.0	874.0	NA	NA	NA	2770.7
9.5	Box Elder	33.0	595.1	12.0	5.0	19.0	2764.5
12.8	Cottonwood	31.5	774.0	24.0	5.2	33.0	2763.3
13.5	East Cottonwood	26.0	273.0	12.0	5.2	2.0	2763.1
14.8	Target Canyon	30.5	380.0	12.0	5.2	18.0	2762.8
15.6	Little West Snell	26.0	214.0	12.0	5.0	<1.0	2762.6
15.8	West Snell	36.6	552.0	16.0	5.0	12.0	2762.6
16.4	Middle Snell	25.0	213.5	12.0	5.0	2.0	2762.5
17.7	Snell	25.0	853.7	24.0	5.0	53.0	2762.1
20.0	West Conroy	25.0	285.0	12.0	5.0	3.0	2761.4
22.8	Jeffrey	70.0	1034.0	20.0	8.0	595.0	2760.0
<b>Johnson Section</b>							
40.8	Hiles	25.0	501.7	12.0	5.0	22.0	2634.6
42.7	Jensen	18.0	572.0	12.0	5.8	17.0	2633.2
46.1	Brown	25.0	353.7	12.0	5.1	0.0	2632.6
47.5	West Midway	38.0	878.0	20.0	6.1	150.0	2632.4
47.9	Henderson	20.0	254.2	12.0	5.0	6.0	2632.3
48.3	Central Midway	60.0	851.4	12.0	7.0	325.0	2632.3
50.5	Walker	43.0	550.0	16.0	5.2	48.0	2631.9
51.0	Glen Young	53.0	560.7	20.0	5.3	82.0	2631.8
51.5	Schmeeckle	59.0	952.7	18.0	5.4	24.0	2631.7
52.0	Dead End	22.0	192.0	12.0	5.5	0.0	2631.6
56.7	Gallagher	54.4	643.5	20.0	6.0	182.0	2631.1
60.8	Plum Creek	74.0	1794.2	20.0	7.1	263.0	2630.4
64.5	Johnson	47.0	4985.0	20.0	10.0	2266.0	2621.0
<b>Below Johnson</b>							
67.1	Phillips	43.0	354.0	12.0	6.3	29.0	2509.7
68.1	Middle Phillips	29.0	316.0	12.0	6.5	7.0	2509.5
68.9	East Phillips	63.0	618.0	16.0	6.6	142.0	2509.4
71.3	Knapple	33.0	328.0	12.0	7.0	38.0	2509.0

(1) Surface area data taken from digitized aerial photos taken in 1999.

(2) Elevations are in reference to datum of The Central Nebraska Public Power and Irrigation District.

Source: CNPPID, 2007

### **3.1.2 HYDROPOWER FACILITIES**

The Kingsley Hydropower Plant houses a single turbine-generating unit with an authorized installed capacity of 33 MW. It is located at Kingsley Dam and discharges into Lake Ogallala. The Jeffrey, Johnson No. 1, and Johnson No. 2 Hydropower Plants are all located on the Supply Canal. The Jeffrey Hydropower Plant has an authorized installed capacity of 16.8 MW. The Johnson No. 1 Hydropower Plant contains two generators with an authorized installed capacity of 17.3 MW, and the Johnson No. 2 Hydropower Plant (5.7 miles downstream of Johnson No. 1) contains a single turbine-generating unit with an authorized installed capacity of 19.24 MW (FERC, 2002; FERC, 2007).

### **3.1.3 SUPPLY CANAL**

The Supply Canal (Photo 3-1) is 75 miles long, contains 27 dams and impoundments, and three hydropower plants (Jeffrey, Johnson No. 1, and Johnson No. 2), as discussed above. The Supply Canal has two “sections” that are part of the Kingsley Dam Project (the Jeffrey Section and Johnson Section). In addition to serving the hydropower plants, the Supply Canal provides irrigation water to 5,600 acres in Lincoln and Dawson Counties. Three irrigation canals in Gosper, Phelps, and Kearney Counties (E-65, E-67, and the Phelps County Irrigation Canal) connect to the Supply Canal system but are not part of the Kingsley Dam Project (CNPPID, 2007a).

The Jeffrey Section of the Supply Canal extends from the Tri-County Diversion Dam to the Jeffrey Return (CNPPID, 2007a). This 26.9-mile section, with an approximate 2,250 cubic feet per second (cfs) capacity, includes ten earth-fill dams and associated reservoirs. The Jeffrey Return regulates the water level in the Supply Canal and at times returns water to the Platte River, primarily when needed for downstream irrigation.

The Johnson section of the Supply Canal extends from the Jeffrey Return to the Johnson No. 2 Return (CNPPID, 2007a). The Johnson section is 48.6 miles long with an approximate 2,170 cfs capacity and includes 13 earth-fill dams and their associated reservoirs. Approximately 4 miles downstream of the Johnson No. 2 Hydropower Plant, the Supply Canal ends at the Johnson No. 2 Return (J-2 Return). The J-2 Return regulates the flow of water to either the Platte River or the Phelps County Irrigation Canal (CNPPID, 2007a).





**PHOTO 3-1. SUPPLY CANAL**

### **3.2 EXISTING PROJECT OPERATIONS**

The Kingsley Dam Project is operated for two primary purposes: irrigation delivery and hydropower. The general objective of Central's operating regime is to maximize storage for irrigation as a first priority, while utilizing as much available released storage and diverted natural flow as possible for hydropower generation (FERC, 1998).

The Kingsley Dam Project provides irrigation water for approximately 200,000 acres of farmland over seven counties and provides ancillary benefits to farmers by raising groundwater levels in some areas. Throughout the irrigation season (approximately April to September), water is conveyed through the diversion dams and supply canals to meet the irrigation and contract requirements of downstream irrigators (FERC, 1998b). Hydropower generation during the irrigation season is largely dictated by the demand for irrigation water. After irrigation and hydropower generation needs have been met, water is returned to the Platte River through the Jeffrey or Johnson No. 2 Return.

During the non-irrigation season (approximately October to March), Central typically prioritizes storing water in Lake McConaughy for long-term water supply, with releases made primarily to satisfy FERC license requirements (FERC, 1998b), and the Kingsley Dam Project Hydropower Plants (Kingsley Dam, Jeffrey, Johnson No. 1, and Johnson No. 2) will then generate primarily with the water released to meet FERC license requirements and natural flow available at the North Platte diversion dam. If storage in Lake McConaughy is adequate, additional water may be released for hydropower generation.

The flow rate at which a hydropower generator produces the most generation per unit volume of water passed through the generator is the “peak efficiency” point. When the flows passing through a hydropower plant do not allow for a continuous operation at the peak efficiency point, the plant may be operated with a start-and-stop variable flow pattern, known as “hydrocycling,” which enables power generation at peak efficiency. Specifically, under low water supply conditions, Central regulates flow in Johnson Lake and its canal system until sufficient volume is available to operate at higher and more efficient rates and the resulting hydrocycling operation typically occurs in repeated cycles.

When downstream irrigation flow demands are present, Central operates the Johnson No. 2 Hydropower Plant inefficiently to match those demands. Specifically, the Johnson No. 2 Hydropower Plant often discharges only water needed by the Phelps Canal, which requires a steady flow of water for irrigation that is less than what is necessary for the efficient operation of the Johnson No. 2 Hydropower Plant. As a result, the ability for hydrocycling is limited during the irrigation season, and the Johnson No. 2 Hydropower Plant mostly operates at low efficiency around the clock. Project operations are also limited by License Article 412 (Flow Attenuation Plan) and Ordering Paragraph D (Hydrocycling Agreement), which are discussed in greater detail below.

The Kingsley Dam Project seeks to meet requirements for protecting and enhancing habitat for fish and wildlife, specifically threatened and endangered species that utilize habitat in the Platte River Valley. Central stores 10 percent of the monthly storable inflow to Lake McConaughy in an “Environmental Account”<sup>5</sup> during the non-irrigation season to manage and provide flows for

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<sup>5</sup> Technically, this water is not separately stored in McConaughy, but rather is made available under a storage-use appropriation in accordance with Nebraska water law; however, from a layperson’s standpoint, it is common to describe the Environmental Account as being stored in Lake McConaughy.

threatened and endangered species habitat when needed downstream. In addition, the Johnson No. 2 Hydrocycling Agreement works to lessen the impacts of hydrocycling, and the Project's Flow Attenuation Plan works to reduce the return of high flows into the Platte River caused by rejection of irrigation water, during the nesting and migration seasons for certain threatened and endangered species.

Currently, regulating reservoirs do not exist between the Johnson No. 2 Hydropower Plant and the end of the Supply Canal. Therefore, there is a correlation between Johnson No. 2 Hydropower Plant releases and downstream diversions. The combined flows at the Johnson No. 2 Return diverted to the Platte River and to the Phelps Canal must generally match flows through the Johnson No. 2 Hydropower Plant. At times, the Johnson No. 2 Hydropower Plant releases control the downstream diversions, while at other times the downstream demands control the Johnson No. 2 Hydropower Plant discharges.

### **3.2.1 FLOW ATTENUATION PLAN**

A Flow Attenuation Plan for the Project directs how return flows are managed at the J-2 Return following rainfall events to reduce or avoid river flow increases that could flood least tern and piping plover nests during the nesting season (June 1 to August 15) (FERC, 2000; FERC, 2007). According to the Flow Attenuation Plan, Central manages lake levels at Johnson Lake at the lower end of a range of 2617.5 to 2619.0 ft msl to provide storage capacity to capture precipitation run-off during or following a rain event between June 1 and August 15. The objective of the Plan is to avoid increased water returning to the Platte River in excess of a preset benchmark flow recorded at the Platte River gage near Overton. If the flow at the gage is near or exceeds the benchmark, the flow rate at the J-2 Return is not increased until the flow recedes or the elevation at Johnson Lake is meets or exceeds 2619.0 ft msl (FERC, 2000).

### **3.2.2 JOHNSON NO. 2 HYDROPOWER PLANT HYDROCYCLING AGREEMENT**

Peak operating efficiency at the Johnson No. 2 Hydropower Plant occurs at approximately 1,700 cfs. However, water supply conditions during the non-irrigation season often results in a lesser amount diverted into the Supply Canal and returned to the Platte River at the Johnson No. 2 Return. Under these partial diversions, Central cycles its Johnson No.2 Hydro turbine to operate the turbine efficiently and to reduce the risk for cavitation (USFWS, 2007).

To prevent nest inundation during the least tern and piping plover nesting season (mid-May to August 15), the Johnson No.2 Hydropower Plant is operated so the peak flows are similar to or less than a benchmark flow rate (consistent with the Flow Attenuation Plan)<sup>6</sup>. In addition, during March 18 to April 30 and October 17 to November 10 of each year, and any other days when whooping cranes are present, the Johnson No.2 Hydropower Plant is cycled through a series of wicket gate positions at certain times of the day to reduce nighttime rises in river stage downstream of the Johnson No. 2 Return (CNPPID, 2007; USFWS, 2007). Specifically, Central is required to adhere to the following general terms of the Agreement (USFWS, 2007):

- from March 18 to April 30 and from October 17 to November 10 of each year, and on any additional days beginning when whooping cranes are known to be present until they have departed, Central will hydrocycle the Johnson No. 2 Hydropower Plant in a series of stepped-up wicket gate positions (WOP), between certain hours of the day, such that overnight stage increases potentially affecting whooping crane roosting sites downstream are reduced;
- during the first seven days of May, Johnson No. 2 powerplant hydrocycling operations will not be restricted; when hydrocycling during the remainder of May, Central will use best efforts to operate the Johnson No. 2 Hydropower Plant so that peak flows are similar to or less than those which occurred earlier in the month; and
- from June 1 to August 15, when hydrocycling occurs, Central will use best efforts to operate the Johnson No. 2 Hydropower Plant to keep flows at Overton at or below the benchmark flow rate then in effect under the FERC-approved Flow Attenuation Plan established pursuant to License Article 412.

### **3.3 EXISTING PROJECT BOUNDARY**

The existing project boundary for the Kingsley Dam Project includes Central's canal system and hydropower facilities including the Jeffrey Reservoir and Johnson No. 1 and Johnson No. 2 Reservoirs. The project boundary extends downstream of the J-2 Hydropower Plant to the J-2 Return. The J-2 Return regulates discharges to the Platte River and the Phelps Canal.

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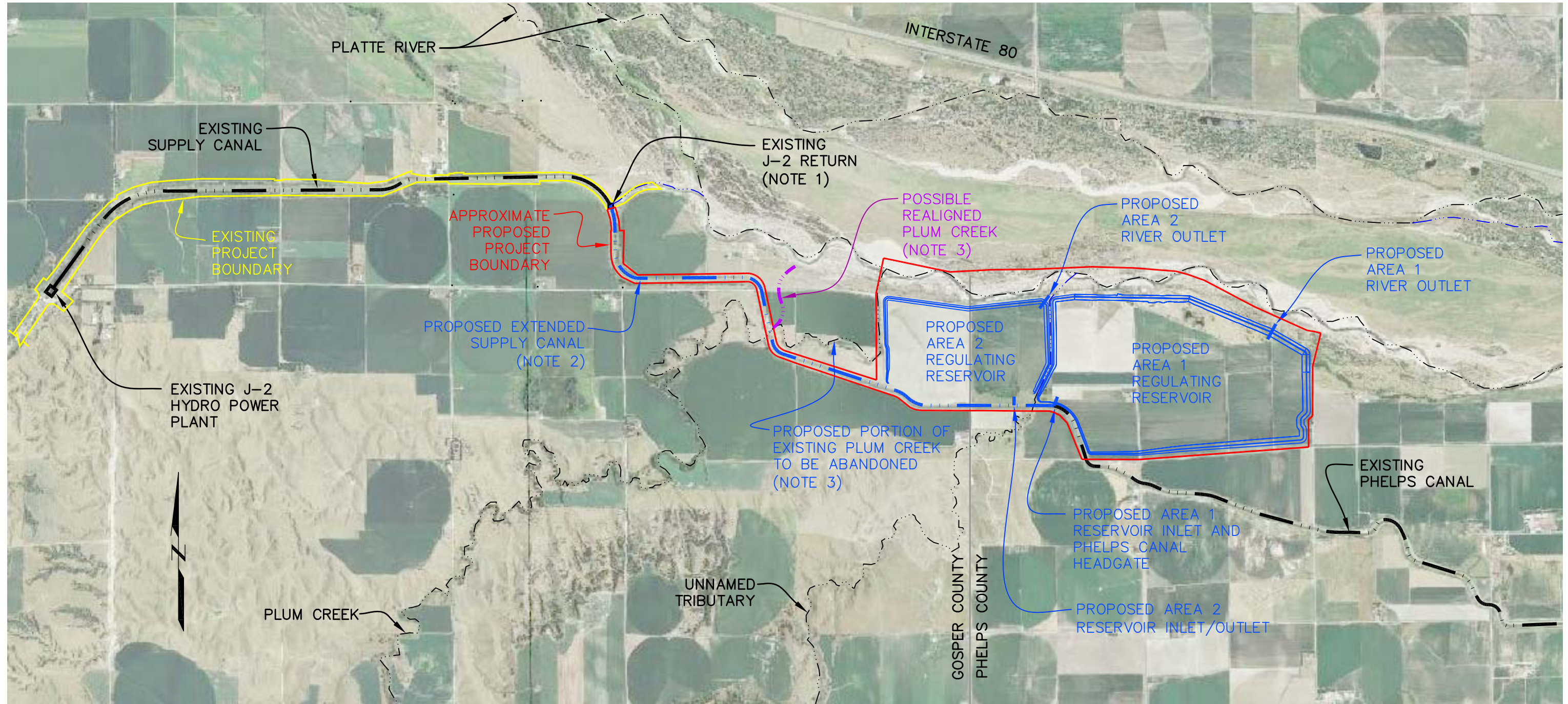
<sup>6</sup> The Agreement uses the same benchmark flow set forth in the Flow Attenuation Plan. The Flow Attenuation Plan requires that Central and the USFWS establish a benchmark flow each year at the Overton gage for the June 1 to August 15 time period at a level equal to the highest flow during May, or at another flow rate set by the USFWS based on data regarding nesting locations or desired nesting locations and flows that are believed not to inundate known nests, and with consideration of the storage capacity at Johnson Lake.



### 3.4 PROPOSED PROJECT FACILITIES AND OPERATIONS

The proposed J-2 Regulating Reservoirs Project will include the following facilities and associated actions (Figure 3-2):

- extending the Supply Canal near the border of Gosper and Phelps Counties, Nebraska, including modifying approximately 3.3 miles of the current Phelps Irrigation Canal, constructing and operating two new regulating reservoirs, and adding two new river returns;
- relocating a portion of Plum Creek;
- abandoning roads and certain residential electric distribution lines, relocating roads and drainages, and other minor site modifications related to canal modifications and reservoir construction;
- acquiring Property and modifying the Project boundary; and
- modifying or eliminating as appropriate operating agreements and plans pursuant to License Article 412 (Flow Attenuation Plan) and Ordering Paragraph D (Hydrocycling Agreement) of the August 2, 2007 Order Amending License.



NOTES:

1. EXISTING J-2 RETURN WILL REMAIN IN PLACE AND OPERABLE, BUT WILL NOT BE THE PRIMARY RETURN FLOW POINT FOLLOWING CONSTRUCTION OF THE PROJECT.
2. THE PROPOSED EXTENDED SUPPLY CANAL WILL INVOLVE INCREASING THE CAPACITY OF THE EXISTING PHELPS CANAL.
3. REALIGNMENT OF PLUM CREEK IS CURRENTLY NOT DEFINED. REALIGNMENT AND SEGMENT TO BE ABANDONED ARE PRELIMINARY CONCEPTS.



THIS DRAWING MUST BE REPRODUCED IN COLOR.

		J-2 REGULATING RESERVOIR PROJECT GOSPER AND PHELPS COUNTIES NEBRASKA	GENERAL PLAN OF PRIMARY PROJECT COMPONENTS
		PROJECT NO. 13130	June 2014

Figure 3-2



### **3.4.1 CANAL EXTENSION AND CAPACITY MODIFICATIONS**

Portions of the existing Phelps County Irrigation Canal will be modified to enable conveyance of approximately 1,700 cfs downstream of the existing Canal head gate, thereby extending the Supply Canal by approximately 3.3 miles. Improvements to the modified canal include:

- raising portions of the canal banks by approximately 1 to 2 feet in up to six separate locations. The length of each location to be raised varies from approximately 100 feet to approximately 800 feet;
- increasing the capacity of the siphon underneath Plum Creek by either adding a second parallel siphon or by removing the existing 13 foot diameter siphon and replacing it with a new larger-diameter siphon;
- modifying up to four bridges that cross over the canal; and
- raising the walls of an existing flume that crosses over an unnamed tributary. The wall consists of reinforced concrete and would need to be raised approximately 1 foot.

### **3.4.2 REGULATING RESERVOIRS AND RIVER RETURNS**

The two regulating reservoirs designated as Reservoir No. 1 and Reservoir No. 2 are proposed as part of the J-2 Regulating Reservoirs Project. Reservoir No. 1 (east reservoir) will occupy approximately 850 acres and have a regulating capacity of up to approximately 14,500 acre-feet (ac-ft). Reservoir No. 2 (west reservoir) will occupy approximately 350 acres and have a regulating capacity of up to approximately 3,500 ac-ft. The total regulating capacity in the two reservoirs will be up to approximately 18,000 ac-ft. The two reservoirs will receive inflow from the Johnson No. 2 Hydropower Plant outflow and both will discharge water to the Platte River.

The reservoirs will be created by zoned earthen embankment dams that will extend around most of the reservoir perimeters and abut the natural ground surface near the extended Supply Canal (Phelps County Irrigation Canal extension). The length of Reservoir No. 1's embankment is approximately 3.7 miles, and the length of Reservoir No. 2's embankment is approximately 2.0 miles. The maximum height of the dams will be about 32 feet for Reservoir No. 1 and 22 feet for Reservoir No. 2. The reservoirs will be lined with compacted clayey soils to manage seepage, and the bottom of the reservoirs will be graded to slope toward the river returns. The dams will have a zone of low permeability clayey fill that is connected to the clayey reservoir liner and a zone of filter sand downstream of the clayey zone to safely manage seepage. The entire upstream

faces of the dams will be covered with soil-cement to protect the embankments from wave erosion.

Reservoir No. 1 will have an inlet gate to convey water from the extended Supply Canal into the reservoir and a river return structure to discharge water from the reservoir to the Platte River. Reservoir No. 2 will have a combined inlet/outlet structure to convey water back and forth between the extended Supply Canal and the reservoir and a river return structure to discharge water to the Platte River. A gate will be installed at the end of the extended Supply Canal, downstream of the inlet to Reservoir No. 1, to regulate the elevation of the water in the Canal at the reservoir inlets and to regulate flow into Phelps Canal.

The existing drainage channel of an unnamed tributary, which is located between the two proposed reservoirs, will be reconstructed along the same approximate alignment to safely convey flows. The unnamed tributary is a perennial watercourse that discharges to the Platte River. Plum Creek, which currently flows towards the west side of the Reservoir No. 2, will be re-routed in a new channel to protect the western side of the Reservoir No. 2 embankment from high flows that could erode and damage the dam. A specific alignment for re-routing Plum Creek has not been selected at this stage of project development, but is expected to extend from where the Phelps Canal siphon crosses beneath Plum Creek, located approximately southwest to northeast, and emptying to the Platte River upstream of the northwest corner of Reservoir No. 2.

The existing J-2 Return conveys a daily average annual mean flow of 785 cfs from the Johnson No. 2 Hydropower Plant to the Platte River. While flow will continue to be conveyed to the Platte River from the Johnson No. 2 Hydropower Plant at the new reservoir outlets, normal use of the J-2 Return for discharges to the Platte River will be discontinued. However, this short reach will continue to receive some hydrologic inputs from ground water seepage and backwater effects from the Platte River.

### **3.4.3 PROPOSED PROJECT OPERATIONS**

The proposed J-2 Regulating Reservoirs Project will change the operations of the Johnson No. 2 Hydropower Plant and the pattern and timing of the releases to the Platte River. The J-2 Regulating Reservoirs Project provides regulating capacity that will create the ability for the Johnson No. 2 Hydropower Plant to operate independently of downstream irrigation demands.

Central will operate the Johnson No. 2 Hydropower Plant to generate hydropower as preferred (i.e., hydrocycling for peak generation efficiency), while meeting the demands for irrigation deliveries, and returning water to the river at times and at flows that are more beneficial to the environment.

Central, the Nebraska Department of Natural Resources (NDNR), and the Nebraska Community Foundation (representing the Platte River Program) executed a fifty-year Water Service Agreement (the Agreement) on July 9, 2013 providing for construction and operation of the proposed J-2 Regulating Reservoirs Project. The Agreement outlines the operating parameters for the J-2 Regulating Reservoirs Project including mitigation of hydrocycling operations and providing target and short duration high flows to the Platte River and will supersede two primary operational agreements of the Kingsley Dam Project: the Flow Attenuation Plan and the Johnson No. 2 Hydrocycling Agreement. Central will operate the J-2 Regulating Reservoirs Project in accordance with the Agreement for as long as it remains in effect. The Agreement outlines the following purposes for operation of the J-2 Regulating Reservoirs (Central, 2013):

- Regulation for Target Flows - Flows from the Johnson No. 2 Hydropower Plant will be regulated in the J-2 Regulating Reservoirs<sup>7</sup> to reduce shortages to Platte River flows recommended by the USFWS and set forth in the Platte River Recovery Implementation Program. The J-2 Regulating Reservoirs Project may not be operated to cause flows in the Platte River to exceed, or to increase the amount or duration by which they exceed, flood stage.
- Regulation for Short Duration High Flows (SDHF) - Flows from the Johnson No. 2 Hydropower Plant will be regulated in the J-2 Regulating Reservoirs to create or enhance Short Duration High Flows, which are defined as flows of approximately three to five day duration with magnitudes approaching bank full capacity downstream of the J-2 Regulating Reservoirs Project, but which may not exceed flood stage.
- Mitigation of Hydrocycling - Central may regulate releases from the J-2 Hydropower Plant in Reservoir No. 2 to mitigate fluctuations in flow in the Platte River and Central's Phelps Canal due to hydrocycling any time from June 15 through August 31, with the priority of operations given to hydrocycling mitigation above target and short duration high flows.

Construction activities for the J-2 Regulating Reservoirs Project will be sequenced and timed to maintain irrigation deliveries. During construction, Central will continue to operate the Kingsley

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<sup>7</sup> The Platte River Program and the USFWS have estimated that the J-2 Regulating Reservoirs Project will provide 40,800 acre-feet of annual average reduction of shortages to Target Flows.

Project in accordance with the existing Hydrocycling Agreement and Flow Attenuation Plan. Construction required along the Phelps Canal to extend the Supply Canal and add the intake structures from the canal to the reservoirs will occur during the non-irrigation season. Construction of the reservoirs should not impact operations of the canal and hydropower releases will continue to be returned to the River at the J-2 Return until the J-2 Regulating Reservoirs Project is operational.

#### **3.4.4 MODIFYING EXISTING PUBLIC INFRASTRUCTURE**

This proposed J-2 Regulating Reservoirs Project will affect portions of existing public roads and utilities. The anticipated effects include:

- elimination of approximately 1.5 to 2 miles of Road 749; the portion of Road 749 that will be removed extends from the intersection of Road A to the west approximately 1.5 miles (to the bridge over Plum Creek) or 2 miles (to the intersection with County Road 437);
- elimination of approximately 3,000 feet of Road 438; the portion that would be removed is north of the existing Phelps Canal;
- elimination of approximately 4,700 feet of Road A; the portion that would be removed is north of Road 748;
- construction of a new road to facilitate traffic flow from the intersection of Road A and Road 748, around the proposed reservoirs, to Road 749; a specific alignment for this new road has not been selected at this stage of project development; and
- removal of approximately 3 miles of residential electric distribution lines located along Road 749, Road 438 and A Road (within the footprints of the regulating reservoirs) and the possible relocation of approximately 1.5 miles of electric distribution lines located along Road 748 and the extended Supply Canal near the siphon below Plum Creek and the Reservoir No. 1 intake.

#### **3.4.5 FERC LICENSE CONDITIONS**

As part of the non-capacity amendment, Central is requesting an extension of the project boundary to include those lands necessary for the development and operation of the J-2 Regulating Reservoirs Project.

The proposed project boundary for the Kingsley Dam Project will be revised to encompass the extension of the Supply Canal, including the two additional regulating reservoirs and the two new river returns. The revised project boundary will include approximately 1,500 acres.

Figure 3-2 shows the proposed project boundary revisions. In accordance with Standard License Article 5, Central will acquire title in fee or the right to use in perpetuity all lands necessary or appropriate for the construction maintenance and operation of the project.

The J-2 Regulating Reservoirs Project will render unnecessary the existing Flow Attenuation Plan and the Hydrocycling Agreement. The J-2 Regulating Reservoirs Project has a greater capacity to regulate flows than do the facilities used in the Flow Attenuation Plan, and the Flow Attenuation Plan, if continued, would actually work to deprive the J-2 Regulating Reservoirs Project of flows available to be returned to the river. Additionally, the J-2 Regulating Reservoirs Project has sufficient regulating capacity to completely or nearly completely mitigate for the effects of hydrocycling. Therefore, Central will seek appropriate modification or removal of the operating agreements and plans pursuant to License Article 412 (Flow Attenuation Plan) and Ordering Paragraph D (Hydrocycling Agreement) of the August 2, 2007 Order Amending License.

### **3.5 REFERENCES**

Central Nebraska Public Power and Irrigation District (CNPPID). 2007a. Appendix II of the Application for Amendment of License. Exhibit A Description of the Project (FERC Project No. 1417).

Central Nebraska Public Power and Irrigation District (CNPPID). 2007b. J-2 Hydrocycling agreement between CNPPID and USFWS. August 13, 2007.

Federal Energy Regulatory Commission. 1998a. Order Issuing New License Kingsley Dam Project (FERC Project No. 1417). 84 FERC P61,079. Issued July 29, 1998.

Federal Energy Regulatory Commission. 1998b. Final Environmental Impact Statement. FERC/FEIS-0063. Kingsley Dam Project (FERC Project No. 1417) and North Platte/Keystone Diversion Dam Project (FERC Project No. 1835). Issued August 1, 1998.

Federal Energy Regulatory Commission (FERC). 2000. Order Approving Flow Attenuation Plan. Project No. 1417. 93 FERC ¶ 62,032.

Federal Energy Regulatory Commission (FERC). 2007. Order Amending License. Project No. 1417. 120 FERC ¶ 62,093. Issued August 2, 2007.

U.S. Fish and Wildlife Service. 2007. Biological Opinion and Incidental Take Statement Related to the Lake Level Amendment Application for the Kingsley Dam Project (FERC No. P-1417-196). Issued March 12, 2007.

## **4.0 ENVIRONMENTAL RESOURCES**

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### **4.1 AFFECTED ENVIRONMENT**

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effect on environmental resources. Because the proposed action has the potential to affect each resource differently, the geographic scope for each resource varies. Generally, for upland based resources such as wildlife and land use, the geographic scope is limited to those lands within the proposed project boundary and those lands that will be disturbed by construction and associated activities such as the road realignments. For fish and aquatic resources and those affected by flow discharges, the geographic scope generally includes the extended Supply Canal below the existing J-2 Return, the proposed Regulating Reservoirs, the reach of Plum Creek to be relocated, and the points in the Platte River where the new returns are located.

#### **4.1.1 GEOLOGY AND SOILS**

##### **4.1.1.1 EXISTING GEOLOGICAL FEATURES**

The proposed J-2 Regulating Reservoirs Project will be within the northern and central Great Plains. The region is characterized by level to irregular plains, broad alluvial valleys, and occasionally hilly, dissected plains. The region is at slightly lower elevations and is somewhat more irregular than the High Plains, which are located to the west (CEC, 1997). The proposed J-2 Regulating Reservoirs Project will be located in areas underlain by sedimentary bedrock (UNL, 2014).

##### **4.1.1.2 BEDROCK GEOLOGY**

The underlying bedrock of Phelps and Gosper Counties are soft sandstones, siltstones, conglomerate cemented with calcium-carbonate and opaline-silica, and loosely consolidated sand, gravel, loess-like silt, cemented clays, and volcanic ashes of the Ogallala Formation. The deposits originated from the eastern uplifted face of the Rocky Mountains, creating a broad, gently eastwardly sloping plain (Olsson Associates, 2012; Cultural Resources Consulting, 2012).

The proposed project area is underlain by Tertiary-age (2.6 to 65 million years old) Ogallala Formation, which is predominantly sandstone. Figure 4-1 shows the geologic region in which the proposed J-2 Regulating Reservoirs Project will be located.



