JAN 1 3 2011

Nebraska
STATE HISTORICAL SOCIETY

3 January 2011

Neal Suess
Loup Power District
P.O. Box 988
Columbus, NE 68602-0988

Re: Loup River Hydroelectric Project Relicensing
FERC No. 1256, Docket No. 1256-029
Platte Co.
H.P. #0804-127-01

Dear Mr Suess:

Our office has reviewed the report (Carlson 2010) on the above referenced project. We concur with the findings of the report that no adverse effect has occurred to site 25PT115 and the project will have no effect on historic resources

This review does not constitute the opinions of any Native American Tribes that may have an interest in Traditional Cultural Properties potentially affected by this project.

There is, however, always the possibility that previously unsuspected archaeological remains may be uncovered during the process of project construction. We therefore request that this office be notified immediately under such circumstances so that an evaluation of the remains may be made, along with recommendations for future action.

Sincerely,

Terry Steinacher
H.P. Archaeologist

Concurrence:

L. Robert Puschendorf
Deputy NeSHPO

1500 R Street
PO Box 82554
Lincoln, NE 68501-2554
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Selzle, Lydia

From: Pillard, Matt
Sent: Wednesday, January 19, 2011 2:40 PM
To: 'frank.albrecht@nebraska.gov'; 'john.bender@nebraska.gov'; 'jeff_runge@fws.gov'; 'robert_harms@fws.gov'; 'barbara.j.friskopp@usace.army.mil'; 'abaum@upperloupnrd.org'; 'randy_thoreson@nps.gov'; 'bob.puschendorf@nebraska.gov'; 'mkuzila1@unl.edu'; 'david.jundt@dhhs.ne.gov'; 'jmiyoshi@lpnnrd.org'; 'steve.chick@ne.usda.gov'; 'pcclerk@megavision.com'; 'cityadmin@cablene.com'; 'ncpza@hamilton.net'; 'rbishop@cpnrd.org'; 'jwinkler@papionrd.org'; 'lpsnrd@lpsnrd.org'; 'jmangi@columbusne.us'; 'cgenoa@cablene.com'; 'monroe@megavision.com'; 'calms@neb.rr.com'; 'danno@nohva.com'; 'mbrown9@unl.edu'; 'rtrudell@santeedakota.org'; 'jblackhawk@aol.com'; 'vwills@pawneenation.org'; 'Brian.Dunnigan@nebraska.gov'; 'msittler@lpsnrd.org'; 'butchk@nctc.net'; 'robertm@llnrd.org'; 'jmsunne@nppd.com'; 'jalexand@usgs.gov'; 'jjshadl@nppd.com'; 'cothern.joe@epa.gov'; 'justin.lavene@nebraska.gov'; 'bobbie.wickham@nebraska.gov'; 'kennyj@headwaterscorp.com'; 'mferguson@gp.usbr.gov'; 'Willie_Taylor@ios.doi.gov'; 'Robert_F_Stewart@ios.doi.gov'; 'jeddins@achp.gov'; 'kenneth.sessa@dhs.gov'; 'peggy.harding@ferc.gov'; 'djjarecke@clarkswb.net'; 'al.berndt@nebraska.gov'; 'astuthman@leg.ne.gov'; 'ksullivan@leg.ne.gov'; 'clangemeier@leg.ne.gov'; 'adubas@leg.ne.gov'; 'chairmanrhodd@ponca.com'; 'asheridan@omahatribe.com'; 'don_simpson@blm.gov'; 'nicholas.jayjack@ferc.gov'; 'jill.dolberg@nebraska.gov'; 'prescott.brownell@noaa.gov'; 'marvp@megavision.com'; 'lewrightjr@gmail.com'; 'thowe@ponca.com'; 'zach_nelson@bennelson.senate.gov'; 'julias@poncatribe-ne.org'; 'todd.crawford@mail.house.gov'; 'louis-pofahl@mail.house.gov'; 'emily_brummund@johanns.senate.gov'; 'deb.vanmatre@mail.house.gov'; 'tpetr@loup.com'; 'mike.black@bia.gov'; 'janet.hutzel@ferc.gov'; 'isis.johnson@ferc.gov'; 'lee.emery@ferc.gov'; 'paul.makowski@ferc.gov'
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District - Study Results Meeting

Relicensing Participants:

This e-mail is to remind you of the Second Initial Study Results meeting scheduled for February 23rd and 24th at the New World Inn, 265 33rd Ave, Columbus, Nebraska. Please RSVP by February 21st to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275.

For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to: http://www.loup.com/relicense/html/agencymeetingsresources.html in advance of the meeting (by end of day 2/22/10). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

On February 11th, the District will be submitting the Updated Initial Study Report to FERC, it will also be posted on the website at http://www.loup.com/relicense. The following studies will be presented in the updated report and at the meeting:

- 1 – Sedimentation (ungaged site analysis)
- 2 – Hydrocycling
- 4 – Water Temperature in the Loup River Bypass
- 5 – Flow Depletion and Flow Diversion
- 8 – Recreation Use
- 12 – Ice Jam Flooding on the Loup River

Please come ready to discuss; we have a lot of material to cover and will start promptly at 9:30 AM on the 23rd and at 8:00 AM on the 24th.

Please bring your own copy of the Updated Initial Study Report. It can be found online after 2/11/11.

We look forward to seeing you on February 23rd.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate

HDR | **One Company** | ***Many Solutions***

8404 Indian Hills Drive | Omaha, NE | 68114-4098
Phone: 402.399.1186 | Fax: 402.399.1111
Email: Matt.Pillard@hdrinc.com

Please consider the environment before printing.

Selzle, Lydia

From: Mary B Brown [mbrown9@unlnotes.unl.edu]
Sent: Friday, January 21, 2011 3:22 PM
To: Marinovich, Melissa
Subject: tern and plover data
Attachments: Interior Least Terns and Piping Plovers on the Loup Public Power North Sand Management Zone.docx

Hi Melissa,

Here is the data for the terns and plovers nesting on the Loup Public Power North Sand Management Zone (the sand pile). Hope this what you were looking for.

Thanks, Mary

Mary Bomberger Brown
Tern and Plover Conservation Partnership
153C Hardin Hall
University of Nebraska
3310 Holdrege Street
Lincoln, NE 68583-0931 USA
telephone: (402) 472-8878
fax: (402) 472-2946
email: mbrown9@unl.edu
http://ternandplover.unl.edu

Interior Least Terns and Piping Plovers on the Loup Public Power North Sand Management Zone
2008-2009-2010

In 2008, the first Piping Plover was seen on the Loup Public Power North Sand Management Zone (sand pile) on 28 April; the last plover was seen on 22 July. There were 8 plover nests on the sand pile in 2008; 6 were located inside the bermed area constructed by Preferred Rocks of Genoa and 2 were outside. There were 29 eggs laid in the 8 nests; 27 eggs hatched and the chicks all survived to fledging. One of the adult plovers on the sand pile was wearing a green leg flag indicating that it originated along the Missouri River near Ponca, NE.

In 2008, the first Least Tern was seen on the Loup Public Power North Sand Management Zone (sand pile) on 5 May; the last tern was seen on 13 August. There were 17 tern nests on the sand pile in 2008; 12 were located inside the bermed area constructed by Preferred Rocks of Genoa and 5 were outside. There were 40 eggs laid in the 17 nests; 13 eggs hatched and the chicks all survived to fledging.

In 2009, the first Piping Plover was seen on the Loup Public Power North Sand Management Zone (sand pile) on 15 May; the last plover was seen on 10 July. There were 5 plover nests on the sand pile in 2009; all were located inside the bermed area constructed by Preferred Rocks of Genoa. There were 20 eggs laid in the 5 nests; 20 eggs hatched and the chicks all survived to fledging. One of the adult plovers on the sand pile was wearing a green leg flag indicating that it originated along the Missouri River near Ponca, NE. Another of the adult plovers on the sand pile was wearing a yellow leg flag indicating that it originated along the Missouri River in North Dakota.

In 2009, the first Least Tern was seen on the Loup Public Power North Sand Management Zone (sand pile) on 22 May; the last tern was seen on 27 July. There were 14 tern nests on the sand pile in 2009; all were located inside the bermed area constructed by Preferred Rocks of Genoa. There were 28 eggs laid in the 14 nests; 19 eggs hatched and the chicks all survived to fledging.

In 2010, the first Piping Plover was seen on the Loup Public Power North Sand Management Zone (sand pile) on 11 May; the last plover was seen on 14 July. There were 7 plover nests on the sand pile in 2010. There were 27 eggs laid in the 7 nests; 20 eggs hatched and 11 chicks survived to fledging. Six of the adult plovers on the sand pile were wearing green leg flags indicating that they originated along the Missouri River near Ponca, NE.

In 2010, the first Least Tern was seen on the Loup Public Power North Sand Management Zone (sand pile) on 28 May; the last tern was seen on 14 July. There were 22 tern nests on the sand pile in 2010. There were 60 eggs laid in the 22 nests; 38 eggs hatched and 9 chicks survived to fledging.

Selzle, Lydia

From: Pillard, Matt
Sent: Monday, February 14, 2011 9:26 PM
To: 'frank.albrecht@nebraska.gov'; 'john.bender@nebraska.gov'; 'jeff_runge@fws.gov'; 'robert_harms@fws.gov'; 'barbara.j.friskopp@usace.army.mil'; 'abaum@upperloupnrd.org'; 'randy_thoreson@nps.gov'; 'bob.puschendorf@nebraska.gov'; 'mkuzila1@unl.edu'; 'david.jundt@dhhs.ne.gov'; 'jmiyoshi@lpnnrd.org'; 'steve.chick@ne.usda.gov'; 'pcclerk@megavision.com'; 'cityadmin@cablene.com'; 'ncpza@hamilton.net'; 'rbishop@cpnrd.org'; 'jwinkler@papionrd.org'; 'lpsnrd@lpsnrd.org'; 'jmangi@columbusne.us'; 'cgenoa@cablene.com'; 'monroe@megavision.com'; 'calms@neb.rr.com'; 'danno@nohva.com'; 'mbrown9@unl.edu'; 'rtrudell@santeedakota.org'; 'jblackhawk@aol.com'; 'vwills@pawneenation.org'; 'Brian.Dunnigan@nebraska.gov'; 'msittler@lpsnrd.org'; 'butchk@nctc.net'; 'robertm@llnrd.org'; 'jmsunne@nppd.com'; 'jalexand@usgs.gov'; 'jjshadl@nppd.com'; 'cothern.joe@epa.gov'; 'justin.lavene@nebraska.gov'; 'bobbie.wickham@nebraska.gov'; 'kennyj@headwaterscorp.com'; 'mferguson@gp.usbr.gov'; 'Willie_Taylor@ios.doi.gov'; 'Robert_F_Stewart@ios.doi.gov'; 'jeddins@achp.gov'; 'kenneth.sessa@dhs.gov'; 'peggy.harding@ferc.gov'; 'djjarecke@clarkswb.net'; 'al.berndt@nebraska.gov'; 'astuthman@leg.ne.gov'; 'ksullivan@leg.ne.gov'; 'clangemeier@leg.ne.gov'; 'adubas@leg.ne.gov'; 'chairmanrhodd@ponca.com'; 'asheridan@omahatribe.com'; 'don_simpson@blm.gov'; 'nicholas.jayjack@ferc.gov'; 'jill.dolberg@nebraska.gov'; 'prescott.brownell@noaa.gov'; 'marvp@megavision.com'; 'lewrightjr@gmail.com'; 'thowe@ponca.com'; 'zach_nelson@bennelson.senate.gov'; 'julias@poncatribe-ne.org'; 'todd.crawford@mail.house.gov'; 'louis-pofahl@mail.house.gov'; 'emily_brummund@johanns.senate.gov'; 'deb.vanmatre@mail.house.gov'; 'tpetr@loup.com'; 'mike.black@bia.gov'; 'janet.hutzel@ferc.gov'; 'isis.johnson@ferc.gov'; 'lee.emery@ferc.gov'; 'paul.makowski@ferc.gov'
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Teresa Petr; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District - Second Initial Study Report Filed

Relicensing Participants:

Loup Power District has electronically filed its Second Initial Study Report (SISR) with FERC. The report is available on FERC's e-library and on the District's relicensing website: http://www.loup.com/relicense/.

The SISR includes study reports for the following completed studies:

1 – Sedimentation Addendum (ungaged sites)
2 – Hydrocycling
4 – Water Temperature in the Project Bypass Reach
5 – Flow Depletion and Flow Diversion
8 – General Recreation Use and Creel Survey
11 – Ice Jam Flooding on the Loup River

The District will hold the Second Initial Study Results meeting on February 23rd & 24th at the New World Inn, 265 33rd Ave, Columbus, Nebraska. Please RSVP by February 21st to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275.

For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to: http://www.loup.com/relicense/html/agencymeetingsresources.html in advance of the meeting (by end of day 2/21/11). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

Please bring your own copy of the Initial Study Report and come ready to discuss; we have a lot of material to cover and will start promptly at 9:30 AM on the 23rd.

We look forward to seeing you on February 23rd.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate

HDR | **One Company** | ***Many Solutions***

8404 Indian Hills Drive | Omaha, NE | 68114-4098
Phone: 402.399.1186 | Fax: 402.399.1111
Email: Matt.Pillard@hdrinc.com

Please consider the environment before printing.

Selzle, Lydia

From:	Pillard, Matt
Sent:	Tuesday, February 22, 2011 10:13 AM
To:	'frank.albrecht@nebraska.gov'; 'john.bender@nebraska.gov'; 'jeff_runge@fws.gov'; 'robert_harms@fws.gov'; 'barbara.j.friskopp@usace.army.mil'; 'abaum@upperloupnrd.org'; 'randy_thoreson@nps.gov'; 'bob.puschendorf@nebraska.gov'; 'mkuzila1@unl.edu'; 'david.jundt@dhhs.ne.gov'; 'jmiyoshi@lpnnrd.org'; 'steve.chick@ne.usda.gov'
Cc:	Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Teresa Petr; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject:	Loup Power District - Second Initial Study Report Presentation
Follow Up Flag:	Follow up
Flag Status:	Completed

Relicensing Participants:

The presentation for tomorrow's and Thursday's Second Initial Study Report meeting is now available on the website. The meeting will be held in the Cartier and Magellan rooms at New World Inn in Columbus, NE. Call in instructions can also be found on the web. If you call in, we would request you send an alternate phone number to Wendy Thompson (wendy.thompson@hdrinc.com) in case of technical difficulties.

Thank you. Look forward to seeing you/hearing from you tomorrow.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate

HDR | **One Company** | ***Many Solutions***

8404 Indian Hills Drive | Omaha, NE | 68114-4098
Phone: 402.399.1186 | Fax: 402.399.1111
Email: Matt.Pillard@hdrinc.com

Please consider the environment before printing.

Second Initial Study Results Meeting Summary

Project:	Loup River Hydroelectric Project FERC Project No. 1256		
Subject:	Second Initial Study Results Meeting Summary		
Meeting Date:	February 23, 2011, 9:30 am – 5:00 pm and February 24, 2011, 8:00 am – 12:00 pm	Meeting Location:	New World Inn, Columbus, NE
Notes by:	Loup Power District		

Loup River Public Power District (Loup Power District or the District) filed its Second Initial Study Report (Second ISR) with the Federal Energy Regulatory Commission (FERC) on February 11, 2011, as part of relicensing the Loup River Hydroelectric Project (FERC Project No. 1256) and in accordance with the regulations of FERC's Integrated Licensing Process (ILP) (18 Code of Federal Regulations [CFR] 5). Subsequently, the Second Initial Study Results were presented to FERC and other relicensing participants during the Second Initial Study Results Meeting held on February 23-24, 2011, at the New World Inn (265 33rd Street) in Columbus, Nebraska. The proceedings of that meeting are presented in this Second Initial Study Results Meeting Summary, which follows the organization of the agenda for the meeting.

The meeting agenda and handout of the slide presentation are included as Attachments A and B, respectively.

Welcome and Introductions

Neal Suess (Loup Power District) and Stephanie White (HDR) provided those attending the Second Initial Study Results Meeting with an overview of the agenda and the goals for the meeting. The meeting goals and the list of attendees are provided below.

Meeting Goals

The goals of the Second Initial Study Results Meeting were the following:

- To present the remaining results of the studies identified in the Revised Study Plan and Study Plan Determination.
- To discuss any proposals to modify the study plan (by the District or other participants) in light of study progress and data collected.

Attendees:

The following agency and District representatives attended the Second Initial Study Results Meeting:

February 23, 2011

Name	Organization	Name	Organization
Jason Buss	CART	Mike Gutzmer	New Century Environmental LLC
John Bender (via phone)	NDEQ		
Shuhai Zheng	NDNR	Roger Kay	USACE
Frank Albrecht	NGPC	Robert Cerv	Loup Power District
Richard Holland	NGPC	Rick Cheloha	Loup Power District
Joel Jorgensen (via phone)	NGPC	Bob Clausen	Loup Power District
Michelle Koch	NGPC	Jim Frear	Loup Power District
Jeff Schuckman	NGPC	Charles Gonka	Loup Power District
Jim Jenniges	NPPD	Theresa Petr	Loup Power District
John Shadle	NPPD	Neal Suess	Loup Power District
Randy Thoreson	NPS	Ted Thieman	Loup Power District
Ann Bleed	UNL	Ron Ziola	Loup Power District
Chris Thompson	UNL	Quinn Damgaard	HDR
Tom Econopouly	USFWS	Pat Engelbert	HDR
Robert Harms	USFWS	Dennis Grennan	HDR
Jeff Runge	USFWS	George Hunt	HDR
Robert White	Retired CEO Loup Power District	Gary Lewis	HDR
		Melissa Marinovich	HDR
Lee Emery	FERC	Matt Pillard	HDR
Janet Hutzel (via phone)	FERC	Lisa Richardson	HDR
Nick Jayjack (via phone)	FERC	Scott Stuewe	HDR
Isis Johnson (via phone)	FERC	Wendy Thompson	HDR
Paul Makowski (via phone)	FERC	George Waldow	HDR
		Stephanie White	HDR

February 24, 2011

Name	Organization	Name	Organization
John Bender (via phone)	NDEQ	Mike Gutzmer	New Century Environmental LLC
Shuhai Zheng	NDNR		
Frank Albrecht	NGPC	Bob Clausen	Loup Power District
Richard Holland	NGPC	Jim Frear	Loup Power District
Joel Jorgensen	NGPC	Theresa Petr	Loup Power District
Michelle Koch	NGPC	Neal Suess	Loup Power District
Jeff Schuckman	NGPC	Ron Ziola	Loup Power District
Jim Jenniges	NPPD	Pat Engelbert	HDR
John Shadle	NPPD	Dennis Grennan	HDR
Randy Thoreson	NPS	George Hunt	HDR
Tom Econopouly	USFWS	Gary Lewis	HDR
Robert Harms	USFWS	Melissa Marinovich	HDR
Jeff Runge	USFWS	Matt Pillard	HDR
Lee Emery	FERC	Lisa Richardson	HDR
Isis Johnson (via phone)	FERC	Scott Stuewe	HDR

Name	Organization	Name	Organization
Paul Makowski (via phone)	FERC	Wendy Thompson	HDR
		George Waldow	HDR
		Stephanie White	HDR

Integrated Licensing Process Overview

Lisa Richardson (HDR) discussed the overall relicensing process for the Loup River Hydroelectric Project (Project). She reviewed the previous meetings held to get to this point. She also gave a brief summary of the Study Plan Determination.

FERC issued its Study Plan Determination on August 26, 2009. In the Study Plan Determination, they removed three studies, the deletion of which had already been agreed to by the participating agencies:

- Water Temperature in the Platte River
- Fish Sampling
- Creel Survey

FERC approved three studies without modification:

- Fish Passage
- Land Use Inventory
- Section 106 Compliance

FERC also modified six studies based on agency comments:

- Sedimentation
- Hydrocycling
- Water Temperature in the Loup River Bypass Reach
- Flow Depletion and Flow Diversion
- Recreation Use
- Ice Jam Flooding on the Loup River

The following studies were completed for the Initial Study Report, submitted on August 26, 2010:

- Sedimentation
- Fish Passage
- Recreation Use (Telephone Survey)
- Land Use Inventory
- Section 106 Compliance
- PCB Fish Sampling

FERC's Determination after the Initial Study Results Meeting included:

- Studies Requiring No Revisions:
    - Study 7.0, Fish Passage
    - Study 10.0, Land Use Inventory
    - Study 11.0, Section 106 Compliance
- Studies Requiring Revisions:
    - Study 1.0, Sedimentation
        - Add confidence limits for sediment rating curves.
        - Add aggradation/degradation analysis for Duncan, North Bend, Ashland, and Louisville (from Pre-Application Document [PAD]).
        - Add aggradation/degradation analysis for Genoa.

        - Complete the Kendall tau test to assess aggradation/degradation trends.
        - Complete additional statistical analysis related to interior least tern and piping plover nesting.
        - Provide additional references (Chen et al., 1999, and Missouri River Basin Commission [MRBC] report) to FERC.
    - Study 2.0, Hydrocycling
        - Conduct sediment transport analysis using HEC-RAS.

Finally, Richardson briefly discussed the next steps in the process, which include preparation of this Second Initial Study Results Meeting Summary and an opportunity for relicensing participants to submit comments.

Discussion:

- Q: Jeff Runge (USFWS) noted that in the relicensing process, NEPA is the next step. He then asked if this is the last opportunity for agencies to request additional studies and analysis of effects related to alternatives and whether multiple alternatives will be considered in the NEPA analysis.
  A: Lee Emery (FERC) responded that this is the last opportunity to request study revisions. When updated studies are filed, agencies will have another opportunity to comment on analysis. Once the application is filed, FERC will perform the NEPA analysis and identify all alternatives.
- Q: Runge also asked if agencies need to identify effects on their resources of concern as well as potential alternatives so that protective mitigation enhancement measures would be incorporated and a range of alternatives would be evaluated.
  A: Emery noted that agencies should provide comments and that FERC would incorporate the analysis in its NEPA document.
- Q: Runge asked if requests for protection mitigation enhancement measures should be included in agency comments on the Second Initial Study Report.
  A: Emery noted that that is not necessary at this stage of the analysis. Agencies can make recommendations later in the process.
  A: Nick Jayjak (FERC) noted that agencies can propose environmental measures and alternatives in their comments on the District's Draft License Application. There will be additional opportunities for recommendations during FERC's environmental analysis.
- Q: Randy Thoreson (NPS) asked about the schedule and deadline for comments on the Second Initial Study Report.
  A: Lisa Richardson (HDR) noted that agencies may send in comments anytime between now and April 11.

Presentation of Study Results

Members of the Project team from HDR provided results for the studies that have been completed:

- Study 4.0, Water Temperature in the Project Bypass Reach
- Study 8.0, Recreation Use and Creel Survey
- Study 1.0, Sedimentation Addendum (Ungaged Sites)
- Study 12.0, Ice Jam Flooding on the Loup River
- Study 2.0, Hydrocycling
- Study 5.0, Flow Depletion and Flow Diversion

After the results of each study were given, the other meeting attendees had an opportunity to ask questions and offer comments on the respective studies.

Study 4.0, Water Temperature in the Project Bypass Reach

Study Results:

George Hunt (HDR) presented the study results of the water temperature study. The key points were as follows:

- At Merchiston (upstream) and at Genoa (downstream), there is not a statistically significant relationship between water temperature and flow, water temperature and radiative flux, and water temperature and relative humidity.
- At Merchiston (upstream) and at Genoa (downstream), there is a statistically significant relationship between water temperature and air temperature and between water temperature and soil temperature.
- Synchronous daily oscillations in water temperature are seen between all analyzed stations.
- A statistically significant relationship exists between the recorded water temperatures at the upstream and downstream stations.
- There is a statistically significant relationship between water temperature at Genoa and Columbus.
- Temperature on the Platte River between the Loup River confluence and the Loup Power Canal Tailrace Return is highly correlated with upstream temperature on the Platte River.
- There is not a critical reach in the Project bypass reach.
- The best predictor of a possible excursion was 8 a.m. air temperature.

Discussion:

- Q: Lee Emery (FERC) asked how soil temperature at Monroe was measured.
  A: Lisa Richardson (HDR) noted that the District did not do the actual measurements. The soil temperature data came from the Great Plains Climate Center.
- Q: Jeff Runge (USFWS) noted that in the Study Plan Determination, FERC stated that additional temperature monitoring and analysis would need to be conducted on the Platte River if the Platte River bypass reach water temperature was higher than the Loup River bypass reach water temperature and asked why additional monitoring and analysis was not done.
  A: George Hunt (HDR) noted that the District used an additional temperature probe upstream on the Platte River and found that temperature in the Platte River bypass reach was related more to temperature in the Platte River upstream of the Loup River confluence than water temperature in the Loup River bypass reach. Therefore, the same analysis was not done. The section of the Platte River is driven by air temperature, and the temperature at the two Platte River locations both tracked together.
- Q: Frank Albrecht (NGPC) noted that the fact that there is no statistical difference for flow versus water temperature was surprising. He noted that the scale on the x-axis on slide 23 shows a significant difference in water temperature at low flows (temperature ranging from 48 to 96 degrees). He also noted that there have been fish kills in this reach. In addition, Runge (USFWS) noted that the regression analysis doesn't separate flows with temperatures above 90, but looks at all the relationships between water and temperature; it does not focus on very low and high temperatures.
  A: Hunt noted that this issue was addressed in three ways. First, there are graphs in the report showing flow and temperature for subsets of the data, less than 500 cfs, less than 400 cfs, etc. Second, the same analysis was conducted on just the daily maximums data set. Third, a logistical analysis was completed in which any time the temperature was above 87 or 88 degrees Fahrenheit, a 1 was assigned, and below that, a 0 was assigned to help to reduce the scatter. Hunt also noted that in Appendix C, Study 4.0, graphs on pages 21to 24 more clearly show the left side of the x-axis. George Waldow (HDR) added that what is shown on the left is all temperature points collected during the summer season, and it is clear that temperature varied greatly for low flows. Hunt added that slide 35 is another way to look at the data. Although flow is higher at Merchiston than Genoa, temperatures plot right on top of each other.

Study 8.0, Recreation Use and Creel Survey

Study Results:

Quinn Damgaard (HDR) presented the study results of the recreation use study. The key points were as follows:

Loup Power Canal Survey Results:

- **General Findings**
  - Size of Party: 1 to 2 = 51%
  - Miles Traveled: 60% traveled 25 miles or less; 92% traveled 100 miles or less
  - Overnight Stays: 35% were staying overnight; 39% were staying for two nights
  - Frequency of Visitation: 2 to 3 times per year
  - Visitation by Month: May, June, July, and August = 66% of visitation
- **Most Common Activity Participation**
  - Fishing from Shore (23.8%); Relaxing/Hanging Out (22.2%); Camping (14.9%); Off-Highway Vehicles (8.7%); wildlife/Scenic Viewing (7.6%); Picnicking (5.2%)
- **Activity Importance (Percentages indicate responses of important or very important)**
  - Relaxing/Hanging Out (79.1%); Fishing (75.8%); Camping (59.0%); Wildlife/Scenic Viewing (58.4%); Picnicking (50.3%); Trails (42.5%)
- **Facility Ratings (Percentages indicate responses of above average or excellent)**
  - Trails (84.7%); OHV Park (83.3%); Campground (72.4%); Swimming Beach (66.4%); Picnic Areas (66.4%)
  - Lowest Rating: Restrooms
- **Requested Improvements**
  - Headworks Park: Additional camper hookups and power in restrooms; showers installed in OHV area
  - Lake Babcock Park: Cleanliness of restrooms; showers installed
  - Lake North Park: Fish cleaning station, fish stocking and structures; cleanliness and showers installed in restroom
  - Columbus Powerhouse Park: Restroom lighting; fish cleaning station
  - Tailrace Park: Restroom installed; general cleanup; fish cleaning station

Loup River Bypass Reach Survey Results

- **General Findings**
  - Size of Party: 1 to 2 = 63%
  - Miles Traveled: 70% traveled 25 miles or less; 90% traveled 100 miles or less
  - Overnight Stays: 22% were staying overnight; 31% were staying for four nights
  - Frequency of Visitation: 48% cite weekly visitation
  - Visitation by Month: May, June, July, and August = 59% of visitation
- **Activity Participation**
  - Relaxing/Hanging Out; Other; Fishing from Shore; Swimming/Wading; Hiking
  - 85% of respondents cite no hindrance to activities
- **Loup Lands WMA – Activity Participation**
  - Hunting; Camping; Fishing from Shore; Wildlife/Scenic Viewing; Relaxing/Hanging Out

Creel Survey Results

- **General Findings**
  - Surveys Conducted: 439
  - Mean Party Size: 1.75
  - Mean Completed Trip Length: 2.9 hours
  - Total Angler Hours: 32,766

    - Total Angler Trips: 11,299
- **Fish Species Sought**
    - Channel Catfish (65%); Anything (10%); Walleye/Sauger (9%); Freshwater Drum (6%); Flathead Catfish (4%); Crappie (3%)
- **Fishing Pressure**
    - September received the most pressure (7,739 hours), followed by May, July, June, August, and October
    - 95% of effort occurs via shore fishing
- **Catch, Release, and Harvest**
    - Total 2010 Catch Estimate: 20,800 fish
    - Total 2010 Release Estimate: 11,800 fish
    - Total 2010 Harvest Estimate: 9,000 fish
    - Greatest Catch Values: May
    - Greatest Harvest Values: October
- **Angler Satisfaction**
    - 57% Rated Above Average or Excellent; 4% Rated Below Average or Poor

Discussion:

- Q: Jeff Schuckman (NGPC) asked if the estimated 82,000 people per year visiting the Loup Power Canal for recreation included 11,000±-people per year on fishing trips.
  A: Quinn Damgaard (HDR) noted that anglers and recreators of any kind were included in the 82,000 and noted that this is not information determined from the creel output, but was based on two alternate estimate methods that considered the number of persons interviewed and those observed. Damgaard also noted that Schuckman provided corrected numbers on creel usage prior to the meeting but noted that the updated numbers will not affect the overall use estimate.
- Q: Lee Emery (FERC) noted that various projects across the country use Christmas tree bundling to create structures for fish habitat and asked if that has been considered here.
  A: Ron Ziola (Loup Power District) noted that bundled trees have been used on the south side of Lake North.
- Q: Randy Thoreson (NPS) noted that the report contains a lot of good information. He noted that the three main interests of NPS are inventory, use and demand, and possible improvements, and he also noted that all three would be discussed further in the Recreation Management Plan. He noted that the conclusions in Appendix F1 on page 14 contained very little information on use and demand; he would like to see more analysis and summary of conclusions in the Recreation Management Plan. He noted that requested facility improvements should be included in the Recreation Management Plan and noted that there was not any information in the slide presentation related to improvements associated with the recreation areas along the Loup Power Canal.
  A: Damgaard noted that specifics regarding improvements along the Loup Power Canal were not included in the presentation but are provided in the report.
- Q: Thoreson noted that the Recreation Management Plan needs to marry the inventory information with the possible improvements at each location.
  A: Damgaard noted that requested improvements by location are included in the report and that this information will be used to develop the Recreation Management Plan.
- Q: Thoreson noted that he would like to be involved early in the development of the Recreation Management Plan, including early outlines for it. He also asked if any improvements were requested to trails.
  A: Damgaard noted that the report highlighted the top requests, so it appears that trail improvements were not one of the top requests. However, he noted that specific requests can be reviewed to confirm this.

- Q: Janet Hutzel (FERC) asked for clarification on why there are two percentages for "white" under the "Race" column in Table 5.7 and asked if one of them should be Hispanic.
  A: Damgaard noted that one is white non-Hispanic and the other is white Hispanic because this is how the census breaks out ethnicity.
- Q: Hutzel noted that it was good to see that most people surveyed were okay with the survey and future capacity. However, capacity was exceeded, and Hutzel did not see any documentation or table of what the actual capacity is. She noted that the District would have included this information on the Form 80 by site and that it also needs to be provided in the Recreational Management Plan. It will be very important to FERC to determine whether improvements are needed. Thoreson agreed that this information would be helpful.
  A: Damgaard noted that capacity data are available and will be provided in the Recreation Management Plan; he also noted that capacity is discussed in Section 5.2, Facility Inventory, where camping capacity by site is broken out.
- Q: Hutzel noted that she is more interested in percentages of usage so FERC can see what is at capacity, under capacity, and above capacity. She also noted that the Form 80 information requires percentages.
  A: Damgaard noted that the only time that there was more usage than capacity in 2010 was Memorial Day weekend at Lake North and during the fall NOHVA Jamboree at the Headworks.
- Q: Emery asked how much ice fishing occurs, if any.
  A: Ron Ziola (Loup Power District) noted that ice fishing is dependent on weather. During the last couple of winters, the cold spells have allowed for reasonable ice thickness; the few winters before that, there were not enough cold spells. Typically, on a weekend, 25 to 30 people ice fish on Lake North. The District discourages it only because they are cycling the water beneath the ice. He noted that there are signs to caution anglers about getting on the ice, but the District does not make anglers get off of the ice if they are out there.
- Q: Emery asked if there is any trapping.
  A: Ziola noted that the area is a tight system, with dogs and cats and people moving around throughout. Occasionally, trapping does occur, but the District limits it to responsible trappers and is very particular about where and how people trap; the District does not want domestic pet issues.
- Jason Buss (CART) noted that he is looking forward to the Recreation Management Plan and collaborating with the District. People are very appreciative of using the facilities, and CART would like to offer any help it can.
- Q: Hutzel asked if showers were requested because of swimming or another reason.
  A: Damgaard noted that showers were commonly requested at the Headworks by users of the OHV park. They stay for a few days and would like to use a shower. Camping is pretty open along the Loup Power Canal, so the showers would be for campers and others staying overnight and are not specifically requested by swimmers.

Preliminary Analysis – Studies 1, 2 and 5

Pat Engelbert (HDR) briefly discussed the common analyses that were used for Studies 1, 2, and 5:

- Field data collection (cross-section and water surface elevation data)
- Wet, dry, and normal flow classifications
- Synthetic hydrograph development
- Hydraulic model development and calibration
- Flow duration, volume duration, and flood flow frequency analysis

Discussion:

- Q: Lee Emery (FERC) asked for clarification on the cross section upstream of Site 4.
  A: Pat Engelbert (HDR) noted that this was an intermediate cross section between the Tailrace

Return and the Burlington Northern bridge. He noted that one model was developed for both Sites 3 and 4 so that potential tailwater effects could be evaluated.
- Q: Paul Makowski (FERC) noted that it appears that the later cross sections show a widening of the channel, and he was curious whether that is showing actual channel widening.
  A: Engelbert agreed that it looks like the channel could have shifted a little bit. Gary Lewis (HDR) added that the appearance of a change in channel width is likely due to a slightly skewed cross section measurement. He does not believe that any widening or narrowing occurred.

Study 1.0, Sedimentation Addendum (Ungaged Sites)

Study Results:

Pat Engelbert (HDR) presented the study results of the sedimentation study of ungaged sites. The key points were as follows:

- Both rivers at all locations studied are clearly not supply limited.
- Spatial analysis of effective and dominant discharge reveals that they increase in a downstream direction in a manner consistent with natural river processes.
- The effective discharge, and associated river morphology, has not changed since 1928.
- Sediment transport calculations show that the channel geometries are in "regime." Nothing appears to be constraining either the Loup or Platte River from maintaining the hydraulic geometry associated with the effective discharges.
- The combinations of slopes, sediment sizes, and effective discharges result in all locations being well within the braided river morphologies, with none being near any thresholds of transitioning to another morphology.
- Literature and analysis clearly indicate that both rivers are in dynamic equilibrium with no indications of aggradation or degradation or channel geometry changes over time.
- Literature and calculations demonstrate that the Loup River bypass reach and the lower Platte River are in regime and are well seated within regime zones classified as braided streams.

Discussion:

- Q: Michelle Koch (NGPC) asked what the potential supply is based on. She asked whether it includes the sediment and sand in stabilized sandbars.
  A: Pat Engelbert (HDR) noted that supply was calculated based on the amount sediment coming off the watershed through overland flow as well as the material available within the channel.
- Q: Koch asked if that is the moveable material rather than material that is stabilized.
  A: Engelbert noted that this was done by USACE and that he is not sure if USACE looked at sandbars and islands. However, he noted that those would be relatively small in comparison to the supply available in the overall watershed. Gary Lewis (HDR) added that because of the methods used in the sediment yield calculations, he believes that the values are yields from the watershed and do not include the sediment in the bed. The supply available is in excess of the transport capacity and increases downstream because the watershed is contributing more sediment. All of the investigators consider that even if supply was less than the capacity, there is still ample surplus of material in the river that could be mobilized. If supply was found to be less than transport capacity for a prolonged period, it would mobilize bed material reserves, and changes might be noted over the years. Some changes in yield in the Loup River have occurred as reflected in the District's dredging records. Supply in the MRBC report is that amount being carried to the streams by the watershed. If transport capacity exceeds available sources and reserve in the river is running out, then you will see a change. USACE concluded that because it looked at some of the same material, the yield is equal to transport capacity in the Platte River. The District's calculations in the sedimentation study do not show it carrying less sediment than it is capable of. Instead, there is an oversupply of sediment, which is a clear definition of a braided river.

- Q: Jeff Runge (USFWS) asked if this oversupply of sediment would result in aggradation of the channel.
  A: Lewis noted that the Platte River has degraded over the years in the geologic long-term, but USGS has not detected it.
- Q: Runge noted that if the supply greatly exceeds what is being transported, it seems like that would be evident on a much smaller scale than a decadal scale.
  A: Lewis stated that there is a long-term effect of the oversupply of sediment, but we do not see it and it is not cause for alarm in the time frame of the Project life.
- Q: Runge asked why the regime model used in the Initial Study Report, which was a Leopold and Wolman model, was not used in this study.
  A: Lewis noted that the Leopold and Wolman graph was discussed in the Initial Study Report but pointed out limitations with it. Because it was discounted in the Initial Study Report, it was not discussed in the Second Initial Study Report.
- Q: Tom Econopouly (USFWS) noted that the District's report also mentioned that USACE did not use the Leopold and Wolman model. However, he thought it would be nice to see it in the District's Second Initial Study Report for consistency.
  A: Lewis confirmed that USACE did not use it and noted that USACE did not provide an explanation. Engelbert agreed that the Leopold and Wolman graph could be included in the District's report for consistency.
- Q: Runge noted that in the Initial Study Report, Parker's regime equation was used to look at effective flow discharge, sediment size, and slope to develop numbers for wetted width, mean depth, and mean column velocity. He asked why this was not computed for the ungaged sites.
  A: Engelbert noted that Parker's equation was not used in the sediment transport analysis. However, dominant discharge was calculated, and then a width was determined based on a measured width versus discharge relationship. Lewis noted that Parker was mentioned as having done some work in the Platte River, but his method was not used in the District's study.
- Q: Econopouly asked how the slope for the cross sections was calculated for use in the models and the regime diagrams. He also asked if the d_{50} was estimated from nearby gages.
  A: Engelbert replied that several sources were used for the information, including USGS topographic maps, surveys, and literature on the Platte River system. Then Engelbert explained that the d_{50} was calculated from USGS gages and compared to the District's dredging data. At the ungaged locations, like Site 2, information from the Genoa gage was used, but for Sites 3 and 4,data was interpolated between the gage locations based on river mile.
- Q: Runge noted that FERC requested, on page 11 of its Study Plan Determination, a longitudinal or spatial comparison of all sites on Loup and the lower Platte rivers, starting at the most upstream site on each river and going downstream.
  A: Engelbert explained that each of the sediment transport calculations was listed relative to its gages and then trends were noted. Longitudinal analysis was conducted for sediment transport calculations.