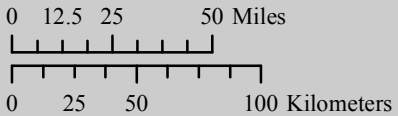
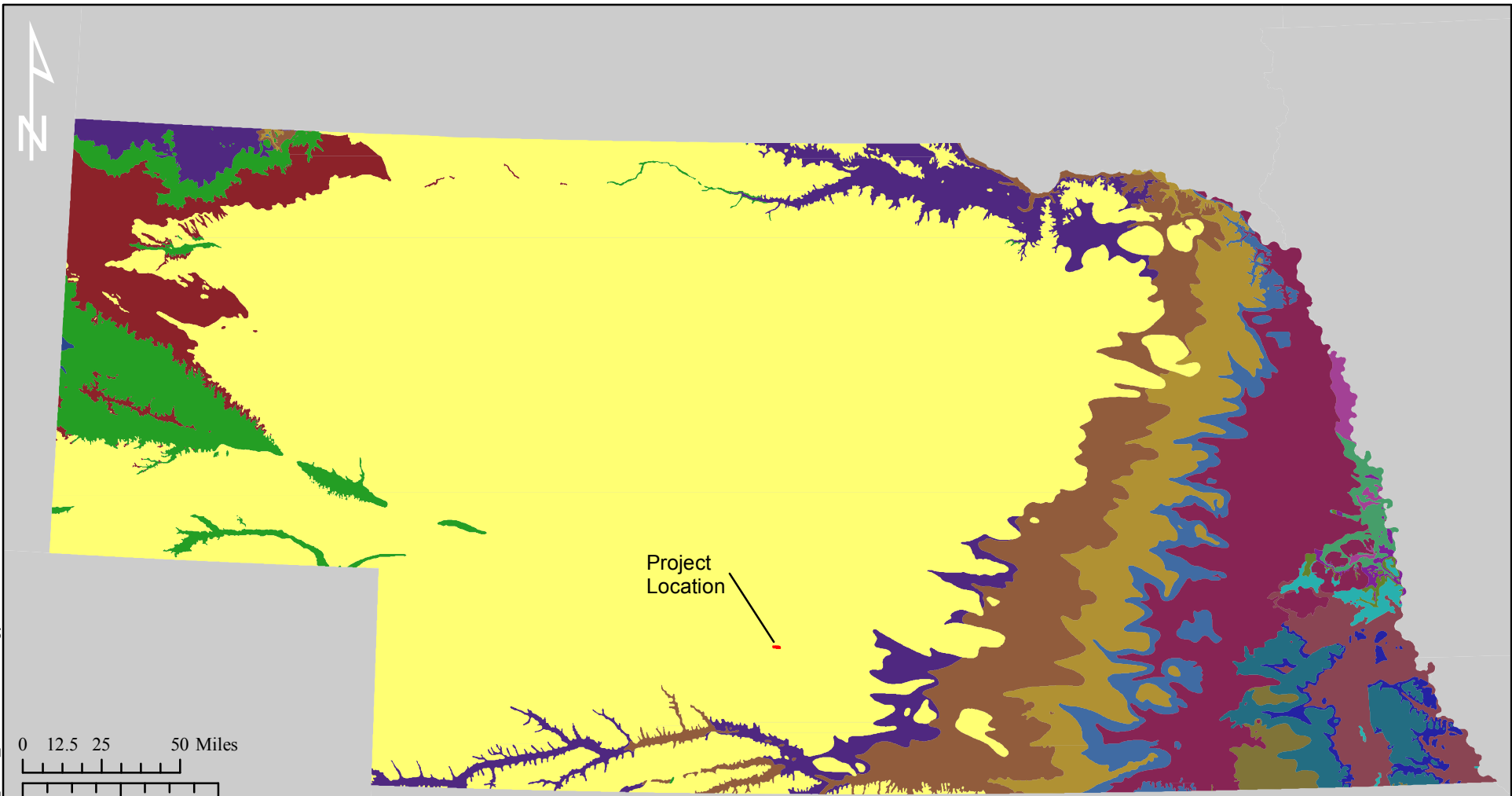
### 4.1.1.3 SOILS

Surficial materials are derived primarily from alluvial or loess (wind deposited) materials (UNL, 2014). Most rivers in the region have their origins in the Rockies, where rainfall, snowmelt and glacial runoff from the north contribute to soil formation. The soils are commonly deep throughout most of the Central Plains region (CEC, 2011). In the project vicinity, the surface of the Ogallala Formation has been eroded, creating a landscape of undulating plains and gently rolling hills, with several major drainage valleys that was later mantled by a series of unconsolidated, windborne deposits, including the Loveland Loess formation, Gilman Canyon Loess formation, and the Late Wisconsinian Age Peorian Loess formation (Olsson Associates, 2012; Cultural Resources Consulting, 2012).

Like much of the region, the proposed project area is characterized by soils formed from recent alluvium or wind deposited loess. The majority of soils in the project area were developed under a dense grassland cover. Loess was the predominant inorganic parental material for soil production on uplands and high terraces, and loess mixed with glacial till and alluvium was the predominant parent material on side slopes and lower terraces. These soils have maintained a rich and fertile humus complex due to the extremely dense root zones of the native vegetation. The Platte River bottom and floodplain is blanketed with many feet of alluvium washed from the uplands and slopes and from upstream sources and include large amounts of sand to gravelly-sand, which makes them often very fertile and organically rich (Olsson Associates, 2012; Cultural Resources Consulting, 2012).

Today, soils of agricultural potential throughout the Great Plains face problems of reduced nutrient potential, increasing salinity and susceptibility to wind and water erosion (CEC, 2011).

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**Bedrock Unit**

- |               |                    |          |             |
|---------------|--------------------|----------|-------------|
| Admire        | Dakota             | Lansing  | Shawnee     |
| Arikaree      | Douglas            | Marmaton | Wabaunsee   |
| Carlile       | Fox Hills          | Niobrara | White River |
| Chase         | Greenhorn-Graneros | Ogallala |             |
| Council Grove | Kansas City        | Pierre   |             |

Scale: AS SHOWN	Central Nebraska Power and Irrigation Phelps County, NE	1 of 1
Project No: 1145016.01		
Filename: see margin	Kingsley Project Initial Consultation Document (ICD)	
Drawn By: KPN	Nebraska Bedrock Geology	
Date Drawn: 05-20-2014	 141 Main St., PO Box 650 Pittsfield, Maine 04967 Telephone: (207) 487-3328 Fax: (207) 487-3124 www.KleinschmidtUSA.com	

Source:

Figure 4-2 includes mapped soils within the proposed project area and immediate vicinity. Table 4-1 contains a list of soil series that are mapped within the footprints of the proposed project area as well as drainage class and K-factor (erosion factor). Cozad silt loam (3715, 8815, 8816, 8817), Gosper loam (8831), Hord silt loam (8869, 8875), and Lex loam (8502) are the most commonly found soils mapped within the footprints of the proposed J-2 Regulating Reservoirs. Other soil series, included in Table 4-1, occur but are less common. Slopes within the areas to be occupied by Reservoir No. 1 and Reservoir No. 2 are generally level with the vast majority of soils occurring in areas of 0-6% slope. An area of Coly silt loam (2541), which occurs in areas of 11-17% slope, occurs within the area to be occupied by the J-2 Regulating Reservoirs. Soils surrounding the J-2 Regulating Reservoirs Project outside of the project area include Hord silt loam, Hobbs silt loam and made lands.

#### **4.1.1.4 STREAMBANK CONDITIONS**

The predominant soil series present along the Platte River in the vicinity of the proposed J-2 Regulating Reservoirs Project are Gothenburg soils (8495) (Figure 4-2). These soils are common along river bars and floodplains and are formed in recent sandy or gravelly alluvium. Slopes for this series are generally low, and it occurs primarily in areas of level terrain (0-2% slope). This series is poorly drained and is flooded frequently as a result of landscape position. Gothenburg soils are generally sandy or gravelly and as a result have moderate erosion potential (NRCS, 2014).

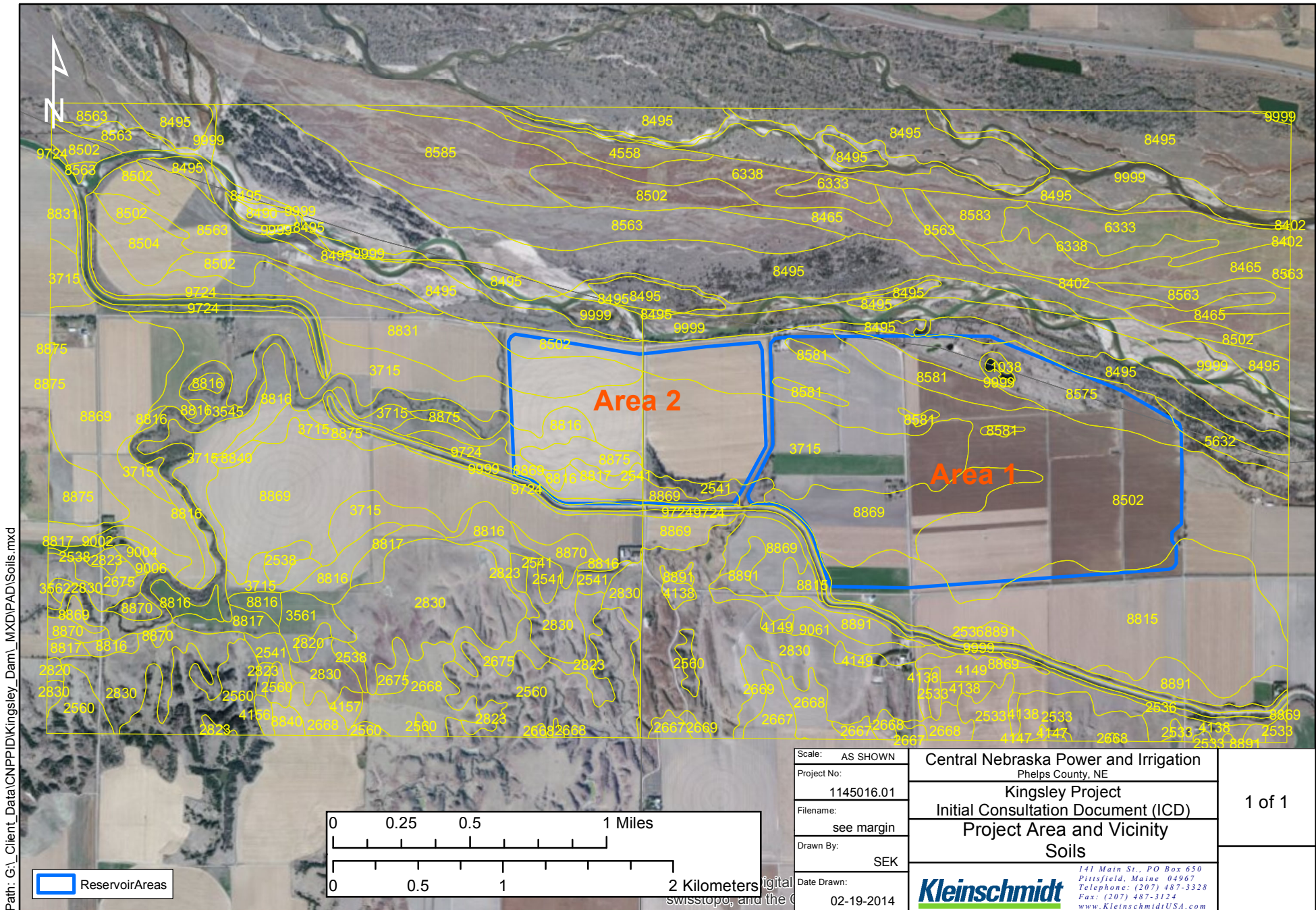
#### **4.1.1.5 EROSION**

The Natural Resources Conservation Survey has assessed the susceptibility of the soils including and surrounding the J-2 Regulating Reservoirs Project to erosion caused by water including rainfall and stormwater run-off. K-Factor estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity with values ranging from 0.02 to 0.69; the larger value indicating greater susceptibility to sheet and rill erosion by water.

**TABLE 4-1. LIST OF MAPPED SOILS WITH DRAINAGE CLASS AND K-FACTOR THAT OCCUR WITHIN THE FOOTPRINTS OF THE J-2 REGULATING RESERVOIRS**

<b>SOILS SYMBOL</b>	<b>SOIL SERIES NAME</b>	<b>DRAINAGE CLASS</b>	<b>K-FACTOR</b>
2541	Coly silt loam, 11 to 17 percent slopes, eroded	Well drained	0.43
3545	Hobbs silt loam, channeled, frequently flooded	Well drained	0.37
3715	Cozad silt loam, rarely flooded	Well drained	0.43
8502	Lex loam, rarely flooded	Somewhat poorly drained	0.28
8575	Platte-Wann complex, channeled, occasionally flooded	Somewhat poorly drained	0.17-0.32
8581	Wann fine sandy loam, rarely flooded	Somewhat poorly drained	0.28
8815	Cozad silt loam, 0 to 1 percent slopes	Well drained	0.43
8816	Cozad silt loam, 1 to 3 percent slopes	Well drained	0.43
8817	Cozad silt loam, 3 to 6 percent slopes	Well drained	0.43
8831	Gosper loam, 0 to 1 percent slopes	Moderately well drained	0.28
8869	Hord silt loam, 0 to 1 percent slopes	Well drained	0.32-0.37
8875	Hord silt loam, wet substratum, 0 to 1 percent slopes	Somewhat poorly drained	0.32-0.37
9724	Ustorthents, 17 to 60 percent slopes	Well drained	0.37

Source: NRCS, 2014



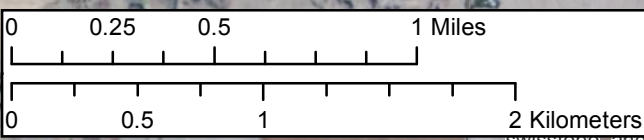
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 Date Drawn: 02-19-2014

Central Nebraska Power and Irrigation  
 Phelps County, NE  
 Kingsley Project  
 Initial Consultation Document (ICD)  
 Project Area and Vicinity  
 Soils  
 141 Main St., PO Box 650  
 Pittsfield, Maine 04967  
 Telephone: (207) 487-3328  
 Fax: (207) 487-3124  
 www.KleinschmidtUSA.com

1 of 1

ReservoirAreas



Source: NRCS. 2014 Custom Soil Resource Report for Dawson County, Nebraska, Gosper County, Nebraska, and Phelps County, Nebraska

Note: Soil symbols are described in detail within the text of the soils section



The K-Factors for the soils within the J-2 Regulating Reservoirs Project range from 0.17 (Platte-Wann soils) to 0.43 (Coly and Cozad soils), which generally indicate a generally moderate susceptibility to erosion from water. Areas of Coly with greater slopes (11-17%) are often susceptible to erosion. As described in Section 4.1.1.4, Gothenburg soils along the shore of the Platte River are generally sandy and have moderate susceptibility to erosion (0.43) (NRCS, 2014).

#### **4.1.1.6 REFERENCES**

Cultural Resource Consulting. 2012. Archaeological Investigation and Assessment: Platte River Recovery and Implementation Program, Areas of Potential Effect, Plum Creek Vicinity, Gosper and Phelps Counties, Nebraska. January, 2012.

Commission for Environmental Cooperation (CEC). 1997. Ecological Regions of North America. Montreal Canada. 60 pp.

Commission for Environmental Cooperation (CEC). April 2011. North American Terrestrial Ecoregions. Available online at: [ftp://ftp.epa.gov/wed/ecoregions/pubs/NA\\_TerrestrialEcoregionsLevel3\\_Final-2june11\\_CEC.pdf](ftp://ftp.epa.gov/wed/ecoregions/pubs/NA_TerrestrialEcoregionsLevel3_Final-2june11_CEC.pdf) Accessed 02/25/2014.

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#### **4.1.2 BOTANICAL RESOURCES**

##### **4.1.2.1 UPLAND HABITAT COMMUNITIES AND SPECIES**

The proposed J-2 Regulating Reservoirs Project will be within the Central Great Plain Ecoregion of Nebraska. Within this region, there are a variety of vegetation communities, which provide habitat to diverse assortment of wildlife species. Within Big Bend Reach of the Platte River Valley, which extends from the project area downstream approximately 80 miles, upland habitat is commonly characterized by lowland prairie and cultivated fields on the river terraces and upland prairies on the loess bluffs that occur along the ancient river escarpment. Upland habitats that occur most frequently within the proposed project area and vicinity include: mixed prairie,

shortgrass prairie, sandsage prairie, riparian forest, and wooded river channel islands, as well as manmade habitats such as sand and gravel pits, shelterbelts, cropland and residential land (USGS, 2013).

Mixed prairie habitat exists along both the north and south side of the Platte River. Because it occurs on nearly level terrain, most of the mixed prairie in this region has been converted to agricultural land. Dominant native grasses in this community include big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), and needle-and-thread (*Hesperostipa comata*). Typical herbaceous vegetation may also include scurfpea (*Psoralidium tenuiflorum*), and eastern pricklypear (*Opuntia humifusa*). The shrub layer typically includes lead plant (*Amorpha canescens*), western snowberry (*Symphoricarpos occidentalis*), white coralberry (*Symphoricarpos orbiculatus*), smooth sumac (*Rhus glabra*), and soapweed yucca (*Yuca glauca*) (USGS, 2013).

The shortgrass prairie community occurs in the western region of the Platte River system on nearly level to gently sloping plains frequently divided by intermittent streams. Because of the flat topography, most of the shortgrass prairie has been developed for cropland. Dominant grasses of this community include prairie sandreed (*Calamovilfa longifolia*), western wheatgrass, and Indian ricegrass. Common forbs include scurfpea, silverleaf scurfpea, dotted gayfeather, and soapweed yucca (USGS, 2013).

Sandsage prairie is characterized rolling sand dunes that are stabilized by grasses. The well-drained sands are derived from wind-deposited sand sediments. Common grasses include sand bluestem (*Andropogon hallii*), and purple three-awn (*Aristida purpurea*). Typical forbs include stiff sunflower (*Helianthus pauciflorus*), prairie spiderwort (*Tradescantia occidentalis*), and eastern pricklypear. The principal shrub species associated with this community is sand sagebrush (*Artemisia filifolia*) (USGS, 2013).

Riparian forest vegetation types between Lake McConaughy and Merrick County, which includes the proposed project area and vicinity, have been characterized by species composition, soils, biogeographic distribution, and the mixture of shrub species (Currier, 1982). The most widespread community in the valley is cottonwood/cedar community, dominated by cottonwood (*Populus deltoides*) in the overstory and red cedar (*Juniperus virginiana*) and rough-leaved dogwood (*Cornus drummondii*) in the shrub layer. Prevalent ground layer species are Kentucky

bluegrass (*Poa pratensis*), poison ivy (*Toxicodendron radicans*), and Canada goldenrod (*Solidago canadensis*) (USGS, 2013).

Wooded river channel islands are characterized by stabilized vegetation on islands that are raised above the river channel (Nagel et al., 1980). The islands are dominated by shrubs and have an open sandy understory with scattered grasses and forbs (USGS, 2013). Red-osier dogwood (*Cornus sericea*) is the prevalent shrub species and dominant overstory vegetation includes downy brome (*Bromus tectorum*), and white sweet clover (USGS, 2013).

#### **4.1.2.2 PROJECT AREA UPLAND HABITATS**

The project area contains primarily agricultural areas, which would include cropland, shelterbelts, and residential development. In addition portions of the shoreline include areas of riparian forest while the channel of the river may include areas of wooded river channel. The most common row crop in this region is corn and soybeans; however, alfalfa and winter wheat are also grown in this region. Common plant species found in shelterbelts in this area include cottonwood, red cedar, Russian olive, green ash, American elm, slippery elm, red mulberry, box elder, silver maple, hackberry, Chinese elm, and Siberian elm (USGS 2013). A description of common vegetation within habitats of the J-2 Regulating Reservoirs Project is discussed below.

#### **SHELTERBELTS**

Shelterbelts are narrow lines of trees and shrubs that are planted on periphery of agricultural fields and near farmsteads. These manmade belts are dominated by cottonwood and red cedar. Other common tree species include Russian olive, green ash, American elm, slippery elm (*Ulmus rubra*), red mulberry (*Morus rubra*), box elder (*Acer negundo*), silver maple (*Acer saccharinum*), hackberry (*Celtis occidentalis*), Chinese elm (*Ulmus parvifolia*), and Siberian elm (*Ulmus pumila*). The ground layer is usually poorly developed, consisting of various grasses including Kentucky bluegrass and timothy (*Phleum pratense*) (USGS, 2013).

#### **CROPLAND/GRASSLAND**

Most of the cropland along the central Platte is dedicated to corn and soybean production, including Gosper and Phelps Counties. The project area is dedicated primarily to corn crops. (USGS, 2013). Grasslands are located along the fringes of croplands and adjacent to the River.



## **RESIDENTIAL HABITATS**

Urban and residential areas provide a wide range of habitats for wildlife. Ornamental plantings around residences, parks and cemeteries, industrial areas, grain elevators, building ledges, and landfills provide diverse food sources, which accommodate the existence of numerous bird species (USGS, 2013). Limited residential development is located within the area that will be occupied by the proposed regulating reservoirs.

## **RIPARIAN FOREST**

Riparian forest vegetation along the Platte River is primarily cottonwood/cedar community dominated by cottonwood in the overstory and red cedar and rough-leaved dogwood in the shrub layer. Other common tree species in riparian forests include green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and diamond willow (*Salix planifolia*). Common shrub species include Russian olive (*Elaeagnus angustifolia*), river-bank grape (*Vitis riparia*), wild rose (*Rosa* sp.), false indigo (*Amorpha fruticosa*), and coyote willow (*Salix exigua*). Prevalent ground layer species are Kentucky bluegrass, poison ivy, common ragweed (*Amrosia artemisiifolia*), black medick (*Medicago lupulina*), white sweetclover (*Melilotus albus*), false soloman's seal (*Maianthemum rasemosum*), water sedge (*Carex aquatilis*), and Canada goldenrod (USGS, 2013).

## **WOODED RIVER CHANNEL ISLAND**

This community is primarily associated with Jeffrey Island, located within the Platte River channel adjacent to the discharges of the proposed regulating reservoirs and managed by Central. There is a great degree of variation in river channel island vegetation due to varying degrees of soil moisture and stage of growth. However this community is generally dominated by coyote willow, false indigo, eastern cottonwood, and diamond willow. Red-osier dogwood is the prevalent shrub species. The understory is typically characterized by common ragweed, fog fruit (*Phyla lanceolata*), prairie cordgrass, narrowleaf aster (*Sericarpus linifolius*), Canada goldenrod, cocklebur (*Xanthium* Spp), and Japanese brome (*Bromus japonicas*). Dominant overstory vegetation includes downy brome, and white sweet clover. Poison ivy is a prevalent understory species on islands where red-osier dogwood and false indigo occur (USGS, 2013).

#### **4.1.2.3 PROJECT VICINITY WETLANDS**

A variety of wetland types occur in the Big Bend Reach of the Platte River Valley and provide habitat for a wide range of wildlife. Wetland habitats that occur within the project vicinity as defined in the National Wetlands Inventory (NWI) include: prairie wetlands, wet meadows and riverine wetlands.

Prairie wetlands occur within the Rainwater Basin region, which includes the Phelps and Gosper Counties and developed as ground water seepage areas within the valleys of sand dunes. In the Rainwater Basin emergent vegetation is characterized by hybrid cattail (*Typha angustifolia x glauca*), hardstem bulrush (*Schoenoplectus actus*), and various smartweeds (*Polygonum Spp.*) (Evans and Wolfe, 1967). The wet meadow community occurs along river channels and other low, sub-irrigated areas in open grasslands and colonizing forests (Currier, 1982). This community is distributed throughout the central Platte River region and is typically found in grazed pastures with palustrine emergent vegetation occurring in depression that follows the natural drainage patterns (Currier, 1982; Cowardin, et. al., 1979). Vegetation is characterized by sedges including spikerush (*Eleocharis Spp.*), fescue sedge (*Carex festucacea*), and fox sedge (*Carex vulpinoidea*) with reed canary grass (*Phalaris arundinacea*) as the prevalent grass and common forbs include fringed loosestrife (*Lysimachia ciliate*), and lady's thumb (*Polygonum maculosa*). These wetlands provided a natural habitat and migratory bird stopover area in the valley's agricultural environment. Riverine wetlands in the project vicinity typically occur adjacent to the Platte River and tributaries with common emergent vegetation including Hardstem bulrush, cattail, and coyote willow.

#### **4.1.2.4 PROJECT AREA WETLANDS**

Wetlands located in the project area are within agricultural areas and occupy a combined area of less than approximately 7.5 acres (Figure 4-3). These wetlands are classified by the USFWS under the NWI as a temporarily flooded freshwater forested/shrub wetland (PFOA) and a semi-permanently flooded, excavated freshwater pond (PUBFx).

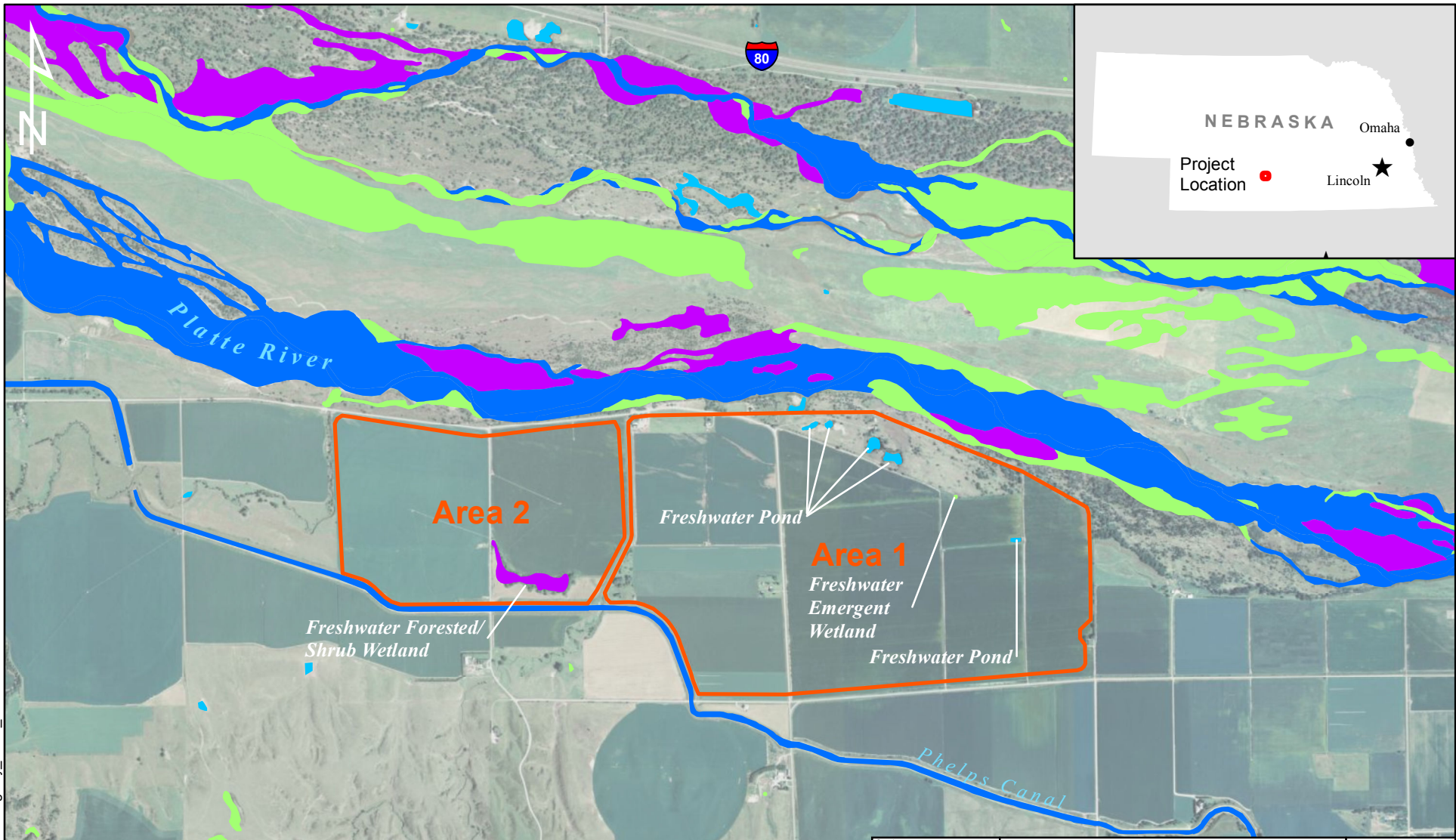
Although not within the project area, the Platte River and associated wetlands adjacent to this area may be affected by the J-2 Regulating Reservoirs Project. Wetlands in this area include lower perennial riverine with unconsolidated shore (R2USA) or unconsolidated bottom (R2UBF), temporarily flooded freshwater emergent (PEMA), temporarily flooded freshwater

scrub-shrub (PSSA) and temporarily flooded freshwater pond (PUSA) or permanently flooded, excavated freshwater pond (PUBFx).





Forested and shrub NWI wetlands within the project area, and within the Central Platte River Valley, are primarily dominated by eastern cottonwood often with green ash, eastern red cedar, black willow, and slippery elm in the sub-canopy. Shrubs often include rough-leaved dogwood, saplings of overstory species, false indigo, prickly ash (*Zanthoxylum americanum*) and coral berry. River-bank grape and Virginia creeper (*Parthenocissus quinquefolia*) are also common (McKee, 2006).

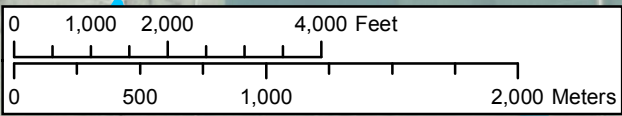
Riverine wetlands and freshwater ponds typically occur in areas of standing water behind dams or in pools of water adjacent to the river channel (Currier, 1982; Currier and Goldowitz, 1994). Riverine wetlands occur most frequently along the North Platte River and in widely spread areas of the Platte River between Lexington and Grand Island. Common emergent vegetation includes Hardstem bulrush, cattail, spikerush, water sedge, fog fruit, and coyote willow.


Emergent wetlands, with less exposure to flood waters from the river may be similar in species composition to prairie wetlands. Emergent wetland vegetation is characterized by hybrid cattail, hardstem bulrush, and various smartweeds (Evans and Wolfe, 1967). Common submerged aquatic species include sago pondweed (*Stuckenia pectinata*), muskgrass (*Chara Spp.*), coontail (*Ceratophyllum demersum*), and water milfoil (*Myriophyllum Spp.*)(Steinauer, 1995).