Study 12.0, Ice Jam Flooding on the Loup River

Study Results:

Roger Kay (USACE) presented the study results of the ice jam flooding study. The key points were as follows:

- A review of flood history indicates that ice jam frequency has NOT increased since commencement of Project operations.
- A review of climatological data and hydraulic models does NOT show a difference in occurrence of minor ice jam flooding.
- Climatic variability and floodplain development may lead to an increase in flood risk with time.

- Project operations have NOT measurably changed the Loup River ice regime or increased the risk of significant ice jam flooding.

Discussion:

- Q: Randy Thoreson (NPS) asked why there was a difference in the blue data point in 1920, shown in Figure 2.2 on slide 177.
  A: Roger Kay (USACE) explained that the blue data point shows only a 5-year average versus the other longer-term averages and that there were four very cold winters in that particular 5-year period.
- Q: Tom Econopouly (USFWS) noted that even though there may have been a lower probability of ice jams, that does not necessarily correlate to lower damages that could have occurred, so a low AFDD year could have more damage.
  A: Kay noted that is possible but added that there was only one time when a below-average AFDD year had a significant flooding event and that was because a rain event occurred simultaneous to snowmelt.
- Q: Lee Emery (FERC) asked if there was a recent ice jam near Genoa.
  A: Kay noted that there was a jam last year near Genoa, but it only caused lowland flooding. He also noted that the occurrence of jams showed no difference between the Loup River and other natural streams.

Study 2.0: Hydrocycling

Study Results:

Pat Engelbert (HDR), Matt Pillard (HDR), and Scott Stuewe (HDR) presented the study results of the hydrocycling study. The presentation of results began on February 23 and continued on February 24. The key points were as follows:

- Analysis of hydrocycling effects on water surface elevation (WSEL) revealed the following:
  - The difference between maximum and minimum daily WSEL was larger under current operations than under run-of-river (ROR) operations.
  - There were similar differences for ROR operations over several weeks.
  - The largest difference occurs for a dry year.
  - Differences are smaller downstream than in the Project vicinity.
  - The average annual difference in WSEL is typically less than 1 foot.
- For the nest inundation analysis for both interior least tern and piping plover:
  - Generally, current operations have higher maximum daily flows than ROR operations.
  - There were no instances where a current operations exceedance could have been avoided under ROR operations.
  - Normal seasonal flow events during the nesting season create conditions for potential nest inundation.
  - Project operations did not cause any exceedances of benchmark flows.
  - Run-of-river operations would carry slightly less sediment than current operations
  - Channel area would likely be slightly smaller under run-of-river operations.
- Literature review and comparison to other rivers indicated that because the Project does not control large flood flows, Project effects on daily sandbar formation from daily hydrocycling are minor compared to effects from large flood flows.
- Analysis of pallid sturgeon habitat using Peters and Parham's methods indicate that:
  - Compared to ROR operations, current operations exhibit a higher percentage of suitable habitat during maximum flows and a lower percentage of suitable habitat during minimum flow scenarios.

    - The effect of hydrocycling on habitat diminishes as you move downstream with the most habitat found below Elkhorn confluence (above Ashland gage); under both ROR operations and current conditions, habitat above the Elkhorn confluence would be considered marginal.
- Preliminary results of the University of Nebraska-Lincoln Shovelnose Sturgeon Population Dynamics Study provides evidence that pallid sturgeon prefer lower reaches, but do utilize upper reaches, primarily during the spring when flows are higher.
- Review of the Lower Platte River Stage Change Study provided the following insights:
    - Percent habitat has a relatively high rate of change for flows ranging between 4,000 cfs to 6,000 cfs and large changes in discharge may have the most effect on pallid sturgeon when flows are in this range.
    - Changes in habitat areas as a result of 100 or 500 cfs environmental releases would have a negligible influence on pallid sturgeon habitat in the lower Platte River.
    - Increases in discharge do not move the conductivity, turbidity, temperature, or dissolved oxygen outside the typical range selected by pallid sturgeon
- Evaluation of cross-sections upstream and downstream of the Tailrace Canal return for both early and late summer indicated (Site 3 = upstream of Tailrace return; Site 4 = downstream of Tailrace return; Site 5 = North Bend):
    - At each site, average channel cross-section area decreased (3 to 6 percent) from early summer to late summer survey
    - Macroforms present in June were still there in September
    - Site 3 had greater percentage of exposed channel width than Site 4 during a wet year; the opposite was true during a normal and dry year.
    - Current operations had a lower percentage of exposed channel width than ROR operations.
    - Early summer cross-section exhibited a greater percentage of exposed channel width than late summer.
    - At Site 4, current conditions had a lower percent exposed channel width than ROR operations (other than at the 50 percent exceedance flow)
    - At Site 5, current operations had greater percent exposed channel width at 50 percent and 75 percent exceedance flows under current operations than did ROR for both early and late summer

Discussion:

- Q: Paul Makowski (FERC) asked why it is that as you move downstream, the sediment capacity does not necessarily increase.
  A: Engelbert noted that Site 4 had the highest calculated sediment capacity. He stated that the curves for the ungaged sites were based on two or three survey dates within 1 year. The other parameter used was the d_{50} calculation, which was interpolated from existing gage stations. The combination of the two may be skewing the sediment transport.
- Q: Jeff Runge (USFWS) asked if the effective and dominant discharges were run through the HEC-RAS model to get width and depth numbers.
  A: Engelbert noted that the discharge versus width and depth relationships were generated from the HEC-RAS model.
- Q: Runge asked why the effective or dominant discharge was selected as the measure to compare current and ROR operations.
  A: Engelbert stated that it goes back to the original definitions of those terms. The discharges are what is ultimately shaping the river.
- Q: Runge noted that the HEC-RAS model assumes a fixed bed rather than a mobile bed.
  A: Engelbert confirmed that the HEC-RAS model is a fixed bed model. However, the width and depth relationships were developed for a wide variety of flow scenarios, and the best fit of those relationships was interpreted to best represent a long-term average. As noted in the report, the best data available is this estimation looking at two points in time.

- Q: Emery asked if any pallid sturgeon stocking occurred in the Platte River and what size was stocked. He requested that the information be provided for the record.
  A: Rick Holland (NGPC) noted that stockings occurred in the Platte River in 1996 or 1994; a small group was stocked at Two Rivers (river mile 42). Another stocking occurred as part of a telemetry study around 2000. However, he was unsure of the sizes. He noted that he will try to get the information for the record.
- Q: Joel Jorgensen (NGPC) noted that the benchmark flow was derived prior to April 27 but asked if in reality, it is more likely that larger flows that occurred later would create habitat for the birds.
  A: Matt Pillard (HDR) noted that the analysis was not predicting whether a certain flow created a sandbar of a particular size.
- Q: Jorgensen noted that using April 25 as the start date for piping plover nesting is reasonable, but noted that May events may be a more important event for interior least terns. He asked if a different peak could be selected?
  A: Pillard noted that selecting a second peak after the birds arrive was considered and is another way to look at later flows that would set a new benchmark. Lisa Richardson (HDR) pointed out that the slides were particular to piping plovers but that a separate analysis was completed for interior least terns. She added that the benchmark flow was the highest that occurred between February 1 and the established date when nesting begins for each species. Regardless of when the benchmark is set, the analysis is still the same: current operations do not exceed the current operations benchmark during the analysis period any more than ROR operations exceed the run-of-river benchmark during the same analysis period. Pillard added that in some years, the benchmark was never exceeded during nesting for either condition.
- C: George Waldow (HDR) noted that the analysis was completed using the methodology outlined in the Revised Study Plan and agreed to by FERC. Jorgensen noted that the study methods may sound good when they are created, but may not make sense once the study is conducted.
- Q: Runge asked FERC representatives to what extent modifications can be made to the study.
  A: Emery noted that FERC typically does not make modifications. Instead, it looks at the results and tries to determine if something weather-related or beyond nature's control may have made the results bad. Normally, FERC makes its determinations based on the data it has and noted that only Limited changes could be made at this point.
- Q: Jorgensen (NGPC) noted that in the report, a key assumption is that nest distribution is considered to be a uniform distribution, a single volume where nests are distributed to sandbars and where in elevation the nests are located. In reality, nests can occur above and below the elevation in what is likely a normal distribution, but that information is not provided in the study. So peak flow, regardless of the magnitude, can cause nest inundation because there will be nests below the elevation. He noted that in 2008, the birds did not initiate nests until June 16, in that year there was a high flow event early in the season and a subsequent high flow event in July, when only one nest was found to be inundated. In 2009, 60 nests were inundated during a high flow event. He noted that each subsequent peak flow after nesting has an effect on inundation and that current operations has a higher peak than ROR operations, and so the probability of inundation is higher. He also stated that the peak flow event that occurred in mid-June 2009 and that there is data that says that inundation occurred – and if the peak flow is greater for either condition, that information could be used to determine effects.
- Q: Holland asked what the results from Leslie, et al showed related to beneficial results from subjecting habitat to periodic high flow and whether this occurred with daily hydropower operation
  A: Melissa Marinovich (HDR) noted that the Leslie et al. study found that high flows regenerated the habitat and provided more habitat; they found that the dam in the study was releasing large flood flows, which was having a greater effect on the birds and proved to be beneficial. However, they found that hydrocycling was not affecting bird populations.
- Q: Runge noted that the analysis conducted for pallid sturgeon looked at percentage of change in habitat, but the relative change in high flow is in cubic feet per second (cfs). He asked how the

change in 4,000 to 6,000 cfs relates to change in habitat.
A: Scott Stuewe (HDR) noted that at 2,000 cfs, habitat is negligible, so with any increase from 2,000 cfs, there would be an increase in habitat availability. In looking at the cross sections, the increases from 4,000 to 6,000 cfs allow more habitat.

- Q: Runge asked if the Lower Platte River Stage Change Study could show the change in percentage of habitat at 4,000 cfs and 6,000 cfs.
  A: Engelbert noted that the stage change study identified habitat types, which are typically based on hydraulic parameters. Sensitivity analysis was also applied to create ranges of flows to see how it changed in discharge.
- Q: Holland asked if conclusion of the stage change study is that due to constraints of the central Platte River, enough water cannot be put into the system to make a significant impact on flows.
  A: Engelbert noted that it works the other way, too. When a large flow moves through, enough cannot be pulled out of the system.
- Q: Runge asked if the percentage of available sturgeon habitat could be tied to a specific flow?
  A: Richardson responded yes and noted that although the body of the report presents results on a yearly basis, that the Peters and Parham analysis was conducted for the minimum and maximum flow for every day and that those results are included in an attachment to the hydrocycling report.
- Q: Isis Johnson (FERC) asked if any work was being done to compare how the results of the hydrocycling and sedimentation studies have impacted sandbar width.
  A: Pillard noted that such a comparison has been considered, but it is difficult to connect everything together. Johnson noted that FERC will be evaluating what could reasonably happen so there will need to be some analysis of how the two studies interact.
- C; Holland noted that the data shows that early season cross sections have deep troughs and high points in the form of a channel, but the late season cross sections shallow out, showing some deposition in some of the deep areas. A portion of the deposition comes from erosion on the margins of the sandbars. He also noted that one of the most biologically significant findings in the comparison between current operations and run-of-river operations is that run-of-river operations decrease the variance of the stage relative to current operations. Therefore, a lot of habitat remains covered by water for longer periods of time under run-of-river operations. This impacts primary and secondary productivity. Under ROR operations, how great a percentage of habitat that is affected may not be as important as the effect on productivity in the system.
- Q: Michelle Koch (NGPC) asked how the duration of the high and low flows relates to the available habitat. She noted that a short high flow does not create much habitat because the water is not there very long; conversely, low flows that last a long time may not be used by pallid.
  A: Stuewe noted that pallid may actually go out on the newly inundated areas to look for food and then return to deeper water areas for refuge. He is not aware of any documentation of pallid stranding due to hydrocycling. Holland added that there is no documentation of pallid stranding but that he has observed isolation of various other fish species in isolated pockets during low flows.
- Q: Runge asked what the time period is from peak to trough during hydrocycling.
  A: Ron Ziola (Loup Power District) noted that it is 12 hours from peak to trough and 24 hours from peak to peak.

Study 5.0: Flow Depletion and Flow Diversion

Study Results:

Pat Engelbert (HDR), Matt Pillard (HDR), and Scott Stuewe (HDR) presented the study results of the flow depletion and flow diversion study. The key points were as follows:

- Flow depletions under current operations are less than would occur under the no diversion condition.
- On average, 71 percent of applied irrigation water is lost to consumptive use for both current operations and the no diversion condition

- Average annual Lost Creek flow entering the Tailrace Canal is approximately 14 cfs and the average annual flow discharged from the Tailrace Canal through the Lost Creek Siphon is approximately 12 cfs.
- There is an increase in stage under the no diversion condition; the magnitude of the change decreases with increasing discharge. The increase is largest under dry flow conditions.
- The Genoa gage shows a long-term positive (increasing) flow trend; the same trends are evident at Duncan. Therefore, it is concluded that there is no Project impact on long-term historic flow trends.
- Land Cover Aerial Imagery results:
    - Detectable differences in measured parameters above and below the Diversion Weir (based on average of all years analyzed) are as follows:
        - There are a greater number of sandbars per river mile above the Diversion Weir
        - The sandbars above the Diversion Weir are smaller
        - Channel width is, on average, 400 feet wider above the Diversion Weir than below.
    - A lower percentage of vegetation exists on sandbars above the Diversion Weir.
    - A lower percentage of bare sand on sandbars exists above the Diversion Weir.
    - More point bars exist below the Diversion Weir, and more mid-channel bars exist above the Diversion Weir.
- Habitat evaluation using HEC-RAS for cross-sections upstream (Site 1) and downstream (Site 2) of the Diversion Weir for current operations and ROR conditions:
    - Percentage of exposed channel width decreased with wetter conditions at Site 1 and Site 2 under both current operation and the no diversion condition.
        - At Site 2, current operations had greater percentage of exposed channel widths than under the no diversion condition.
        - Site 1 had similar percentages of exposed channel width as Site 2 under the no diversion condition.
- Sedimentation Analysis:
    - Total sediment transport, effective discharge, and dominant discharge were higher for the no diversion condition than current operations.
    - Channel widths and depths were greater for the no diversion condition than current operations.
- Regime Analysis indicated that current operations and the no diversion condition are both well within braided river morphology, with neither being near to transitioning to another morphology.
- Analysis determined that there were no measurable differences in depletions to the lower Platte River under current operations or under ROR conditions; therefore, fisheries and habitat are not adversely impacted to a greater extent under current operations than they would be under the no diversion condition.
- Evaluation of fishery populations and habitat above and below the Project Diversion provides the following conclusions:
    - NGPC studies show that fish use the lower reaches as much as the upper reaches, suggesting that habitat is not limiting.
    - Sport fisheries are similar upstream and downstream.
    - Montana Method analysis suggests degraded flows for the Loup River, but fisheries studies do not support this.
    - The Loup Power Canal is an important sport fishery resource.
    - The Platte River exhibits degraded flows upstream and downstream of the Loup River confluence; this suggests that fisheries habitat in the Platte River is not affected by Loup River diversion.
- Evaluation of the availability of potential whooping crane roosting habitat above and below the Diversion Weir under Project operations and the no diversion condition provides the following conclusions:

- Unobstructed widths above and below the Diversion Weir are outside whooping crane habitat parameters.
- Channel widths above and below are within whooping crane habitat parameters.
- The area of shallow water/wet sand is greater upstream of the Diversion Weir.
- For current operations there is a smaller percentage of channel widths with water depths of 0.8 feet or less during all low to medium flow conditions.
- For current operations there is a greater percentage of channel widths with water depths of 0.8 feet or less during all higher flow conditions.

Discussion:

- Q: Rick Holland (NGPC) asked why canal water was included under the no diversion condition.
  A: Pat Engelbert (HDR) noted that there would still be some water present for years to come under the assumption that there is a ground water mound adjacent to the canal.
- Q: Paul Makowski (FERC) asked if the water in the canal is not really coming from the Loup River, whether it would go to the canal or to the Loup River. It is counter-intuitive that if you go from two bodies of water to one, there would be more consumptive use.
  A: Engelbert noted that the assumption was that the groundwater would make its way to the Loup River. In accordance with FERC's Study Plan Determination, Project decommissioning is not a viable alternative; some water would remain in the canal for irrigators.
- Q: Makowski asked if 1 foot of water is being put into the canal for irrigators.
  A: Engelbert noted that the assumption is that irrigation use would be the same with or without the Project, as stated in FERC's Study Plan Determination. However, in order to evaluate the consumptive use under the no diversion condition, the assumption was that there would still be water in the system through groundwater seepage. It was recognized by FERC in its Study Plan Determination that decommissioning was not a reasonable alternative; however, it provides the least amount of Project consumptive use.
- Lisa Richardson (HDR) noted that this analysis was related to depletions on the Platte River, not the Loup River. Because it is all part of the Platte River basin, water that seeps into the canal under the no diversion condition would be considered a potential depletion to the Platte River.
- Ron Ziola (Loup Power District) also noted that there are a few small areas that drain directly into the canal during rain events. There are approximately 8 to 10 locations where storm water would enter the canal. Engelbert added that several scenarios were discussed during study execution regarding the no diversion condition, and under all, there would still be some water in the canal exposed to evaporation.
- Q: Michelle Koch (NGPC) asked if the same lake coefficient was used for the Loup River bypass reach under current operations and the no diversion condition.
  A: Engelbert answered yes.
- Gary Lewis (HDR) noted that even though it is believed that some losses will continue to occur in the canal for the no diversion condition, as shown in the table on slide 310, the results without this assumption are shown as well. The losses would be 18,260 ac-ft versus 18,080 ac-ft.
- Q: Holland noted that under the no diversion condition, there is a reduction in total acres of about 50 percent in the canal, yet evaporative loss is maybe 10 percent.
  A: Engelbert noted that under current operations, 470 acres of surface area is reduced to 232 acres, or roughly half. However, the Project reservoirs would remain, and those continue to contribute to evaporation.
- Q: Holland noted that the reservoirs would have to be refilled each year if they are being included, and he asked if they are being refilled through precipitation directly into the reservoirs. He also noted that if the analysis was done over time, the reservoir volumes would decrease over time and thus the loss of depletion through evapotranspiration from the reservoirs would decline over time.
  A: Engelbert noted that the analysis looked at scenarios both with and without the reservoirs.

Richardson added that the information was only shown for a single year; over the course of time, the amount of depletion would transition from the highest number to the lowest number.

- Q: Jeff Schuckman (NGPC) asked how many acre feet per year are used for irrigation and whether that amount would be lost under both current operations and the no diversion condition. He also asked if that irrigation water has to be provided even if there is no water in the canal.
  A: Engelbert noted that an average of 2,000 acre feet per year are pulled out of the canal according to the District's metering records. This amount was assumed to be lost under both current operations and the no diversion condition. He also noted that the logistics of how the water would get into the canal was not evaluated. Per Scoping Document 2, decommissioning the Project is not an alternative that FERC would actually evaluate. Therefore, irrigation water would still be provided and the associated consumptive losses would be the same under any alternative.
- Q: Lee Emery (FERC) asked if there is still some water that enters Lost Creek from the old point of entry.
  A: Engelbert replied that yes, water is still being conveyed to the siphon. Neal Suess (Loup Power District) added that the City of Columbus has built additional structures to make it clear where Lost Creek is and to return flow to Lost Creek. An additional runoff structure goes down to the Platte River.
- Q: Koch asked if other than just evaporative loss and evapotranspiration, was they any consideration to how much water is held back in the reservoirs that never reaches the Tailrace Return.
  A: Engelbert noted that this portion of water volume was not taken into consideration. Ziola added that the District's reservoirs are not a dam. Water is impounded for less than 12 to 24 hours and then it has to be released back into the system. Lake Babcock can be drained, though not completely, and there is a small dead pool in Lake North that cannot be drained via the canal.
- Q: Koch asked if everything that is diverted into the canal goes back into the river except water that is taken out of the canal for irrigation.
  A: Ziola answered yes, with the exception of the small dead pool in the bottom of Lake North.
- Q: Tom Econopouly (USFWS) asked if there is any seepage from the reservoir that is contributed to groundwater. He also asked where the coefficients for evapotranspiration for the winter and summer came from.
  A: Engelbert noted that the Nebraska Department of Natural Resources' hydrologcially connected liens (the 10-50 line) was evaluated, and as long as the water stays within that boundary, it is eventually returned to the Platte River system through groundwater. He noted that the coefficients for evapotranspiration for the winter and summer came from a document from USFWS.
- Holland noted that long-term positive trends start at the 50s, and there is evidence that flows are decreasing from the central Platte prior to that period of time. Part of the explanation from historical geological time is there used to be more flow coming from the central Platte system into the lower Platte system.
- Q: Isis Johnson (FERC) questioned how there could be a lower percentage of vegetation on the sandbar above the Diversion Weir and also a lower percentage of bare sand. She asked if this is based on overall surface area.
  A: Matt Pillard (HDR) explained that it is because the sandbars are smaller above the Diversion Weir, and that is how the percentages turn out based on the size of the sandbars. He confirmed that it is based on the surface area available.
- Q: Joel Jorgensen (NGPC) asked if the aerial photos used in the land cover analysis were taken in the late July or August time period. Then he asked if the results would change if the macroform depth determination was changed from greater than 75 percent of the exposed sands surrounded by water to 100 percent surrounded by water.
  A: Pillard confirmed that the photos used were taken in late July or August. He also confirmed that the results would change if the macroform depth determination was changed; the number of mid-channel bars would likely decrease and there would be more point bars if the macroform depth determination was increased to 100 percent surrounded by water.

- Q: Jorgensen asked how the study defined whether a sandbar was disconnected. He noted that from a bird's standpoint, a little water is probably the same as bone dry in terms of access to predators.
  A: Melissa Marinovich (HDR) noted that Kirsch's methodology was used. Kirsch defined a mid-channel bar as anything that was surrounded by 75 percent or more water. Therefore, this was used for the mid-channel versus point bar determination.
  C: Jeff Runge (USFWS) noted that USFWES requested 1-D modeling because it is hard to pick out sandbar types with aerial photos, and it requested that this information be supplemented with information on the ground, too.
- Jorgensen noted that for channel width, the average really does not mean as much as the extremes. For instance, on the lower Platte River, 50 percent of nesting occurs in widest 2 percent of the channel. He noted that the birds respond best to the width in the range 1,065 feet. He is interested in how different the top 10 percent of channel widths are because that is what the birds are using. The lower 50 percent if channel widths are not as important. Jorgensen also noted that a direct quotation from a report by Brown and Jorgensen was used, but the parenthetical statistical information was omitted. He recommended that the parenthetical data be incorporated in the report because the narrative builds upon that point.
- Q: Runge noted that the range of average valley widths is 15.2 to 24.3 miles, which are pretty wide. He asked if is would be safe to assume the valley width does not constrict the channel width or vice versa.
  A: Pillard noted that valley width was studied in relation to interior least tern and piping plover nesting rather than channel width formation.
- Runge noted that the exposed channel width is helpful, but the 1-D model was intended to verify the information from the aerial photography analysis. There are some important variables that are missing, such as whether the percentage of exposed sand is attached or connected to the bank or disconnected as well as wetted width and mean depth, that would help improve this analysis.
- Q: Jorgensen asked if, based on sediment and dominant discharge information, it can be concluded that the no diversion condition would have sandbars at a higher elevation than with current operations because there is more sediment and greater dominant discharge. He also asked if there is an inverse relationship, that if there are deeper channels, the sandbar height would be an inverse of that.
  A: Engelbert noted that it would convey more sediment, but it cannot be concluded that a sandbar would be higher. You can't make the leap to that conclusion because the sandbar height would potentially be limited by the channel banks. Lewis added that higher flows create higher sandbars; it is related to the hydrograph, not dominant discharge. He is not aware of any literature or methodology that relates to the height of sandbars. Lewis and Engelbert agreed that the sandbar would be taller but at the same elevation. In the study, however, it was shown they were at the same level in high events and did not change between current operations and the no diversion condition.
- Q: Holland asked if as long as flows stay within the river banks, can flow increase without an increase in dominant discharge.
  A: Engelbert noted that the greater the flow is, the greater the dominant discharge will be.
- Q: Runge noted that HEC-RAS is a fixed bed analysis, so the channel geometry doesn't adjust with the change in dominant or effective discharge.
  A: Engelbert responded that it is understood that the fixed bed is a limitation of the analysis but as compensation for that, the width and depth relationships were averaged between the two sets of cross-section (June and September).
- Q: Runge noted that the slopes are very similar upstream and downstream of the Diversion Weir and that there is nothing to constrain channel geometry, so under a no diversion scenario is it safe to say that downstream would look the same is upstream?
  A: Lewis responded that probably over time, it would trend that way.
- Q: Runge asked how the different geometries upstream and downstream of the Diversion Weir related to the definitions of a braided stream.

A: Lewis noted that there would be differences in geometry, but they're both considered braided and that the full definition of the terms in Chang's paper would further explain the lines on the regime graph.

- Q: Jorgensen asked if there has been a change in regime above or below?
  A: Engelbert answered no.
- Q: Runge asked that even though there are differences in geometry upstream and downstream that the broad conclusions are that both upstream and downstream are in regime and braided?
  A: Engelbert responded yes. Lewis added that if the year by year dominant discharge from the original sedimentation study are plotted on the regime graphs that the same slope is maintained but moves left and right within certain limits but without heading in any particular direction.
- Q: Jorgensen asked that even if the river stays in regime as a braided stream, it can still have changes in geometry.
  A: Engelbert responded yes.
  C: Holland questioned the conclusions related to the NGPC fish sampling studies. He noted that the sampling in those studies was for relative abundance and presence or absence, and there were no population estimates for those studies and there is no information on trends.
  Q: Runge asked if the Montana Method is an index of physical habitat and if so, was the analysis completed for a with and without diversion scenario?
  A: Stuewe responded that conditions were evaluated upstream and downstream without a change in flow alternative. Richardson added that we have to assume that for a no diversion scenario, downstream conditions would mimic what you see upstream. She noted that it would be an improper application of the Montana Method to compare monthly flows downstream with mean flows upstream because upstream flows do not reflect the habitat; the Montana Method evaluates habitat based on the flows that are routinely seen in that particular stretch.

Next Steps

Lisa Richardson (HDR) discussed the next steps in the relicensing process.

- March 11, 2011 – District submits meeting summary
- April 11, 2011– Agencies file meeting summary disagreements and submit requests for modification to on-going studies
- May 12, 2011 – District responds to summary comments and study modification requests
- June 12, 2011 – FERC resolves comments and study modification requests
- August 26, 2011 – District submits Updated Study Report to FERC
- September 9, 2011 – Updated Study Results Agency Meeting (Location TBD)
- November 18, 2011 – District files Draft License Application

Discussion:

- C: Randy Thoreson (NPS) – There is a lot of good information and really wants to be involved in the recreation management plan, please convey to him the schedule to be involved.

Selzle, Lydia

From: Pillard, Matt
Sent: Thursday, March 10, 2011 9:24 AM
To: 'frank.albrecht@nebraska.gov'; 'john.bender@nebraska.gov'; 'jeff_runge@fws.gov'; 'robert_harms@fws.gov'; 'barbara.j.friskopp@usace.army.mil'; 'abaum@upperloupnrd.org'; 'randy_thoreson@nps.gov'; 'bob.puschendorf@nebraska.gov'; 'mkuzila1@unl.edu'; 'david.jundt@dhhs.ne.gov'; 'jmiyoshi@lpnnrd.org'; 'steve.chick@ne.usda.gov'; 'pcclerk@megavision.com'; 'cityadmin@cablene.com'; 'ncpza@hamilton.net'; 'rbishop@cpnrd.org'; 'jwinkler@papionrd.org'; 'lpsnrd@lpsnrd.org'; 'jmangi@columbusne.us'; 'cgenoa@cablene.com'; 'monroe@megavision.com'; 'calms@neb.rr.com'; 'danno@nohva.com'; 'mbrown9@unl.edu'; 'rtrudell@santeedakota.org'; 'jblackhawk@aol.com'; 'vwills@pawneenation.org'; 'Brian.Dunnigan@nebraska.gov'; 'msittler@lpsnrd.org'; 'butchk@nctc.net'; 'robertm@llnrd.org'; 'jmsunne@nppd.com'; 'jalexand@usgs.gov'; 'jjshadl@nppd.com'; 'cothern.joe@epa.gov'; 'justin.lavene@nebraska.gov'; 'bobbie.wickham@nebraska.gov'; 'kennyj@headwaterscorp.com'; 'mferguson@gp.usbr.gov'; 'Willie_Taylor@ios.doi.gov'; 'Robert_F_Stewart@ios.doi.gov'; 'jeddins@achp.gov'; 'kenneth.sessa@dhs.gov'; 'peggy.harding@ferc.gov'; 'djjarecke@clarkswb.net'; 'al.berndt@nebraska.gov'; 'astuthman@leg.ne.gov'; 'ksullivan@leg.ne.gov'; 'clangemeier@leg.ne.gov'; 'adubas@leg.ne.gov'; 'chairmanrhodd@ponca.com'; 'asheridan@omahatribe.com'; 'don_simpson@blm.gov'; 'nicholas.jayjack@ferc.gov'; 'jill.dolberg@nebraska.gov'; 'prescott.brownell@noaa.gov'; 'marvp@megavision.com'; 'lewrightjr@gmail.com'; 'thowe@ponca.com'; 'zach_nelson@bennelson.senate.gov'; 'julias@poncatribe-ne.org'; 'todd.crawford@mail.house.gov'; 'louis-pofahl@mail.house.gov'; 'emily_brummund@johanns.senate.gov'; 'deb.vanmatre@mail.house.gov'; 'tpetr@loup.com'; 'mike.black@bia.gov'; 'janet.hutzel@ferc.gov'; 'isis.johnson@ferc.gov'; 'lee.emery@ferc.gov'; 'paul.makowski@ferc.gov'
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Teresa Petr; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District - Second Initial Study Report Revision Filed

Follow Up Flag: Follow up
Flag Status: Completed

Relicensing Participants,

On Thursday, March 10, 2011, the District filed a revision to the Second Initial Study Report with FERC. The revisions consisted of minor changes to the text, tables, or appendices of the following studies:

- Study 1.0 – Sedimentation – page 19
- Study 2.0 – Hydrocycling – pages 45 & 46
- Study 5.0 – Flow Depletion and Flow Diversion – Attachment H, page 111 has been added and Table of Contents updated
- Study 8.0 – Recreation Use – pages ii, 14, 15, 16 & 28
- Study 12.0 – Ice Jam Flooding on the Loup River – 21, 22, 28, 29 & 32

The changes to the text of these pages are highlighted and underlined and noted with a revision date of March 8, 2011. The revised pages have been inserted into the electronic version of the appropriate studies on the District's relicensing website: www.loup.com/relicense and notes have been added to the site indicating the revision dates for studies 1.0, 2.0, 8.0 and 12.0.

Thanks!

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate

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Please consider the environment before printing.

From:	Thompson, Wendy
To:	"frank.albrecht@nebraska.gov"; "john.bender@nebraska.gov"; "jeff_runge@fws.gov"; "robert_harms@fws.gov"; "barbara.j.friskopp@usace.army.mil"; "abaum@upperloupnrd.org"; "randy_thoreson@nps.gov"; "bob.puschendorf@nebraska.gov"; "mkuzila1@unl.edu"; "david.jundt@dhhs.ne.gov"; "jmiyoshi@lpnnrd.org"; "steve.chick@ne.usda.gov"; "pcclerk@megavision.com"; "cityadmin@cablene.com"; "ncpza@hamilton.net"; "rbishop@cpnrd.org"; "jwinkler@papionrd.org"; "lpsnrd@lpsnrd.org"; "jmangi@columbusne.us"; "cgenoa@cablene.com"; "monroe@megavision.com"; "calms@neb.rr.com"; "danno@nohva.com"; "mbrown9@unl.edu"; "rtrudell@santeedakota.org"; "jblackhawk@aol.com"; "vwills@pawneenation.org"; "Brian.Dunnigan@nebraska.gov"; "msittler@lpsnrd.org"; "butchk@nctc.net"; "robertm@llnrd.org"; "jmsunne@nppd.com"; "jalexand@usgs.gov"; "jjshadl@nppd.com"; "cothern.joe@epa.gov"; "justin.lavene@nebraska.gov"; "bobbie.wickham@nebraska.gov"; "kennyj@headwaterscorp.com"; "mferguson@gp.usbr.gov"; "Willie_Taylor@ios.doi.gov"; "Robert_F_Stewart@ios.doi.gov"; "jeddins@achp.gov"; "kenneth.sessa@dhs.gov"; "peggy.harding@ferc.gov"; "djjarecke@clarkswb.net"; "al.berndt@nebraska.gov"; "astuthman@leg.ne.gov"; "ksullivan@leg.ne.gov"; "clangemeier@leg.ne.gov"; "adubas@leg.ne.gov"; "chairmanrhodd@ponca.com"; "asheridan@omahatribe.com"; "don_simpson@blm.gov"; "nicholas.jayjack@ferc.gov"; "jill.dolberg@nebraska.gov"; "prescott.brownell@noaa.gov"; "marvp@megavision.com"; "lewrightjr@gmail.com"; "thowe@ponca.com"; "zach_nelson@bennelson.senate.gov"; "julias@poncatribe-ne.org"; "todd.crawford@mail.house.gov"; "louis-pofahl@mail.house.gov"; "emily_brummund@johanns.senate.gov"; "deb.vanmatre@mail.house.gov"; "tpetr@loup.com"; "mike.black@bia.gov"; "janet.hutzel@ferc.gov"; "isis.johnson@ferc.gov"; "lee.emery@ferc.gov"; "paul.makowski@ferc.gov"
Cc:	Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Teresa Petr; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject:	Loup FERC Relicensing Second Initial Study Results Meeting Summary
Date:	Friday, March 11, 2011 3:59:13 PM

Relicensing Participants:

Loup Power District has electronically filed the Meeting Summary from the Second Initial Study Results Meeting held on February 23 & 24, 2011. The report is available on FERC's e-library and on the District's relicensing website: http://www.loup.com/relicense/html/documents.html.

Thank you.

Wendy Thompson
Public Involvement Specialist

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8404 Indian Hills Drive | Omaha, NE | 68114-4098 Phone:402.399.1341| Fax: 402.399.1111
Email:wendy.thompson@hdrinc.com

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup River Hydroelectric Project; FERC Project No. P-1256
Date:	Friday, March 18, 2011 8:03:00 AM

For the DB and PW.

From: Lee Emery [mailto:Lee.Emery@ferc.gov]
Sent: Friday, March 18, 2011 6:08 AM
To: Richardson, Lisa (Omaha)
Subject: RE: Loup River Hydroelectric Project; FERC Project No. P-1256

Hi Lisa
Your proposal looks fine. We have had some errors recently where staff was given documents by applicants to put in the public record and they were not timely filed. Thus, the request that the applicant's file documents themselves into the public record for items such as this. Sorry for the inconvenience. It was something I had done occasionally in the past, but it has been brought to my attention that we should discourage this approach and have applicant's file documents into the public record themselves when they are requested documents for projects.

Have a good weekend. We may see 76 degrees today.

Lee Emery
Fishery Biologist
Office of Energy Projects
Federal Energy Regulatory Commission
Phone (202) 502-8379
FAX (202) 219-0205

From: Richardson, Lisa (Omaha) [mailto:Lisa.Richardson@hdrinc.com]
Sent: Thursday, March 17, 2011 4:56 PM
To: Lee Emery; Hunt, George
Cc: Thompson, Wendy
Subject: Loup River Hydroelectric Project; FERC Project No. P-1256

Lee,

I received the message today that you need us to officially file the USGS Water Resources Investigations Report (99-4103) "Trends in Channel Gradation in Nebraska Streams, 1913-1995" by Chen et al (1999) for the public record (this is the report I provided to you in hard copy at the SISR meeting).

I will file it as soon as possible. Unfortunately, that particular report is very hard to get a hold of and is not available electronically. In order to file it, we need to obtain another copy so we can cut the binding and scan it. Our local USGS office doesn't have any copies of this report, so we have requested another copy from the national USGS clearinghouse (they only have 5 copies in their warehouse). We expect to receive the additional copy next week and will get it filed as soon as we get it. In the meantime, you have the hardcopy I previously provided if you need the document for reference.

Please let me know if this timeline won't work or if you have any other questions.

Lisa
Lisa M. Richardson, P.E.
Associate Vice President
Professional Associate

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

April 7, 2011

FWS-NE: 2011-303

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: Comments on Second Initial Study Report; Loup River Hydroelectric Project; Federal Energy Regulatory Commission Project Number 1256; Nance and Platte Counties, Nebraska

Dear Ms. Bose:

Please make reference to the Second Initial Study Report (SISR) filed by the Loup Power District with the Federal Energy Regulatory Commission (FERC) on February 11, 2011, that was prepared as part of the proposed relicensing of the Loup River Hydroelectric Project (Project), FERC Project Number 1256. The SISR provided study reports for the sedimentation, hydrocycling, bypass water temperature, flow depletion and diversion, recreation use, and ice jam flooding. A meeting was held on February 23 and 24, 2011, to discuss the SISR results. SISR studies supplement Initial Study Report (ISR) results for sedimentation, fish passage, recreational use, land use inventory, Section 106 compliance, and PCB fish tissue sampling.

The following U.S. Fish and Wildlife Service (Service) comments are provided in accordance with regulations implementing the Federal Power Act (18 CFR § 5.9) and our authorities pursuant to the Endangered Species Act (ESA), Fish and Wildlife Coordination Act (FWCA), National Environmental Policy Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and other executive orders and policies.

PROJECT EFFECTS TO FEDERALLY LISTED SPECIES

The ESA requires that the action agency provide the best scientific and commercial data available concerning the impact of the proposed Project on listed species and/or critical habitat. Likewise, the Service is also required to gather, review, and evaluate information to determine if it meets the best scientific and commercial data standards prior to undertaking listing, recovery, section 7 consultation, and permitting actions [59 FR 34271 (July 1, 1994)]. For section 7 consultation, the Service completes its evaluation in the context of whether the best scientific and commercial data is sufficient to ascertain if the proposed Project relicensing "may affect" federally listed species or federally designated critical habitat. Thus, our comments will apply the legal definition of "may adversely affect" as the measure of Project effects to federally listed species and federally designated critical habitat.

Project Effects to Whooping Crane

The Service has determined that Project operations may adversely affect the whooping crane (*Grus americana*) within the bypass area of the Loup River. Adverse effects include a long-term change in the channel morphology of the Loup River bypass reach and Project diversion-related effects to instream habitat suitability.

Diversion of water at the Project diversion has resulted in long-term effects to the channel morphology in the Loup River bypass reach. Study sites upstream of the Project diversion have wider channel widths compared to study sites downstream of diversion (see General Comment 1). Differences in channel widths are relatively stable with less than 3 percent change for the five years of evaluated data (Table 5-7, SISR Flow Depletion/Diversion). This reduction in channel width for the Loup River bypass reach constrains maximum "wetted widths" (or inundated channel width) (see General Comment 2). Study sites upstream have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars. Mid-channel bars provide roosting habitat (i.e., water less than 0.8 feet) that is higher in suitability compared to point pars (see General Comment 3).