Path: G:\\_Client\_Data\CNPPIID\Kingsley\_Dam\_MXD\IPAD\Wetlands.mxd

Wetlands (NWI)	
	Freshwater Emergent Wetland
	Freshwater Forested/Shrub Wetland
	Freshwater Pond
	Riverine



Scale: AS SHOWN	Central Nebraska Power and Irrigation Phelps County, NE	1 of 1
Project No: 1145016.01		
Filename: see margin	Kingsley Project Initial Consultation Document (ICD)	
Drawn By: KPN	NWI Wetlands	
Date Drawn: 02-19-2014	 141 Main St., PO Box 650 Pittsfield, Maine 04967 Telephone: (207) 487-3328 Fax: (207) 487-3124 www.KleinschmidtUSA.com	

Source: USFWS National Wetland Inventory (NWI) (2005)

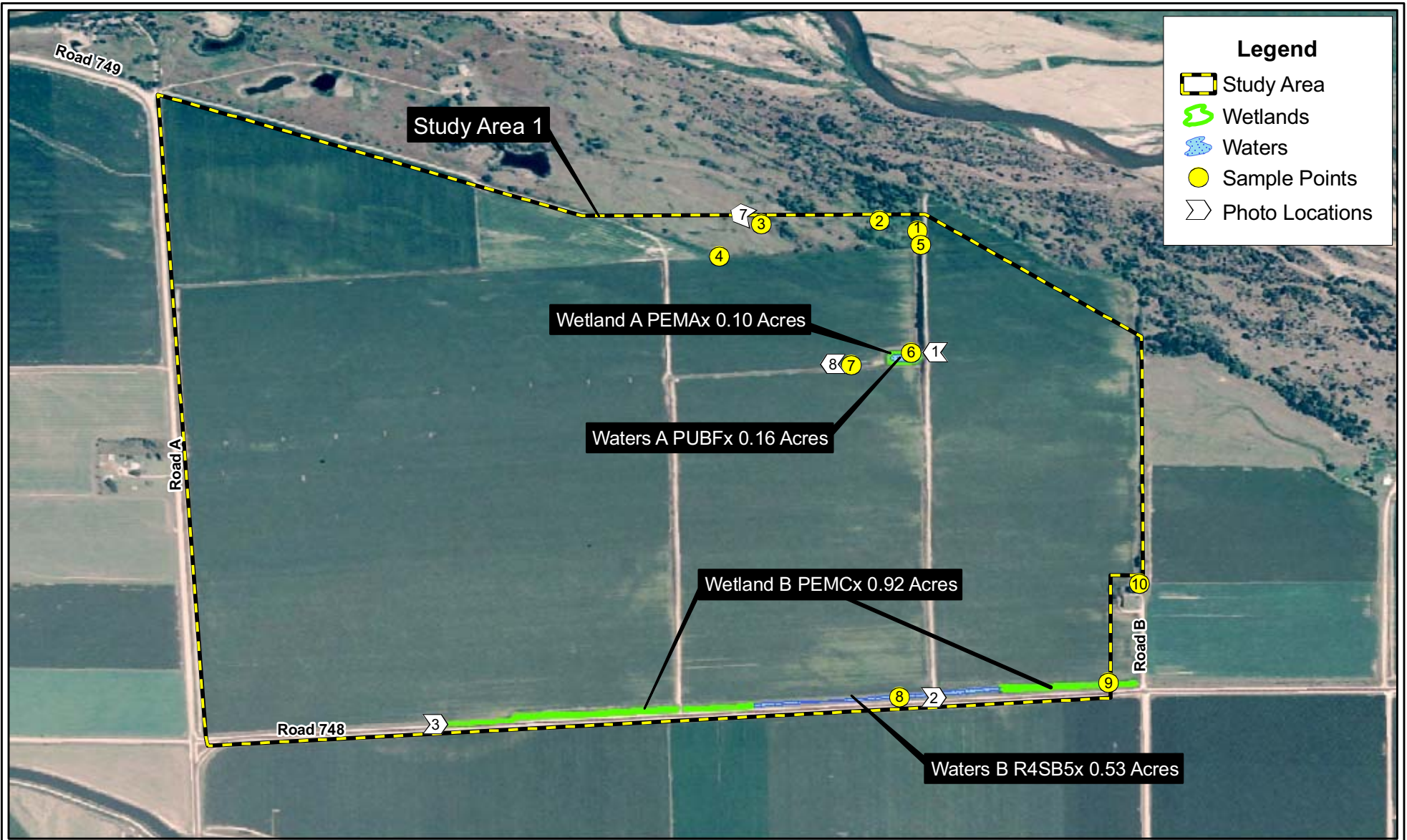
A wetland delineation was conducted to identify the extent of wetlands and other waters within project area (Olsson Associates, 2012). This wetland delineation included review of existing databases, and an onsite investigation using the USACE Wetland Delineation Manual methodology. Wetland Study Area 1 (Figure 4-4 ) encompassed a portion of the footprint of the Reservoir No. 1, from the east end west to Road A. Wetland Study Area 2 encompassed the entirety of the Reservoir No. 2 footprint (Figure 4-5). Three wetlands are reported within the project area and discussed below.

Wetland/Waters A, located within the northeast portion of Wetland Study Area 1 (Figure 4-4), is an agricultural re-use pit, depicted on the NWI map as a freshwater pond (PUBFx). The field investigation found a Palustrine Emergent Temporarily Flooded Excavated (PEMAx) wetland fringe surrounding the freshwater pond. The wetland fringe was dominated by a sedge species and spreading yellowcress (Olsson Associates, 2012).

Wetland/Waters B is located within the roadside ditch north of 748 Road in the southern portion of Wetland Study Area 1 (Figure 4-4). The bottom of this ditch was characterized by flowing water up to 1 foot deep with areas of emergent vegetation and other areas that lacked vegetation. The vegetated areas were dominated by reed canarygrass and cattails and are classified as a Palustrine Emergent Seasonally Flooded Excavated (PEMCx) wetland. The un-vegetated areas are Riverine Intermittent Streambed Mud Excavated (R4SB5x) waters. The ditch appears to be directly connected to the Platte River approximately 2 miles down-gradient of the project area (Olsson Associates, 2012).

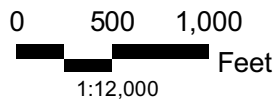


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Data Source: 2007 NAIP Aerial Photograph, Gosper & Phelps Counties

Figure 3-1

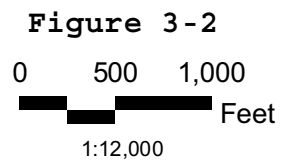


CNPPID Re-Regulation Reservoir Project  
 Platte River Recovery Implementation Program  
 OLSSON Project No. 009-1466  
 Gosper and Phelps Counties, Nebraska  
 Study Area 1 Delineation Map  
 Figure 4A





Data Source: 2007 NAIP Aerial Photograph, Gosper & Phelps Counties



Wetland C is located within a wooded area in the southeast portion of Wetland Study Area 2 (Figure 4-5) along a remnant section of Plum Creek. Plum Creek was previously diverted just west of Wetland Study Area 2 to facilitate agricultural use of the lands through which the creek flowed. Most of the land that was formerly encompassed by Plum Creek and its adjacent riparian area is now being used for irrigated row crop production. However, one remnant section of Plum Creek is still located within Wetland Study Area 2 identified as Wetland C. Portions of this area are classified by the NWI as Palustrine Forested Temporarily Flooded (PFOA), and Palustrine Scrub/Shrub Seasonally Flooded (PSSC) and PEMC wetlands. The site visit revealed that water flows through this area typically during large runoff events and that wetlands are located within the old channel, but not in the adjacent wooded area. Portions of the wetland were dominated by smartweed species, kidney-leaf buttercup, and reed canarygrass or characterized by submergent aquatic vegetation, duckweed, and algae (Olsson Associates, 2012).

#### 4.1.2.5 INVASIVE PLANTS AND WEEDS

There are currently over 30 invasive plant species that are known to occur in Nebraska (NISP, 2013). Although no site specific data is available for the proposed project area, several of the invasive plants have been documented in the Platte River Valley including purple loosestrife, common reed, and saltcedar. Other invasive plants that are likely to occur at or near the proposed J-2 Regulating Reservoirs Project based on preferred habitat and known distribution are listed in Table 4-2.

**TABLE 4-2. INVASIVE PLANTS POTENTIALLY OCCURRING IN THE PROJECT AREA**

COMMON NAME	SCIENTIFIC NAME
Garlic mustard	<i>Alliaria petiolata</i>
Giant Reed	<i>Arundo donax</i>
Plumeless thistle	<i>Carduus acanthoides</i>
Musk thistle	<i>Carduus nutans</i>
Spotted knapweed	<i>Centaurea biebersteinii</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Black knapweed	<i>Centaurea moncktonii</i>
Canada thistle	<i>Cirsium arvense</i>
Crown vetch	<i>Coronilla varia</i>
Houndstongue	<i>Cynoglossum officinale</i>
Common teasel	<i>Dipsacus fullonum</i>
Cutleaf teasel	<i>Dipsacus laciniatus</i>
Russian olive	<i>Elaeagnus angustifolia</i>
Leafy spurge	<i>Euphorbia esula</i>

COMMON NAME	SCIENTIFIC NAME
Japanese/ Giant knotweed	<i>Fallopia japonica, F. sachalinensis</i>
Goatsrue	<i>Galega officinalis</i>
Yellow bedstraw	<i>Galium verum</i>
Dame's rocket	<i>Hesperis matronalis</i>
Common St. John's wort	<i>Hypericum perforatum</i>
Eastern red cedar	<i>Juniperus virginiana</i>
Serecia lespedeza	<i>Lespedeza cuneata</i>
Purple loosestrife	<i>Lythrum salicaria, L. virgatum</i>
Scotch thistle	<i>Onopordum acanthium</i>
Common reed	<i>Phragmites australis</i>
Sulphur cinquefoil	<i>Potentilla recta</i>
European buckthorn	<i>Rhamnus cathartica</i>
Saltcedar	<i>Tamarix ramosissima</i>
Hybrid cattail	<i>Typha Xglauca</i>

Source: NISP, 2013 and PVWMA 2013

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### 4.1.3 FISH AND AQUATIC WILDLIFE RESOURCES

#### 4.1.3.1 AQUATIC HABITAT

The Central Platte River, including the Big Bend Reach (between Lexington and Grand Island, Nebraska), provides important habitat for a wide variety of fish species, many of which are forage for migratory birds and wildlife that depend upon the Platte River Valley ecosystem. These include the endangered interior least tern and the whooping crane, and the bald eagle (USFWS, 2006a, 2006b) and are discussed more fully in Section 4.1.11.

The habitat of the Central Platte River presently consists of low gradients with sand/silt substrates, highly variable flows and high turbidity (FERC, 1998). The common habitat types have been characterized as backwater, open channel, bank, and snag. Open channel is the dominant habitat type (approximately 95%) (FERC, 1998 and references therein). Fish utilize habitat in deeper pools, open side channels, and backwaters and where there is shoreline cover (FERC, 1998; USFWS, 2006). Fish also utilize the tributaries and creeks which flow into the river during times of low water level or drought (FERC, 1998).

#### 4.1.3.2 FISH RESOURCES

The North, South, and Central Platte Rivers support a wide variety of fish species. A representative list is presented in Table 4-3.

**TABLE 4-3. FISH SPECIES DOCUMENTED IN THE NORTH AND CENTRAL PLATTE RIVERS, NEBRASKA.**

COMMON NAME	SCIENTIFIC NAME
Alewife	<i>Alosa pseudoharengus</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
River carpsucker	<i>Carpiodes carpio</i>
Quillback	<i>Carpiodes cyprinus</i>
Longnose sucker	<i>Catostomus catostomus</i>
White sucker	<i>Catostromus commersoni</i>
Red shiner	<i>Cyprinella lutrensis</i>
Carp	<i>Cyprinus carpio</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Northern pike	<i>Esox lucius</i>
Muskellunge	<i>Esox masquinongy</i>
Tiger musky	<i>Esox maxquinongy x esox lucius</i>
Plains top minnow	<i>Fundulus sciadicus</i>
Plains killifish	<i>Fundulus zebrinus</i>

COMMON NAME	SCIENTIFIC NAME
Mosquitofish	<i>Gambusia affinis</i>
Channel catfish	<i>Ictalurus punctatus</i>
Bluegill	<i>Lepomis macrochirus</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Largemouth bass	<i>Micropterus salmoides</i>
White bass	<i>Morone chrysops</i>
Wipers (white bass-striped bass hybrid)	<i>Morone saxatilis x morone chrysops</i>
Striped bass	<i>Morone saxatilis</i>
Redhorse	<i>Moxostoma carinatum</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Emerald shiner	<i>Notropis atherinoids</i>
Bigmouth shiner	<i>Notropis dorsalis</i>
Spottail shiner	<i>Notropis hudsonius</i>
Sand shiner	<i>Notropis stramineus</i>
Cutthroat trout	<i>Oncorhynchus clarki</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Rainbow smelt	<i>Osmerus mordax</i>
Yellow perch	<i>Perca flavescens</i>
Fathead minnow	<i>Pimephales promelas</i>
White crappie	<i>Pomoxis annularis</i>
Black crappie	<i>Pomoxis nigrmaculatus</i>
Flathead catfish	<i>Pylodictis olivaris</i>
Brown trout	<i>Salmo trutta</i>
Sauger	<i>Sander canadensis</i>
Walleye	<i>Sander vitreus</i>

Source: FERC, 1998; NGPC, 2014a-g

Several coldwater and warmwater fisheries are supported by the lakes and ponds within 10-15 miles of the project area, including Johnson Lake (2,800 acres). This reservoir is in close proximity to the J-2 Regulating Reservoirs Project, and will be hydrologically linked via the extended Supply Canal. Johnson Lake is eutrophic (high nutrient levels, high plant production, and high turbidity) (FERC, 1998)). The reservoir provides significant fisheries for walleye, channel catfish, flathead catfish, white bass, largemouth bass, freshwater drum, bluegill, crappie, and yellow perch. Nongame fish include gizzard shad, carp, white sucker, shorthead redhorse, redhorse, longnose sucker, river carpsucker, and quillback carpsucker (FERC, 1998).

## JOHNSON LAKE

Johnson Lake is a shallow-basin off-channel regulating reservoir used for irrigation and hydropower generation (CNPPID, 2007) and provides flows to the Supply Canal for generation

at the Johnson No. 1 and Johnson No. 2 Hydropower Plants. Because the reservoir outflow is to the Supply Canal, it is assumed the same species composition exists in the Supply Canal as exists in Johnson Lake.

Walleye are stocked annually and in the highest numbers (Table 4-4) (NPGC, 2014a) relative to channel catfish, wipers, and yellow perch, which are stocked intermittently. Walleye abundance has remained stable the past several years (10-20 per net since 2008) (Table 4-5) (NGPC, 2014d). Sauger are not stocked in Johnson Lake but are stocked in upstream reservoirs; the catch rate is 1-5 per net. The abundance of channel catfish has remained fairly uniform at 1-5 per net since 2003. The wiper abundance has been low the past several years (<2 per net). The number of crappie (white and black) per net has been highly variable. In 2013, the sample was 60% black crappie and 40% white crappie. Approximately 10-50 and 5 to 25 walleye and white bass, respectively, have been sampled per net. The catch rate of yellow perch has increased in Johnson Lake since they were first stocked in 2007 with catch rates of approximately 2-9 per net in 2009 to 2012; however, 0 perch were caught in 2013 (NGPC, 2014d).

**TABLE 4-4. ANNUAL STOCKING OF JOHNSON LAKE (2002--2013)**

DATE	SPECIES	NUMBER	SIZE (INCHES)
2011	Channel catfish	6,070	7
2012	Channel catfish	37,470	5
2002	Palmetto bass (wiper)	14,600	1.2
2004	Palmetto bass (wiper)	14,000	1.5
2005	Palmetto bass (wiper)	14,000	1
2003	Striped bass hybrid (wiper)	14,168	1.45
2006	Striped bass hybrid (wiper)	28,000	1.25
2008	Striped bass hybrid (wiper)	43,780	1.25
2009	Striped bass hybrid (wiper)	14,763	2
2013	Striped bass hybrid (wiper)	10,963	1.2
2007	Sunshine Bass (wiper)	40,475	1.75
2002	Walleye	142,420	1.2
2003	Walleye	140,146	1.3
2004	Walleye	145,125	1.4
2006	Walleye	140,000	1.25
2007	Walleye	140,000	1.25
2008	Walleye	100,000	1.1-1.25
2009	Walleye	219,525	1.4
2010	Walleye	438,473	1.25-1.5

DATE	SPECIES	NUMBER	SIZE (INCHES)
2012	Walleye	219,375	1.3-1.4
2013	Walleye	239,082	1.2
2007	Yellow perch	65,973	4-4.1
2009	Yellow perch	66,610	2.8-3
2011	Yellow perch	66,674	2.75-3.1
2013	Yellow perch	60,048	3-3.4

Source: NGPD, 2014a

**TABLE 4-5. NUMBER OF FISH PER NET SAMPLED DURING SURVEYS CONDUCTED IN JOHNSON LAKE BETWEEN 2002 AND 2013 AND LENGTH RANGES OF FISH (INCHES)**

YEAR	CHANNEL CATFISH	CRAPPIE <sup>a</sup>	WALLEYE	SAUGER	WHITE BASS	WIPERS	YELLOW PERCH
2013	3	25	12	1	6	0.5	-
2012	3.5	65	15	5	8	0.5	4
2011	1	63	16	3	15	2	8.8
2010	4.5	-	18	2	5	0.5	5
2009	2	105	19	2	10	1	1.8
2008	3.5	30	12	1	6	9	-
2007	3	75	30	3.5	8	2.5	1.5
2006	2	2	40	3	15	1	1
2005	1.5	5	37	1	16	0.5	.6
2004	2	5	15	1	4	2	-
2003	3	15	50	5.5	25	3	3.6
2002	2.5	60	15	1	13	5	-
<b>Size Range</b>	<11 to >24	<5 to >10	<10 to >25	<8 to >20	<6 to >12	<8 to >20	<5 to 15

Source: NGPD, 2014d

<sup>a</sup>Includes white and black crappie

An angler survey was conducted at Johnson Lake during May to October 2011 by the NGPC (Table 4-6). Walleye and white bass dominated the fishery with over 22,000 of each species caught. Catch rates were 1.05 and 1.13 per hour for walleye and white bass, respectively. Approximately 15,400 crappie were caught with a catch rate of 4.67 per hour. Crappie, walleye, and wiper catches peaked in May and June, channel catfish catch peaked in July, and white bass catch peaked in August. Other species caught in 2011 included freshwater drum, smallmouth bass, largemouth bass, common carp, sauger, yellow perch, bluegill, and flathead catfish (NGPD, 2012).

**TABLE 4-6. NUMBER OF FISH CAUGHT AND AVERAGE LENGTH RESULTS FROM AN ANGLER SURVEY CONDUCTED AT JOHNSON LAKE IN 2011**

FISH SPECIES	NUMBER CAUGHT	AVERAGE LENGTH (INCHES)	CATCH RATE (FISH/HOUR)
<b>Channel catfish</b>	2,193	18.0	0.33
<b>Crappie</b>	15,421	-	4.67
<b>Walleye</b>	22,810	18.8	1.05
<b>White bass</b>	22,180	11.3	1.13
<b>Wiper</b>	766	16.8	-

Source: NGPD, 2012

#### **4.1.3.3 FISH SPECIES, SPECIES DISTRIBUTION AND LIFE HISTORY**

##### **WALLEYE AND SAUGER**

Walleye prefer large and/or deep lakes, ponds, rivers and streams with sand, gravel or bedrock substrate. The closely related sauger prefers turbid large, shallow lakes and slow moving rivers. Walleye and saugers are nocturnal predators with a diet consisting of fish (i.e., alewife, gizzard shad), insects, and crustaceans (Collette et al., 1977). Walleye are photophobic, and tend to remain in deeper water during daylight hours. Walleye and sauger spawn in spring in shallow water near shorelines (FERC, 1998) by broadcast spawning eggs and milt over cobble and gravel substrates. Sauger typically spawn after walleye (Collette et al., 1977) Eggs are negatively buoyant and adhere to substrates for incubation. Females lay 9,000 to 90,000 eggs which hatch in 12-18 days (Scott and Crossman, 1973). Saugers develop more slowly than walleye. Males reach maturity at 2-4 years and females at 3-6 years (Scott and Crossman, 1973).

##### **CHANNEL CATFISH**

Channel catfish prefer pond, stream, river, or lake habitats with deep pools and cover provided by undercut banks and debris (FERC, 1998). Channel catfish feed on insects, fish, mollusks, and crayfish (Robison and Buchanan 1988). Catfish spawn during the spring; the males build nests in shallow water under banks or debris and guard the eggs and fry until they are ready to disperse (Robison and Buchanan, 1988). This species reaches maturity at 4-5 years and lengths of 12-15 inches.



## **CRAPPIE**

White crappie inhabit silty streams, lands, ponds, and slow moving rivers (Scott and Crossman, 1973). Black crappie prefer clear water in ponds, shallow areas in lakes, and slow moving water with abundant aquatic vegetation. Their diet consists of crustaceans, aquatic insects, and small fish. White and black crappie spawn in late spring to summer (Scott and Crossman, 1973). Males clean nests of approximately 1 foot diameter over a variety of substrates and often near vegetation. White and black crappie females lay approximately 27,000-70,000 eggs which adhere to the substrate or each other. Males guard and fan the eggs which hatch in 2-5 days. Crappie reach maturity at 2-4 years at lengths of 6-8 inches (Scott and Crossman, 1973).

## **WHITE BASS**

White bass inhabit moderate to large rivers with clear water and sand or rock substrates (Robison and Buchanan, 1988). Their diet consists of insects, crustaceans, and fish. White bass spawn in spring. Females may lay approximately 250,000 to 900,000 eggs (Scott and Crossman, 1973). Eggs are released near the surface or mid-water, are fertilized as they sink, and then attach to the substrate or vegetation on the bottom (Scott and Crossman 1973). Neither males nor females care for or guard the eggs which hatch within <2 days. White bass grow rapidly and have a short lifespan (~4-8 years) (Robison and Buchanan, 1988).

## **LARGEMOUTH BASS**

Largemouth bass prefer habitats with sand/mud substrates in shallow lakes, backwaters, ponds, and slow moving streams and rivers (Scott and Crossman, 1973). Largemouth bass are highly cover oriented with aquatic vegetation and cover provided by logs, boulders, steep embankments, branches and banks being preferred. Bass are ambush predators, and their diet is varied, but primarily consists of fish, amphibians, insects and crayfish (Scott and Crossman, 1973). Larger adults will opportunistically consume birds and rodents and other small animals that they incidentally encounter. Largemouth bass spawn in late spring (Scott and Crossman, 1973). Males build nests in shallow water with sand/mud substrates often among emergent vegetation by sweeping clear a 2-3 foot area. Females may lay between 2,000 to 100,000 eggs per year between the ages of 5 to 12. Males guard the eggs which hatch in 3-5 days. Males reach maturity at 3-4 years, and females at 4-5 years (Scott and Crossman, 1973).

#### 4.1.3.4 REPTILES AND AMPHIBIANS

In the project area and immediate vicinity, seven species of frogs and toads, five species of turtle, nine species of snakes, one salamander, and two species of lizards may occur (Table 4-7).

**TABLE 4-7. REPTILE AND AMPHIBIAN SPECIES KNOWN TO OR WITH THE POTENTIAL TO OCCUR WITHIN THE PROJECT AREA OR PROJECT VICINITY**

COMMON NAME	SCIENTIFIC NAME
<b>Turtles</b>	
Ornate box turtle	<i>Terrapene ornata</i>
Painted turtle	<i>Chrysemys picta</i>
Snapping turtle	<i>Chelydra serpentina</i>
Spiny softshell	<i>Apalone spiniferus</i>
<b>Lizard</b>	
Six-lined racerunner	<i>Chemidophous sexlineatus</i>
Lesser earless lizard	<i>Holbrookia maculata</i>
Great Plains Skink	<i>Plestiodon obsoletus</i>
<b>Snakes</b>	
Bullsnake	<i>Pituophis catenifer</i>
Eastern hognose snake	<i>Heterodon platyrhinos</i>
Lined snake	<i>Tropidoclonion lineatum</i>
Milk snake	<i>Lampropeltis triangulum</i>
Northern watersnake	<i>Nerodia sipedon</i>
Plains garter snake	<i>Thamnophis radix</i>
Racer (blue or green)	<i>Coluber constrictor</i>
Common garter snake	<i>Thamnophis sirtalis</i>
Western hognose snake	<i>Heterodon nasicus</i>
<b>Amphibians</b>	
Bullfrog	<i>Rana catesbeiana</i>
Great Plains Toad	<i>Bufo cognatus</i>
Northern Cricket Frog	<i>Acris crepitans</i>
Plains Leopard Frog	<i>Rana blairi</i>
Plains Spadefoot	<i>Spea bombifrons</i>
Western Striped Chorus Frog	<i>Pseudacris triseriata &amp; P. maculata</i>
Woodhouse's Toad	<i>Bufo woodhousii</i>
Tiger Salamander	<i>Ambystoma tigrinum</i>

Source: Lynch, 1985; UNL, 2012; Goldowitz and Whiles, 1999

#### TURTLES

The painted turtle, snapping turtle, and spiny softshell turtle are primarily aquatic while the ornate box turtle is the only terrestrial turtle which may occur in the project vicinity and project area. The painted turtle prefers slow moving water in ponds and streams as well as

shallow/weedy areas of lakes (UNL, 2012; Goldowitz and Whiles, 1999). The snapping turtle is the largest turtle in Nebraska, prefers permanent water bodies, and has a diet consisting of insects, fish, frogs, worms, and birds. The spiny softshell turtle prefer streams, rivers, lakes, and reservoirs and feeds on fish, insects, and amphibians (Lynch, 1985). The ornate box turtle lives in dry open grasslands and feeds on vegetation, insects, small mammals, and invertebrates (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

## **SNAKES**

Snakes that may inhabit the project vicinity and occupy the project area are primarily habitat generalists which may occur within areas of agriculture or near areas of development. The bullsnake, milk snake, racer, and western hognose snake live in woodlands, grasslands, and farmlands with a diet of birds, insects, frogs, toads, lizards, and small mammals (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985). The eastern hognose snake lives along rivers/streams bordered by deciduous forests and prairies and has a diet of toads (Lynch, 1985). The plains garter snake is the most common snake in Nebraska, may live near populated areas (i.e., parks, yards), and has a diet consisting of insects, worms, frogs, slugs, and salamanders. The primarily aquatic northern watersnake prefers moist areas, such as marshes, swamps, ponds, streams, and lakes, and has a diet of fish, crayfish, and amphibians (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

## **FROGS AND TOADS**

Of the species potentially occurring within the project area, several are primarily aquatic (e.g., bullfrog) while others are more terrestrial in habit (e.g., tiger salamander), but all require aquatic environments to successfully breed.

The bullfrog prefers aquatic habitats including lakes, ponds, bogs, and rivers and has a diet consisting of small fish, birds, mice, and insects. Females lay up to 20,000 eggs, and tadpoles may live for up to 2 years before metamorphosis. Bullfrogs reach maturity following another 2-3 years (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

The northern cricket frog prefers ditches, marshes, ponds, lakes, and flooded areas and has a diet of insects and gnats. This frog breeds in late spring to early summer (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985; USGS, 2014).

The plains leopard frog lives in wet meadows, grasslands, lakes, ponds, and rivers. Its diet consists of insects, worms, and crickets. The plains leopard frog breeds in spring by laying 4,000-6,000 eggs attached to submerged vegetation. This frog prefers to reproduce in smaller bodies of water (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

The western striped chorus frog lives in ditches, marshes, flooded areas, and grassy wetlands. It eats aquatic insects. This frog breeds in spring and development is completed within 45 days (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

Woodhouse's toad is the most common toad in Nebraska and prefers moist habitats, such as streams, ponds, marshes, rivers and irrigated areas. Its diet consists of insects, spiders, and beetles. Woodhouse's toad breeds in pools following spring flooding of rivers. The eggs are laid in strings, and tadpoles undergo metamorphosis in 45-60 days (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

The Great Plains toad prefers grasslands near rivers or irrigation ditches. This toad has a diet of insects, worms, and crickets. The Great Plains toad breeds in temporary bodies of water, and tadpoles undergo metamorphosis after around one month (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

The plains spadefoot prefers grasslands, and has a diet of insects and worms. It breeds in summer in temporary ponds following rain, and thus develops rapidly. The eggs hatch within 48 hours, and tadpoles undergo metamorphosis in less than one month (UNL, 2012; Goldowitz and Whiles, 1999; Lynch, 1985).

Tiger salamanders utilize a mixture of habitat types, including wetlands and terrestrial habitats (forested and cleared areas). Tiger salamanders are known to inhabit croplands and hedgerows provided there is terrestrial substrate that is suitable for burrowing and a suitable water body nearby for breeding. Generally, breeding occurs in spring with the salamander utilizing open,

grassy, temporary ponds. Depending on temperature, the eggs hatch, generally, within 2-5 weeks (Natureserve, 2014).

#### **4.1.3.5 MACROINVERTEBRATE SPECIES AND HABITATS**

Macroinvertebrates include annelids (e.g., worms), arthropods (e.g., crayfish), mollusks (e.g., freshwater mussels), and aquatic insects (e.g., stoneflies and mayflies). These organisms provide a link between a system's primary productivity and its aquatic consumers through the conversion of plant biomass to consumable energy.

The Nebraska Department of Environmental Quality's Stream Biological Monitoring Program samples rivers and streams in all of the state's 13 river basins in a 5 year cycle. During the 1997-2001 sample period, 60 sites in the Central Great Plains ecoregion, which includes the Big Bend reach, were sampled (NDEQ, 2005). The most abundant macroinvertebrates included several diptera, ephemeroptera, coleoptera, haplotaxida, and amphipoda (NDEQ, 2005).

#### **4.1.3.6 AQUATIC INVASIVE SPECIES**

Zebra mussels have been documented in Omaha, Nebraska (approximately 200 miles east), but not in ponds or lakes in the project vicinity and are not expected in the reach of the Platte River affected by the proposed J-2 Regulating Reservoirs Project (NGPC, 2014b). Asiatic Clam (*Corbicula fluminea*) is found in the area and it is invasive (Peyton and Maher, 1995).

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#### **4.1.4 TERRESTRIAL WILDLIFE HABITATS AND SPECIES**

##### **4.1.4.1 WILDLIFE RESOURCES AND HABITATS IN THE PROJECT AREA AND VICINITY**

The J-2 Regulating Reservoirs Project is located in Gosper and Phelps County adjacent to the Platte River. The landscape in this area is characterized by watercourses, drainages and river valleys (Jorgensen, 2012). The project area is dominated by areas of active agricultural use. Additional habitats include areas of riparian forest and open areas (i.e., river bars) within the Platte River. In general, areas of forested habitat within the project area are associated with water courses such as the Platte River, Plum Creek, and the unnamed tributary to the Platte River.

#### **BIRDS**

A great variety of wildlife inhabits the Platte River valley including several game and non-game species; however, this region is known for its diversity and numbers of birds. The proposed J-2 Regulating Reservoirs Project occurs within the Platte River Valley, and as of 1990, 409 bird species had been confirmed in the central Platte River valley, which includes nearly 50 percent of all species that have been identified in North America (American Birding Association, 1986). Further, at least 208 bird species have been confirmed nesting at least once in this region. The primary taxonomic groups include 41 species of wood warblers (*Parulidae*) (10 percent), 40 species of shorebirds (*Charadriidae*, *Recurvirostridae*, *Scolopacidae*) (10 percent), 35 species of waterfowl (8.5 percent), and 32 species of emberizid finches (*Emberizidae*) (8.3 percent) (USGS, 2013c).

During February through April, the largest known concentration of sandhill cranes (*Grus canadensis*) (almost 500,000) in the world stage along the central Platte River and along the North Platte River below Lake McConaughy.

Other migrant waterfowl also make use of the Platte River as a stopover during migration, and bird populations during spring migration can range from five to nine million individuals (USFWS 1981, Currier et al. 1985) and is comprised of snow geese (*Chen caerulescens*) (more than one million birds), Canada geese (*Branta canadensis*) (500,000 birds), greater white-fronted geese (*Anser albifrons*) (300,000 birds), mallard (*Anas platyrhynchos*) and northern pintail (*Anas acuta*). The migration population in the fall is smaller than that of the spring; however an estimated 40,000 mallards and 10,000 Canada geese have been recorded during the winter on the Platte River. During fall migration, waterfowl use wet meadows adjacent to the Platte River for resting and foraging (USGS, 2013c).

Several shorebird species make use of Platte River habitats during spring migration. The white-rumped sandpiper (*Calidris fuscicollis*) and long-billed dowitcher (*Limnodromus scolopaceus*), seemingly use the Platte River as an alternative migration staging site during years of low water conditions at the Cheyenne Bottoms Wildlife Management Area in central Kansas (about 200 air miles south of the central Platte River). During fall migration, Western sandpipers (*Calidris mauri*) and semipalmated plovers (*Charadrius semipalmatus*) also use the Platte River (USGS, 2013c).

During winter, about 250 bald eagles (*Haliaeetus leucocephalus*) inhabit the central Platte River. No bald eagle nest locations are documented within the project area, however there are a few documented in proximity of the project location along the Platte River with two active bald eagle nests in Dawson County and 6 active bald eagle nest in Buffalo County reported in 2013 to the north of the project area. Phelps County has reported active bald eagle nests in prior years (NGPC, 2013). Eagles utilizing the project area are likely using the area for perching or feeding. This area also provides important habitat for other raptors, including red-tailed hawks (*Buteo jamaicensis*), northern harriers (*Circus cyaneus*), Swainson's hawk (*Buteo swainsoni*), and American kestrels (*Falco sparverius*) (USGS, 2013c).

The primary breeding birds in this region include 17 species of emberizid finches (8.8 percent), 15 species of waterfowl (8.2 percent), 12 species of flycatchers (*Tyrannidae*) (5.8 percent), and 11 species each (5.3 percent) of hawks (*Accipitridae*), quail (*Phasianidae*) and blackbirds (*Icteridae*) (Faanes and Lingle, unpubl. data; USGS, 2013c).

Bird species richness varies greatly among the different Platte River habitats. Lowland forest and native prairies had the greatest species richness with 55 and 51 species respectively, while agricultural fields, of which the project area is comprised, had the lowest species richness with 18 and 3 species respectively (USGS 2013c). The project area is largely agricultural, and therefore is expected to have a lower number of bird species than the adjacent Platte River and its associated habitats. However, with the expansion of riparian forest in the Platte River valley, there are still several bird species that use croplands for foraging, including the sandhill crane, the endangered whooping crane (*Grus americana*), as well as many ducks and geese (USGS, 2013a).

## **MAMMALS**

The majority of the mammalian fauna that occupy the Platte River valley belong to the *Muridae* (voles), *Sciuridae* (squirrels), and *Vespertilionidae* (bats) families. Eastern and central Nebraska is the western range limits of 25 percent of all the mammalian fauna occurring in the Platte River Valley and these distribution patterns are especially evident among small mammals that are native to eastern or southern Nebraska (Freeman and Benedict 1993). The project area includes little forested habitat and therefore the occurrence of large mammals within the project area is limited to species such as white-tailed deer. Mammals that are present within the project area are primarily habitat generalists (i.e., raccoon) or species that may utilize the riparian corridor for movement. A list of mammals that may occur in the project area based on distribution and habitat preferences can be found in Table 4-8 (UNL, 2014).

## **HERPTOFAUNA**

Forty species of reptiles and amphibians occur in the Platte river system, with snakes (*Colubridae*, *Viperidae*) comprising roughly 40 percent of the total. The absence of complex forested habitat and the harsh climate in the Platte River System has been attributed to the depauperate herptofauna in this area (USGS, 2013c). As described above, the project area is

dominated by agricultural and residential development. In general, available habitat within the project area limits the potential use to those species that are habitat generalists or occupy areas of residential development. More species diversity would be expected within riparian areas adjacent to the Platte River where more natural habitat conditions are present. A list of herptofauna that may occur in the project area based on distribution and habitat preferences can be found in Table 4-8 (UNL, 2014).

**TABLE 4-8. HERPTOFAUNA AND MAMMALS THAT MAY OCCUR IN THE PROJECT AREA**

COMMON NAME	SCIENTIFIC NAME
<b>Herptofauna</b>	
Tiger salamander	<i>Ambystoma tigrinum</i>
Plains spadefoot	<i>Spea bombifrons</i>
Great Plains toad	<i>Bufo cognatus</i>
Woodhouse's toad	<i>Bufo woodhousii</i>
Plains leopard frog	<i>Rana blairi</i>
Ornate Box turtle	<i>Terrapene ornata</i>
Lesser earless lizard	<i>Holbrookia maculata</i>
Six-lined racerunner	<i>Cnemidophorus sexlineatus</i>
Great plains skink	<i>Eumeces obsoletus</i>
Yellow-bellied racer	<i>Coluber constrictor</i>
Ring-necked snake	<i>Diadophis punctatus</i>
Western hog-nosed snake	<i>Heterodon nasicus</i>
Milksnake	<i>Lampropeltis triangulum</i>
Plains garter snake	<i>Thamnophis radix</i>
Common garter snake	<i>Thamnophis sirtalis</i>
<b>Mammals</b>	
Virginia opossum	<i>Didelphis virginiana</i>
Elliot's short-tailed shrew	<i>Blarina hylophaga</i>
Northern short-tailed shrew	<i>Blarina brevicauda</i>
Least shrew	<i>Cryptotis parva</i>
Eastern mole	<i>Scalopus aquaticus</i>
Small-footed myotis	<i>Myotis ciliolabrum</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Coyote	<i>Canis latrans</i>
Red fox	<i>Vulpes vulpes</i>
Raccoon	<i>Procyon lotor</i>
River otter	<i>Lontra canadensis</i>
Long-tailed weasel	<i>Mustela frenata</i>
Black-footed ferret	<i>Mustela nigripes</i>
Least weasel	<i>Mustela nivalis</i>
Badger	<i>Taxidea taxus</i>
Striped skunk	<i>Mephitis mephitis</i>
Spotted skunk	<i>Spilogale putorius</i>



COMMON NAME	SCIENTIFIC NAME
White-tailed deer	<i>Odocoileus virginianus</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
Fox squirrel	<i>Sciurus niger</i>
Franklin's ground squirrel	<i>Spermophilus franklinii</i>
Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>
Plains pocket gopher	<i>Geomys bursarius</i>
Hispid pocket mouse	<i>Perognathus hispidus</i>
Cotton rat	<i>Sigmodon hispidus</i>
Northern grasshopper mouse	<i>Onychomys leucogaster</i>
White-footed mouse	<i>Peromyscus leucopus</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>
Plains harvest mouse	<i>Reithrodontomys montanus</i>
Prairie vole	<i>Microtus ochrogaster</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
House mouse	<i>Mus musculus</i>
Norway rat	<i>Rattus norvegicus</i>
Meadow jumping mouse	<i>Zapus hudsonius</i>
Black-tailed jack rabbit	<i>Lepus californicus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>

SOURCE: USGS, 2013

#### 4.1.4.2 INVASIVE WILDLIFE SPECIES

A number of exotic wildlife species are known to occur in Nebraska. These include insect, bird and mammal species. A list of invasive species that may occur in the project area based on distribution and habitat preferences can be found in Table 4-9 (UNL, 2014). Several of these invasive pests are closely associated with agricultural land use or residential development.

**TABLE 4-9. INVASIVE WILDLIFE SPECIES OF NEBRASKA**

COMMON NAME	SCIENTIFIC NAME
<b>Insects</b>	
European corn borer	<i>Ostrinia nubilalis</i>
Hessian fly	<i>Mayetiola destructor</i>
Honey bee tracheal mite	<i>Acarapis woodi</i>
Russian wheat aphid	<i>Diuraphis noxia</i>
Soybean aphid	<i>Aphis glysines</i>
<b>Birds</b>	
House Sparrow	<i>Passer domesticus</i>
Rock dove	<i>Columba livia</i>
European Starling	<i>Sturnus vulgaris</i>
<b>Mammals</b>	
Norway Rat	<i>Rattus norvegicus</i>
House mouse	<i>Mus musculus</i>

SOURCE: UNL, 2014

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## 4.1.5 WATER QUANTITY AND QUALITY

### 4.1.5.1 MAJOR WATER USES

Primary instream uses on the Platte River, which is north of the J-2 Regulating Reservoirs Project are recreation, hydropower, and irrigation. Primary use on the Phelps County Irrigation Canal, which is south of the J-2 Regulating Reservoirs is irrigation.

### 4.1.5.2 WATER QUANTITY

Flow in the Platte River near the proposed discharge points for the J-2 Regulating Reservoirs Project was estimated based on USGS gage No. 06768000 (Plate River near Overton, Nebraska) located approximately 7 miles downstream of the project area, for the time period of January 1, 1946 to December 31, 2013 (Table 4-11). Based on this data, the mean annual daily flow is 1,690 cfs at the USGS Gage. The highest flow recorded during the period of record (water years 1946 to 2013) for the USGS gage is 22,300 cfs and the lowest flow for the USGS gage is 18 cfs. This gage flow data includes the outflow from the J-2 Return; the reservoirs will be regulating the flow in this gage that comes through Central's system.

Annual and monthly flow duration curves for the Platte River near the J-2 Regulating Reservoirs Project are provided in Appendix A.

**TABLE 4-10. FLOW STATISTICS FOR THE PLATTE RIVER IN PROXIMITY OF THE PROPOSED J-2 REGULATING RESERVOIRS PROJECT (1946-2013)**

MONTH	LOWEST DAILY AVERAGE FLOW (CFS)	MEAN DAILY AVERAGE FLOW (CFS)	HIGHEST DAILY AVERAGE FLOW (CFS)
January	90	1,591	5,600
February	152	1,849	7,750
March	274	1,988	8,130
April	139	1,846	12,800
May	78	1,913	18,800
June	52	2,320	22,300
July	55	1,089	21,200
August	31	755	8,480
September	18	1,231	12,000
October	20	1,426	8,820
November	116	1,448	6,900
December	131	1,519	6,660
Annual	199	1,690	22,300

Flows to the proposed J-2 Regulating Reservoirs Project are estimated based on the J-2 Return (Central Station ID No. 14400) from January 1, 1946 to December 31, 2013. The highest flow recorded during the period of record (water years 1946 to 2013) for the J-2 Return is 2,200 cfs on February 3, 2000. There were high system inflow years in 2010 and 2011; however, with the continued reduction in Lake McConaughy inflows<sup>8</sup>, future returns are expected to be less than the historic average.

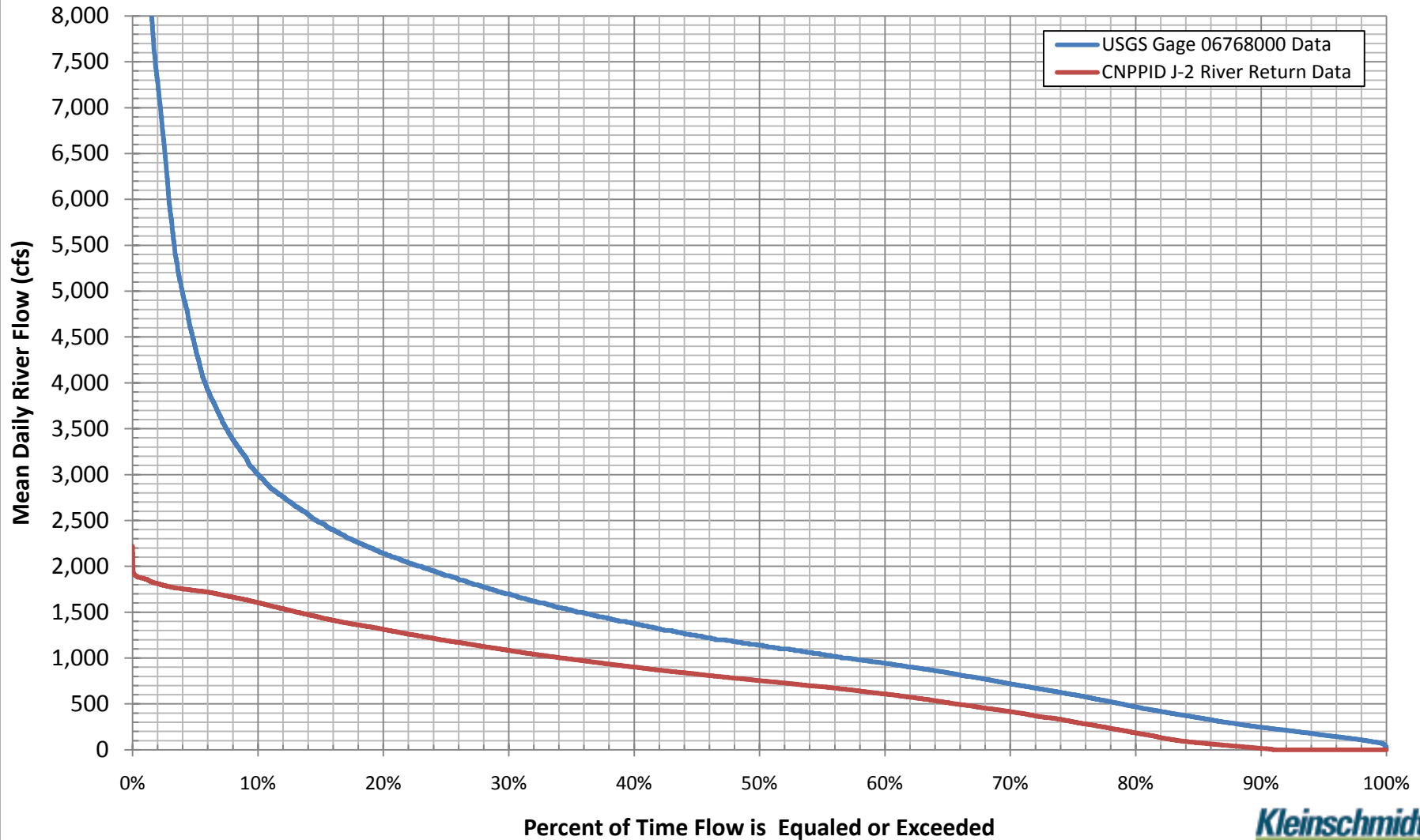
**TABLE 4-11. FLOW STATISTICS FOR THE JOHNSON NO. 2 RETURN FLOW FROM PERIOD OF RECORD (1946-2013)**

MONTH	LOWEST DAILY AVERAGE FLOW (CFS)	MEAN DAILY AVERAGE FLOW (CFS)	HIGHEST DAILY AVERAGE FLOW (CFS)
January	0	982	1,936
February	0	1,112	2,220
March	0	1,143	1,956
April	0	962	2,025
May	0	669	2,018
June	0	560	1,928
July	0	283	1,773
August	0	275	1,700
September	0	658	1,969
October	0	886	1,962
November	0	937	1,981
December	0	980	1,936
Annual	0	785	2,220

<sup>8</sup> McConaughy inflows are declining in large part as a result of groundwater development in the North Platte River basin upstream from Lake McConaughy, particularly in the Nebraska panhandle. Although laws are now in place to limit additional future well development, there has already been a significant impact, and lag effects are projected to occur into the future. Upstream conservation measures on irrigation projects are also potentially reducing return flows to the river.

# Platte River at J-2 Hydro Power Plant Discharge Annual Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))





### 4.1.5.3 WATER QUALITY

The NE-MP2-20000 section of the Platte River designated as the Dawson County Canal Diversion to Kearney Canal Return, which includes the reach of the Platte River at the Johnson No. 2 Return and at the proposed project discharges, is classified as a Class A Warm Water Fishery according to the Nebraska Department of Environmental Protection (NDEP, 2012). The quality of Class A warm waters must support sufficient water quality and water flow to support year-round populations of one or more key warm water species. The NE-MP2-20000 section is also classified for recreation, aesthetics and as a Class A Agricultural water supply and as such it must be sufficient for swimming, canoeing, livestock watering and irrigation without treatment, and free of human-induced pollution (NDEQ, 2012a). Table 4-13 provides a summary of water quality standards for the NE-MP2-20000 section of the Platte River.

**TABLE 4-12. WATER QUALITY STANDARDS SECTION NE-MP2-20000 OF THE PLATTE RIVER**

<b>WATER QUALITY PARAMETER</b>	<b>CLASS B WATERS, WARM WATER FISHERY</b>
Dissolved Oxygen (DO)	April 1-September 30: 7-day mean minimum of not less than 6.0 mg/l for early-life stages. October 1- March 31: 7-day mean minimum of not less than 4.0 mg/l for early-life stages.
Chromium (VI)	Acute: 1-hour concentrations shall not exceed 16 ug/l Chronic: 4-day average concentrations shall not exceed 11 ug/l
Cyanide	Acute: 1-hour concentrations shall not exceed 41.3 ug/l Chronic: four-day concentrations shall not exceed 9.8 ug/l
Temperature	Temperatures frequently exceed 25° C.
E. coli	Shall not exceed 126/100 ml
Conductivity	April 1- September 30: Not to exceed 2,000 umhos/cm
Nitrate and Nitrite as Nitrogen	Not to exceed 100 mg/l
Selenium	Not to exceed 0.02 mg/l
Color and Turbidity	Waters shall be free from human-induced pollution
Solids	Waters shall be free from human-induced pollution
Oil and grease	Waters shall be free from human-induced pollution
Taste and Odor	Waters shall be free from human-induced pollution

Source: NDEQ, 2012a

Water bodies that fail to meet water quality standards are placed on the 303(d) impaired water bodies list as required under the Clean Water Act (CWA). The 303(d) list assesses the attainment criteria of water bodies and determines whether designated uses are threatened or the water body is impaired by bacteria, mercury or a legacy pollutant such as polychlorinated biphenyls (PCBs), dioxins, DDT, and others. The CWA requires Total Maximum Daily Loads (TMDL), the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards, be calculated for identified pollutants. Section 305(b) of the CWA directs states to prepare a report every two years that describes the existing water quality, the extent to which designated uses are supported, pollution issues and sources, and the effectiveness of the water pollution control programs.

According to the 2014 Water Quality Integrated Report, the NE-MP2-20000 section of the Platte River is designed as a Category 2 waterbody, defined as a waterbody where some of the designated uses are met but there is insufficient information to determine if all uses are being met. This reach is reported as supporting aquatic life, agriculture water supply, and aesthetic uses (NDEQ, 2014).

Johnson Lake, which supplies water to the Supply Canal and to the J-2 Regulating Reservoirs Project, is listed as Category 5 as a waterbody where one or more beneficial uses are impaired. Johnson Lake was identified as aquatic life use impaired for Chlorophyll a and Total Phosphorous. Because Johnson Lake is assigned an Industrial Water Supply use and no water quality concerns have been reported, the Lake is reported as supporting this use. Data collected in 2012 determined both the recreation and agriculture water supply uses are being met. Johnson is also reported to support aesthetics (NDEQ, 2014).

According to the 2014 303(d) list for the state of Nebraska, the NE-MP2-30000 reach of the Platte River and the NE-MP2-20300 Spring Creek tributary of the Platte River, both located directly upstream of the J-2 Regulating Reservoirs Project, are listed as Category 5 for E. coli. Both waters are reported to be supporting of aquatic life, agriculture water supply and aesthetics. Plum Creek is reported as Category 1, meaning that all designated uses are met, and is supportive of aquatic life, agriculture water supply and aesthetic uses (NDEQ, 2014).

#### 4.1.5.4 WATER QUALITY MONITORING

Water quality monitoring of the Platte River has been periodically conducted by the NDEQ and the Platte River Recovery Implementation Program (PRRIP). No violations of state standards have been reported. The J-2 Regulating Reservoirs Project would discharge into the Big Bend Reach of the Platte River, which is limited by temperatures in excess of state standards and DO levels below during low summer flows. These impairments are primarily related to higher air temperatures, though flow quantities also have an influence (FERC, 1998).

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#### **4.1.6 LAND USE**

##### **4.1.6.1 LAND USES AND MANAGEMENT WITHIN THE PROJECT VICINITY**

The proposed J-2 Regulating Reservoirs Project will be within Gosper County and Phelps County, Nebraska, which combined have a land area of approximately 998 square miles (U.S. Census, 2012a, 2012b). The project vicinity is dominated by agricultural lands. Approximately 98.5% of Phelps County is farmland and 76.9% of Gosper County is farmland (USDA, 2007a, 2007b), including the areas to be occupied by the J-2 Regulating Reservoirs Project.

The lands in the immediate vicinity of the proposed J-2 Regulating Reservoirs Project are primarily agricultural interspersed with limited residential development (Figure 4-7). Lands surrounding the J-2 Regulating Reservoirs Project to the south, east, and west consist of irrigated cropland and pasture land. The Platte River and riparian lands border the J-2 Regulating Reservoirs Project on the north. The Phelps County Irrigation Canal borders Reservoir No. 2 and portions of Reservoir No. 1 on the south.

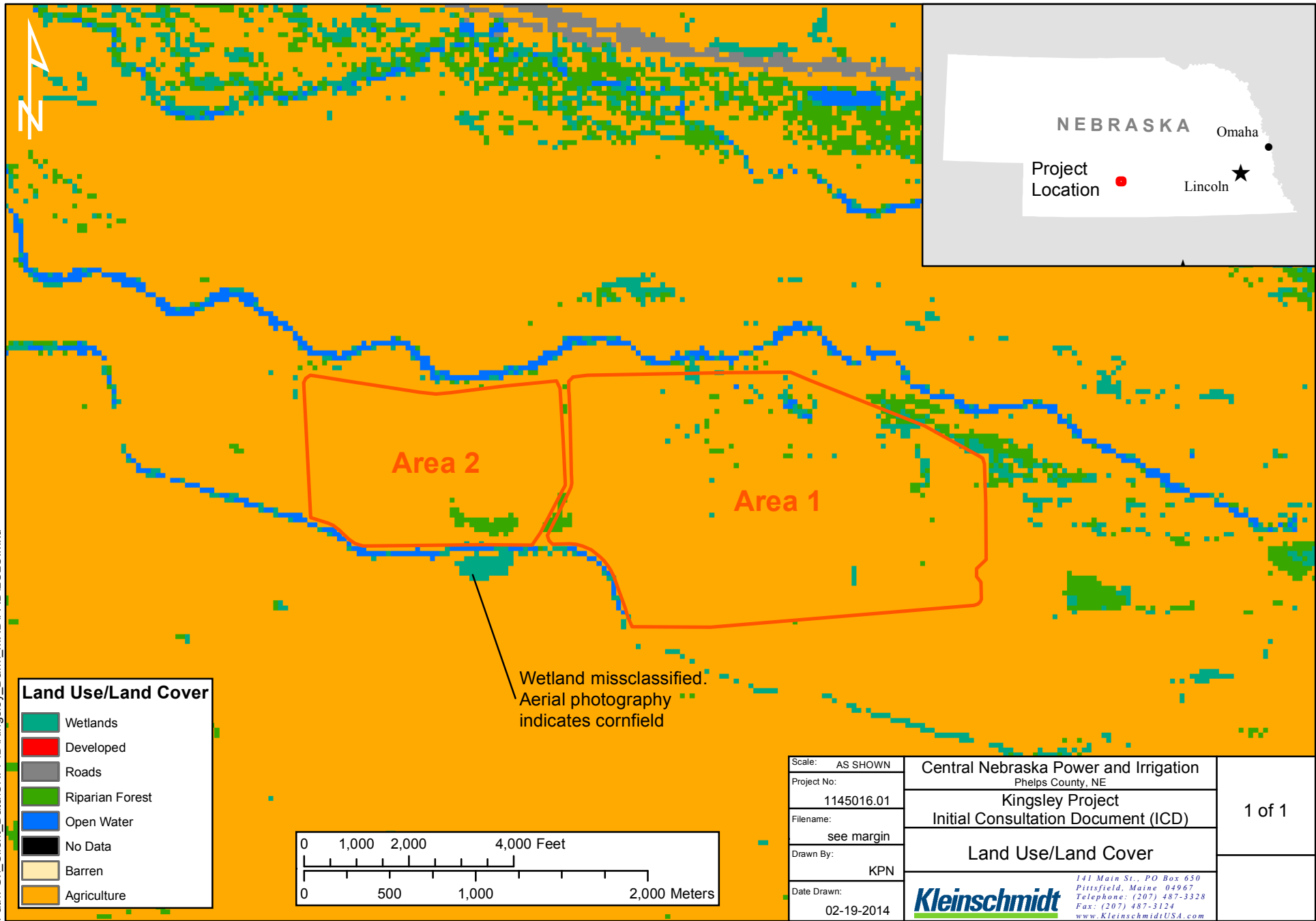
##### **4.1.6.2 LAND USE AND MANAGEMENT OF PROJECT LANDS**

Agriculture (mostly corn production) is the primary activity that occurs at the area to be occupied by the J-2 Regulating Reservoirs Project. There are three primary residences and two secondary residences located within the area to be occupied by the J-2 Regulating Reservoirs Project. In addition, several local roads traverse the areas to be occupied by the J-2 Regulating Reservoirs Project. Specific land uses of the project area are presented in Table 4-15.

**TABLE 4-13. LAND USES OF THE PROJECT AREA**

<b>AREA</b>	<b>AGRICULTURE</b>	<b>RIPARIAN FOREST</b>	<b>OTHER</b>
1	98.22%	1.10%	LESS THAN 1%
2	97.01%	2.87%	LESS THAN 1%

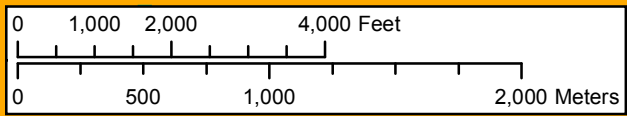
Path: G:\\_Client\_Data\CNPPID\Kingsley\_Dam\ MXDIPAD\LULC.mxd




**Land Use/Land Cover**

- Wetlands
- Developed
- Roads
- Riparian Forest
- Open Water
- No Data
- Barren
- Agriculture

Wetland missclassified.  
Aerial photography  
indicates cornfield



Scale: AS SHOWN	Central Nebraska Power and Irrigation Phelps County, NE	1 of 1
Project No: 1145016.01		
Filename: see margin	Kingsley Project Initial Consultation Document (ICD)	
Drawn By: KPN	Land Use/Land Cover	
Date Drawn: 02-19-2014	 <small>141 Main St., PO Box 650 Pittsfield, Maine 04967 Telephone: (207) 487-3328 Fax: (207) 487-3124 www.KleinschmidtUSA.com</small>	

Source: Land Use / Land Cover designations derived from the 2005 Nebraska Land Use Mapping

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### **4.1.7 RECREATION RESOURCES**

#### **4.1.7.1 REGIONAL RECREATION OPPORTUNITIES**

The proposed J-2 Regulating Reservoirs Project will be contained within the Frontier Trails tourism region as defined by the Nebraska Tourism Commission (NTC). The Frontier Trails area consists primarily of agricultural lands with few recreational opportunities mainly consisting of State Recreation Areas and museums, such as the Cheyenne State Recreation Area in Wood River, Cottonmill Park in Kearney, Willa Cather Memorial Prairie in Red Cloud, and Hastings Museum in Hastings (NTC, 2014).

#### **4.1.7.2 PROJECT VICINITY RECREATION OPPORTUNITIES**

Recreation activities occurring in the project vicinity are generally traditional outdoor pursuits such as fishing, hunting, camping, and boating. Several municipal and state parks are located in the project vicinity as described in more detail below.

#### **STATE RECREATION AREAS**

Within the Frontier Trails tourism region there are 16 state recreation areas, trails, campgrounds, and reserved lands (NTC, 2014). Some notable areas include Sandy Channel State Recreation Area, Union Pacific State Recreation Area, Johnson Lake State Recreation Area, Gallagher Canyon State Recreation Area and Elwood Reservoir. Sandy Channel State Recreation Area,



located approximately 13 miles east of the project area near the town of Elm Creek in Phelps County, provides opportunities for fishing, boating, and primitive camping (NGPC, 2014a).

Union Pacific State Recreation Area is located approximately 19 miles east of the project area, near the town of Odessa. Union Pacific State Recreation Area was formerly a wayside area and provides opportunities for fishing, boating, picnicking, and primitive camping (NGPC, 2014b).

Johnson Lake State Recreation Area is approximately 11 miles west of the project area, near the town of Elwood in Gosper County. Johnson Lake State Recreation Area offers an abundance of recreation opportunities including: trails; picnicking; camping; and access to the 2,068-acre Johnson Lake for fishing, boating, and swimming (NGPC, 2014c).

Gallagher Canyon State Recreation Area is approximately 19 miles west of the project area, near the town of Eustis. Gallagher Canyon State Recreation Area provides opportunities for picnicking, boating, fishing, and primitive camping (NGPC, 2014d).

Elwood Reservoir is an irrigation pumped-storage reservoir created in the 1970s by Central that serves the E-65 Canal and is located in Gosper County. The reservoir was formed by damming one end of a series of canals and pumping water in the reservoir from the E65 Canal. The Nebraska Game and Parks Commission (NGPC) manages the reservoir as a Wildlife Management Area providing opportunities for door deer and waterfowl hunting. NGPC also stocks the reservoir each year and permits fishing (CNPPID, 2013).

#### **COUNTY/MUNICIPAL RECREATION AREAS**

Within Phelps County, there are several municipal and county recreation areas, particularly within the town of Holdrege, the county seat. Gosper County is a rural area with a small population and very few formal recreation opportunities. Between Phelps County and Gosper County there are five county and municipal parks. The parks located in Phelps and Gosper Counties are:

- The Rainwater Basin Trail System - a trail system that runs throughout Phelps and Kearney Counties. The trail is a popular birding destination, particularly for the Sandhill Crane migration (Chicken Dance Trail, 2014).
- Funk Lagoon Waterfowl Production Area - A wetland marsh located in Phelps County. With 1163 acres of wetland marsh and 826 upland acres, Funk Lagoon is the largest

Rainwater Basin marsh. The area includes a 3-mile long birding trail and a handicap-accessible observation deck with views of the marsh (Nebraska Birding Trails, 2014).

- Holdrege North Park - a park located within the town of Holdrege in Phelps County. This park is planned around a man-made lake with a trail system around the lake, playground facilities, tennis courts, and an arboretum (Phelps County, 2014a).
- Holdrege South Park - a public park located on the south side of Holdrege in Phelps County. Amenities at this park include a playground, a swimming pool, tennis courts, Frisbee-golf course, and a walking trail (Phelps County, 2014a).

In the City of Lexington, which is in Dawson County across the Platte River from the project area, there are 9 city parks.<sup>9</sup> These parks provide the following amenities: fishing, playgrounds, trails, an arboretum, disc-golf, picnic areas, tennis courts, swimming pool, and birding and wildlife watching opportunities (Phelps County, 2014a; City of Lexington, 2013). The parks located in the City of Lexington include:

- Arbor Park - A 4-acre skate park containing picnic tables and playground.
- Oak Park - A 3.2-acre park containing playground and picnic shelter.
- Plum Creek Park - A 23-acre park containing tennis courts, playground, volleyball courts, ball field, golf, fishing, bocce, horseshow, walking trail, and open space.
- Kirkpatrick Memorial Park - A 29.1-acre park containing swimming pool, tennis courts, playground, open space, picnic shelter, gazebo, ball field, and open space.
- Pioneer Park - A 2.1-acre park containing playground and picnic shelter.
- Optimist Recreational Complex - A 35.9-acre complex featuring softball, soccer, legion ball, indoor hitting, and concessions.
- Centennial Park - A 1.5-acre park containing walking trail, benches, and memorial wall.
- Water Tower Park - .25-acre park containing picnic shelter and scenic garden.
- Family Aquatic Center - A water park containing water slide, zero-depth pool, Olympic-sized pool, and splash pad (City of Lexington, 2013).

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<sup>9</sup> While the reservoirs are not within Dawson County, the recreational areas in the City of Lexington are notable since they are within close proximity to the reservoirs.

#### **4.1.7.3 EXISTING PROJECT RECREATION OPPORTUNITIES AND USE**

Currently, the areas that will become the J-2 Regulating Reservoirs Project provide no existing public recreation opportunities though some private recreational use may occur, such as hunting. The current site consists primarily of privately owned agricultural lands.

The existing Johnson No. 2 Return currently provides informal angling opportunities and pedestrian access to the Platte River (Photo 4-1).



**PHOTO 4-1. EXISTING J-2 RETURN**

#### 4.1.7.4 REFERENCES

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#### 4.1.8 SOCIOECONOMIC RESOURCES

The following is a summary of selected socioeconomic variables for the closest city, Lexington, as well as socioeconomic information for the project vicinity (Gosper County and Phelps County).

##### 4.1.8.1 POPULATION PATTERNS

In 2012, an estimated 2,029 people lived in Gosper County and 9,215 people lived in Phelps County, making them the 78th and 30th most populated counties out of 93 in the state of Nebraska, respectively. The city of Holdrege is the largest developed area in Phelps County with a population of 5,495 in 2010 (U.S. Census, 2012g). The village of Elwood is the largest developed area in Gosper County with a population estimate of 699 in 2012 (U.S. Census, 2012h). The city of Lexington is approximately 9 miles northwest of the J-2 Regulating Reservoirs Project in Dawson County and is the 16th largest city in the state of Nebraska with a population estimate of 10,213 in 2012.