Information provided by the SISR has been helpful in quantifying long-term changes in the channel morphology. Outside of effective (or dominant) discharge and transport capacity, the SISR provides no information that explains differences in channel morphology for the Loup River upstream of the Project diversion and within the bypass reach. It was identified in the February 24, 2011, SISR meeting transcript that, in absence of diverted water, the Loup River bypass area would have similar characteristics as the Loup River upstream of the diversion (Page 153, Lines 23-25 and Page 154, Lines 1-9). The Service has proposed modifications in the Proposed Modifications to Studies section of this document. Service recommendations for a longitudinal (spatial) comparison of all Loup River study sites would be essential in quantitatively assessing how differences in effective (or dominant) discharge would explain differences in channel morphology.

SISR results have also indicated that flow changes in Loup River bypass affect channel metrics used as indices for whooping crane habitat. The Service supports the use of the SISR variables channel width with water less than 0.8 feet recognizing its limitations in addressing all habitat suitability indices (see General Comment 3). When compared to the Current Operation condition, the No Diversion condition improves shallow water habitat at relatively lower flows while decreasing shallow water habitat at higher flows (see General Comment 3). Maximum channel width with water less than 0.8 feet is also constrained by the channel's maximum wetted channel widths (see General Comment 3). Based on information from General Comment 2, the No Diversion condition provides for wider wetted widths at Study Site 2 compared to the

Current Operations condition. In summary, changes in flow bypass would result in both positive and negative effects to whooping crane habitat suitability criteria.

Project Effects to Interior Least Tern and Piping Plover:

The Service has determined that Project operations may adversely affect the Interior least tern (*Sternula antillarum*) and piping plover (*Charadrius melodus*) within the bypass area of the Loup and Platte rivers. Diversion of water at the Project diversion has resulted in long-term effects to the channel morphology of the Loup River and Platte River bypass reach. Project diversion may also increase the probability of high temperature exceedences which may affect the food source for least terns. Project hydrocycling operations may also increase the risk of least tern and piping plover nest and chick mortality from water inundation. Limitations in the Sedimentation and Hydrocycling methods limit the Service's ability to discern Project sediment and hydrocycling effects to channel habitat, sandbar formation, and sandbar permanence.

Diversion of water at the Project diversion has resulted in long-term effects to the channel morphology of the Loup River and Platte River bypass reach. Study sites upstream of the Project diversion have wider channel widths compared to study sites downstream of diversion (see General Comment 1). This reduction in channel width for the Loup River bypass reach constrains maximum wetted channel widths (see General Comment 2). Study sites upstream of the Project diversion also have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars (see General Comment 3). Study Site 3, located within the Platte River bypass area, has narrower channels compared to study sites downstream of the Project's tailrace return (see General Comment 4).

Project temperature-related events are addressed in the Interior least tern section because of the potential for catastrophic fish kills affecting least tern food availability. Exceedences of the Nebraska Department of Environmental Quality water quality standard to support warm water aquatic life (i.e., 90 degrees Fahrenheit) represent an increased risk for fish kills. Table 5-16 of the SISR – Temperature clearly shows the relationship between flow and the probability of temperature exceedences. Subsequent multivariate approaches add too much variability to their analyses which diminishes any relationship between flow and water temperature exceedences. To address limitations to the temperature methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document. The Service supports SISR conclusions that it is difficult to predict the relationship between streamflow and temperature at the Platte bypass area because of the influence of Platte River streamflow. The Service is still concerned about how streamflow could affect probability of temperature exceedences in the Platte River bypass area, but recognizes that there is a limited ability for studies to quantify effects with a within the time constrained study period.

Project hydrocycling operations may directly affect individuals via nest inundation. The Service has enclosed a review of by Joel Jorgensen, Nongame Bird Program Manager of the Nebraska Game and Parks Commission (NGPC), Objective 2 methods. In the review, Mr. Jorgensen identifies several shortcomings of the SISR nest inundation analysis. After reviewing Mr. Jorgensen's review, the Service has identified two shortcomings that affect the SISR method's ability to accurately model the potential for nest inundation. The model incorrectly assumes that the high flow event February 1 through April 25 sets the peak stage for nest inundation. The model also incorrectly assumes that all birds nest on bars at a single, uniform elevation. The inclusion of these assumptions, some of which were originally promoted by the Service, could not pass a validation test using recently collected nesting data. The Service supports the alternate methods developed by Mr. Jorgensen because the proposed methods represent a means of addressing the shortcomings in the prior assumptions. By evaluating inundation risk based on incremental ranges of potential nest elevations, the alternate methods is better able to predict nest inundation risks associated with hydrocycling.

It is currently not known if Project hydrocycling operations affect nesting habitat via sandbar erosion. Limitations in the hydrocycling methods also limit the Service's ability of to discern Project hydrocycling effects to sandbar formation and permanence. Hydrocycling has resulted in exposed channels widths in the Platte River that were narrower downstream from the tailrace than what was calculated for run-of-river operations (SISR Hydrocycling, page 40). However, this effect is likely the result of a fixed bed analysis evaluating only changes in river stage associated with hydrocycling. It is difficult for the Service to assess sandbar erosion rates for Study Site 3 because a June peak flow redistributed sandbars between cross-section measurement dates. The redistribution of sandbars eliminates any ability to assess sandbar erosion rates at Study Site 3. Since Study Site 3 represents a no hydrocycling condition, it is difficult to compare erosion rates of sandbars at Study Site 3 to Study Sites 4 and 5. To address limitations to the hydrocycling methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document.

Project diversion operations may not affect sediment balance at the Loup River bypass area. The 1,445,000 tons of sediment removed by dredging operations is similar to the 1,480,000-ton sediment surplus at Study Site 2 (See General Comment 5). Total sediment transported downstream of the Project diversion is equivalent to sediment transported from upstream of the diversion. This similarity may imply that Project does not affect the Loup River sediment balance although Project effects to physical habitat exist via the reduction in effective discharge in the Loup River bypass area.

Project diversion operations have resulted in sediment deficits at the Project's tailrace return. The cumulative sediment deficit as a result of Project flow diversion and hydrocycling operations is approximately 1,606,000 tons per year (see General Comment 6). The volumes of sediment deficit, assuming a bulk density of sand at 1.9 tons per cubic yard (Kinzel 2009) is 845,263 cubic yards of sediment per year. This represents 845,263 cubic yards of sediment that is removed from the available sediment supply (i.e., riverbed and sandbars) near the Project tailrace return on a yearly basis. Limitations in the Sedimentation methods limit the Service's ability to discern Project sediment-related effects channel habitat. One sedimentation study product was the longitudinal (spatial) comparison of all sites on the Loup and lower Platte River study sites starting at the most upstream site on each river, and progressing downstream. The Service has determined that a longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel morphology. To address limitations to the sedimentation methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document.

<u>Project Effects to Pallid Sturgeon:</u>

The Service has determined that the Project hydrocycling operations may adversely affect the pallid sturgeon (*Scaphirhynchus albus*). The SISR evaluated Project hydrocycling effects to on the pallid sturgeon suitable habitat as defined by Peters and Parham (2008). The Service would like to note that the applied microhabitat metric of Percentage of Suitable Pallid Sturgeon Habitat (Sturgeon Habitat) is not truly habitat unless it is available to the species. Parham (2007) identified that the lower Platte River is generally unconnected at discharge rates below 4,400 cubic feet per second (cfs) and rapidly becomes connected as discharges reaches 6,300 cfs. The river can be considered fully connected at a discharge of 8,100 cfs. Conclusions from the Lower Platte River Stage Change Study also validate conclusions from Parham (2007). The Lower Platte River Stage Change Study identified Run and Plunge habitats (i.e., pallid sturgeon microhabitat) are mostly connected across the width of the river at 6,000 cfs (HDR et al., 2009). Discharges less than 6,000 cfs may lower water elevations enough to limit access for pallid sturgeon since they will not or cannot move through Flat or Slackwater habitat. In summary, Sturgeon Habitat identified in the SISR may not represent habitat that is accessible by the species.

The Service used information in the Hydrocycling Attachment J of the SISR to evaluate Project effects to connectivity of Sturgeon Habitat using connectivity thresholds developed by Parham (2007). Optimal habitat represents fully connected habitat at 8,100 cfs and is equivalent to Sturgeon Habitat at 27-percent or higher. Habitat with moderate connectivity occurs when flow is greater or equal to 6,300 cfs but less than 8,100 cfs (i.e., Sturgeon Habitat ≥ 24-percent but < 27-percent). Habitat with a minimum level of connectivity occurs when flow is greater or equal to 4,400 cfs but less than 6,300 cfs (i.e., Sturgeon Habitat ≥ 15-percent but < 24-percent). Habitat that is completely unconnected occurs when discharge falls below 4,400 cfs (Sturgeon Habitat < 15%).

The Service applied levels of Optimal Connectivity, Moderate Connectivity, Minimum Connectivity, and No Connectivity to Current Operations and Run-of-River Operations values using data from Tables 5-18 through 5-29 in the SISR Hydrocycling Section. The Service developed the following classification system to compare changes in connectivity for Current and Run-of-River Operations.

1 = No Connectivity for Current and Run-of-River Operations
2 = No Connectivity Current Operations, Minimum Connectivity Run-of-River Operations
3 = Minimum Connectivity Current and Run-of-River Operations
4 = Minimum Connectivity Current Operations and Moderate Connectivity Run-of-River Operations
5 = Moderate Connectivity Current and Run-of-River Operations
6 = Moderate Connectivity Current Operations and Optimal Connectivity Run-of-River Operations
7 = Optimal Connectivity Current and Run-of-River Operations
8 = Minimum Connectivity Current Operations and Optimum Connectivity Run-of-River Operations

Results of the pallid sturgeon habitat connectivity evaluation are in Tables 1 through 12 of this document. Project effects to pallid sturgeon habitat connectivity are infrequent during the winter months of December and January. Project effects to pallid sturgeon habitat connectivity during the low flow months of July through October are primarily limited to the Ashland and Louisville study sites. The most prominent Projects effects to connectivity occur from February through June and in November. For certain months, Projects effects to connectivity occur upstream to Study Site 4. Additionally for the months of March, April, May, June, and November, there is some level of connectivity at Study Site 4 for the Run-of-River operations, but this connectivity is not present at Study Site 3. These losses of connectivity at Study Site 3 could imply Project diversions potentially affecting pallid sturgeon habitat in the Platte River Bypass area.

The pallid sturgeon may also be affected by Project bypass operations. Study Site 3, located within the Platte River bypass area, has narrower channels compared to study sites downstream of the Project's tailrace return (see General Comment 4). This reduction in channel area reduces the proportionate area of pallid sturgeon habitat. Additionally, sediment deficits at the tailrace return (see General Comment 6) may also affect habitat suitability for the pallid sturgeon. However, aforementioned limitations in Sedimentation methods limit the Service's ability to assess how sediment deficits at the project's tailrace affects pallid surgeon habitat. To address limitations to the sedimentation methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document.

PROJECT EFFECTS TO FISH AND WILDLIFE COORDINATION ACT RESOURCES

FWCA requires consultation with the Service and State fish and wildlife agency for the purpose of giving equal consideration to fish and wildlife resources in the planning, implementation, and operation of federal and federally funded, permitted, or licensed water resource development projects. The FWCA requires that federal agencies take into consideration the effect that water related projects may have on fish and wildlife resources, to take action to avoid impact to these resources, and to provide for the enhancement of these resources. While Project temperature-related events are addressed in the Interior least tern section because of the potential for catastrophic fish kills, Project effects to fish habitat are addressed under FWCA.

Table 13 summarizes of number years from April through September that the mean monthly flow is categorized as Fair, Poor, or Degraded. Table 13 represents a tabular version of Figures 5-14 to 5-19 which summarizes the percent of total categorized as Fair, Poor, or Degraded for the 56 year period of record from 1954 to 2009. There are large differences in the proportion of Fair, Poor, or Degraded conditions for each of the respective months when comparing Site 1 to Genoa. The percentage of years categorized as Fair, Poor, or Degraded for the months from April though June ranged from 0 to 1.8 percent for Site 1 while percentages at Genoa ranged from 37.5 to 48.2 percent. From July through September, the percentage of years categorized as Fair, Poor, or Degraded ranged from 1.8 to 19.6 percent for Site 1 while percentages at Genoa ranged from 71.4 to 82.1 percent. Most notably, approximately half of the years at Genoa were categorized as degraded for the months of July though September.

Table 14 summarizes of number years from October through March that the mean monthly flow is categorized as Fair, Poor, or Degraded. Table 14 also summarizes the percent of total categorized as Fair, Poor, or Degraded for the 56 period of record. There is an obvious difference in October when the Site 1 has zero years in a degraded condition while Genoa has 46.4% of the years categorized as degraded. The percentage of years categorized as Fair, Poor, or Degraded for the months from November though March ranged from 0 to 1.8 percent for Site 1 while percentages at Genoa ranged from 0 to 16.1 percent.

Limitations in the Flow Depletion/Diversion methods limit the Service's ability to discern Project's flow diversion effects to the fish community in the Platte River bypass area because of the absence of a No Diversion condition Study Site 3. The Platte River near Duncan is not a surrogate for a No Diversion condition, so a comparison of the study site near Duncan to the Study Site 3 – Current Operation is inadequate in identifying Project diversion effects to the fish community. To address limitations to the Flow Depletion/Diversion methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document.

The Service has determined that continued District operations would continue to impact the fish community for the bypass area of the Loup River and possibly the bypass area of the Platte River. While the SISR identify the July through October as the months of severe degradation for the Loup River, the Service also considers the months of April through June being severely impacted by Project diversions. The Service does not support the SISR conclusion that fish habitat is available both above and below the weir based on results of the NGPC fish data collection report (NGPC, June 1997 and April 1998). Fish sampling occurred in 1996 and 1997 which represented the 19.40 and 7.46 exceedence levels, respectively, for mean annual discharge using a 66-year period of record (Attachment C of the SISR Sedimentation Addendum). In other words, NGPC sampled during years when flows were relatively high within the 66-year period of record. The Service cautions the application of NGPC collected data within SISR conclusions.

GENERAL COMMENTS on ISR and SISR

General Comment 1 - Loup River Channel Widths:

The SISR has identified differences in channel width when comparing river reach upstream of the district diversion versus conditions in the Loup River bypass reach. A comparison of average channel widths from Table 5-7 (Study 5.0) shows that channel widths at locations upstream of the diversion (Mean 1,061 feet ± SD 8 feet) are wider than locations downstream (Mean 664 feet ± SD 8 feet). A similar conclusion was derived from Table 5-10 (Study 5.0) with channel width at Site 1 of 825 feet exceeding widths of 640 feet at Site 2. Outside of effective (or dominant) discharge and transport capacity, the SISR provides no information that explains differences in channel morphology for the Loup River upstream of the Project diversion and within the bypass reach. It was identified in the February 24, 2011, SISR meeting transcript that, in absence of diverted water, the Loup River bypass area would have similar characteristics as the Loup River upstream of the diversion (Page 153, Lines 23-25 and Page 154, Lines 1-9).

General Comment 2 - Loup River Wetted Channel Widths:

The SISR has identified differences in wetted channel width when comparing river reach upstream of the district diversion versus conditions in the Loup River bypass reach. Figure 5-11 in the SISR Flow Depletion/Flow Diversion identified wider wetted widths for the No Diversion condition for all Loup River bypass areas (i.e., Study Site 2, Genoa Study Site, and Columbus Study Site). Table 15 is a revision to Table 5-10 in the SISR Flow Depletion/Flow Diversion. Percent of exposed channel was converted to wetted width (i.e. percent of width inundated by flow). An evaluation of HEC-RAS data was preferred to the aerial interpretation because of its ability to model No Diversion conditions in the bypass reach. A comparison of the Current Operation condition to No Diversion condition for Study Site 2 shows an increase in average wetted channel widths with a corresponding increase in streamflow under the No Diversion condition.

A comparison of wetted channel Site 1 to Site 2-No Diversion in Table 15 shows narrower channel widths associated with Site 2 result in narrower wetted widths. Average wetted widths for the Site 1 dry, normal, and wet time period are greater than the average channel width for Site 2. As demonstrated in General Comment 1, differences in channel width are consistent when comparing study sites upstream and downstream of the Project diversion. Figure 5-11 in the SISR Flow Depletion/Flow Diversion also shows that the No Diversion condition for study sites in the Loup Bypass area have the same streamflow as Study Site 1 but do not have the ability to achieve comparable wetted widths.

General Comment 3 – Loup River Instream Flow and Habitat Suitability

Page 101 of the SISR Flow Depletion/Diversion identifies the limitations of the analysis when assessing whooping crane suitable habitat. The analysis did not factor in conditions such as unobstructed view from bank to bank, location and configuration of the shallow water areas, presence or absence of vegetation, proximity to human development and feeding sites, and potential for predation. The predominance of point bars for the Loup River bypass area, as identified in the imagery review section of the SISR Flow Depletion/Diversion, would indicate that the available shallow water habitat would be located next to the inside bends (i.e., tips of point bars). Submerged point bars, compared to submerged mid-channel bars, would have shallow water habitat that is closer to visual obstructions and would have an increased likelihood of land predator access.

The Service has identified important relationships between instream flow and channel width with water depths of 0.8 foot or less. Table 16 compares the increase (or decrease) in Channel Width with Water Depths of 0.8 Foot or Less when comparing the Current Operations condition to No Diversion condition for the Loup River bypass area only. The No Diversion condition increases the amount of shallow water habitat at lower flows (i.e., 75-percent exceedence) but decreases the amount of shallow water habitat at higher flows (i.e., 25-percent exceedence). The No Diversion condition shows the greatest increase in shallow water habitat for the dry year of 2006 but the greatest decrease in shallow water habitat for the wet year of 2008. Keep in mind that the increases and decreases in shallow water habitat due to flow is relative based on the positioning of this habitat adjacent to point bars. Similar to discussions in General Comment 2, reduced channel widths for the Loup River downstream also constrains channel width with water depths of 0.8 foot or less (Table 5-19, SISR Flow Depletion/Diversion).

Similar to the whooping crane habitat evaluation, indices used to assess least tern and piping plover habitat may not address all factors used to identify suitable habitat. The evaluation of exposed channel area (Figure 5-11 in the SISR Flow Depletion/Flow Diversion) does not address all suitability criteria discussed on Table 4-5 of the SISR Flow Depletion/Flow Diversion. The sandbar position upstream of the Project diversion compared to position downstream would affect least tern and piping plover habitat suitability. The higher percentage of point bars downstream of the diversion provides less suitable habitat conditions for the least tern and piping plover because both species select for mid-channel bars for nesting. Point bars represent habitat that is easily accessed by land predators compared to mid-channel bars that have flowing water around its perimeter. Mid-channel sandbars would also be located further from visual obstructions such as woody riparian vegetation compared to point bars.

General Comment 4 – Platte River Instream Flow and Habitat Suitability

An understanding of Project diversion effects to the Platte River bypass area is less evident. A study of aerial imagery was not conducted for the Platte River bypass area. The Study Site 3 in the bypass portion of the Platte River was consistently narrower than Study Sites downstream of the Project's tailrace return (Table 17) which uses cross-section information from page 39 and 40 from the SISR Hydrocycling.

The Service in an October 20, 2010, letter ranked the sedimentation studies based on criteria of importance to the fish and wildlife species under our authorities. The Service has ranked the longitudinal comparison of geomorphic characteristics from cross-sections as the most important of all of the sedimentation studies. A longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel geomorphic features. To address limitations to the sedimentation methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document.