Gosper County is lightly populated, with a population density of 4.5 people/mi<sup>2</sup>. Phelps County has a slightly higher population density of 17 people/mi<sup>2</sup>. The city of Lexington has a population density of 2,273.3 people/mi<sup>2</sup> (Table 4-16). From 2010 to 2012 the population of Gosper County decreased by -0.7% and the population of Lexington decreased by -0.2%, while the population of Phelps County grew by 0.3%. The population changes for Gosper County, Phelps County, and the city of Lexington were lower than the growth experienced statewide in Nebraska during that time (1.6%) (U.S. Census 2012a, 2012b, 2012c).

**TABLE 4-14. POPULATION STATISTICS FOR THE PROJECT VICINITY**

	<b>CITY OF LEXINGTON, NEBRASKA</b>	<b>GOSPER COUNTY, NEBRASKA</b>	<b>PHELPS COUNTY, NEBRASKA</b>	<b>NEBRASKA</b>
<b>Population</b>				
Population (2012 estimate)	10,213	2,029	9,215	1,855,350
Population (2010)	10,230	2,044	9,188	1,826,341
Population Change (April 1, 2010 to July 1, 2012)	-0.2%	-0.7%	0.3%	1.6%
<b>Geography (2010)</b>				
Land area in square miles	4.5	458.2	539.8	76,824.2
Population Density (ppl/sq mi)(2010)	2,273.3	4.5	17	23.8
<b>Gender (2012)</b>				

	<b>CITY OF LEXINGTON, NEBRASKA</b>	<b>GOSPER COUNTY, NEBRASKA</b>	<b>PHELPS COUNTY, NEBRASKA</b>	<b>NEBRASKA</b>
Male	51.7%	50.9%	49.5%	49.7%
Female	48.3%	49.1%	50.5%	50.3%
<b>Age (2012)</b>				
Persons under 5 years old	9.7%	5.2%	6.7%	7.1%
Persons under 18 years old	32.5%	22.2%	24.2%	25%
Persons 18 to 64 years old	58.2%	57.9%	56.5%	61.1%
Persons 65 years old and over	9.3%	19.9%	19.3%	13.9%
<b>Race (2012)</b>				
Caucasian	31.0%	94.0%	93.6%	81.4%
Black	6.6%	0.4%	0.4%	4.8%
American Indian and Alaska Native	1.2%	0.3%	0.5%	1.3%
Asian	1.0%	0.3%	0.3%	2.0%
Native Hawaiian and Other Pacific Islander	0.4%	0.0%	Z	0.1%
Hispanic or Latino	60.4%	3.5%	4.9%	9.7%
Two or more races	3.3%	1.5%	0.8%	1.9%

Source: U.S. Census, 2012a, 2012b, 2012c

#### **4.1.8.2 HOUSEHOLD/FAMILY DISTRIBUTION AND INCOME**

Gosper County residents had an annual per capita income of \$23,034 in 2012, which is slightly below the state of Nebraska per capita personal income of \$25,523. That same year, Gosper County had 784 households and an average household size of approximately 2.5 individuals. Between the years of 2008-2012, Gosper County had a lower percent of persons below the poverty level than the state average: 10.8% and 12.4% respectively (U.S. Census, 2012a).

In 2012, the annual per capita personal income for Phelps County was \$25,807, comparable to the overall average for the state of Nebraska. In 2012, Phelps County had 3,875 households and an average household size of approximately 2.3 individuals. From 2008-2012, the County had a lower percent of persons below poverty level than the state average, at 10.6% (U.S. Census, 2012c).

Lexington residents had an annual per capita income of \$15,669 in 2012, significantly below the per capita income for Nebraska. Lexington had 3,002 households with an average household size of approximately 3.3 individuals in 2012. From 2008-2012, Lexington had a higher percentage of persons below the poverty level than the state average, at 16.6% (U.S. Census, 2012b).



Approximately 54% of the population of Lexington had an education attainment of high school graduate or higher, while 9% held Bachelor's degrees or higher (U.S. Census, 2012b).

Approximately 95% of the population of Gosper County had an education attainment of high school graduate or higher, while 17% held Bachelor's degrees or higher (U.S. Census, 2012a).

Approximately 94% of the population of Phelps County had an education attainment of high school graduate or higher, while 21.1% held Bachelor's degrees or higher (U.S. Census, 2012c).

#### **4.1.8.3 PROJECT VICINITY EMPLOYMENT SOURCES**

In Gosper County the education and health services sector is the largest employer, employing 21% of the workforce. The retail trade and manufacturing sectors were also important, accounting for approximately 13% and 9% respectively (U.S. Census, 2012d). In December of 2013, Gosper County was ranked 47th out of 93 counties for lowest unemployment rate at 3.3%, this is slightly below the mean unemployment rate for the state of Nebraska which was 3.9% (NDL, 2014). See Table 4-17 below for 2012 data on employment sources in the city of Lexington and Gosper and Phelps Counties.

In 2012, there were 4,746 individuals in the labor force in Phelps County. As with Gosper County, the education and health services sector provides the greatest number of jobs employing approximately 22% of the workforce. The retail trade and manufacturing sectors were the next largest employers accounting for approximately 11% each (U.S. Census 2012f). In December 2013, Phelps County was ranked 11th out of 93 counties for lowest unemployment rate at 2.6%. This is below the Nebraska unemployment rate of 3.9% (NDL, 2014).

In 2012, there were 4,688 individuals in the labor force in the city of Lexington. Unlike Gosper and Phelps Counties, the education and health services sector was not the top employer in the city, instead manufacturing provided the greatest number of jobs employing approximately 41% of the workforce. The education and health services and retail trade sectors were the next largest employers accounting for approximately 10% and 8% of the workforce respectively. In 2012, the city of Lexington had an unemployment rate of 5.9%, higher than the unemployment rate for the state of Nebraska and the neighboring counties (U.S. Census, 2012e).

**TABLE 4-15. LARGEST EMPLOYMENT SECTORS AS OF 2012**

	CITY OF LEXINGTON, NEBRASKA	GOSPER COUNTY, NEBRASKA	PHELPS COUNTY, NEBRASKA
<b>Civilian Labor Force</b>			
<b>Employment Status</b>			
Number Employed	4,688	1,061	4,746
<b>Non-Farm Employment by Industry</b>			
Natural Resources, and Mining	284	106	562
Construction	319	58	312
Manufacturing	1,941	96	504
Wholesale Trade	200	49	221
Retail Trade	394	143	542
Transportation and Utilities	72	78	339
Information	21	27	85
Financial Activities	182	59	248
Professional and Business Services	223	37	325
Education and Health Services	459	218	1,024
Leisure and Hospitality	280	44	191
Other Services	213	58	239
Public administration	213	88	154

Source: U.S. Census 2012d, 2012e, 2012f

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#### **4.1.9 CULTURAL RESOURCES**

##### **4.1.9.1 HISTORY OF THE REGION**

The proposed J-2 Regulating Reservoirs Project will be located in Phelps County and Gosper County, which are situated in the Central Plains cultural subarea of the Great Plains (Wood 1998:10). The prehistoric record of Phelps and Gosper Counties is not well known because few archaeological surveys have been completed in these counties. There is evidence of Paleoindian occupation near and possibly within the project area though it is sparse. It appears that Paleoindians entered the area between 13,500 and 30,000 calendar years ago at the end of the Pleistocene Ice Age (Holen and Holen 2013; Holen 2014) ; Cultural Resource Consulting, 2012). During the Paleo-Indian period (ending 8,000 years ago), the earliest distinct cultural tradition was that of the “Clovis Culture” which existed approximately 13,000-13,500 calendar years ago. Clovis people were nomadic hunters of mammoths and other large extinct animals like horses, camels and mastodons. Clovis peoples lived in small groups that were highly mobile and they moved hundreds of miles across the Great Plains. (Holen 2014; Cultural Resource Consulting, 2012). Evidence of Clovis use of the project area includes the possible find of a Clovis spearpoint within the project area (Cultural Resource Consulting, 2012), the discovery of Clovis

artifacts on the Platte River gravel bars immediately adjacent to the project area, and the discovery of a Clovis cache of two artifacts about five miles west of the project area at the J-2 Hydropower Plant on the Supply Canal (Holen 2002). Numerous other Paleoindian artifacts from later time periods have been found on the Platte River gravel bars north of the project area by local collectors.

There is evidence of the entire span of Archaic occupation, from 8,000 to 2,000 years ago, in central Nebraska with Early, Middle and Late Archaic sites recorded (Carlson and Steinacher 1978; Kay 1998). Major climatic shifts taking place across the entire central North American continent during the Early Archaic period resulted in a severe warming and drying of the Great Plains, which altered the range and abundance of flora and fauna available for consumption and subsequently reduced human occupation levels at that time. Adaptation to subsistence lifestyles, including a shift to smaller prey and gathered plant foods, and the lessening of the effects of warming and drying on the Plains in the Middle and Late Archaic period returned larger human populations to the area (Cultural Resource Consulting, 2012). At least one Archaic site is recorded about three miles southwest of the project area and numerous Archaic projectile points have been found on the Platte River gravel bars just north of the project area by local collectors. One Archaic biface was found in a buried context just west of the project area by the landowner (Cultural Resource Consulting, 2012).

The Plains Woodland culture ranged from 1,000 to 2,000 years ago, and had a strong presence the south-central portion of the state (Bozell and Winfrey 1994). The period was defined by the adaption of ideas from the east for use in a Plains environment. The most important adaptations were pottery and the bow and arrow, both of which were major technological advances for the time as well as permanent structure housing. Horticulture subsidizing the hunting and gathering subsistence is suggested and evidence of maize has been found in late Woodland sites (Cultural Resource Consulting, 2012). One Woodland site was excavated by the University of Nebraska at the point where Plum Creek enters the Platte River valley about two miles west of the project area (Winfrey 1991; Bozell and Winfrey 1994). This site represents the nearest archaeological site to the project area that has been excavated by professional archaeologists.

The Plains Village Period, extending from about 1000-1874 A.D. in central Nebraska, continued the technological and cultural developments that began in the Woodland Period. Two

subdivisions of the Plains Village Period exist in central Nebraska. These are the Central Plains Tradition dating ca. 1000-1450 A.D. and the Coalescent Tradition, represented by protohistoric and historic Pawnee sites dating to ca. 1550-1874 A.D. This period is characterized as relatively affluent and bountiful as a result of widespread horticulture and populations increased dramatically. The Central Plains Tradition is characterized by scattered earthlodge settlements along major rivers and small streams in much of the eastern two-thirds of Nebraska (Steinacher and Carlson 1998). These populations practiced horticulture, raising corn, beans and squash, in addition to hunting a diverse array of game and gathering wild plants. These groups are thought to be ancestral to the Pawnee and Arikara in a general sense.

The Coalescent Tradition in Nebraska consisted of large Pawnee earthlodge villages situated primarily in the Loup River drainage in central Nebraska with Skidi Pawnee bison hunting territories encompassing the project area and most of southcentral and southwestern Nebraska (Holen, 1991). The Pawnee practiced a dual economy based on horticulture and bison hunting. Primary historic tribes of the region include the Pawnee, Lakota, and Cheyenne, however, other tribes, including the Arapahoe, Omaha, Ponca, Oto, Kansa, Arikara, and Apache occasionally traveled into this region of the Central Plains to hunt, trade, or during inter-tribal raids (Cultural Resource Consulting, 2012). In the historic period the project area was within the bison hunting territory of the Skidi Pawnee and a Pawnee trail followed the Platte River valley west from their villages in the Loup River area to the mouth of Plum Creek. The Pawnee then followed Plum Creek to the southwest and followed other creeks south into the Republican River valley (Holen, 1991). After 1800, the Cheyenne and Lakota began encroaching on Pawnee territory in the Platte River valley and conflict between the groups was intense.

Euroamericans began entering the Central Plains in the late 17<sup>th</sup> century from the south and east to explore the region (Carlson, 1994b). Some of the earliest European explorers were French trappers and traders who began exploring the eastern plains by the late 1600s (Cultural Resource Consulting, 2012). Spanish explorations into the Central Plains began in the mid-1500s but probably did not reach the Platte River valley area until the Villasur Expedition of 1720. These visits were temporary, indicated by very few archaeological remains from explorers of the time period (Carlson, 1994b).

Europeans brought horses and guns to the Native American Plains cultures, which enabled them to travel and hunt more efficiently. The increasing mobility and hunting ranges of the Lakota and Cheyenne increased conflicts during this time because they began moving into territories used by the more sedentary farming groups like the Pawnee. The Plains people were also engaged in trade with the Europeans at this time, which exposed the Native groups to European diseases and resulted in tragic depopulation (Cultural Resource Consulting, 2012). The Pawnee moved to an Oklahoma reservation in 1874-1875 thus ending the Native American occupation of central Nebraska.

The dates of early Euroamerican activities along the Platte River trail corridor south of the Platte River, are from the late 1840s to the mid-1860s when the Union Pacific railroad corridor was completed north of the river and most businesses along the Oregon Trail relocated to the new railroad towns. The Platte River was a primary transportation route in North America in the 19<sup>th</sup> Century, initially for fur trading and then later for travel to Oregon, Utah, and California. Nebraska was not a place of settlement until after the Kansas-Nebraska Act of 1854, which opened it up for settlement (NSHPO, 1991) and actual permanent settlement in Phelps and Gosper Counties along the south side of the Platte River did not start until roughly 1872, after the Platte River Road, over which many emigrants travelled west, was abandoned (Cultural Resource Consulting, 2012).

With the flow of emigrants westward through the area, the U.S. Government decided to establish a number of forts along the Platte River Road, a component of which was the Oregon Trail, to protect and assist the freight lines and travelers (Cultural Resource Consulting, 2012). Fort Kearney, which had been the first fort established in Nebraska City in eastern Nebraska, was relocated in 1848 to south-central Nebraska, on the south side of the Platte River, in Kearney County, directly adjacent to Phelps County (Carlson, 1994b).

In the 1840s and 1850s, people traveled through the area of Gosper and Phelps Counties via the Oregon Trail; later, the Pony Express used this same route (NSHPO, 1991). The initiation of the Indian War of 1864 began on August 8 with the Plum Creek Massacre being one of the first engagements. This massacre occurred about 1.5 miles east of the project area. A freight wagon train headed for Denver was attacked by about 100 Cheyenne warriors and all of the men with the wagon train were killed and one woman and a boy were taken captive (Czaplewski 1993).



The men were buried in a mass grave at the massacre site. Remote sensing at the site was conducted by the National Park Service in 2009 and intact features below the ground surface were detected. These subsurface features include Oregon Trail ruts, concentrations of metal thought to be parts of burned wagons and a feature thought to be the mass grave (DeVore 2013).

The Plum Creek Massacre prompted the U.S. Army to construct, supply, and occupy a military post at Plum Creek in the Fall of 1864. The military occupied Plum Creek Military Post until September 1866 when the Transcontinental Railroad was constructed along the opposite side of the river.

The permanent settlement of Gosper County began in 1872 and the county was officially organized on August 29, 1873 and named after the then Secretary of State, John J. Gosper (NSHPO, 2013). Settlement in Phelps County began about the same year and the county was organized on April 23, 1873. One of the earliest settlers in Phelps County was that of William Dilworth who homesteaded the area of the Post Plum Creek in the early 1870s and developed a ranch there. One of the earliest settlements in Gosper County, Robb Ranch, took place just west of the project area in the early 1870s. Peak population in both counties occurred in the early 1900s after the construction of the Burlington Railroad and platting of towns in the 1880s (NSHPO, 1996).

#### **4.1.9.2 POTENTIAL HISTORIC OR ARCHAEOLOGICAL SITES IN THE PROJECT AREA**

In the project area, there are five areas of historical significance:

1. The Plum Creek Pioneer Cemetery (Photo 4-2), which is adjacent to the proposed J-2 Regulating Reservoirs Project;
2. The Plum Creek Massacre Site (Photo 4-3), which is about 1.5 miles east of the proposed J-2 Regulating Reservoirs Project;
3. The Plum Creek Military Post (Photo 4-3), which was originally the site of a trading post but was established as a military post in the Fall of 1864 following the Plum Creek Massacre (Czaplewski 1993) and is at least partially within the project area;
4. Freeman's Second Post, the reconstructed trading post just west of the Plum Creek Military Post, which is within the project area; and
5. The Oregon Trail (Photo 4-5 and Photo 4-6).

The four Plum Creek sites are located on the Platte Valley Historical Trail, which includes portions of the Oregon Trail (Phelps County, 2014).



**PHOTO 4-2. PLUM CREEK PIONEER CEMETERY**  
 Source: FindaGrave.com, 2013



**PHOTO 4-3. PLUM CREEK MASSACRE SIGN LOCATED 1.5 MILES EAST OF THE PLUM CREEK CEMETERY**





PHOTO 4-4. FORT PLUM CREEK SIGN



PHOTO 4-5. INFORMATION MARKER



**PHOTO 4-6. OREGON TRAIL MARKER**

Because of the likelihood of pre-historic or historic archeological sites within the Platte River valley or adjacent hills and bluffs and to comply with the National Historic Preservation Act (NHPA), an archeological survey of part of the area that will be occupied by Reservoir No. 1 and Reservoir No. 2 was conducted by Cultural Resources Consulting. The survey took place during an earlier phase of the project, and, based on the current design, some of the land within the new project area has not been surveyed for archaeological resources. The initial survey consisted of a review of existing documented sites within the previously identified project Area of Potential Effect (APE), which included all of Reservoir No. 2 and a portion of Reservoir No. 1 west to the A Road and extending beyond the project boundary south to the Phelps Canal. A pedestrian survey was conducted to identify artifacts or other evidence of cultural features on the surface, but no excavations were done (Cultural Resources Consulting, 2012).

The historic sites identified through a database search within the revised Project APE which includes lands within the project boundary, include:

1. Site 25PP1, “Fort Plum Creek”. As discussed above, the U.S. Army was convinced that additional military presence along the emigrant trails was necessary following the Plum

Creek Massacre. The fort was mostly constructed from cut sod and included stables and living quarters. Fort Plum Creek was occupied until September of 1866 when the Union Pacific Railroad line was completed along the north side of the Platte River. During the pedestrian survey, observed artifacts were very sparse.

2. Site 64 25PP15, "Freeman's Second Post". This site is the location of Daniel Freeman's second "Plum Creek Trading Post" after the first was destroyed following the Plum Creek Massacre. No artifacts were observed during the pedestrian survey of this site.
3. Site 25PP16, "Plum Creek Station". A freight home station that was possibly started at Plum Creek around 1850 as part of a once a month stage and postal service and possibly later housing a telegraph office, serving as a Pony Express Station in 1860 - 1861, and as a US Post Office from 1861 -1866 . No artifacts that date to the time of the Plum Creek Station were observed at the site during the pedestrian survey.
4. Site 25PP18, "Oregon Trail Wagon Ruts". This site is the location of a short section of wagon ruts likely associated with "upper road" section of the Platte River Road, a portion of which was comprised by the Oregon Trail. These ruts were not located during the pedestrian survey.
5. Site 25PP7, a Central Plains Tradition prehistoric village site. This site is identified as a probable house site associated with the Central Plains Tradition. The site is within the newly designed project area, although it was not within the project area in the original design.

In addition, the following sites were identified as being outside of the current APE but within close proximity:

- Site 25PP17, "The Thomas Ranch". The Thomas Ranch was constructed of adobe walls with a wood frame and was located approximately 0.25 mile east of where Fort Plum Creek was later established.

While individual artifacts have been collected by local individuals and Historical Societies within the APE, and from land in the immediate vicinity, the on-site investigation indicated that the previously recorded sites within the APE, with the probable exception of the Central Plains Tradition site 25PP7, have been significantly impacted by years of cultivation, and land leveling to allow gravity irrigation. While no prehistoric materials or significant historic artifacts were encountered during the original survey, some potential for intact buried cultural features such as burials, privies and postholes may remain (Cultural Resources Consulting, 2012).

#### **4.1.9.3 NATIONAL REGISTER OF HISTORIC PLACES AND HISTORICALLY SIGNIFICANT SITES**

The Nebraska National Register of Sites for Phelps County contains four sites: the Brenstrom Farmstead (Site PP00-005), a rural site consisting of agricultural buildings, and a farmhouse in the domestic Craftsman Style; the C.B. & Q. Holdrege Depot (also known as Burlington) Railroad (Site PP04-002), which was rebuilt in 1911; the Phelps County Courthouse (Site PP04-013), a Beaux Arts-style structure constructed between 1910-1911; and the Kinner House (Site PP04-293), which is a Neoclassical Revival design built in 1903 (NSHS, 2014a).

The Nebraska National Register for Sites for Gosper County contains one site – the Gosper County Courthouse (Site GO01-001) an Art Deco-style building built in 1939 NSHS, 2014b).

During the preliminary archeological investigation, the following sites were identified within the footprint of Reservoir No. 1 as having the potential for eligibility for the National Register of Historic Places (NRHP) (Cultural Resources Consultants, 2012):

- Scatter 1 - a sparse and very diffuse scatter of historic materials consisting of construction debris and fragments of utilitarian household items covering an area of approximately 24,000-square feet that are at least 50 years in age.
- Scatter 2 - a very sparse scatter of historic materials consisting of fragments of construction debris, and a very few number of utilitarian items such as whiteware, ceramics, and bottle glass covering an area of approximately 15,000 square feet that are at least 50 years in age.

Within the new project area, the Central Plains Tradition prehistoric site, 25PP7, may be eligible for the NRHP if it contains intact cultural deposits. It should also be noted that if evidence of subsurface Oregon Trail ruts is actually present at site 25PP18, then this site could be eligible for the NRHP.

#### **4.1.9.4 TRIBAL RESOURCES**

The project area contains one prehistoric archaeological site, 25PP7, that is recorded as a Central Plains Tradition Site that would date sometime between 1000 and 1450 A.D. The Pawnee Tribe attributes these sites that occur throughout the eastern two-thirds of Nebraska, as their ancestral sites and the archaeological evidence generally supports this claim. The project area was also Pawnee bison hunting territory from about 1550 until the early 1870s although the Pawnee did not live in permanent villages in this area. A Skidi Pawnee Trail to the Republican River area



followed the Platte River west to Plum Creek and then followed this creek south and followed other creeks into the Republican valley. Central recognizes the Pawnee interest in the prehistoric Central Plains Tradition Site and will consult with the Pawnee Nation regarding this site and other newly discovered prehistoric sites in the project area if they should be found.

There are four federally recognized tribes in the state: Ponca Tribe of Nebraska, Omaha Tribe of Nebraska, Santee Sioux Nation, and Winnebago Tribe of Nebraska. In addition, other tribes may have occasionally entered the area on hunting and raiding trips. These tribes include the Arapahoe, Omaha, Ponca, Oto, Kansa, Arikara, Apache, Cheyenne and Lakota.

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#### **4.1.10 AESTHETICS**

##### **4.1.10.1 VISUAL CHARACTER OF THE PROJECT VICINITY AND AREA**

The J-2 Regulating Reservoirs Project will be located in the Central Platte River area at the northern borders of Phelps and Gosper Counties. The project vicinity is predominantly rural, consisting of mostly agricultural lands with minimal development in 21 towns, villages, and townships across the two Counties. The largest developed area in the project vicinity is the city of Lexington in Dawson County, located approximately 10 miles northwest of the proposed J-2 Regulating Reservoirs Project. The closest developed area is the town of Overton, approximately 6.5 miles to the northeast.

Lands surrounding the location of the proposed J-2 Regulating Reservoirs Project on the south, east, and west are agricultural lands, primarily corn fields. The Platte River borders the project area on the north. The adjacent river land to the north (Jeffrey Island) is managed by Central. The extended portion of the Supply Canal that will occupy portions of the current Phelps County Irrigation Canal will border Reservoir No. 2 and portions of Reservoir No. 1 on the south. Gravel roads extend around parts of the perimeter of and through the planned reservoirs connecting the few buildings in the vicinity of the J-2 Regulating Reservoirs Project.

The terrain in the vicinity of the proposed J-2 Regulating Reservoirs Project is very flat allowing for broad, unobstructed views of the surrounding agricultural lands. Limited views of the Platte River are available from some roads in proximity of the J-2 Regulating Reservoirs Project (Photo 4-7 and Photo 4-8).



**PHOTO 4-7. VIEW OF THE PROJECT AREA (AREA 1) FROM THE PLUM CREEK PIONEER CEMETERY**

Source: Google, 2014



**PHOTO 4-8. VIEW OF THE PROJECT AREA (AREA 1) FROM STATE ROUTE 748 ROAD**  
Source: Google, 2014

#### **4.1.10.2 NEARBY SCENIC ATTRACTIONS**

Within the project vicinity, are several scenic attractions of local and regional importance. As described in Section 4.1.7, there are two state and five municipal parks in the project vicinity (NGPC, 2014; Phelps County, 2014). These parks offer a variety of trails and opportunities for bird and wildlife watching as well as views of the local scenic lands.

There are no scenic byways located within Phelps and Gosper Counties (NTC, 2014).

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#### 4.1.11 RARE, THREATENED OR ENDANGERED SPECIES AND CRITICAL HABITATS

There are eight federally threatened and endangered species of plant and animals listed under the Endangered Species Act of 1973 (ESA) and two candidate species with the potential to occur within the project area (Table 4-18). There are five state listed threatened and endangered species of animals and one state listed plant species that may occupy portions of the J-2 Regulating Reservoirs Project (NGPC, 2013).

**TABLE 4-16. ENDANGERED, THREATENED, OR CANDIDATE SPECIES OCCURRING IN THE PROJECT VICINITY.**

SPECIES	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS <sup>1</sup>	STATE LISTED STATUS <sup>1</sup>
<b>Mammals</b>				
	Black-footed ferret	<i>Mustela nigripes</i>	E	E
	River otter	<i>Lutra Canadensis</i>		T
	Northern long-eared bat	<i>Myotis septentrionalis</i>	C	
<b>Birds</b>				
	Piping plover	<i>Charadrius melodus</i>	T	T
	Whooping crane	<i>Grus americana</i>	E	E
	Least tern	<i>Sternula antillarum</i>	E	E
	Sprague's Pipit	<i>Anthus spragueii</i>	C	
<b>Fishes</b>				
	Pallid sturgeon	<i>Scaphirhynchus albus</i>	E	E
<b>Invertebrates</b>				
	American burying beetle	<i>Nicrophorus americanus</i>	E	E
<b>Plants</b>				
	Western prairie fringed orchid	<i>Platanthera praeclara</i>	T	T

<sup>1</sup>E=ENDANGERED, T=THREATENED, C=CANDIDATE  
 SOURCE: USGS, 2013; NGPC, 2013; NNLP, 2011

The whooping crane, piping plover and the interior least tern are target species of the Platte River Cooperative Agreement. This agreement was signed in July 1997 by Nebraska, Colorado, Wyoming and agencies of the DOI and was put into place to provide ESA compliance for all of these species (as well as the pallid sturgeon) simultaneously (NRC, 2005).

The Bald eagle (*Haliaeetus leucocephalus*) may also occur within the project area or immediate vicinity. The bald eagle is no longer listed on the federal or state endangered and threatened species list as the recovery of the species has surpassed goals set for the protection of the species. The eagle is protected under the Bald and Golden Eagle Protection Act (USFWS, 2014a).

The Nebraska Natural Legacy Project implements a two-tiered approach to identifying those species that may be at-risk of extinction or extirpation from the state. The Tier I species are those that are globally or nationally at-risk including federal and state listed threatened and endangered species. Tier II species are those that are at-risk within Nebraska and ranked by the Nebraska Natural Heritage Program as either State Critically Imperiled (S1), State Imperiled (S2) or State Vulnerable (S3) while apparently doing well in other parts of their range. Tier II species are otherwise identified as species of special concern (NNLP, 2011).

The J-2 Regulating Reservoirs Project is located within the Mixedgrass Prairie Biologically Unique Landscape of the Central Platte River, which is home to several species of special concern, some of which may utilize the project area (NNLP, 2011). The Platte River caddisfly (*Ironoquia plattensis*) is a state listed species of special concern. The Platte River caddisfly prefers wetlands, sloughs, and side channels irrigated by the river (USFWS, 2006a). This species was first documented in 1999 and appears to be restricted to the Platte River with the only confirmed records occurring in a few channels of the Platte River near Grand Island (NNLP, 2011). A recent 12 month status review of the Platte River caddisfly by the USFWS determined that it is not warranted for protection under the ESA (USFWS, 2012).

Henslow's sparrow (*Ammodramus henslow*) is a state listed species of special concern documented as occurring in the Central Platte River (NNLP, 2011) but its current breeding distribution is reported to lie east of the J-2 Regulating Reservoirs Project (Silcock and Jorgenson, 2006). This bird prefers tall-grass and wet-mesic tall-grass prairie and large open grasslands (NNLP, 2011).



In the Nebraska portion of the Platte River system, seven reptiles are also on the state's list of species of special concern. These species include yellow mud turtle (*Kinosternon flavescens*), sagebrush lizard (*Sceloporus graciosus*), short-horned lizard (*Phrynosoma hernandesi*), speckled kingsnake (*Lampropeltis holbrooki*), smooth green snake (*Opheodrys vernalis*), plains black-headed snake (*Tantilla nigriceps.*), and western ribbon snake (*Thamnophis proximus*) (Clausen et al., 1989). Only three species are found in the Platte Valley in the area near the J-2 Regulating Reservoirs Project: the speckled kingsnake, smooth green snake, and plains black-headed snake (Fogell, 2010).

#### **4.1.11.1 THREATENED AND ENDANGERED SPECIES DISTRIBUTION AND LIFE HISTORY**

##### **BLACK-FOOTED FERRET**

The federally endangered black-footed ferret range historically coincided within that of prairie dogs, which the ferret depends on for food and habitat. Resulting from the settlement of the plains region much of the ferret's habitat was destroyed. Historically the ferret occurred in the western three-quarters of the state. Currently, the black-footed ferret is listed as being species of historical occurrence with no known extant populations occurring within Nebraska. The last known specimen from Nebraska is an animal killed in Overton (Dawson Co.) in 1949 (NGPC, 2013).

##### **RIVER OTTER**

The river otter, which is listed as a Nebraska state threatened species, occurs throughout the United States and Canada. Currently, this species' range extends from the Great Lakes to the Atlantic Ocean and the Gulf of Mexico and west to the Pacific. Recent urbanization and pollution has caused declines in populations, and this species is now rare in several states including Nebraska. River otters typically live along wooded rivers and streams with natural or manmade sloughs or ponds. In the Platte River, river otters have been shown to prefer open water, riparian and river channel habitat over wet meadow and agricultural habitat (Wilson, 2012). While the range of this species extends through much of Nebraska, habitat within the project area limits the potential for the otter to occur. Otters may occupy portions of the Platte River, and therefore may utilize sections of the river in the area of the proposed project discharges.

## **NORTHERN LONG-EARED BAT**

The northern long-eared bat (NLEB) has recently been proposed for federal protection due primarily to white-nose syndrome which has reduced NLEB numbers by approximately 99% since the disease was first observed in 2006. The NLEB occurs throughout the United States and is known to occur in Nebraska. Specifically, data indicates that NLEB concentrations primarily occur in the northern tier of the state though the NLEB are known to hibernate along the Platte River (USFWS, 2014b). Caves or mines with very high humidity and constant temperatures are the NLEB preferred hibernacula. During the summer, the bats generally roost under tree bark and cavities in live or dead trees. Preferred roosting tree species by the NLEB is not known, but American elm, cottonwood, maples, hickory spp., oaks, and others may be used. The NLEB breeds in late summer or early fall with delayed fertilization resulting with females giving birth in May-July the following year. The NLEB is a nocturnal feeder and focuses primary on insects in flight or insects resting on the surface of the water (USFWS, 2014b). Based on the presence of the Platte River and its associated riparian forest, it is possible that the NLEB utilizes this habitat for migratory life stages within proximity of the proposed J-2 Regulating Reservoirs Project.