General Comment 5 – Loup River Sediment Transport:

Table 5-11 of the SISR – Flow Depletion/Flow Diversion identified sediment transport capacity for Study Site 2 was 890,000 and 2,370,000 tons per year for the Current Operation condition and the No Diversion condition, respectively. This equates to sediment transport surplus of approximately 1,480,000 tons per year because sediment transport capacity is lost due to flow diverted into the project canal. According to Table 4-3 of the ISR – Sedimentation, approximately 2,005,000 tons per year of sediment is dredged from the Project settling basin of which 560,000 tons of sediment per year is returned to the Loup River via the South Sand Management Area. Net sediment removed from the Loup River system by the Project's dredging operation is 1,445,000 tons per year. The 1,445,000 tons of sediment removed by dredging operations is remarkably similar to the 1,480,000-ton sediment surplus at Study Site 2 which implies that total sediment transported downstream of the Project diversion is equivalent to sediment transported from upstream of the diversion (i.e., Project does not affect the Loup River sediment balance).

Comment 6. Platte River Sediment Transport

Attachment J of the SISR – Flow Bypass/Flow Diversion projected sediment transport for Study Site 3 and Study Site 4. Cumulative sediment transport for Study Site 3 averaged 1,040,000 tons for years 2003 to 2009. Cumulative sediment transport for Study Site 4 averaged is 2,553,000 tons. Sediment transport at Study Site 4 is 1,493,000 tons higher then Study Site 3. The sediment transport deficit using the Seasonal data (i.e., May 1st through August 15th) is 452,571 tons per year using the 2003 to 2009 average. The 1,493,000-ton increase in sediment transport at Study Site 4 represents a sediment deficit because the higher sediment transport is due to flow inputs from the Project's tailrace return. The sediment deficit of 1,493,000 tons at Study Site 4 is similar to the 1,480,000-ton sediment surplus at Study Site 2. In other words, sediment deficits at the Project tailrace return can be attributed to sediment dredged at the Project diversion.

Attachment J of the SISR – Flow Bypass/Flow Diversion projected sediment transport based on Current Operations and Run-of-River Operations. Cumulative sediment transport for Run-of-River Operations at Study Site 4 averaged 2,440,000 tons for years 2003 to 2009. Cumulative sediment transport for Current Operations at Study Site 4 averaged 2,553,000 tons. Therefore, hyrdocycling operations, in the study represented as Current Operations, result in an 113,000-ton increase in sediment transport. The 113,000-ton increase in sediment transport at Study Site 4 is represented as a sediment deficit because hydrocycled flow comes from the Project's tailrace return. The sediment transport deficit using the Seasonal data (i.e., May 1st through August 15th) is 30,714 tons per year using the 2003 to 2009 average.

The cumulative sediment deficits as a result of Project flow diversion and hydrocycling operations is approximately 1,606,000 tons per year – the sum of 1,493,000 and 113,000. The volumes of sediment deficit, assuming a bulk density of sand at 1.9 tons per cubic yard (Kinzel 2009) is 845,263 cubic yards of sediment per year. This represents 845,263 cubic yards of sediment that is removed from the available sediment supply (i.e., riverbed and sandbars) near the Project tailrace return on a yearly basis.

Comment 7. Considerations of Regime Theory Analyses

USFWS agrees that Regime theory is a useful technology to determine potential changes in stream morphology. However, with the lack of hydrologic and geomorphologic data for the Loup River at Columbus and other locations, actual streambed measurements are more useful in determining changes in stream morphology. As stated in the February 24, 2011, SISR meeting transcript, a braided plan form and represent river conditions representing various ranges of suitability for federally listed species (page 137, line 12 through page 139, line 8).

PROPOSED MODIFICATIONS TO STUDIES

Expand Platte River One Dimensional HEC-RAS Modeling to Include July

The Service originally proposed the development of a steady-state one dimensional (1-D) HEC-RAS model to better understand the effects of hydrocycling on sandbar erosion. The Service, in a June 24, 2009, letter originally proposed that cross section surveys be measured during the 1st week of March, 1st week of May, 1st week of July, and the1st week of August. The Service considered these time frames for cross-sectional measurements as a necessary means of collecting enough data to assess erosion rates when considering the variable timing of peak flows. In the Final Study Determination, timing of cross-sectional measurements was reduced to the first week in May and the first week in August.

The Service has found that the timing intensity for the 2010 cross-sectional measurements is inadequate in measuring erosion rates. Streamflow at the North Bend streamgage for the 2010 calendar year peaked on June 14. Table 4.4 of the SISR – Hydrocycling shows the survey dates for the cross-sectional measurements. Two of the three measurement dates for Study Site 3 occurred prior to the peak flow of June 14. It is difficult to measure sandbar erosion rates for Study Site 3 because it is likely that the June 14 peak flow redistributed sandbars between measurement dates. Since Study Site 3 represents a no hydrocycling condition, it is difficult to compare erosion rates of sandbars at Study Site 3 to Study Sites 4 and 5. The Service recommends the measurement of cross-sections in 2011 for the first week in May, first week in July, and first week in August. The addition of July measurement would allow for post-peak flow comparison of erosion rates if a mid to late June peak flow is observed in 2011.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service has determined that cross-sectional measurements collected in 2010 is inadequate in assessing erosion rates of sandbars above and below the Project tailrace return.
3) The proposed change in methods is necessary to allow for post-peak flow comparison of erosion rates if a mid to late June peak flow is observed in 2011. A survey during the first week in July and the first week in August would allow for two time periods post June peak flow.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.

Conduct Longitudinal (Spatial) Comparisons of All Loup and Platte River Sites

Page 11 of FERC's Final Study Determination identified the additional analyses required to address Sedimentation Objective 2.

> Using the findings on the current state of river morphology at each site, the District shall make longitudinal (spatial) comparisons of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream. In performing this spatial analysis, the District shall ensure that it uses cross-sectional geomorphic data from the USGS gage sites that are reasonably comparable to the cross-sectional geomorphic data taken at the non-USGS sites (i.e., the data taken at both USGS gage and non-USGS gage sites shall be obtained as close in time as possible).

Page 30 of the SISR – Sedimentation Addendum identified that a longitudinal comparison was not conducted because it was determined that the Loup Bypass reach and lower Platte River was in dynamic equilibrium. However, the FERC's Final Study Determination required a longitudinal comparison of cross-sectional geomorphic data regardless of whether the river is/is not in dynamic equilibrium. Although it was not entirely clear as to what represented a longitudinal comparison in the Final Study Determination, the Service has determined that a longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel morphology.

Page 1-22 of the Revised Study Plan - Sedimentation identified the following study commitment:

> In addition, the channel morphology associated with the effective discharges will be calculated according to the methodology described in Leopold and Maddock (1953) and Karlinger et al. (1983). Leopold and Maddock developed general stream morphology relationships between effective discharge and channel characteristics, and Karlinger et al. (1983) calibrated and applied Parker's regime equations (similar to Leopold and Maddock's) to the central Platte River. Channel characteristics include channel cross sectional area changes, width changes, channel aggradation/degradation changes, and the rate at which these changes, if any, occur over time.

This commitment was partially fulfilled in the ISR and SISR. The above channel characteristics (i.e., channel cross sectional area changes, width changes, channel aggradation/degradation changes, and the rate at which these changes, if any, occur over time) associated with gaged sites were provided, in part, as attachments to the ISR - Sedimentation. Attachment J of the SISR provided limited channel characteristic information for ungaged sites on the Platte River. The Service recommends that channel characteristic information be performed for ungaged sites for the Loup River and the Platte River. The Service also requests that all channel characteristic information for the Loup and the Platte River be presented as longitudinal (spatial) comparisons of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream.

1) Proposed changes in methods were not a result of material changes in the law or regulations.

2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service's October 20, 2010, comments on the ISR identified the longitudinal comparison of study sites as the highest ranked study to address Project affects to channel morphology. The Service has determined that a longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel morphology.
3) The proposed change in methods was not made earlier because the Service assumed that the SISR would include a comprehensive longitudinal (spatial) comparison of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives. The Service assumed that the SISR would include a comprehensive longitudinal (spatial) comparison of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.

<u>Conduct Temperature Analysis for Platte River Bypass Area</u>

The Service recommends a simpler approach of assessing flow-related effects at Merchiston and at Genoa. The Service recommends a table listing the maximum daily temperature and corresponding flow for both study sites. In addition to the table, the Service recommends a summary of the number of days above 90° F for each respective location on a month-by-month basis. Proposed methods are similar to those conducted by Sinokrot and Gulliver (2000). In the study, the authors stated "the occurrence of these high water temperatures can be reduced with an increased in-stream flow." Because times of missing temperature data occurred during low flow conditions in the Loup River bypass area, the Service recommends another year of temperature monitoring within the Loup River at Merchiston and Genoa.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. Because the probability of thermal temperature exceedences at Merchiston and Genoa were conducted independently, there is no evaluation of the No Diversion condition for the Loup Bypass area that relates streamflow to temperature exceedences.
3) The proposed change in methods was not made earlier because the Service needed a stepwise means of addressing temperature-related effects of flow bypass. Now it is determined that there is a relationship between Loup River streamflow and temperature exceedences in the Loup River bypass area, Service proposed

methods would allow for an estimation of No Diversion condition effects on probability of temperature exceedences.

4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives. The Service proposal reflects slight alterations as to how the data is organized.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.

Conduct Montana Method for No Diversion Alternative in the Platte River Bypass Area

The Service recommends a Montana Method evaluation for the No Diversion condition of the Platte River bypass area. The Service has determined that a comparison of results at the Duncan study site to results at Study Site 3 does not provide an adequate evaluation of the No Diversion condition. An evaluation of the No Diversion condition is critical in understanding Project diversion-related effects to the Platte River bypass area.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. An evaluation of the No Diversion condition is critical in understanding Project diversion-related effects to the Platte River bypass area.
3) The proposed change in methods was not made earlier because the Service assumed that the study plan would include an evaluation of the No Diversion condition for the Platte River bypass area.
4) Service proposed modification was not a result of significant changes in the project proposal or that significant new information material to the study objectives has become available. The Service assumed that the study plan would include an evaluation of the No Diversion condition for the Platte River bypass area.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.

In summary, the Service has determined that the Project diversions may adversely affect the least tern, piping plover, and whooping crane for the bypass portion of the Loup River. Project diversions may adversely affect the least tern, piping plover, and pallid sturgeon for the bypass portion of the Platte River. Project sediment transport deficits at the tailrace return may affect the least tern, piping plover, and pallid sturgeon in the Platte River. Project hydrocycling operations may affect the least tern, piping plover, and pallid sturgeon in the Platte River below the Project Tailrace return. The Service looks forward to working with FERC to address these potential adverse effects through continued section 7 consultation under ESA. The Service also looks forward to working with FERC to address Project diversion-related impacts to the fish community in the Loup River bypass area (and possibly the Platte River bypass area) under section 10j of the Federal Power Act. The Service appreciates the opportunity to provide comments on the SISR. Should you have any questions regarding these comments, please contact Mr. Robert Harms within our office at (308) 382-6468, extension 17.

Sincerely,

Michael D. George
Nebraska Field Supervisor

Enclosures

cc: LPD; Columbus, NE (Attn: Neil Suess)
FERC; Washington DC (Attn: Lee Emery)
EPA; Kansas City, KS (Attn: Larry Shepard)
NGPC; Lincoln, NE (Attn: Frank Albrecht)
FWS; Denver, CO (Attn: Dave Carlson)
FWS; Denver, CO (Attn: Tom Econopouly)

Tables 1-4. Categorization pallid sturgeon connectivity for the months of January through April.

Table 1.

January	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	1
Leshara	1	1	1
Ashland	1	3	3
Louisville	2	3	3

Table 2.

February	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	1
Leshara	1	2	2
Ashland	2	4	6
Louisville	3	5	7

Table 3.

March	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	2
North Bend	1	1	4
Leshara	1	2	2
Ashland	2	4	2
Louisville	2	6	6

Table 4.

April	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	2	2
North Bend	1	3	2
Leshara	1	2	2
Ashland	3	4	4
Louisville	4	5	4

1 = No Connectivity Current and Run-of-River
2 = No Connectivity Current, Minimum Connectivity Run-of-River
3 = Minimum Connectivity Current and Run-of-River
4 = Minimum Connectivity Current and Moderate Connectivity Run-of-River
5 = Moderate Connectivity Current and Run-of-River
6 = Moderate Connectivity Current and Optimal Connectivity Run-of-River
7 = Optimal Connectivity Current and Run-of-River
8 = Minimum Connectivity Current and Optimum Connectivity Run-of-River

Tables 5-8. Categorization pallid sturgeon connectivity for the months of April through September.

Table 5.

May

	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	2	1
North Bend	1	2	1
Leshara	1	2	2
Ashland	1	6	5
Louisville	3	7	4

Table 6.

June

	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	3	1
Site 4	1	3	2
North Bend	1	3	2
Leshara	1	4	2
Ashland	1	7	4
Louisville	1	7	8

Table 7.

July

	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	1
Leshara	1	1	1
Ashland	1	2	1
Louisville	1	4	2

Table 8.

August

	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	1
Leshara	1	1	1
Ashland	1	1	2
Louisville	1	1	2

1 = No Connectivity Current and Run-of-River
2 = No Connectivity Current, Minimum Connectivity Run-of-River
3 = Minimum Connectivity Current and Run-of-River
4 = Minimum Connectivity Current and Moderate Connectivity Run-of-River
5 = Moderate Connectivity Current and Run-of-River
6 = Moderate Connectivity Current and Optimal Connectivity Run-of-River
7 = Optimal Connectivity Current and Run-of-River
8 = Minimum Connectivity Current and Optimum Connectivity Run-of-River

Tables 9-12. Categorization pallid sturgeon connectivity for the months of September through December.

Table 9.

September	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	1
Leshara	1	1	1
Ashland	1	1	1
Louisville	1	1	2

Table 10.

October	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	2
Leshara	1	1	2
Ashland	1	3	3
Louisville	1	4	3

Table 11.

November	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	2
North Bend	1	1	2
Leshara	1	1	2
Ashland	1	2	6
Louisville	1	2	6

Table 12.

December	Dry	Wet	Normal
Duncan	1	1	1
Site 3	1	1	1
Site 4	1	1	1
North Bend	1	1	1
Leshara	1	1	1
Ashland	1	3	3
Louisville	2	3	3

1 = No Connectivity Current and Run-of-River
2 = No Connectivity Current, Minimum Connectivity Run-of-River
3 = Minimum Connectivity Current and Run-of-River
4 = Minimum Connectivity Current and Moderate Connectivity Run-of-River
5 = Moderate Connectivity Current and Run-of-River
6 = Moderate Connectivity Current and Optimal Connectivity Run-of-River
7 = Optimal Connectivity Current and Run-of-River
8 = Minimum Connectivity Current and Optimum Connectivity Run-of-River

Table 13. Categorization of years within the 56-year period of record using the Montana Method for the months of April through September.

		Fair		Poor		Degraded		All Categories	
		Total	Percent	Total	Percent	Total	Percent	Total	Percent
April	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	4	7.1	13	23.2	4	7.1	21	37.5
May	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	5	8.9	12	21.4	10	17.9	27	48.2
June	Site 1	1	1.8	0	0.0	0	0.0	1	1.8
	Genoa	2	3.6	18	32.1	7	12.5	27	48.2
July	Site 1	4	7.1	6	10.7	0	0.0	10	17.9
	Genoa	3	5.4	10	17.9	32	57.1	45	80.4
August	Site 1	5	8.9	6	10.7	0	0.0	11	19.6
	Genoa	1	1.8	16	28.6	29	51.8	46	82.1
September	Site 1	1	1.8	0	0.0	0	0.0	1	1.8
	Genoa	3	5.4	12	21.4	25	44.6	40	71.4

Table 14. Categorization of years within the 56-year period of record using the Montana Method for the months of October through March.

		Fair		Poor		Degraded		All Years	
		Sum	Percent	Sum	Percent	Sum	Percent	Sum	Percent
October	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	11	19.6	0	0.0	26	46.4	37	66.1
November	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	7	12.5	0	0.0	2	3.6	9	16.1
December	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	0	0.0	0	0.0	0	0.0	0	0.0
January	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	3	5.4	0	0.0	1	1.8	4	7.1
February	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	1	1.8	1	1.8	0	0.0	2	3.6
March	Site 1	0	0.0	0	0.0	0	0.0	0	0.0
	Genoa	2	3.6	0	0.0	0	0.0	2	3.6

Table 15. Average channel width and wetted channel width in feet for Study Sites 1 and 2.

		Site 2	
	Site 1	Current	No Diversion
Channel Width	825	640	640
Wetted Width (Dry)	660	237	550
Wetted Width (Normal)	726	346	576
Wetted Width (Wet)	743	378	576

Table 16. Change in the percentage of Channel Width with Water Depths of 0.8 Foot or Less for the Loup River bypass area when comparing the Current Operations condition to No Diversion condition.

	75% Exceedence Flow	50% Exceedence Flow	25% Exceedence Flow
2006 (Dry)	24	3	-9
2005 (Normal)	9	0	-25
2008 (Wet)	4	-7	-28

Table 17. Average channel width in feet for ungaged Platte River Study Sites surveyed in 2010.

	June Survey	September Survey
Site 3	1,071	1,077
Site 4	1,726	1,723
Site 5	1,610	1,604

REFERENCES

Federal Register. 1994. Notice of Policy Statement, 59:34271; (July 1, 1994).

Kinzel, P.J., 2009, Channel morphology and bed sediment characteristics before and after habitat enhancement activities in the Uridil Property, Platte River, Nebraska, water years 2005–2008: U.S. Geological Survey Open-File Report 2009-1147, 23

Peters, Edward J., and James E. Parham. 2008. "Ecology and Management of Sturgeon on the Lower Platte River, Nebraska." Nebraska Technical Series Number 18. Nebraska Game and Parks Commission. Lincoln, Nebraska.

Parham, James E. 2007. "Hydrologic Analysis of the Lower Platte River from 1954-2004, with special emphasis on habitats of the Endangered Least Tern, Piping Plover, and Pallid Sturgeon." Nebraska Game and Parks Commission. Lincoln, Nebraska.

Sinokrot, Bashar A., and Guliver, G.S., 2000. In-stream flow impact on river water temperatures. J of Hydraulic Research 38(5):339-350.

Review of the Objective 2 Hydrocycling Methods

April 4, 2011

Joel Jorgensen
Nongame Bird Program Manager
Nebraska Game and Parks Commission

Objective 2 of the Hydrocycling Study was to "To determine the potential for nest inundation due to both hydrocycling (current operations) and run-of-river operations".

The study was based on developing a conceptual theoretical-predictive model in effort to simplify the complex interrelationships in the Loup-Platte River system. The study, as it was initially devised, has been successfully completed. Now that the modeling component of the study has been completed and presented for review, the results must be validated by comparing it with empirical data. Following a review of the theoretical model results with empirical data, it is clear that the theoretical model bears little resemblance to what is happening in Loup-PlatteRiver system. We take this opportunity to evaluate the theoretical model and identify some of the major problems. Specifically, we identify key assumptions that are unrepresentative on review and require modification if the study results are to be considered useful. These assumptions need to be revised if the study results are to be considered informative.

Assumptions unrepresentative on review that require revision

Assumption #1 – The analysis uses the highest flow event between 1 February and 25 April in a year as the benchmark flow for the breeding season in that year. While, on the surface this may appear to be a reasonable assumption, it is flawed as it makes the model inputs far too limiting. For example, A) this pre-nesting season sub-daily peak flow may be inadequate, in any one or even most years, to create the macro-form sandbar habitat that Interior Least Tern and Piping Plovers use for nesting, B) habitat forming flow events can and do occur outside this period, and, C) birds may be forced to delay the onset of breeding when high flow events occur early in the nesting season. The result is that the Study ignores high flow events that are critically important to terns and plovers and consider flows in the Study that are inconsequential.