## **PIPING PLOVER**

Federally listed as threatened in 1986 under the ESA and state threatened, piping plovers are a small, migratory shorebird. This species breeds in three regions of the North America including the northern Great Plains. Of the Great Plains breeding population, about 1% used the Platte River as an area of nesting sites (NRC, 2005). Piping plover are reported as occurring in Gosper and Phelps Counties (NGPC, 2013) and in the Central Platte River (NNLP, 2011). In 2001, the population on the Platte River was estimated to be about 85 nesting pairs (NRC, 2005). In 2011, the population of nesting piping plovers in the Great Plains and prairie habitats, including lands in eastern Nebraska was estimated to be over 2,000 (Elliott-Smith and Haig, 2011).

The river habitat provides bare sandy areas (including channel sandbar and sand and gravel beaches) for nesting, as well as temporary pools and areas of sand and water interface where plovers forage (USFWS, 2002). Changes in the magnitude and frequency of river flows, changes in vegetation communities, flooding from local runoff, and human disturbance have been attributed to a decline in suitable nesting sites for the piping plover (NRC, 2005).

## **WHOOPING CRANE**

The whooping crane, which was federally listed as endangered in 1970 and is likewise state listed as endangered, is the world's rarest species of crane. The total wild population of whooping cranes was estimated at 338 in February of 2006 (NRC, 2005) and down to 304 in 2013/2014 (USFWS, 2014). Approximately 7% of the total population uses the central Platte River on an annual basis as a stopover during spring and autumn as it migrates between wintering grounds in Aransas Nation Wildlife Refuge and vicinity in Texas (NRC, 2005).

In 1978, the USFWS designated a 55-mile segment of the Platte River as critical habitat. This stretch of the river extends from Lexington to Denman, Nebraska, includes the reach of the Platte River within the project area, and retains features that support the specific requirements of the migrating cranes. These requirements include the long vistas, shallow waters, and adjacent meadows and grasslands which provide food sources and roosting habitat for the migrating cranes (NRC, 2005; USFWS, 1978, 2006). Whooping crane are documented as occurring in Gosper and Phelps Counties (NGPC, 2013).

## **INTERIOR LEAST TERN**

The interior least tern (*Sterna antillarum*), a small migratory bird, was listed as endangered under the ESA in 1985 and is a state endangered species. The open sandy islands, bars and beaches of the Platte River provide breeding habitat for this species. In 1999, the estimated total number of birds in the this area is less than 500, and the range for this species in central Platte River had shrunk to include only a stretch of the river valley between Kearney and Grand Island (beginning approximately 30 miles downstream from the proposed J-2 Regulating Reservoirs Project). Interior least tern are documented within Gosper and Phelps Counties (NGPC, 2013).

The loss of open sandy areas in and along the river due to inundation by reservoirs, channelization, mining, changes in flow regimes, and conversion of open areas to woodlands and urban development has resulted in a continuing decline in population (NRC, 2005). The USFWS recently completed a 5-year review of the interior least tern and no critical habitat has been designated for the Interior least tern (USFWS, 2013).

### **SPRAGUE'S PIPIT**

The species was widespread during European settlement; currently the pipit is only common in remnant grasslands within the northern mixed-grass prairie of North America. With the conversion of much of the prairie to agriculture the number of pipits has declined. Currently, the breeding range of the Sprague's Pipits is confined to northern Great Plains, with their highest numbers occurring in the central mixed-grass prairie. Their breeding range is primarily in north-central and eastern Montana, to North Dakota through to northwestern and north-central South Dakota. In Nebraska the pipit primarily occurs as a migrant. Due to the limited existence of mixed grass-land prairie within the project area, the pipit is unlikely to occur. If present, it likely represents a migrant individual (USFWS, 2010).

### **PALLID STURGEON**

Pallid sturgeon prefer turbid, deep, flowing rivers or backwaters with a rocky or sandy substrate (FERC, 1998; USFWS, 2006b). They spawn in spring to early summer and have a long lifetime (typically > 40 years). The diet of pallid sturgeon consists of aquatic invertebrates and fish (USFWS, 2006b). As discussed above, the endangered pallid sturgeon (*Scaphirhynchus albus*) has been documented downstream in the lower Platte River and Missouri River but is not expected in the project vicinity (FERC, 1998).

Central sponsored a study of pallid sturgeon in the lower Platte River in 2008 (Peters and Parham, 2008a). From 2001 to 2004 researchers captured 15 pallid sturgeon from the Platte River downstream from the mouth of the Elkhorn River to the east of the project area (Peters and Parham 2008a). Since 2005 at least one pallid sturgeon was captured in the Platte River. However at least six of the fish captured during this time were hatchery-reared fish (Peters and Parham, 2008b).

### **AMERICAN BURYING BEETLE**

The American burying beetle, which was listed as endangered under the ESA in 1989, has a historical range that includes most of the temperate eastern North America from Nova Scotia to North Platte, Nebraska. Historically, the beetle occurred along watercourses in riparian deciduous or scrub forest in Nebraska. In 1994, three dead and one live American burying beetle

were collected from within ¼ mile of the Platte River near Gothenburg and Brady. American burying beetle are reported for Gosper County (NGPC, 2013).

The decline of the species has been attributed to habitat fragmentation (USFWS, 1991); water development may also be a factor. The reduction of high flows in the river due to water storage and diversion may impact wet meadows and low-lying prairies which, in turn, may have an adverse effect on the beetle (USGS, 2013a). In general, the project area includes primarily active areas of agriculture with few wetlands identified. Based on the active agriculture within the project area, the beetle is unlikely to occur in the project area.

#### **WESTERN PRAIRIE FRINGED ORCHID**

Western prairie fringed orchid occurs in Kearney County, which is directly adjacent to Phelps County. This species is listed as both state and federally threatened. The western prairie fringed orchid occurs in wet prairie habitats, and historically has been distributed through much of the eastern Great Plains. No emergent wetlands are mapped within the proposed reservoir areas; therefore, occurrence within the areas of Reservoirs No. 1 and No. 2 is unlikely. Mapped emergent wetlands occur within the Platte River and in the channel of Plum Creek and, because of the short flowering period, unknown populations may exist in wet meadow habitat near the project area.

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## **4.2 POTENTIAL RESOURCE ISSUES AND INFORMATION NEEDS**

To assist in the identification of issues that should be evaluated in the amendment process, Central exercised due diligence in the preparation of this ICD and conducted preliminary agency meetings with the USFWS, NGPC, and SHPO to obtain existing information about resources at the J-2 Regulating Reservoirs Project and/or in the vicinity of the J-2 Regulating Reservoirs Project, to develop the initial list of resources issues and identify potential information gaps. This section identifies any known or potential effects of project construction and operations on these resources and identifies initial information gathering and studies for each resource based upon the issues identified.

### **4.2.1 GEOLOGY AND SOILS**

Central believes adequate information exists to assess the effects of proposed project operations on erosion. A geotechnical investigation is being conducted as part of the design process and Central will implement a Soil Erosion and Sediment Control Plan during construction. No studies are proposed at this time.

### **TEMPORARY CONSTRUCTION ACTIVITIES**

Construction activities associated with the road and stream realignments, modifications to the canal system, and construction of the reservoirs will involve the use of heavy equipment and will result in vegetation removal, excavation and other earth disturbance that may contribute to erosion of soils and sedimentation of the waterways; namely the Platte River, Plum Creek and unnamed tributary. Any potential effects to soils from construction activities will be localized to the construction footprints of the reservoirs and roads. Central will implement a Soil Erosion and Sediment Control Plan for the proposed J-2 Regulating Reservoirs Project to address short-term effects resulting from ground disturbance during construction activities.

## **PROJECT STRUCTURES**

The reservoir bottoms and berms will be lined with compacted clayey soils to manage seepage. The upstream face of the dams will be covered with soil-cement to protect the embankments from wave erosion. There may be some limited initial sediment release from the reservoir outlets as the reservoirs are filled, creating some turbidity that may be discharged downstream before the reservoirs settle. Likewise, the re-routing of Plum Creek, which currently flows towards the west side of Reservoir No. 2, extending the supply canal may result in some limited sediment discharge as a result of ground disturbance associated with construction.

The majority of the shoreline along the Platte River in the vicinity of the J-2 Regulating Reservoirs is forested. While removal of natural vegetative buffers along the shore may potentially result in concentrated erosion of upland soils, no modification of the shoreline of the Platte River is proposed except in the immediate location of the new discharges at the Reservoir No. 1 and Reservoir No. 2.

## **PROJECT OPERATIONS**

One of the objectives of the Water Use Agreement between Central and the USFWS for the J-2 Regulating Reservoirs Project is the periodic release of flows at certain times of the year, above and beyond target flows for wildlife habitat, to address historic sedimentation and erosion from Platte River channel bed and banks. The Regulating Reservoirs would release short-term pulse flows in an attempt to achieve a more normalized flow regime and for the purpose of channel maintenance and sediment balance.

### **4.2.2 BOTANICAL RESOURCES**

A wetland delineation of portions of the project area was conducted as part of the early design process. However, the effects to wetlands within the proposed project area unquantified. Central proposes to conduct a wetland delineation and functional assessment within the project area, including the existing run of Plum Creek that will be relocated, the J-2 Return, and the proposed corridors for relocation of Plum Creek and county roads.

## **TEMPORARY CONSTRUCTION ACTIVITIES**

As discussed above, construction activities will result in vegetation removal, primarily in the footprints of the project components, however, these areas are primarily agricultural croplands. Relocation of Plum Creek will affect botanical resources as existing upland, agricultural crops are removed in the footprint of the new channel during construction activities.

## **PROJECT STRUCTURES**

Potential effects to botanical resources are primarily associated with disturbance of agricultural crops and residential landscaping in the footprints of the reservoirs and any wetlands that exist in the footprints of the reservoirs. These areas will transition from cornfields, pasture, and limited wetland vegetation to regulating reservoirs having vegetated embankments. The relocation of Plum Creek will result in the transition of vegetation within and adjacent to the existing stream run from wetland and riparian species to upland vegetation. Given the location of the existing run of Plum Creek through crop land, transition to agricultural production is also possible.

Conversely, the existing crop land within the zone targeted for relocation of Plum Creek transition to upland vegetation and wetland and riparian vegetation, although the relocated run is shorter than the existing Plum Creek run to its confluence with the Platte River. Other areas proposed for construction activities such as the road realignment and canal improvements may have limited vegetation removal to accommodate the increased footprint of project structures.

## **PROJECT OPERATIONS**

With the discontinuation of the regular use of the J-2 Return and the relocation of Plum Creek, wetlands and other riparian botanical species in these areas will transition to upland vegetation cover and habitats, although a part of the area at the end of the J-2 Return structure will likely remain inundated by backwater effects from the River and the newly relocated channel of Plum Creek will transition from primarily agricultural vegetative cover to shoreline and riparian species. Although the downstream flow regime will change, project operations are expected to have a beneficial effect on botanical resources of the Platte River.

### **4.2.3 FISH AND WILDLIFE RESOURCES**

Central believes adequate information exists to assess the effects of the proposed J-2 Regulating Reservoirs Projects on fish and wildlife resources and will continue to coordinate with the USFWS, NGPC, and resource agencies on any potential threatened or endangered species, given the limited availability of habitat. No studies are proposed at this time.

### **TEMPORARY CONSTRUCTION ACTIVITIES**

Construction will result in increased noise, traffic and human presence in the vicinity of the proposed project structures including the reservoirs, canal improvements and stream and road realignments. Construction activities will likely temporarily displace terrestrial wildlife resources in the immediate vicinity. Fish and aquatic wildlife are not likely to be significantly impacted by construction activities as most will be in upland areas and no in-water blasting will be necessary. Central will document the presence of bald eagles within the project area as part of the amendment application.

### **PROJECT STRUCTURES**

The J-2 Regulating Reservoirs will occupy an area currently taken up in agricultural crop production. This area likely provides some limited habitat and forage for deer and small mammals. However, the new impoundments may provide some habitat or a migratory stop over for waterfowl. Plum Creek and the existing J-2 Return provide habitat for native amphibians and some reptiles. Plum Creek will be relocated. Some net loss of stream habitat is expected but will be offset somewhat by the intent to create a new meandering channel. Regular use of the J-2 Return will be discontinued although the outlet and a portion of the channel downstream of J-2 Return structure to the Platte River will likely remain inundated by backwater effects and gains from groundwater seepage to the river channel.

### **PROJECT OPERATIONS**

The J-2 Regulating Reservoirs will have benefits to terrestrial and aquatic species dependent upon the Platte River as part of their life cycle. While these benefits are specifically targeted at RTE species, wading bird and waterfowl and other fish species will likely benefit from a targeted flow to the Platte River that is more closely aligned with the natural hydrological regime,

including pulse flows. Benefits to listed species from flow regulation activities is discussed extensively in the Platte River Recovery Implementation Program Final EIS (April, 2006).

#### **4.2.4 WATER QUANTITY AND QUALITY**

Central believes adequate information exists to assess the effects of proposed project operations on water quantity and quality. No studies are proposed at this time.

#### **TEMPORARY CONSTRUCTION ACTIVITIES**

Central will time construction activities such that system flows during the irrigation season and hydropower discharges will be maintained with minimal interruption. Central will implement a Soil Erosion and Sediment Control Plan for the proposed J-2 Regulating Reservoirs Project to address potential short-term effects to water quality resulting from ground disturbance during construction activities. There may be some limited initial sediment release discharged from the reservoir outlets as the reservoirs are filled for the first time and from the re-routing of Plum Creek.

#### **PROJECT STRUCTURES**

While water movement through the system will transition from a canal system to impoundments, flushing rates and turn-over are expected to be high. No significant effects to water quality are anticipated from the J-2 Regulating Reservoirs Project. Existing water quality within the canal system is anticipated to be maintained.

#### **PROJECT OPERATIONS**

Currently, releases to the Platte River from the J-2 Hydropower Plant fluctuate from 0 cfs to as much as 2,000 cfs within an hour (hydrocycling). The duration of flow released to the Platte River is a function of the amount of daily flow available to Central; larger volumes equate to longer durations of generation and releases to the Platte River. Operation of the J-2 Regulating Reservoirs Project would substantially reduce or eliminate fluctuations in discharge to the River from hydrocycling and provide flows to the Platte River at rates and times that are beneficial to the environment. In addition to regulating discharge flows to the Platte River, Central could use the J-2 Regulating Reservoirs Project to maintain irrigation flows independently of hydrocycling.

By extending the Supply Canal to Reservoir No. 1, Central will be able to convey the optimum flow for the Johnson No. 2 Hydropower Plant, which is 1,700 cfs, to the reservoirs and Phelps Canal. This would result in the ability of Central to use the regulating capacity to convey a wide range of flows to the Platte River, providing more water for shortages to target flows. The J-2 Regulating Reservoirs Project will change the timing and rate of flow in the downstream section of the Supply Canal and the discharge to the Platte River.

Effects to water quality will primarily be associated with the potential for runoff during construction and ground disturbance activities, including relocation of Plum Creek, and initial operation of the reservoir system, as discussed above.

#### **4.2.5 LAND USE**

Central believes that adequate information exists to assess the effects of the proposed J-2 Regulating Reservoirs Project on land use. No studies of land use are proposed at this time.

#### **TEMPORARY CONSTRUCTION ACTIVITIES**

Road construction will be completed before the existing roads are closed. Prior to construction, the area within the proposed project boundary will need to be closed to public access, including some roads adjacent to the J-2 Regulating Reservoirs. Land uses will transition to project purposes.

#### **PROJECT STRUCTURES**

The proposed J-2 Regulating Reservoirs Project will transition existing land uses from primarily agricultural and interspersed residential development to project purposes. These lands, those encompassed by the J-2 Regulating Reservoirs, and the extended supply canal, will be requested to be incorporated into the project boundary as project lands and waters of the Kingsley Dam Project. As such, project operations and maintenance will be the primary purpose of this area. The realignment of Plum Creek will result in a net loss of stream habitat.

## **PROJECT OPERATIONS**

Project operations will result in the discontinuance of routine use of the J-2 Return, which will transition the existing bed and banks area to more riparian growth and will remove these lands from routine project operations.

### **4.2.6 RECREATION RESOURCES**

Central believes there is sufficient existing information to characterize recreational use of the Platte River, the J-2 Return, and canal system in the vicinity of the proposed J-2 Regulating Reservoirs Project.

### **TEMPORARY CONSTRUCTION ACTIVITIES**

Lands within the proposed project boundary will be closed to the public for recreation during construction activities. Recreation activities in surrounding areas, such as hunting on private properties and recreational use of the Supply Canal, may be disrupted temporarily by construction activities.

### **PROJECT STRUCTURES**

Reservoirs No. 1 and No. 2 will be closed to the public and not available for public access due to concerns about project operations and public safety. To the extent that they may enhance local waterfowl habitat, they may provide some benefit to hunting and water fowl viewing opportunities in the area. Because the shoreline of the Platte River will continue to provide angling opportunities in the vicinity of the proposed J-2 Regulating Reservoirs consistent with those currently provided by the J-2 Return, no net loss of recreation opportunity is expected.

### **PROJECT OPERATIONS**

Because of the nature of the reservoirs, no recreational opportunity exists on the reservoirs themselves, which will likely be closed to public access for safety. The discontinuation of the regular use of the J-2 Return may displace shoreline anglers that currently use this reach for recreational fishing. It is anticipated that an ancillary benefit of the end of the Flow Attenuation Plan would benefit Johnson Lake recreational use by not requiring the reservoir to be held at a lower level of operations in spring and summer.



#### **4.2.7 SOCIOECONOMIC RESOURCES**

Central believes that adequate information exists to assess the socioeconomic effects of the J-2 Regulating Reservoirs Project and project operations. No studies relevant to socioeconomics are proposed at this time.

#### **TEMPORARY CONSTRUCTION ACTIVITIES**

Construction activities may provide short-term benefits to the local economy.

#### **PROJECT STRUCTURES**

Local traffic patterns will be impacted by the proposed J-2 Regulating Reservoirs Project. The construction of the reservoirs will eliminate portions of Road 749, Road 438, and Road A, while connections to County Road 748, an east-west road located south of the proposed J-2 Regulating Reservoirs Project, will need to be extended to the west and north to maintain traffic around the proposed J-2 Regulating Reservoirs Project.

#### **PROJECT OPERATIONS**

Hydropower generation and irrigation flows will persist under the proposed action. A potential economic benefit may result if hydropower revenue increases for Central, which would offset the need to raise equivalent revenues from other sources, such as irrigation customers.

#### **4.2.8 CULTURAL RESOURCES**

A Phase 1 archaeological survey of the portion of the project area was conducted as part of the early design process. Because of the potential for archaeological resources in the vicinity of the proposed J-2 Regulating Reservoirs Project, including the existing Plum Creek Cemetery and remnants of an old fort, Central is proposing an additional Phase 1 archaeological survey of the lands in the newly designed project area that have not been previously surveyed. A Phase 2 survey and testing program will be implemented on any archaeological sites determined to be potentially eligible for the National Register of Historic Places by the Nebraska State Historic Preservation Office. Central will coordinate with the SHPO on these efforts.

There are no existing Indian reservations within proximity of the J-2 Regulating Reservoirs Project and tribes with a history of regional occupation are not anticipated to be affected by

project operations. However, Central understands that the Pawnee Nation has concerns with any significant cultural, historical, or archaeological sites that may be affected within the APE, and Central will consult with the Pawnee to address these concerns during the amendment process.

### **TEMPORARY CONSTRUCTION ACTIVITIES**

The areas targeted for ground disturbing activities have the potential for archaeological resources. During the initial Archaeological Investigation (Cultural Resources Consultants, 2012) conducted for the proposed J-2 Regulating Reservoirs Project, no prehistoric materials were encountered though two areas containing potentially historic artifacts were identified. The new project design now includes the Central Plains Tradition site, 25PP7, that may contain intact cultural features. In addition, the study further reported that numerous burials may have occurred in or within proximity of the APE. The study also concluded that the significant amount of earthmoving related to land leveling to allow gravity irrigation, the grading of terraces and the filling of the historic Plum Creek channel in the APE have substantially negatively affected any archeological sites that were present at one time, not including site 25PP7.

Given the potential for cultural features, the study recommended shallow grading be conducted to remove the plow zone within the reservoir footprints, along with archeological monitoring to determine if intact subsurface features remain that may contain valuable data. As such, Central will conduct a Phase 1 Archaeological Survey to ascertain the likelihood and nature of such resources prior to construction.

If prehistoric artifacts or features are encountered, or if concentrations of historic artifacts or buried historic cultural features are encountered during any excavations, Central will halt work and contact the Nebraska SHPO for further advice.

### **PROJECT STRUCTURES**

As discussed above, Central will conduct a Phase 1 Archaeological Survey to ascertain the likelihood and nature of cultural resources in the footprints of the project structures.

## **PROJECT OPERATIONS**

Hydropower operation and irrigation flows will persist under the proposed action. Project operations are not anticipated to impact cultural resources.

### **4.2.9 AESTHETICS**

Central believes adequate information exists to assess the aesthetic effects of project structures and operations. No studies of aesthetic resources at the J-2 Regulating Reservoirs Project are proposed at this time.

## **TEMPORARY CONSTRUCTION ACTIVITIES**

During the construction period, there will be some short-term noise, dust, and visual impacts resulting from construction vehicles entering and exiting the site and from construction activities.

## **PROJECT STRUCTURES**

While disruption from construction activities will only be temporary, the landscape in the project area and immediate vicinity will be permanently altered by the project facilities. The reservoirs will change the landscape providing topography and blocking distant views of the Platte River from the public roads.

## **PROJECT OPERATIONS**

Regular use of the J-2 Return will be discontinued and the landscape of this short reach is expected to transition to upland botanical species. More consistent flows to the Platte River could have a positive impact on aesthetics downstream of the J-2 Regulating Reservoirs.

### **4.2.10 RARE, THREATENED OR ENDANGERED SPECIES AND CRITICAL HABITATS**

As discussed above, Central believes adequate information exists to assess the effects of proposed project operations on wildlife resources, including any potential threatened or endangered species, and will continue to coordinate with the USFWS, NGPC and relevant agencies. No studies are proposed at this time.

## **TEMPORARY CONSTRUCTION ACTIVITIES**

Short-term effects to habitats in the project area and vicinity from construction activities may displace resident ESA-listed species or those with other federal or state protections such as the bald eagle. Central will document the presence of bald eagle in the project area prior to construction activities. Should nesting or roosting bald eagle be documented in the project vicinity, Central will follow USFWS Guidelines, whereby project construction activities are anticipated to fall under a Category A classification (USFWS, 2007). As appropriate, Central will implement activity and vegetation buffers and seasonal restrictions and will not undertake tree clearing activities during nesting periods.

## **PROJECT STRUCTURES**

The project structures may permanently displace the limited habitat afforded by the crop lands in the footprint of the reservoirs, though threatened and endangered species are not likely to occupy these areas. There is limited tree clearing of planted trees and riparian forest. Clearing of riparian forest may result in the loss of some potential summer roosting habitat for NLEB. Central will consult with the USFWS regarding known hibernacula along the Platte River and preferred timing of tree removal.

## **PROJECT OPERATIONS**

The J-2 Regulating Reservoirs Project will support, in part, the implementation goals of the Platte River Program. The purpose of the Platte River Program is to mitigate effects of water modifications in the Platte River on ESA-listed the target species and their habitat located in the Central and Lower Platte River, "through the implementation of land and water management actions which result in target species habitat restoration, creation, and/or enhancement." The J-2 Regulating Reservoirs Project directly provide benefits to the Platte River flow regime for the purpose of enhancing ESA-listed species habitat, as well as providing potential waterfowl and wading bird habitats.

#### 4.2.11 REFERENCES

US Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines.

[Online] URL:

<http://www.fws.gov/southdakotafeldoffice/NationalBaldEagleManagementGuidelines.pdf>. Accessed August 17, 2010.

Olsson Associates. 2012. Final CNPPID J-2 Regulating Reservoir Feasibility Report. May, 2012.

**APPENDIX A**

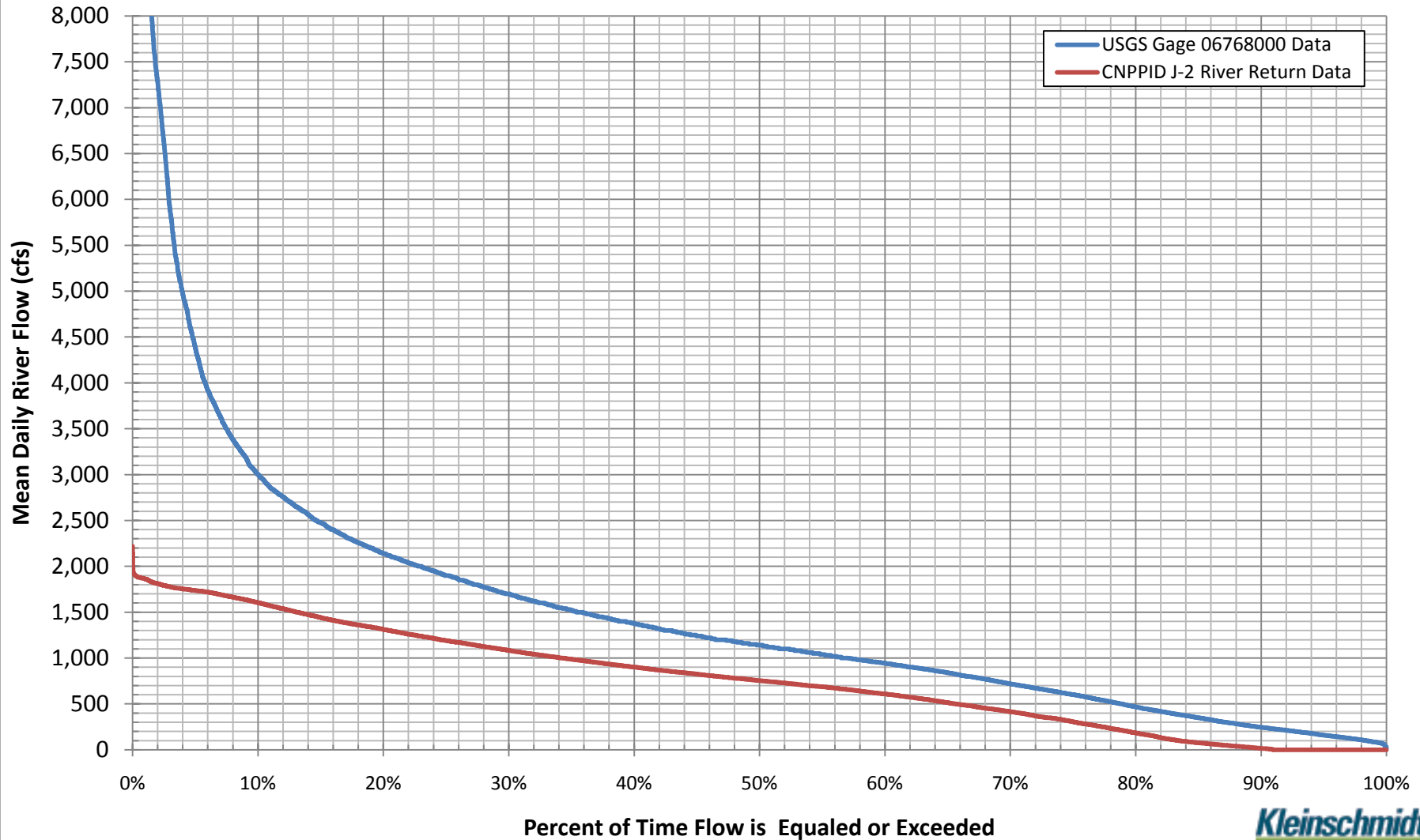
**MONTHLY FLOW DURATION CURVES**

Month	USGS Gage 06768000			J-2 River Return Data		
	Minimum Flow (cfs)	Mean Flow (cfs)	Maximum Flow (cfs)	Minimum Flow (cfs)	Mean Flow (cfs)	Maximum Flow (cfs)
January	90	1,591	5,600	0	983	1,936
February	152	1,849	7,750	0	1,118	2,220
March	274	1,988	8,130	0	1,163	1,956
April	139	1,846	12,800	0	955	1,925
May	78	1,913	18,800	0	667	2,018
June	52	2,320	22,300	0	548	1,928
July	55	1,089	21,200	0	270	1,773
August	31	755	8,480	0	259	1,700
September	18	1,231	12,000	0	639	1,843
October	20	1,426	8,820	0	867	1,930
November	116	1,448	6,900	0	923	1,981
December	131	1,519	6,660	0	978	1,936
Annual	199	1,690	22,300	0	778	2,220



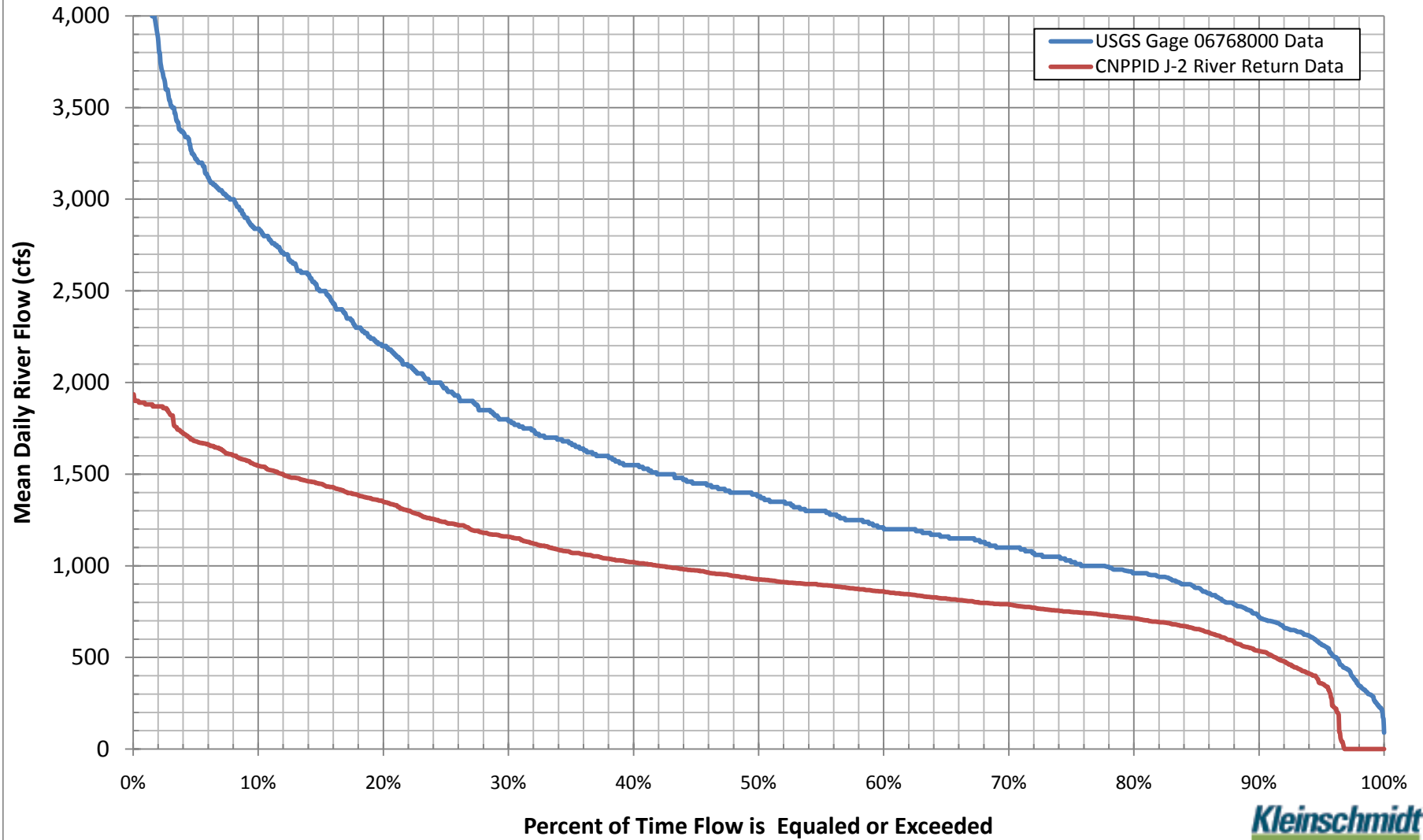
# Platte River at J-2 Hydro Power Plant Discharge Annual Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