Assumption # 2 –The model assumes that using a single point value for nest distributions is adequate; this means that if a benchmark flow occurs at single value, all nests (the actual variable of interest) also occur at a single benchmark value. In actuality tern and plover nests are found at a variety of benchmark values. Indeed, the report acknowledges this point on page 24, under the first bullet point where it states:

> "*It is also assumed that nesting can occur above the highest pre-season flow due to pre-existing, higher sandbars. If habitat is available, nesting may also occur below this benchmark.*"

While the report states that this point of fact is "assumed", it does not incorporate this assumption into the analysis (in fact, the assumption in the model is that all nests occur at a single point value). This sets up the analysis as an all or nothing question (effectively, a 'straw man') regarding the "possibility" of inundation at run-of-river or current operations. Effectively, the analysis avoids addressing the question of whether nests have a lower or higher *probability* of inundation from current operations compared to run-of-river. There is also a temporal distribution of nests that should be considered in the model.

Assumption # 3–The analysis assumes a "60-day period for successful nesting". This is an appropriate choice for Piping Plover; even though "breeding" is a more appropriate term rather than "nesting". More important is that the period in which Least Terns can fledge young is much shorter, approximately 25% shorter or 40-45 days. This is important because many more (4–20 times more) Least Tern pairs than Piping Plover pair have nested on the Lower Platte River in recent decades.

Testing theoretical results with empirical data

The opportunity exists to test the model with data collected in 2006–2009 by the Nebraska Game and Parks Commission Nongame Bird Program and the Tern and Conservation Partnership. Nesting data collected was provided to HDR and the District with the expectation that they would be used in their studies. Additionally, preliminary research results were also summarized in the following documents also made available to HDR and the District online:

Brown, M.B., and J.G. Jorgensen. 2010. "2010 Interior Least Tern and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

Brown, M.B., and J.G. Jorgensen. 2009. "2009 Interior Least Tern and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

Brown, M.B., and J.G. Jorgensen. 2008. "208 Interior Least Tern and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

Assumption #1 -The analysis uses the highest flow event between 1 February and 25 April in a year as the benchmark flow for the breeding season in that year.

A) This pre-nesting season sub-daily peak flow in most years is likely inadequate in some years to create macro-form sandbar habitat that Interior Least Tern and Piping Plovers use for nesting.

   Parham (2007, *Hydrologic Analysis of the lower Platte River from 1954-2004, with special emphasis on habitats of the endangered Least Tern, Piping Plover, and Pallid Sturgeon*) stresses the importance of high flow events. High flows events of a certain magnitude are necessary to create the macro-form sandbars that are used by terns and plovers. Parham (2007) identified 38,170 cubic feet per second (cfs) as the critical threshold necessary to create habitat of sufficient quality for nesting birds. Thus, flow events below this value, especially those well below this value, will be inconsequential in creating sandbars that birds would use for nesting. If sandbars of a certain size and relative elevation are not available, birds may select other sites or even systems for nesting. The Study uses benchmark flows under current operations of 9,077 and 26,523 for the years 2006 and 2007, respectively, in the model analysis. However, the data (in the possession of HDR and LPPD) show that no nesting was observed between river miles 50–103 in those years; a point not recognized by the Study. River Miles 50–103 is the section that includes the LPD diversion return and extends approximately fifty miles downstream from the diversion return.

B) Habitat forming flow events can and do occur outside this period

   The highest flow events more often occur outside the pre-nesting season sub-daily peak (benchmark) flow period of 1 February to 25 April. Specifically, only 24% of the annual peak stream flow events occurred during that period at Louisville from 1953–2009 (Figure 1). A similar pattern can be expected throughout the Loup-Platte River system. Furthermore, peak stream flow only occurred in the 1 February to 25 April period during one year (2006) of the study. As noted above, this was a year when no nesting was observed in the portion of the river proximal to the project. Parham (2007) used a moving window analysis and identified the greatest discharge within 1.5 years of each nesting season as the appropriate habitat-forming flow. Although recent information suggests that, in some instances, macro-form sandbars used for nesting and created by habitat-forming high flow events may persist longer than the 1.5 year period (see Brown and Jorgensen 2010, pages 38–45).

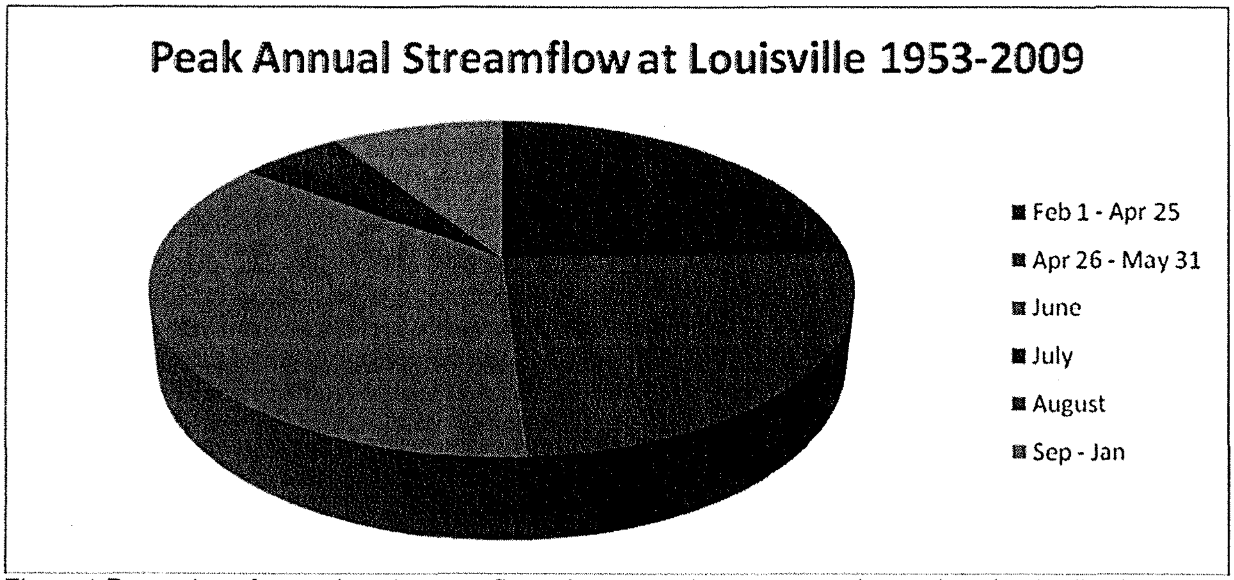

Figure 1.Proportion of annual peak streamflows that occur during temporal periods at Louisville, 1953–2009. The graphic shows that more than 75% of peak flow events occur outside the pre-nesting season sub-daily peak flow period.

C) Birds may be forced to delay the onset of breeding when high flow events occur early in the nesting season.

This occurs regularly when there are high flow events early in the nesting season. In fact, Least Terns are well adapted to such events. In 2008, a high flow event occurred during late May and early June. Following the high flow event, 150 Interior Least Tern and three Piping Plover nests were located on the Lower Platte River from River Mile 7 to 99 and the earliest initiation date for any nest on the Lower Platte River based on egg-floating data was 16 June. Parham (2007) correctly identified the highest discharge within 1.5 years of each nesting season as the appropriate flow relative to bird nesting, regardless of when it occurred.

Assumption #2 - The model assumes that using a single point value for nest distributions is adequate; this means that if a benchmark flow occurs at single value, all nests (the actual variable of interest) also occur at a single benchmark value.

Flow events that create habitat have maximum values, but these values do not represent the relative elevations of the sandbars or of all nests in the system. In 2009, we measured sandbar elevations. Figure 3 shows the benchmarks for individual transects on sandbars where nesting was observed between River Miles 60 and 102. Note: this is not a distribution of nest benchmarks. The graphic only shows that there is a wide range of benchmarks and that the data generally follow a normal distribution. It should be noted that most of the benchmarks in Figure 3 are greater than the Study's 2009 pre-nesting benchmark.

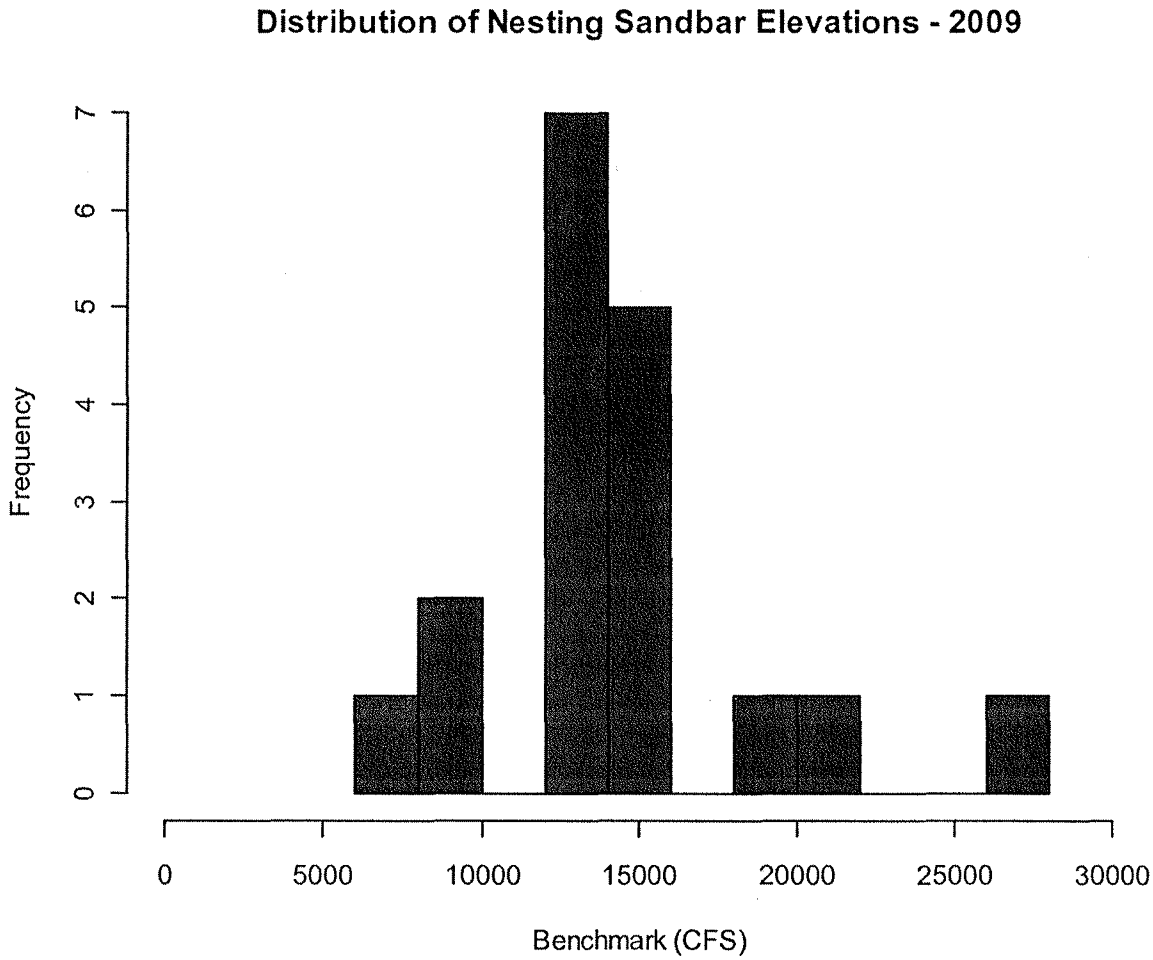

Figure 2. Distribution of nesting sandbar elevations in Lower Platte River in 2009 between River Mile 60 – 102.

We were making regular visits to colonies in 2008–2009 and our observations show that inundation events do not necessarily have all or nothing consequences for the birds, as the Study assumes. In 2008, out of 153 nests (150 tern, 3 plover), only one nest was inundated and this was below the Salt Creek confluence. This is notable because Salt Creek flows were responsible for a substantial rise in Platte River levels on approximately 21 July 2008. In 2009, out of 311 (264 tern, 47 plover), 67 were known to be inundated, thus, it was only a partial inundation event. We do not have benchmark information for nests. Importantly, we can isolate the actual high flow event that actually resulted in the inundation of nests (it occurred during the third week of June and is highlighted in Figure 3, which is a graphic provided in the Study report).

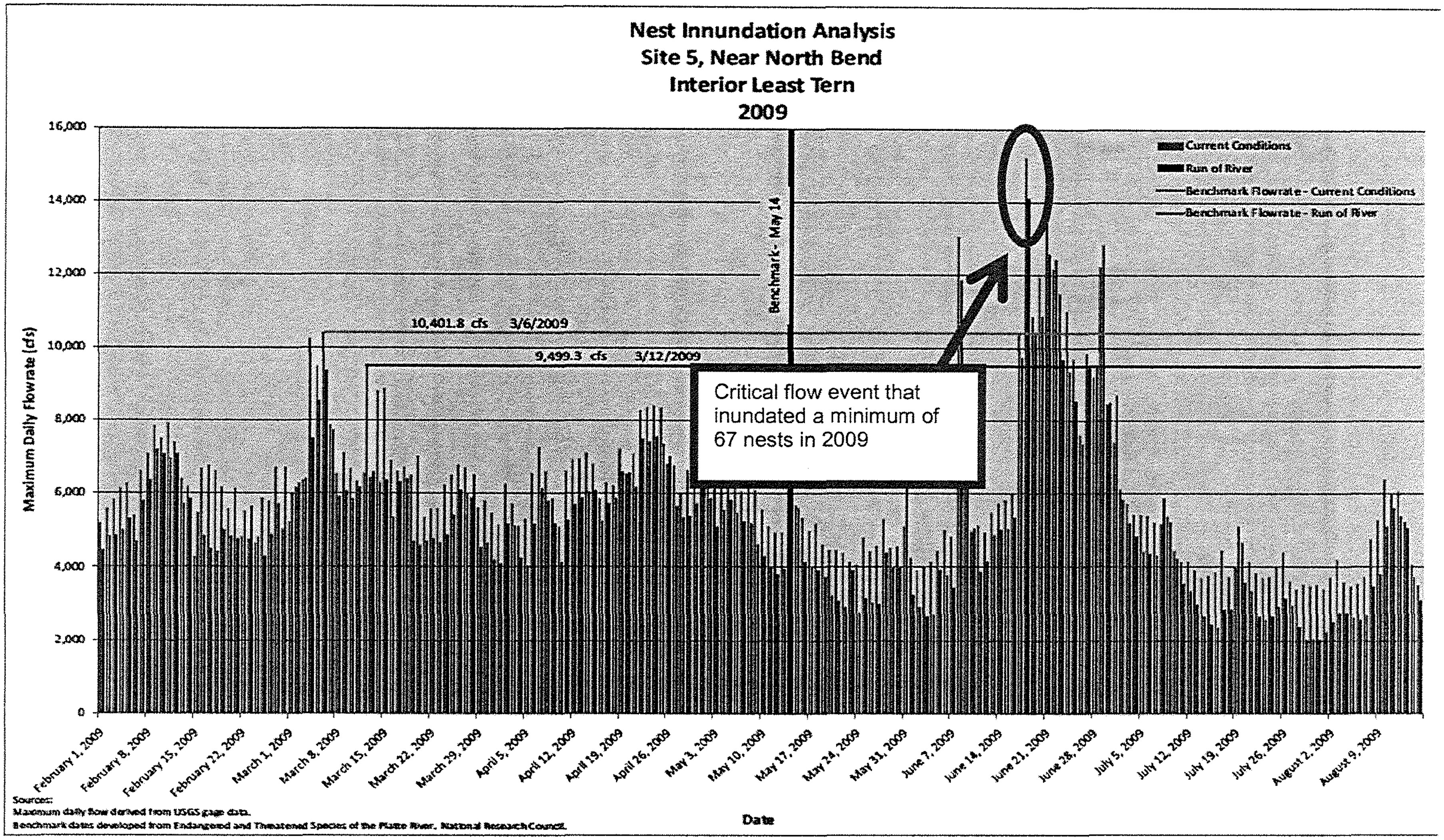

Figure 3: 2009 hydrograph from the 2009 study highlighting the high flow event that caused actual nest inundation. The Study results show that the difference in the peak of the current operations was 1122 cfs greater than the run of the river. Hydrocycling **did** inundate nests.

Alternative Analysis A

Here we provide that an additional analysis be considered. The objective of this analysis is to show the probability that a nest/chick will remain inundation free for a 45-day period during the breeding season over the range of benchmarks. Once this relationship is determined, we will be able to show how average changes in nesting season maximum peak sub-daily flows (we use the same terminology as the District's hydrocycling study) will change probabilities.

METHODS

The analysis is for Least Terns only. The 45-day period was selected because this is the time period required for a pair of terns to produce fledged young. Least Terns respond to changing conditions and are flexible in regard to when they initiate nests. We used the complete history (1949–2009) of river flow data from the USGS gage near North Bend. We conducted a moving window analysis for all years for a 45-day inundation free period from 1 May to 15 Aug at benchmark values of 2500, 5000, 7500, 10000, 12500, 15000, 17500, 20000, 25000. We make no assumptions regarding initial benchmarks because we have no information with which to make an informed decision. The moving window searches for uninterrupted 45-day during the 1 May to 15 Aug period. We used results from the analysis to determine the proportion of years where the benchmark value includes a 45-day inundation free period. We then used Generalized Additive Model (GAM) in Program R to model the relationship between a particular benchmark value and the probability that a benchmark will remain inundation free for 45 days during the 1 May to 15 Aug nesting season. GAMs are extensions of Generalized Linear Models that can be used to evaluate non-linear relationships. We refer to the initial relationship as run of river. Once the initial relationship was determined, we tested how inundation probabilities would change by adding 2,000 cfs to nesting season maximum peak sub-daily flows. In the analysis, based on a review of gage data we chose 2,000 cfs as the amount that hydrocycling increases peak sub-daily flows. This value is referred to as current operations.

RESULTS

Results of the analysis are shown in Table 1 and Figure 4.

Table 1. Predicted probabilities whether a benchmark would remain inundation free for a 45-day period during the breeding season at North Bend, Nebraska gage data 1949–2009.

Discharge (CFS)	Current Operations	Run of river
2500	0.115	0.279
5000	0.377	0.459
7500	0.574	0.705
10000	0.689	0.852
12500	0.852	0.934
15000	0.934	0.951
17500	0.951	0.967
20000	0.967	0.984

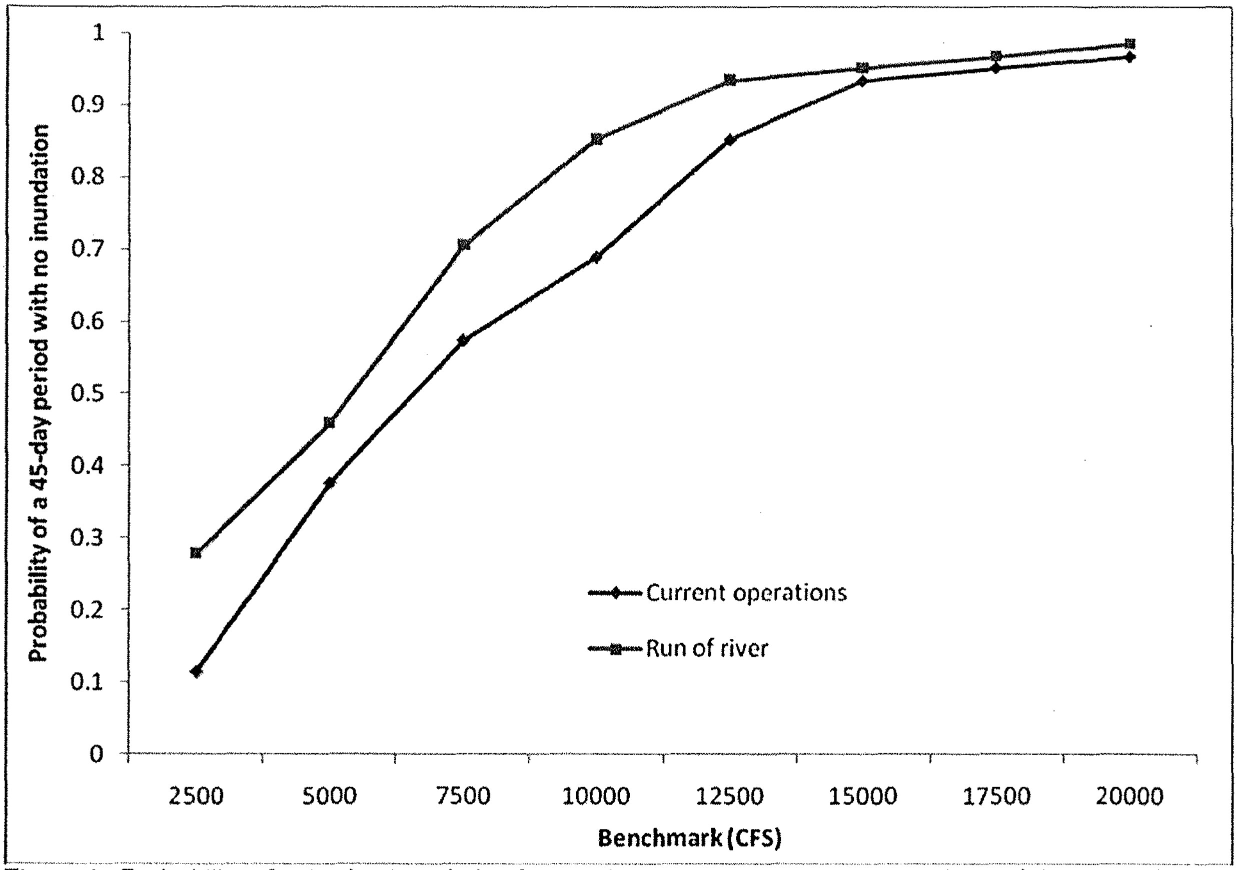

Figure 4. Probability of a 45-day inundation free period for current operations and run of river over the range of values observed at the North Bend Gage 1949–2009.