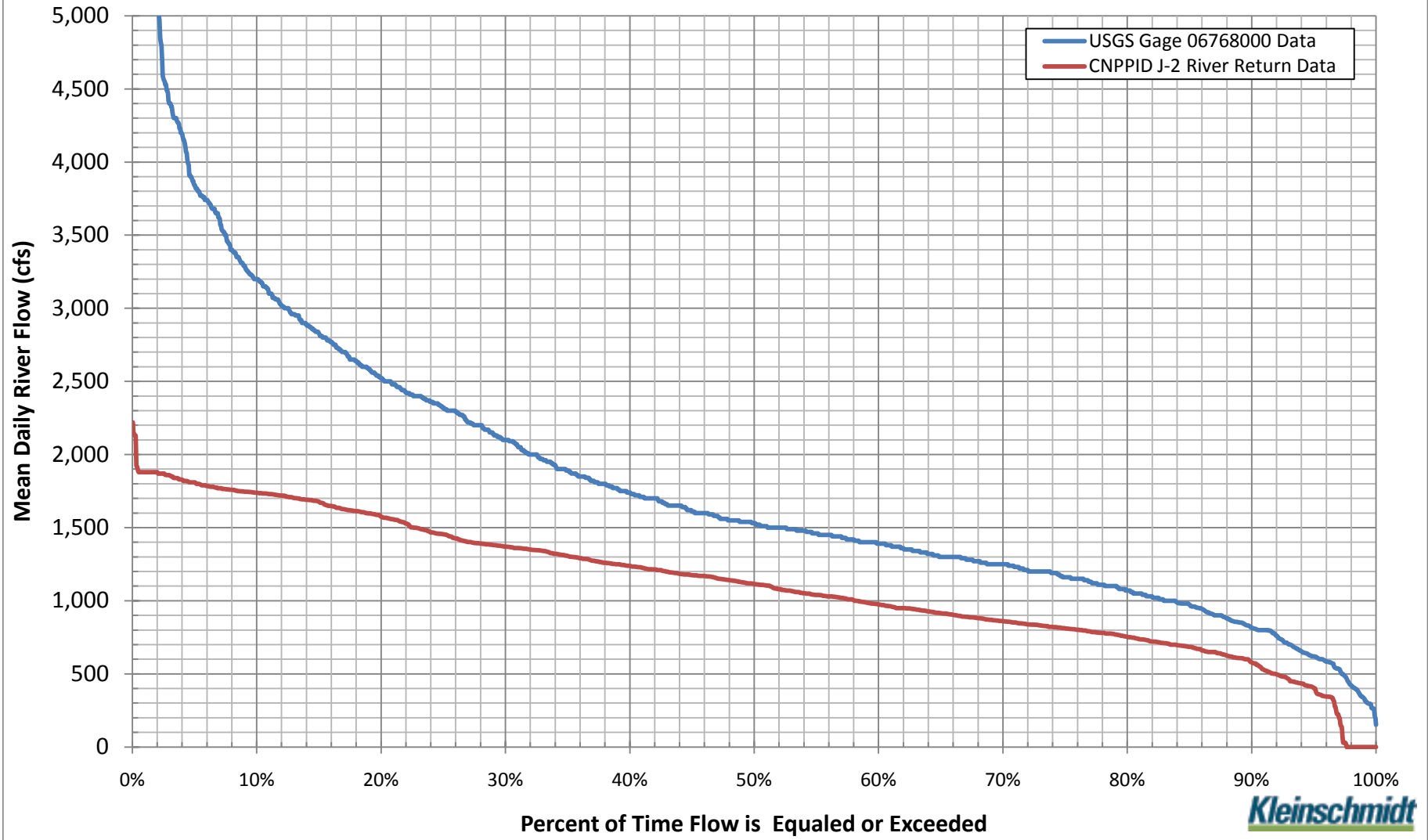
# Platte River at J-2 Hydro Power Plant Discharge January Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



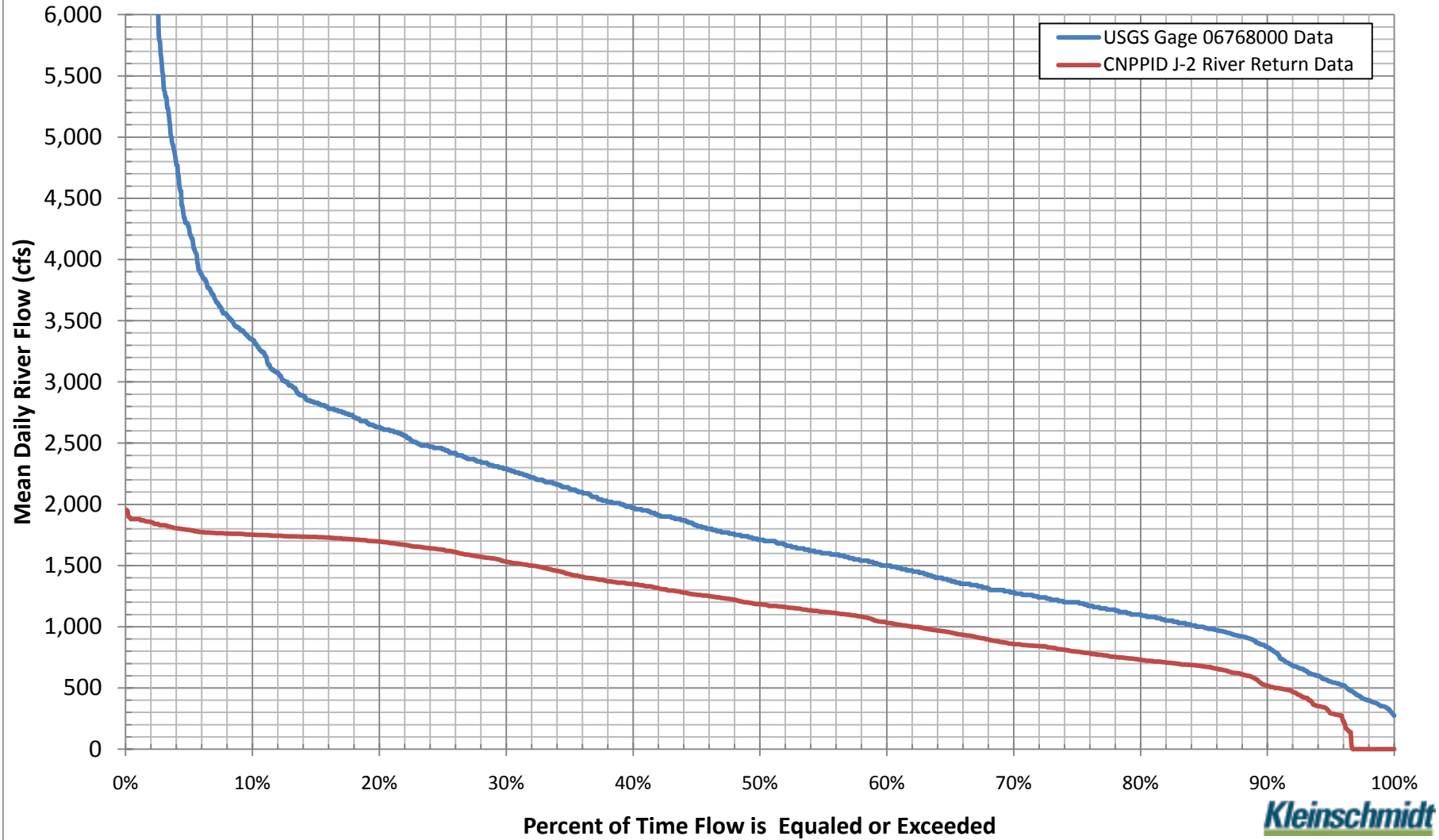
# Platte River at J-2 Hydro Power Plant Discharge February Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



# Platte River at J-2 Hydro Power Plant Discharge March Flow Duration Curves

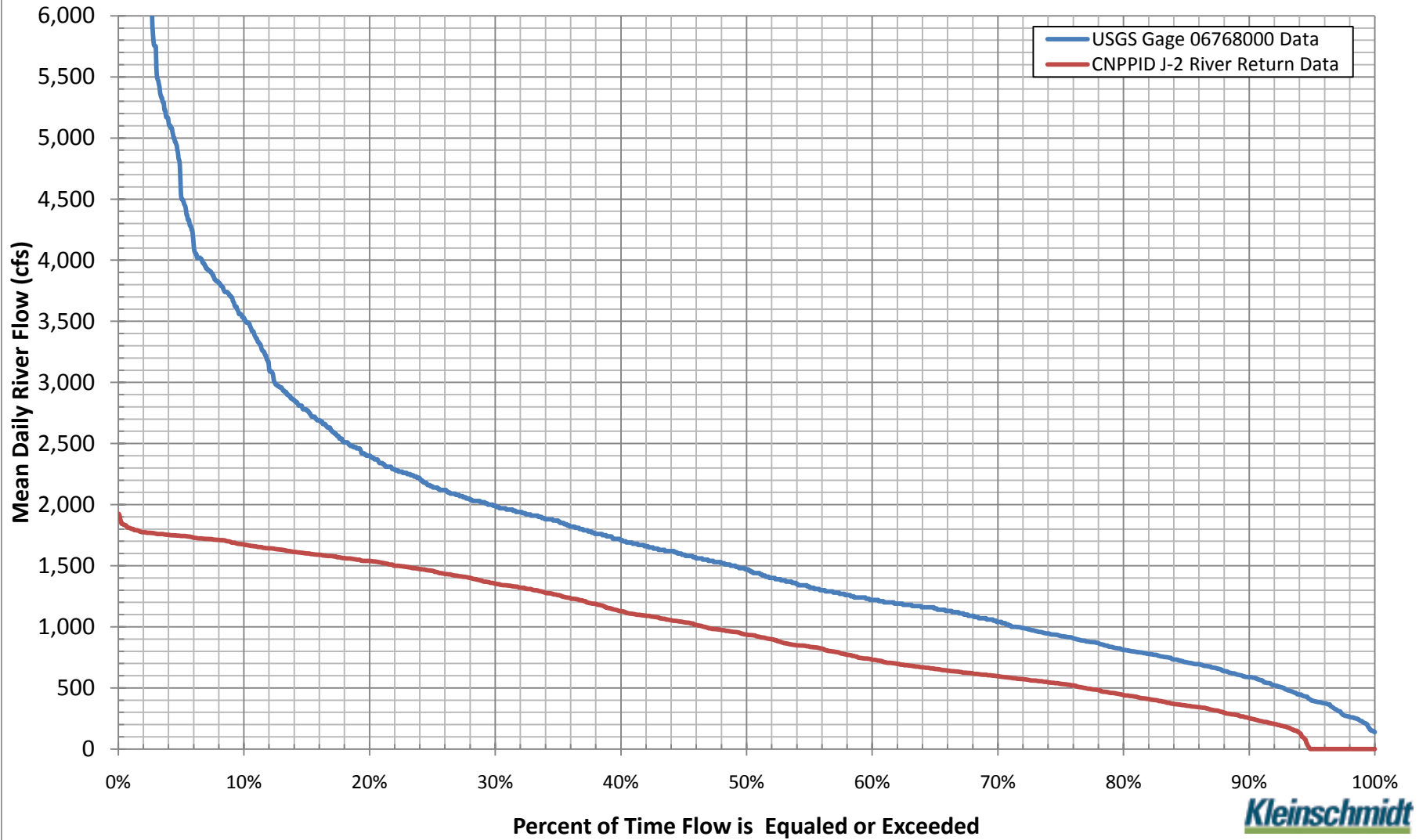
(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



# Platte River at J-2 Hydro Power Plant Discharge

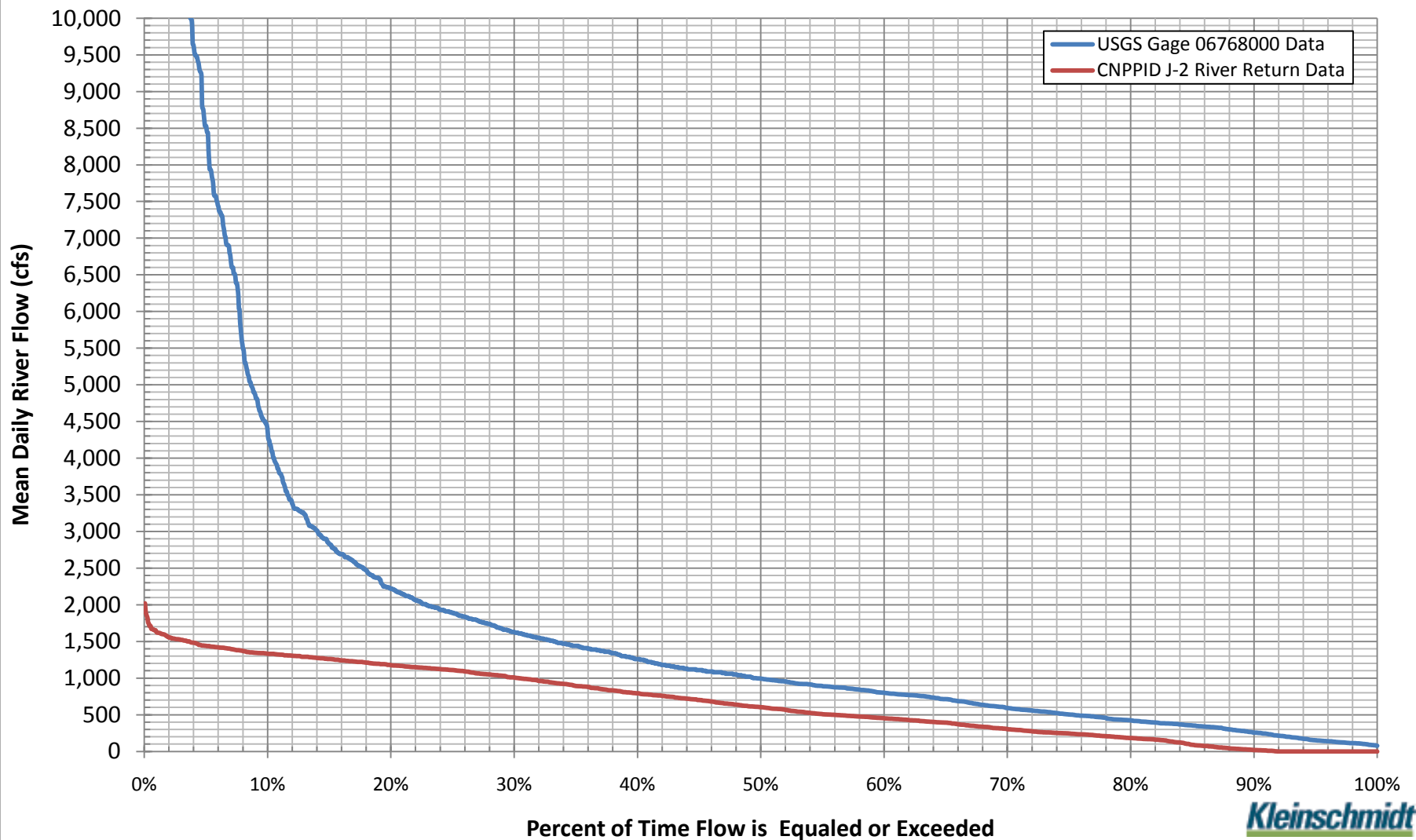
## April Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



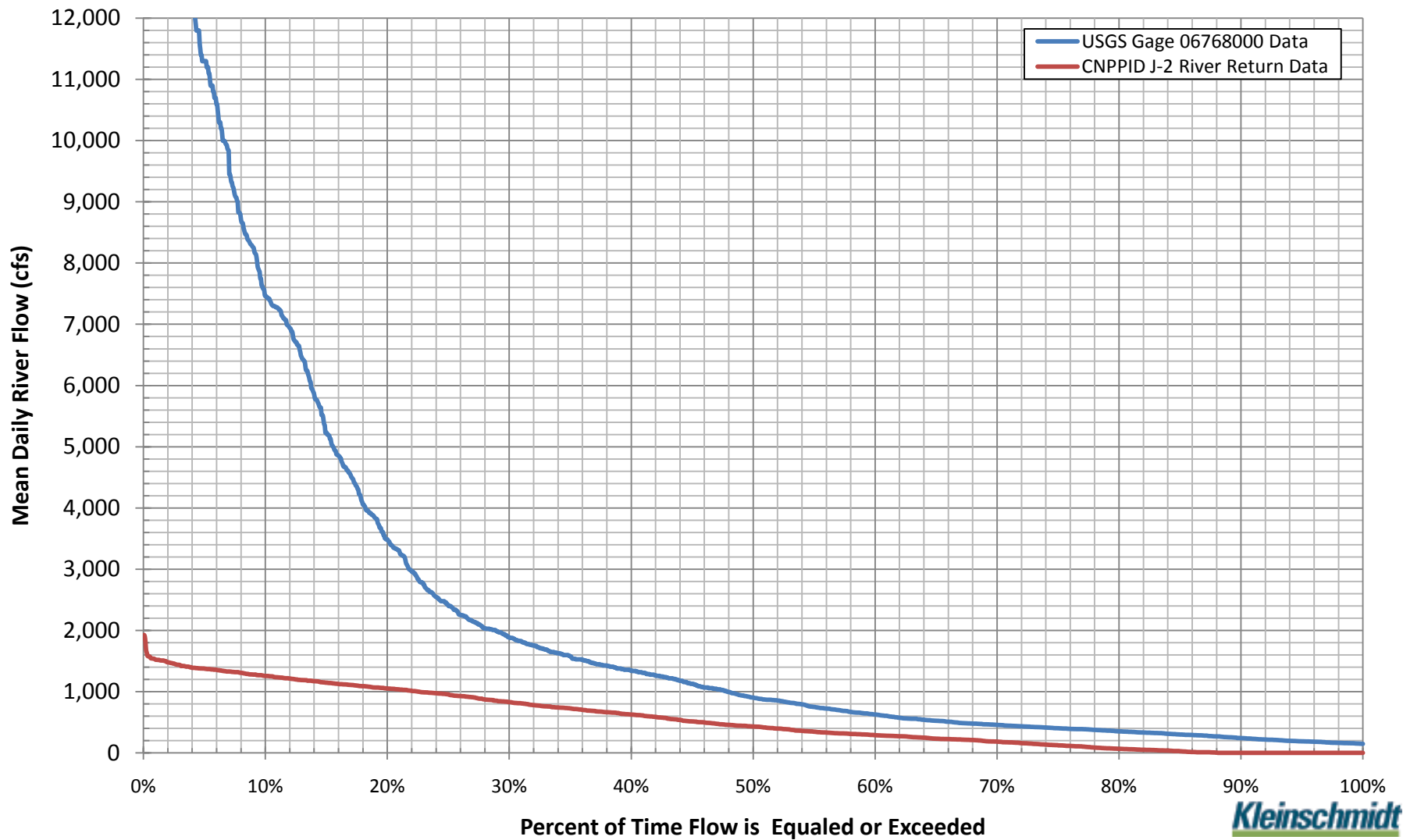
# Platte River at J-2 Hydro Power Plant Discharge May Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



# Platte River at J-2 Hydro Power Plant Discharge June Flow Duration Curves

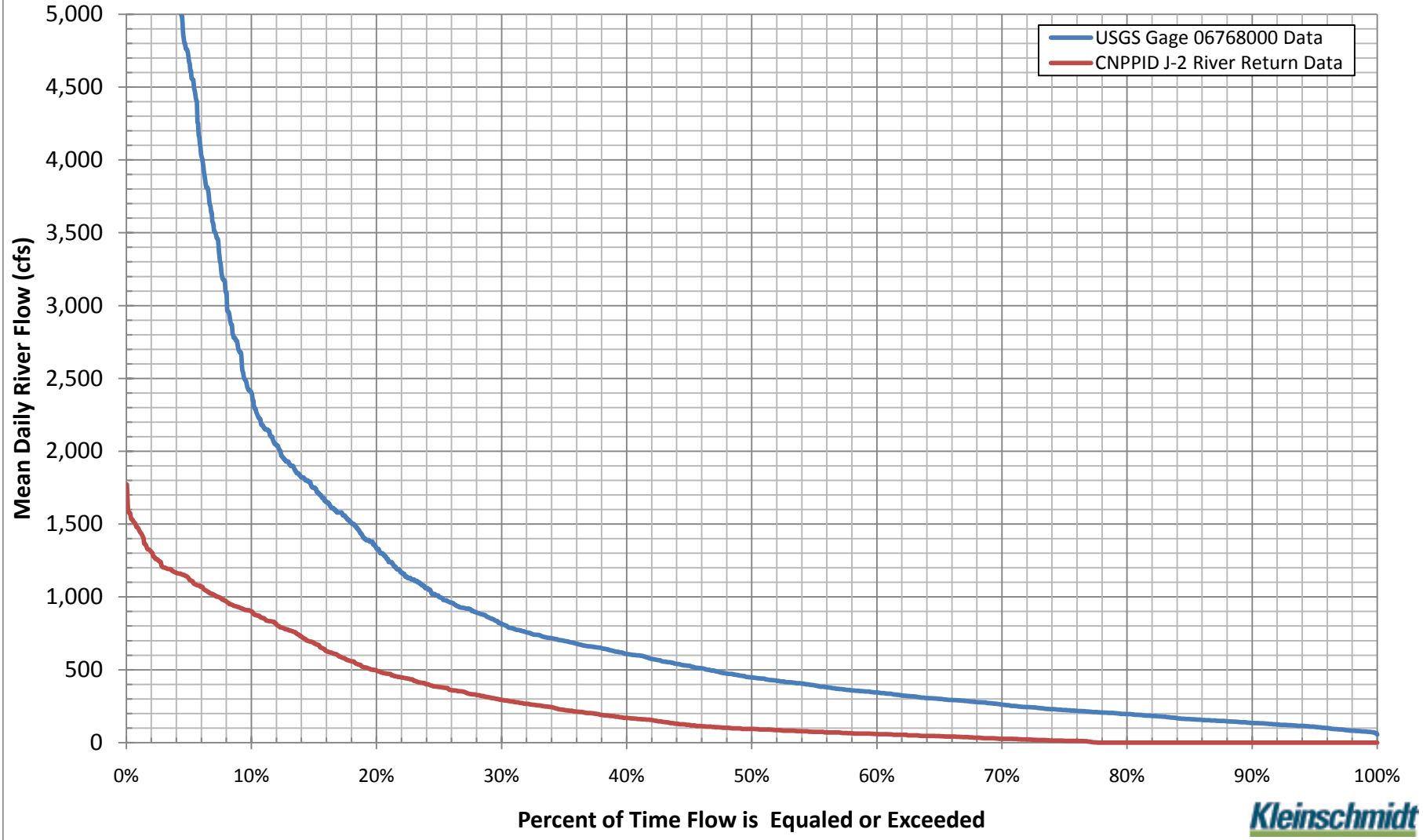
(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))





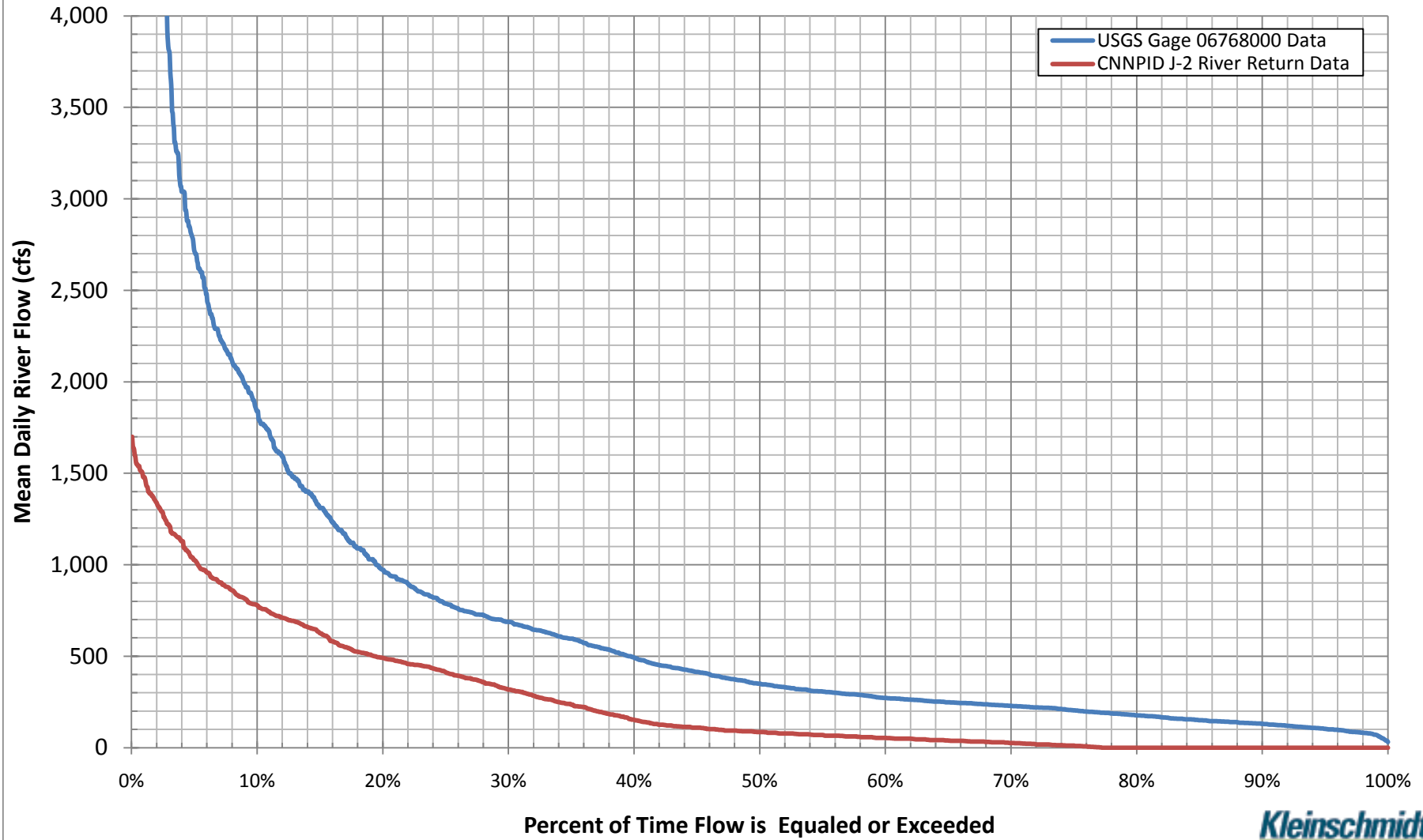
# Platte River at J-2 Hydro Power Plant Discharge July Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



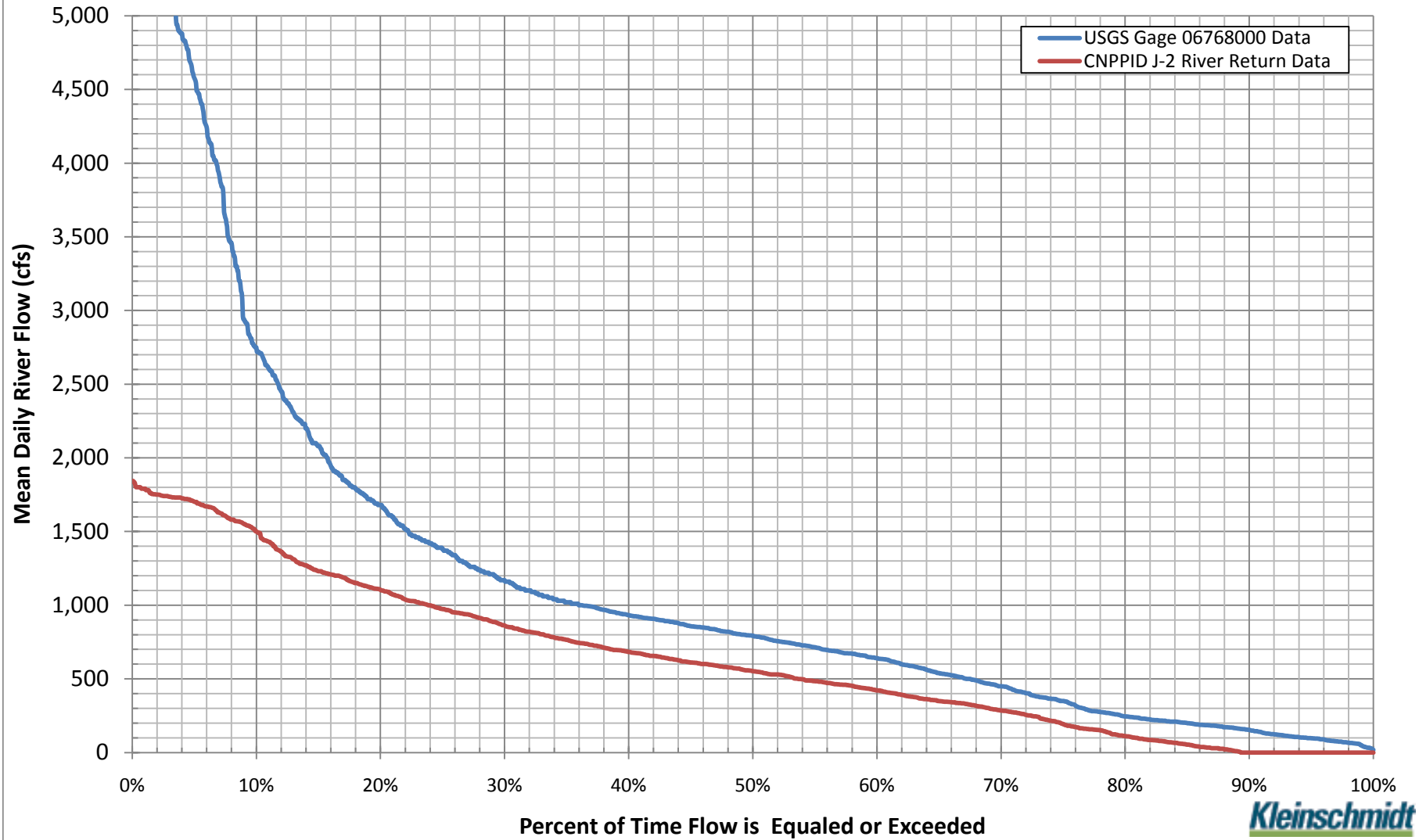
# Platte River at J-2 Hydro Power Plant Discharge August Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



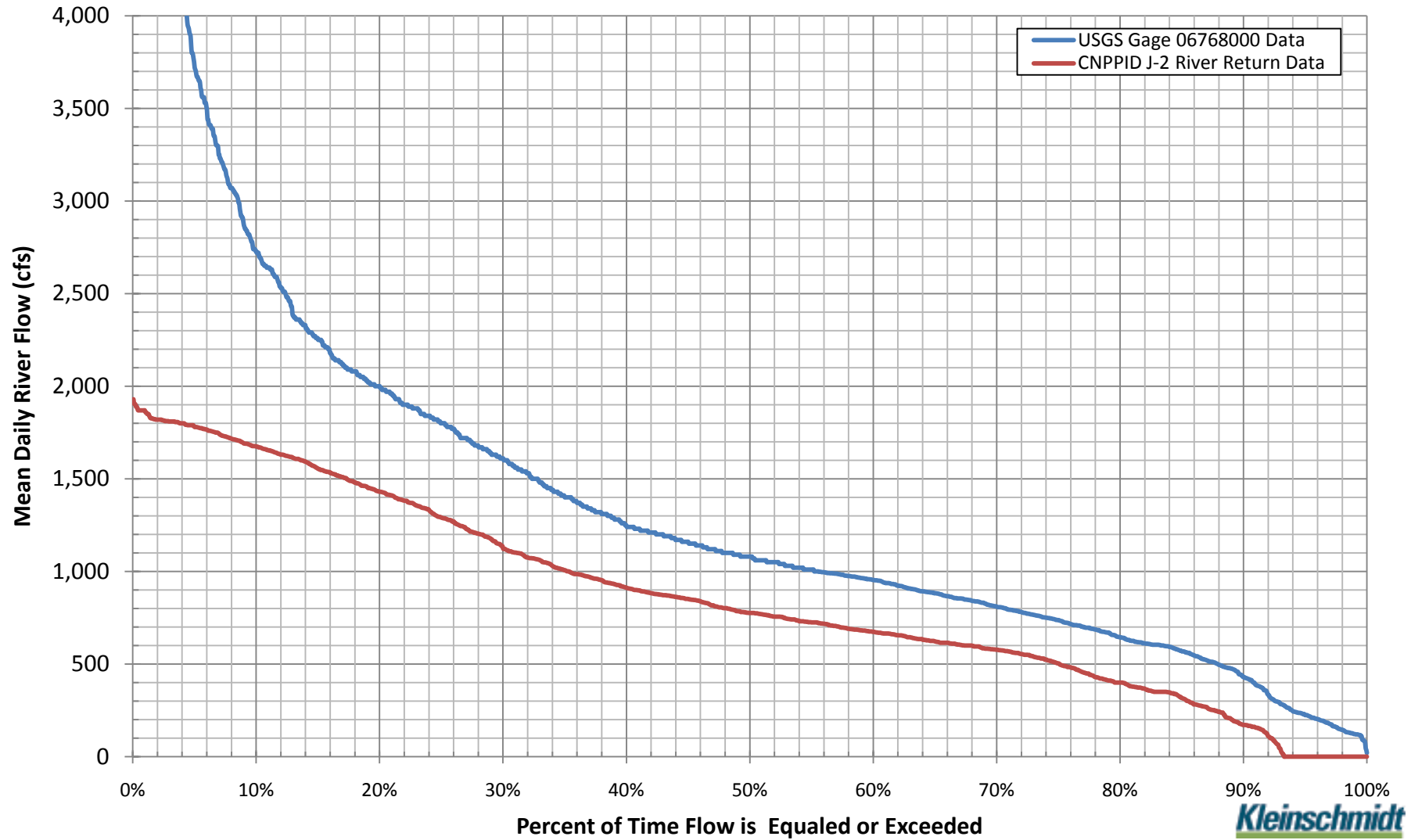
# Platte River at J-2 Hydro Power Plant Discharge September Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



# Platte River at J-2 Hydro Power Plant Discharge October Flow Duration Curves

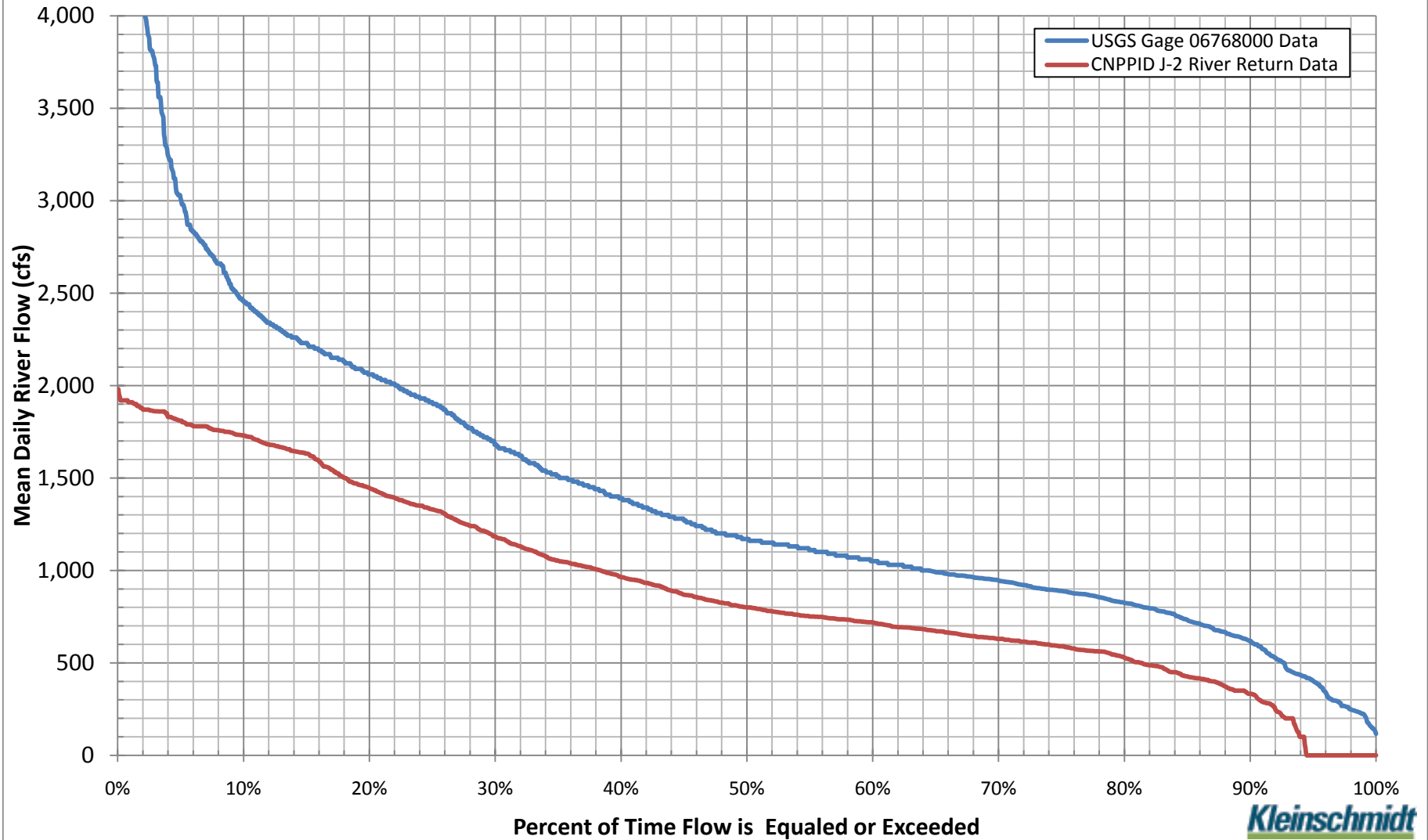
(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



# Platte River at J-2 Hydro Power Plant Discharge

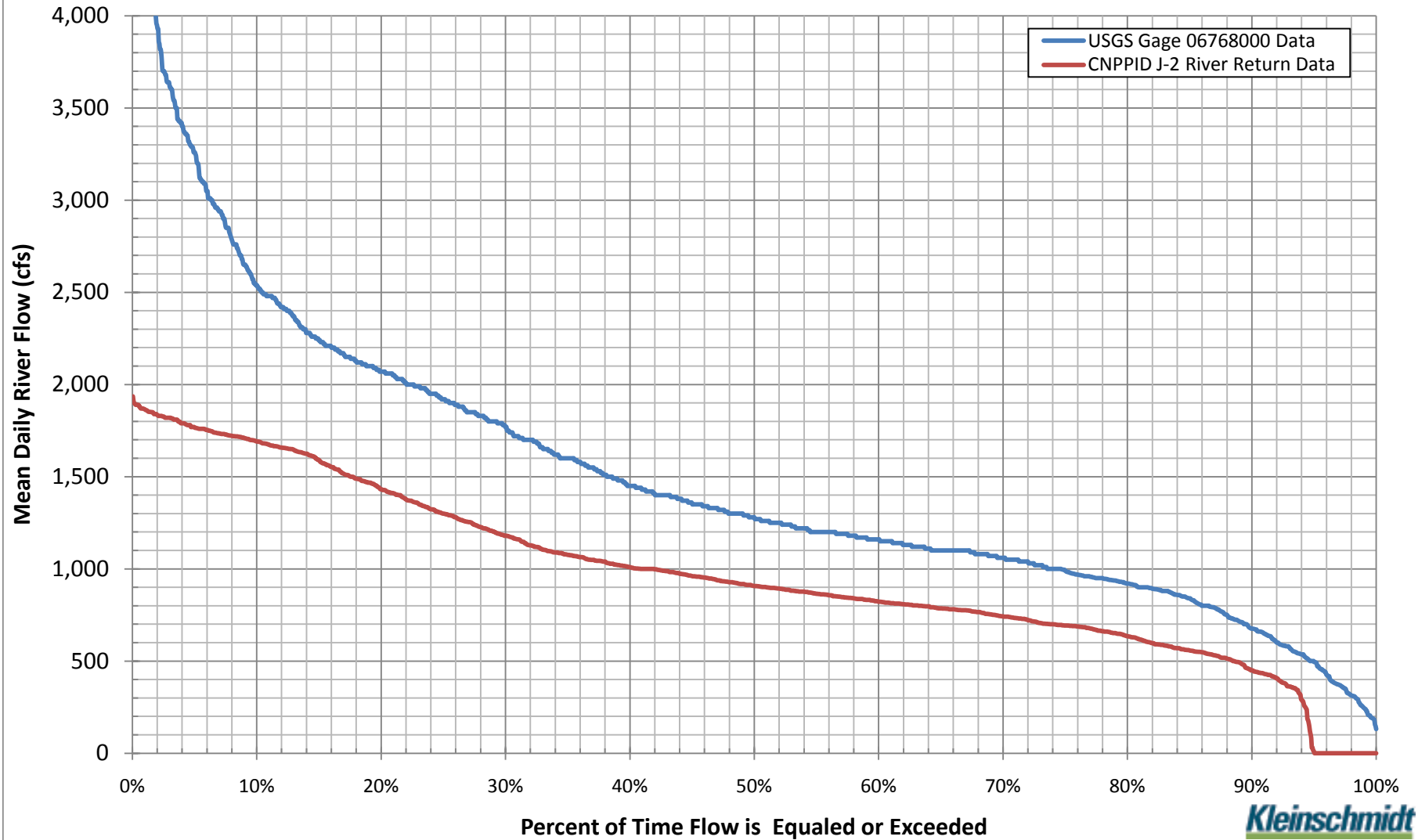
## November Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



# Platte River at J-2 Hydro Power Plant Discharge December Flow Duration Curves

(Data from USGS Gage No. 06768000 Platte River near Overton, NE (1-1-1946 to 12-31-2013)  
and CNPPID Station ID No. 14400 (1-1-1946 to 12-31-2008))



**APPENDIX B**

**PRELIMINARY AGENCY CONSULTATION**

**MEETING NOTES**  
**THE CENTRAL NEBRASKA**  
**PUBLIC POWER AND IRRIGATION DISTRICT**  
**KINGSLEY PROJECT - FERC No. 1894**  
**J-2 REGULATING RESERVOIRS PROJECT AMENDMENT**  
**HOLDREGE, NEBRASKA**

**ATTENDEES:** Mike Drain (Central)  
Cory Steinke (Central)  
Bob Huzjak – RJH Consultants (RJH)  
Tom MacDougall – RJH Consultants (RJH)  
Dr. Steve Holen – Mammoth Archaeology Consulting  
Dr. Terry Steinacher – Nebraska State Historical Preservation Office  
Jill Dolberg - Nebraska State Historical Preservation Office (Lincoln)

**DATE:** May 27, 2014

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These meeting notes are RJH's and Dr. Holen's documentation of general discussions from the meeting held on the above-noted date. These notes are not a verbatim account of proceedings, are not meeting minutes, and do not represent any final decisions or official documentation for the Project or agency.

Dr. Steinacher had done background research and presented a list of known sites within the project area and an overview of the local history. He had not yet seen the cultural resource management report completed by Stan Parks of Cultural Resources Consulting for the previous design of the project, so he did not know about the new resources that had been discovered, or that some of the previously recorded Oregon Trail sites could not be relocated. I explained what I knew about the Oregon Trail sites near the Plum Creek Cemetery within the project area and indicated that land leveling probably had destroyed most of the archaeological evidence. We started our consultation at the Plum Creek Cemetery and discussed Oregon Trail sites in that vicinity, including the unmarked cemetery identified in the Parks report. We next moved to the prehistoric Central Plains Tradition site (prehistoric Pawnee) and then to the location of the reported Oregon Trail ruts in native pasture. I will summarize Dr. Steinacher's major concerns/comments below.

**SUMMARY OF KEY DISCUSSIONS**

- The meeting participants visited three sites: The Plum Creek Cemetery, an overlook to the Central Plains Tradition site (prehistoric Pawnee), and an overlook to the wooded area immediately east of Road 438 that reportedly may contain Oregon Trail ruts in native pasture.
- At the Plum Creek Cemetery, Mike Drain provided an overview of the Project, including the plan for two reservoirs, road relocations, and plum creek relocation.



- Dr. Terry Steinacher noted concerns about archaeological sites within the project area. Based on his initial research, he presented a list of known sites within the project area and an overview of the local history. He had not yet seen the cultural resource management report prepared by Stan Parks of Cultural Resources Consulting for an earlier phase of this Project, so he did not know about the resources that had been discovered, or that some of the previously-noted Oregon Trail sites could not be located.
- Dr. Holen mentioned that the Plum Creek Cemetery only holds one grave of an unknown person (despite the various head stones) and that the person was moved from a near-by grave. There are records that indicate the presence of an unmarked cemetery southwest of the Plum Creek Cemetery, which was identified in the Parks report.
- The unmarked cemetery is a potential issue because the cemetery is subject to the Nebraska statute dealing with unmarked graves. Dr. Steinacher said that the law is vague as to whether the graves could be moved or not, if they were to be identified. This could be an issue. He suggested using remote sensing to evaluate if the graves are present.
- Dr. Steinacher indicated that another survey would need to be made to determine if there are any intact subsurface features that can be associated with Post Plum Creek, Freeman's Second Trading Post, and the Plum Creek Stage Station. He recommended using remote sensing to look for these sites.
- Dr. Holen stated that he was aware of the potential for Oregon Trail sites near the Plum Creek Cemetery and within the project area and indicated that land leveling probably had destroyed most of the archaeological evidence.
- Dr. Holen noted that land leveling could have potentially destroyed the three Oregon Trail sites and the burial area, but that this would be studied as part of this Project's permitting.
- Dr. Steinacher seemed especially interested in the prehistoric Central Plains Tradition site. He indicated that we would have to consult with the Pawnee concerning this site because the Pawnee claim direct descent from the Central Plains Tradition culture. The site may contain house locations and would have to be mitigated if construction would destroy the site.
- Dr. Steinacher mentioned that the reported Oregon Trail ruts should also be considered significant because the public seems very interested in the ruts. Nebraska State Historical Society had already received comments from people interested in the Oregon Trail. Dr. Steinacher recommended using remote sensing to look for the trail ruts if they cannot be identified on the surface. The initial survey by Parks did not identify any surface indication of the ruts.
- Dr. Steinacher mentioned that there may be other prehistoric Central Plains Tradition sites along the high terrace remnant where the trail ruts are reported to exist. He indicated a need to try to identify these possible sites, potentially using remote sensing.
- Both Dr. Steinacher and Jill Dolberg stated that Central Nebraska Public Power and Irrigation District (Central) would likely need to develop a Programmatic Agreement with the State Historic Preservation Office and other interested parties concerning the cultural resources impacted by this project. Other parties could include: the Oregon-California Trails Association and the Pawnee Tribe. The Advisory Council on Historic Preservation (Federal Government) may or may not want to become involved. Central mentioned that they have an agreement in place for cultural resources for the Kingsley Dam Project.

- Ms. Dolberg stated that she did not think that the historic house along the east edge of Section 7 was eligible for the National Register of Historic Places and that we would not have to do an architectural survey.
- Ms. Dolberg stated that we would probably be working mostly with Terry Steinacher because the cultural resources were archaeological. She stated that she did not know which one of them would be the lead for developing the Programmatic Agreement with Central.

### **COMMENTS FROM JILL DOLBERG**

- I asked Ms. Dolberg about the need for an architectural survey of the historic house along the east edge of Section 7. I explained that the house had two additions and had been extensively remodeled. We could see the house quite well from the canal location where we were standing. She stated that she did not think that the house was eligible for the National Register of Historic Places and that we would not have to do an architectural survey.
- Ms. Dolberg stated that we would probably be working mostly with Terry Steinacher because the cultural resources were archaeological. She stated that she did not know which one of them would be the lead person in developing the Programmatic Agreement with CNPP.

Overall, I thought this was a productive meeting. My major area of concern resulting from this meeting was that the graves in the unmarked cemetery may be problematic because the vague Nebraska unmarked graves statute might not allow the graves to be moved. Other than that, the SHPO concerns about the sites within the project area were in line with other similar projects that I have worked on in the past. I think both Dr. Steinacher and Ms. Dolberg were trying alert us to the potential for a lot of public input on the Oregon Trail sites.

**From:** [Mike Drain](#)  
**To:** [terry.steinacher@nebraska.gov](mailto:terry.steinacher@nebraska.gov); "Dolberg, Jill"  
**Cc:** "[Steven R Holen](#)"; "[Robert Huzjak](#)"; "[Cory Steinke](#)"; "[Tom MacDougall](#)"; [Kelly Larimer](#); [Kelly Maloney](#)  
**Date:** Wednesday, May 28, 2014 9:54:28 AM  
**Attachments:** [OlssonArcheologicalInvestigationReport\\_J2Reservoir\(CFCforOlsson\)\\_Jan2012....pdf](#)  
[J-2 Regulating Reservoirs - FERC 2-24-2014 Letter designating Central as....pdf](#)

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Terry and Jill,

Thank you for visiting with us regarding the J-2 Regulating Reservoirs Project yesterday. As discussed, I am attaching to items for your reference. The first item is the Stanley Parks report that was done in 2012 for the Platte River Program. This is work that we would like to build upon, but it would need to be supplemented. The second item is the letter from FERC designating us as the non-federal representative for purposes of consultation. Please let me know if you have any questions regarding either of these items. Thanks.

- Mike

Michael A. Drain, P.E.  
Natural Resources Manager

The Central Nebraska Public Power  
and Irrigation District  
PO Box 740  
Holdrege, NE 68949

p: 308-995-8601  
c: 308-991-5832  
f: 308-995-5705

**SIGN-IN SHEET**

Name	Organization	Phone	Email Address
Bob Huzjak	RJH CONSULTANTS	303-225-4611	RHUZJAK@RJH-CONSULTANTS.COM
Frank Albrecht	NGPC	471-5422 <del>5422</del>	Frank.albrecht@nebraska.gov
Scott Taylor	NGPC	471-5439	scott.taylor@nebraska.gov
Richard Holland	NGPC	471-5501	richard.holland@nebraska.gov
Cory Steinke	CNPPID	308-995-3542	csteinke@cnppid.com
Mark Peyton	CNPPID	308-537-3582	mpeyton@cnppid.com
Mike Drain	CNPPID	308-995-3553	mdrain@cnppid.com
(By Phone) Kelly Larimer	Kleinschmidt	509-260-0151	Kelly.Larimer@kleinschmidt.com
(By Phone) Kelly Maloney	Kleinschmidt	207-416-1271	Kelly.Maloney@kleinschmidt.com

# MEETING NOTES

**KINGSLEY PROJECT - FERC No. 1894**  
**J-2 REGULATING RESERVOIRS PROJECT AMENDMENT**  
**NEBRASKA GAME & PARKS COMMISSION OFFICE, LINCOLN, NE**  
**JUNE 3, 2014**  
**1:00 PM – 2:00 PM**

**ATTENDEES:** Frank Albrecht, Nebraska Game & Parks Commission (NGPC)  
Scott Taylor, NCPC  
Richard Holland, NCPC  
Mike Drain, Central Nebraska Public Power & Irrigation District  
(CNPPID or Central)  
Cory Steinke, CNPPID  
Mark Peyton, CNPPID  
Bob Huzjak, RJH  
Kelly Larimer, Kleinschmidt (by phone)  
Kelly Maloney, Kleinschmidt (by phone)

**DATE:** June 3, 2014

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These meeting notes are documentation of general discussions from the meeting held on the above-noted date. These notes are not a verbatim account of proceedings, are not meeting minutes, and do not represent any final decisions or official documentation for the Project or agency.

## <sup>1</sup>Agenda & Meeting Summary Notes:

- **J-2 Regulating Reservoirs Project Proposal Overview**

- Mike D. gave an overview of the history behind the project, which includes collaborating with the Platte River Program (comprised of state and federal agencies, NGOs), the states of Nebraska, Colorado, and Wyoming to identify, plan for, fund, and implement the J-2 Regulating Reservoirs Project. The project purpose and benefits are to 1) retine water to better meet the needs for habitat flow objectives of the Platte River Program, and 2) to mitigate the impacts of hydrocycling of the J-2 hydroelectric plant. Specifically, implementation of the project would allow the hydro operate independently of stream flow requirements and to run more efficiently.
- Mike further explained that the funding and support for the project is divided between the state of Nebraska and the Platte River Program and totals approximately \$70 million. Central is responsible for 5%, or up to a \$2.5 million cap.
- Bob H. gave a project overview, describing the project purpose as Central proposes to amend the Kingsley Dam Project license to include extending the existing main Supply Canal; constructing, operating, and maintaining two regulating reservoirs (the J-2 Regulating Reservoirs); and adding two new return flow points to the Platte River.

- Bob H. also explained that part of the project is to relocate a portion of Plum Creek and some county roads.
- NGPC asked about the relocation of Plum Creek and recommended that Central consider creating some meanders and adding habitat functions to the stream in the new alignment.
- NGPC inquired about the operations, how would the reservoirs be used/filled and managed. Mike D. stated that the flow operations are managed by the Environmental Account Manager, and that that would continue to occur once the project comes on-line. Bob H. explained that the reservoirs would be empty half of the year, with the reservoirs likely filling during the fall/winter and emptying in the spring/early summer for average flow years.
- NGPC asked if there would be public access and use of the reservoirs. Mike D. explained they would function and look much like lagoons and that from an operational standpoint, Central would likely fence the project and not allow public access for safety concerns. Mike D. further explained that there is no current public access, therefore, there is no net loss of public access related to the project.
- NGPC asked about public access for fishing in the reservoirs and whether or not Central would consider wildlife viewing points. NGPC also asked about the Supply Canal and whether or not people used it. Mike D. responded that fishing would not be allowed in the new regulating reservoirs but that people are allowed to drive, fish, and hunt on the Supply Canal. Mike D. also explained that the canal is currently drained September through April each year during the non-irrigation season and will continue to be drained after the completion of this project.
- NGPC asked about Road D and whether or not the cemetery would be closed off. Bob H. explained that the project will not encumber the cemetery or access to it. NGPC also asked if a viewing area could be installed by the cemetery.
- NGPC also inquired about put and take fishing opportunities in the regulating reservoirs, and that unless Central can demonstrate there is a significant safety issue in an adequate fashion, they may pursue trying to get areas of public access on the project. They explained that one of their agency objectives is to promote and provide put and take fishing opportunities.
- NGPC inquired about other interested parties. Mike D. gave a recap on the meeting with Jeff Runge with the United States Fish & Wildlife Service, describing their support for the project. Mike D. also mentioned that they met with the State Historic Preservation Office on -site the week before, and that they had been contacted by the California Oregon Trail Association regarding the project.
- NGPC asked about terns and plovers and whether or not the project will enhance foraging habitat. They also brought up Plum Creek again and do not want to see lost channel length. In addition to a sinuous channel alignment, they recommended planting hardwoods and enhancing wetlands.

- NGPC also stated that there would likely be a need to evaluate wetland impacts. Bob H. stated that we will expand upon existing wetland delineation work that has been performed along with functions assessment.
- **License Amendment Overview & Anticipated Schedule**
  - Kelly M. and Kelly L. gave an overview of the license amendment schedule and the group discussed some challenges with the schedule centered around getting right of entry to private properties within the project location in a timely manner. The group discussed the fact that most of the on-the ground data collection would have to occur later in 2014 and would run into 2015.
- **Initial Consultation Document/Joint Agency Meeting**
  - It was discussed that the Initial Consultation Document would be filed with FERC and provided to agencies, tribes, and stakeholders by no later than June 16, 2014.
  - The Joint Agency Meeting is scheduled for July 1, 2014 and will consist of both the site visit and the meeting. The meeting will begin at 10:30 am at Headwater Corporation located at 4111 4th Avenue, Suite 6, Kearney, NE.
- **Anticipated Studies Overview/Feedback**
  - No studies were recommended by NGPC during the meeting.
- **Questions/Discussion**
  - Discussed throughout the meeting.
- **Adjourn**

# MEETING NOTES

**KINGSLEY PROJECT - FERC No. 1894**  
**J-2 REGULATING RESERVOIRS PROJECT AMENDMENT**  
**USFWS OFFICE, LINCOLN, NE**  
**JUNE 3, 2014**  
**8:30 PM – 9:30 AM**

**ATTENDEES:** Jeff Runge, United State Fish & Wildlife Service (USFWS)  
Mike Drain, Central Nebraska Public Power & Irrigation District  
(CNPPID or Central)  
Cory Steinke, CNPPID  
Mark Peyton, CNPPID  
Bob Huzjak, RJH  
Kelly Larimer, Kleinschmidt (by phone)  
Kelly Maloney, Kleinschmidt (by phone)

**DATE:** June 3, 2014

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These meeting notes are documentation of general discussions from the meeting held on the above-noted date. These notes are not a verbatim account of proceedings, are not meeting minutes, and do not represent any final decisions or official documentation for the Project or agency.

<sup>1</sup>**Agenda & Meeting Summary Notes:**

- **J-2 Regulating Reservoirs Project Proposal Overview**

- Bob H. gave a project overview, describing the project purpose as Central proposes to amend the Kingsley Dam Project license to include extending the existing main Supply Canal; constructing, operating, and maintaining two regulating reservoirs (the J-2 Regulating Reservoirs); and adding two new return flow points to the Platte River.
- Mike D. emphasized that the proposed J-2 Regulating Reservoirs Project would improve the ability for Central to manage the water resources for hydropower generation and irrigation deliveries and return water to the river at times and at volumes that enhance flows in the Platte River at the project location.
- Jeff R. asked about hydrocycling and discussion regarding the future need, or lack thereof, for hydrocycling was addressed. Mike D. explained that both the hydrocycling agreement and flow attenuation plan would no longer be needed once the J-2 regulating reservoirs are constructed and operational.
- Jeff R. asked about Plum Creek and where would the realignment would be. Bob H. explained that the exact realignment has not yet been determined.
- Jeff R. asked about project materials (soils) and if the project would have enough material, if there is excess where would it go. Bob H. explained that the plan is to utilize all the materials excavated on site and generally from within the project area of the reservoir. However, there is potential to obtain some borrow material from outside the project area. He also stated there shouldn't be materials to dispose of off-site.



- Bob H. asked Jeff G. what types of studies he thought the project may need from the perspective of USFWS.
- Jeff R. stated that he didn't think there was much that would need to be done based on the fact that the Platte River Recovery Program has done a lot of studies and habitat enhancement work over the years, in addition to the work CNPPID has done through relicensing and license implementation. He thought there wouldn't be any impacts to Whooping Cranes and that Central should continue to coordinate and work with the Platte River Recovery Program on all environmental aspects of the project.
- Jeff R. stated that wetland impacts would be one of the most important aspects of the project to consider, and that USFWS always defers to the Army Corps of Engineers to address wetland impacts. Jeff R. has concerns that the relocation of Plum Creek will result in wetland impacts. He pointed out that the Platte River Recovery Program has an informal wetland mitigation bank that Central can consider using. Mike D. explained that a wetland delineation has been performed and that it will be supplemented to include parts of the project footprint that weren't originally captured and that a functional wetlands assessment will likely be completed.
- Jeff R. also pointed out that USFWS is expecting to list the northern long-eared bat this fall (2014), and that although there are not geologic features in the project vicinity that could serve as a hibernacula, the riparian zone could be used as migratory habitat. Jeff R. suggested generally identifying general areas that contain riparian trees that are three inches or greater dbh and to consider avoidance of cutting them down outside the potential life-stage use of trees in the project area. Jeff said that there was no need to count and delineate trees, just to identify general areas on a map where there are trees larger than three inches dbh.
- Jeff R. didn't think Section 10(j) would be an issue since the project will directly improve fish and migratory bird habitats.
- Jeff R. and Central agreed they would like to revisit the hydrocycling and flow attenuation plan. Central again explained that this license amendment will include a request to eliminate these plans or that it would be requested as a separate amendment.
- **License Amendment Overview & Anticipated Schedule**
  - Kelly M. and Kelly L. gave an overview of the license amendment schedule and the group discussed some challenges with the schedule centered around getting right of entry to private properties within the project location in a timely manner. The group discussed the fact that most of the on-the ground data collection would have to occur later in 2014 and would run into 2015.
  - Kelly L. mentioned that letters of support and positive agency comments throughout the amendment process are helpful. Jeff R. was on-board with supplying a support letter that will accompany the amendment application.
- **Initial Consultation Document/Joint Agency Meeting**
  - It was discussed that the Initial Consultation Document would be filed with FERC and provided to agencies, tribes, and stakeholders by no later than June 16, 2014.

- The Joint Agency Meeting is scheduled for July 1, 2014 and will consist of both the site visit and the meeting. The meeting will begin at 10:30 am at Headwater Corporation located at 4111 4th Avenue, Suite 6, Kearney, NE.
- **Anticipated Studies Overview/Feedback**
  - Discussed earlier in the meeting.
- **Questions/Discussion**
  - Discussed earlier in the meeting.
- **Adjourn**

**From:** [Robert Huzjak](#)  
**To:** [Kelly Larimer](#); [Kelly Maloney](#)  
**Cc:** [Tom MacDougall](#); [Mike Drain](#)  
**Subject:** Fwd: J-2 Reservoir - Whooping Crane and NLEB  
**Date:** Tuesday, June 03, 2014 11:15:06 AM  
**Attachments:** [Northern long-eared bat NE memorandum final update.pdf](#)  
[ATT00001.htm](#)  
[PRRIPBO Amended RPM2 doc.doc](#)  
[ATT00002.htm](#)  
[PRRIPBO FWS.pdf](#)  
[ATT00003.htm](#)

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All

Information provided by USFW at the meet this morning.

Bob

Robert J. Huzjak, P.E.  
President  
RJH Consultants Inc.  
9800 Mt Pyramid Court, Suite 330  
Englewood, CO 80112  
[rhuzjak@rjh-consultants.com](mailto:rhuzjak@rjh-consultants.com)

Confidentiality Note: This e-mail transmission and/or attachments are intended solely for the use of the designated individual or entity to which it is addressed and may contain information that is legally privileged and confidential. Access to this communication by anyone else is unauthorized.

Begin forwarded message:

**From:** "Runge, Jeff" <[jeff\\_runge@fws.gov](mailto:jeff_runge@fws.gov)>  
**To:** "Drain,, Mike- (non-NPPD recipient)" <[mdrain@cnppid.com](mailto:mdrain@cnppid.com)>, "Cory Steinke" <[csteinke@cnppid.com](mailto:csteinke@cnppid.com)>, "Mark Peyton" <[mpeyton@cnppid.com](mailto:mpeyton@cnppid.com)>, "Robert Huzjak" <[rhuzjak@rjh-consultants.com](mailto:rhuzjak@rjh-consultants.com)>  
**Subject:** J-2 Reservoir - Whooping Crane and NLEB

Everyone,

Here are the electronic copies of today's handouts that provided guidance on the whooping crane and the northern long-eared bat. Please call or email if you have any questions on the attachments.

Jeff

--  
Jeff Runge  
Fish and Wildlife Biologist  
U.S. Fish and Wildlife Service  
Office: (308) 382-6468 Ext. 22  
Cell: (308) 379-8553