DISCUSSION

This analysis illustrates that changes in the nesting season maximum peak sub-daily flows will change probability of a 45-day inundation free period during the breeding season. A review of the District's Hydrocycling Study results show that average nesting season maximum peak sub-daily flows were 1289.4 ± 546.7 cfs (range 12.9 – 4452.6) greater for current operations (hydrocycling) than run-of-river operations (no hydrocycling) during the years 2003-09. While the precise value that hydrocycling increases maximum peak sub-daily flows requires additional study, the relationship and the sensitivity of the change in probability of inundation at different flows are what are most important to evaluate. Probability of inundation appears to be most sensitive to increases in nesting season maximum peak sub-daily flows in the mid-range values (7,500 to 12,500 cfs). Inundation probabilities change very little at upper thresholds at the North Bend Gage study site. The empirical data show that Least Terns rarely nest at some of the lower values (e.g., < 5,000). However, it is impossible to identify a lower threshold at this time.

Alternative Analysis B

After reviewing results from Analysis A, we conducted a second analysis to refine our understanding of how inundation probabilities are affected by hydrocycling. The objective of Analysis B is to determine whether and how much inundation probabilities change if nesting season maximum peak sub-daily flows are altered by the mean amount (1289.4 cfs) identified in the Hydrocycling Study report.

METHODS

The analysis is applicable for both Interior Least Terns and Piping Plovers. We used the complete history (1949–2009) of data from the USGS gage near North Bend. We used benchmark values of 7500, 10000, 12500, 15000, 17500, 20000 cfs. We determined whether the benchmark was exceeded at all benchmarks in all years during June and July; we refer to these exceedences as inundation events. Even though tern and plover breeding can and does occur outside of these months, June and July represent the period when breeding activities are at their peak. Thus, this period is critical and inundation events during this period will have the greatest impact on nesting terns and plovers. If high flows that exceed benchmarks occur early in the breeding season, the birds will delay nest initiation because no habitat is available to them. We only considered an inundation event to have occurred if there was a minimum ten day long period during which flows did not exceed the individual benchmark; this allowed birds to initiate breeding. If flows exceeded benchmarks persistently through the study period and no ten day periods below individual benchmarks occurred, inundation was considered to not have occurred, because there was a low likelihood that birds initiated nesting in the area.

We determined the proportion of years where inundation events occurred at each benchmark. We then used a Generalized Additive Model (GAM) in Program R to model the relationship between benchmark values and inundation probability. We then adjusted benchmark values by mean difference to represent the difference (1289.4 cfs) in nesting season maximum peak sub-daily flows between current operations and run of river. We then used the GAM to predict values in Program R at the adjusted benchmarks.

RESULTS

Results are shown in Figures 5-6 and Table 2.

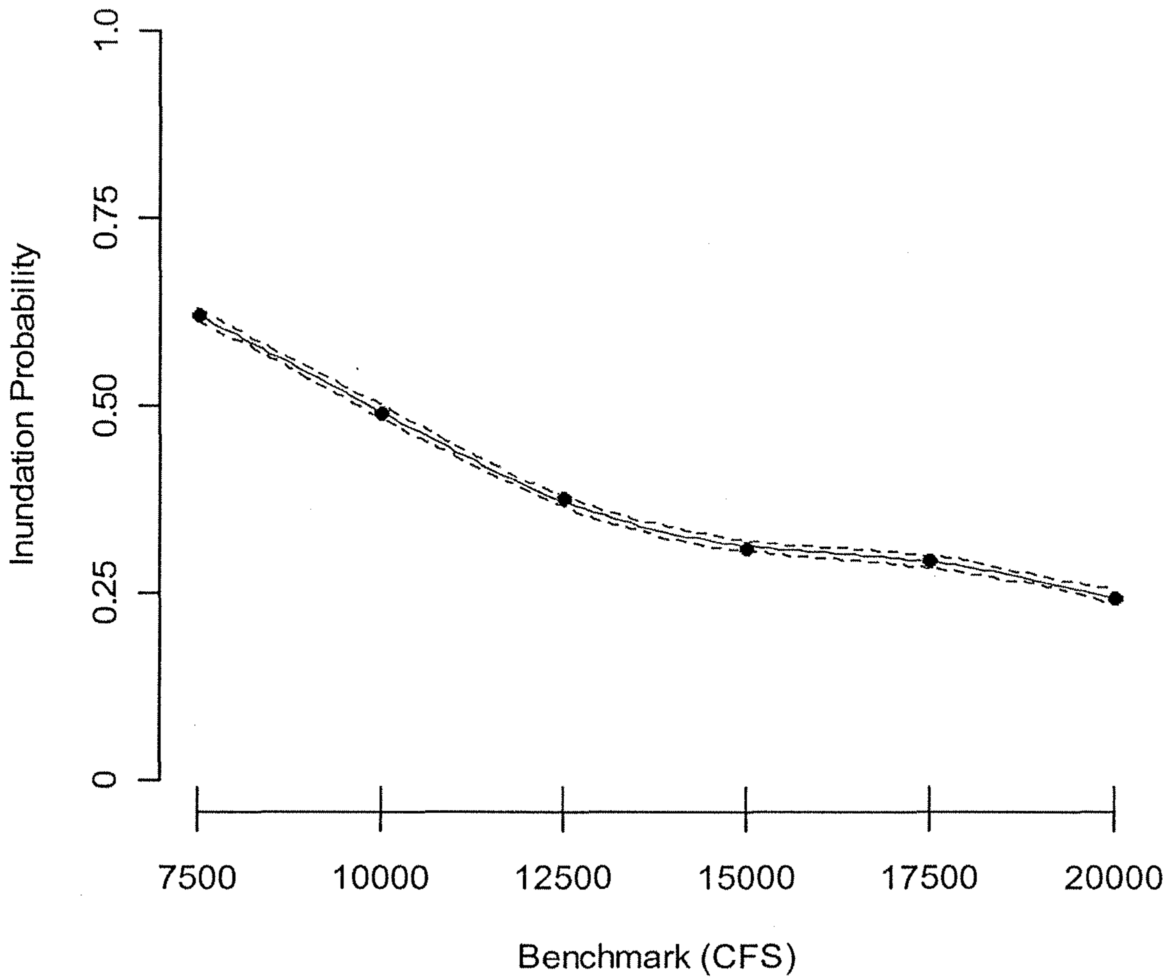

Figure 5. Generalized Additive Model (GAM) model and 95% confidence intervals (dashed lines) of inundation probability at benchmarks developed from North Bend Gage data 1949–2009.

Table 2.Predicted inundation probabilities at the individual benchmarks for current operations and run of river.

Discharge (CFS)	Current operations	Run of river
7500	0.688	0.623
10000	0.560	0.492
12500	0.431	0.377
15000	0.337	0.311
17500	0.304	0.295
20000	0.274	0.246

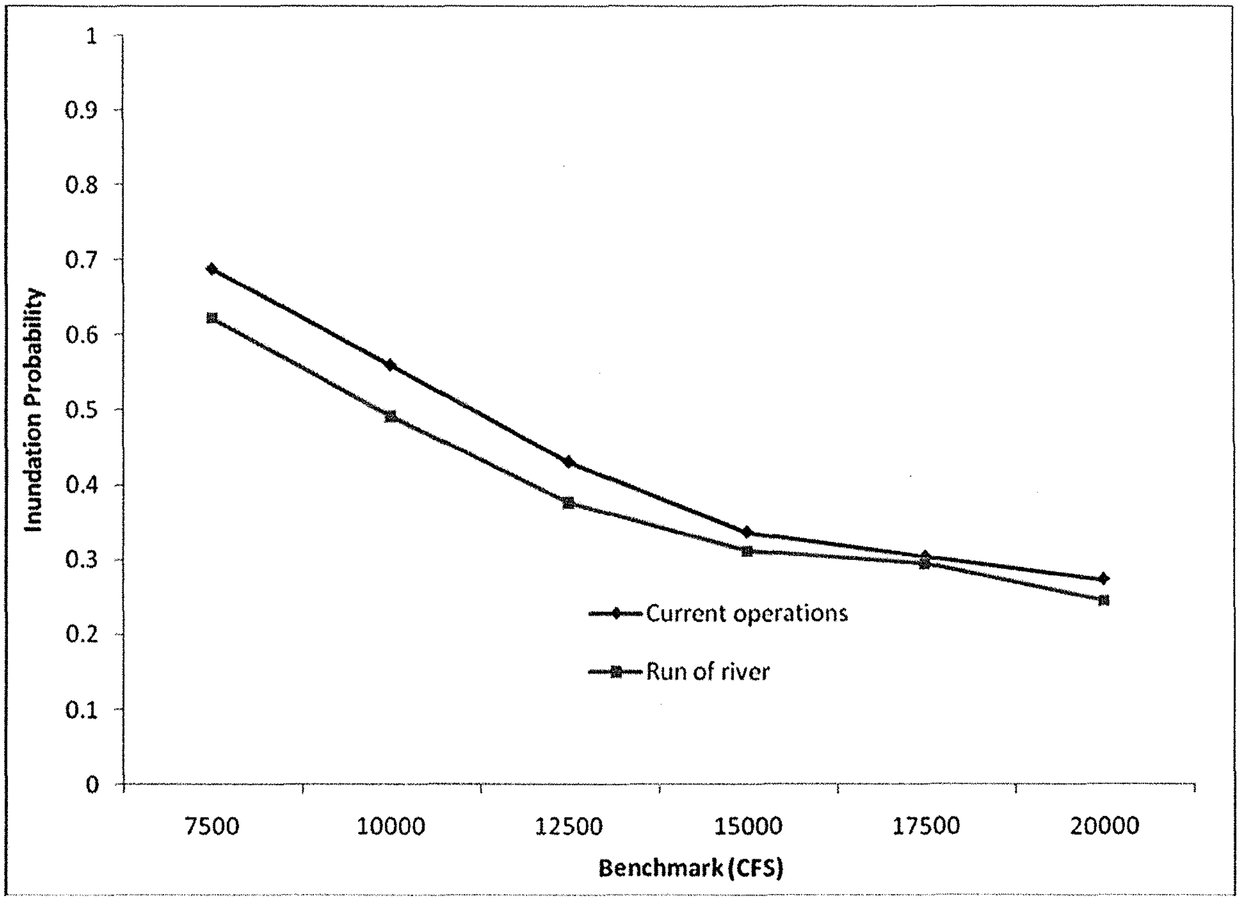

Figure 6.Predicted inundation probabilities for current operations and run of river over the range of benchmarks at the North Bend Gage 1949–2009

DISCUSSION

Analysis B produces results similar to Analysis A. Changes in benchmarks as a result of alterations in nesting season maximum peak sub-daily flows affects inundation probabilities. Specifically, increases in nesting season maximum peak sub-daily flows increase the probability of inundation.

CONCLUSION

The Hydrocycling Study executed by HDR should be tabled. We show that the greater the change in nesting season maximum peak sub-daily flows due to hydrocycling the greater the change in the probability of nest inundation. If hydrocycling increases nesting season maximum peak sub-daily flows, nests/chicks are more likely to be inundated. A higher level of inundation occurred in 2009 as a result of hydrocycling.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
April 8, 2011

OFFICE OF ENERGY PROJECTS

Project No. 1256-029 – Nebraska
Loup River Hydroelectric Project
Loup River Public Power District

Neal D. Suess, President/CEO
Loup Power District
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Reference: Commission Staff Comments on the Second Initial Study Report and Meeting Summary

Dear Mr. Suess:

Commission staff has reviewed the second initial study report and meeting summary for the Loup Project No. 1256, filed on February 11, 2011 and March 11, 2011, respectively. We do not have any comments on the meeting summary. Our comments and requests for clarification on the second initial study report are provided in Appendix A.

Any questions on these comments should be directed to Lee Emery at (202) 502-8379 or lee.emery@ferc.gov.

Sincerely,

Nicholas Jayjack, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosure: Schedule A
cc: Mailing List
Public Files

APPENDIX – A

Comments on Initial Study Report

Commission staff has reviewed the initial study report pursuant to 18 CFR § 5.15(c)(4), and has the following comments and clarifications:

Studies 1.0 (Sedimentation), 2.0 (Hydrocycling), and 5.0 (Flow Depletion and Flow Diversion) Goals and Methodology Discussion

Studies 1.0, 2.0, and 5.0 reference an Attachment A, Cross-Section Surveys – Ungaged Sites. Attachment A includes plots of the cross sections for five ungaged sites - two sites on the Loup River and three sites on the Platte River. Cross sections were surveyed either two or three times (depending on the location), to assess changes in the cross sections of the rivers over time. The cross-sectional information obtained from the surveys was used in hydraulic modeling, characterization of the stream morphology, and for calculating sediment transport indicators.

When we reviewed the plotted cross sections, we noticed a difference between the position of one or both of the end points (bank stations) used for measuring the cross sections. For example, at Site 3, XS 6, we observed that the cross section surveyed in September appeared to be about 6 percent wider than the same cross section surveyed in May. At the study results meeting, we asked whether the difference between measurements for XS 6 represented a widening of the channel through erosion of the river banks. Loup Power District explained that end points of the cross sections were not monumented so location of the bank stations of subsequent survey(s) may differ from previous survey(s). We need to better understand the possible differences in the cross section that result from variations in the bank station locations. Therefore, please describe how the locations of the bank stations were determined and the expected accuracy of the method used to determine the locations for subsequent survey(s). In addition, please describe how the coordinates of the points along the cross sections were obtained. Lastly, please discuss how the survey accuracy would affect assessment of changes in the cross section of the river over time.

Further, while studies 1.0, 2.0, and 5.0 are separately defined by the Commission's study plan determination, the effects of each process on project resources are inextricably linked. You discuss the effects of hydrocycling on sediment transport parameters in section 4.5 of study 2.0, as well as sediment indicators in relation to current and the no-diversion scenarios in section 4.6.4 of study 5.0. However, in both cases the discussion is limited to the modeling parameters and geometric relationships. The results of sedimentation transport, hydrocycling, and water diversion do not exist in isolation, and therefore, the results of each individual study could have cumulative impacts on select resources (i.e., piping plovers and interior least terns). As such, please provide a summary that synthesizes the results of the aforementioned studies to discuss how the results obtained from each study has the potential to collectively impact the presence, absence, and/or nesting success of piping plovers and interior least terns.

Study 1.0, Sedimentation

1. In the Initial Study Report, dated August 26, 2010, Loup Power District identified Study 1.0, Sedimentation as substantially complete and included the Sedimentation Study Report as Appendix A. The Second Initial Study Report, dated February 11, 2011, provided additional analyses and included an Addendum to the Sedimentation Study, identified as Appendix A. However, the Sedimentation Addendum did not integrate the results included in the earlier Sedimentation Study Report. Because data and analysis for the tasks are included in two separate documents, it is difficult for us to review and interpret the methodology and results for the entire Sedimentation Study. Therefore, the Updated Study Report, which is scheduled to be filed by August 26, 2011, should be prepared as a stand-alone comprehensive document that consolidates the new and previously filed information to clearly address the stated objectives for the Sedimentation Study.

2. In our "Determination on Requests for Modifications to the Loup River Hydroelectric Project Study Plan," dated December 20, 2010, we required that two referenced publications[1], which are either out-of-print or not otherwise in general circulation, be included with the Updated Study Report. These two documents should be filed with the Commission so that that may be entered into the record and, therefore, be available for our use in the proceeding and for agency and stakeholder review. Additionally, all publications that are out of general circulation and were referenced subsequent to the Initial Study Report should also be filed with the Commission so that that may be entered into the record.[2] Please note that if you also provide various documents to other interested entities about the project, you should also file these documents with the Commission to ensure they will be put in the public files for the project and so that staff will also be kept

[1] Chen, Rus and Stanton 1999, and Missouri River Basin Commission, 1975.

[2] This includes references used for the other studies submitted to the Commission that are not readily available (e.g., *see* Study 5.0 Flow Depletion and Flow Diversion discussion below).

aware of any pertinent issues relating to environmental resources that could be affected by the proposed project.

3. In our Study Plan Determination for the project issued on August 26, 2009, we required that Loup Power District prepare a sediment budget. The sediment budget would: (a) characterize sediment production and routing through river reaches in the project area; (b) describe the relative importance of various sediment sources; and (c) provide a basic framework to evaluate the relative magnitude of project effects on sediments. The sediment (budget) equation is based on continuity and is expressed as:

$$I + \Delta S = O$$

where I is input, ΔS is change in storage, and O is output.

The sediment budget is constructed for discrete "cells" or segments along the length of the river, with boundaries corresponding to important changes. For each cell, inputs generally include sediment carried from upstream, point source contributions, and sediment contributed from the watershed. Changes in storage typically include erosion or deposition within the stream channel or floodplain. Outputs can include point source withdrawals and sediment transported downstream from the cell.

Your sediment budget results presented in the "Sedimentation Addendum" (dated February 11, 2011) do not provide continuity. It does not appear to us that the cell-to-cell interaction of the sediment budget is currently linked in a cumulative, downstream direction. As a result, the net sediment contribution (or deficits caused by project dredging) from upstream reaches (cells) are not being factored into the subsequent downstream cells. Further, it does not appear to us that you have included the sediment flux resulting from floodplain and in-channel storage as a factor in the sediment budget.

For us to assess the potential cumulative effects of the project on aquatic and riparian habitat, please revise your sediment budget, as appropriate[3], to ensure that continuity is satisfied and sediment flux resulting from floodplain and channel storage is factored into all cells of the sediment budget.

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[3] Please provide the revised sediment budget to us in an Excel-format spreadsheet that contains all formulas, data, and results in a modifiable format. Include any and all related hydraulic computational spreadsheets or any ancillary analyses used to drive the sediment budget.

In addition, please revise the sediment budget data presented in table 5.1 and figures 5-1 and 5-2 of the Sedimentation Addendum so that they include every "node" or "process" within the sediment budget, and each node or process contains all the input information necessary to allow us to make a full examination of the budget's components and variables. Please revise the aforementioned table and figures to include:

a. the total annual volume of sediment contributed by each source; and

b. the annual sediment flux for all other sources and sinks in the reach (cell).

Study 5.0 Flow Depletion and Flow Diversion

In section 1.1.2, you state that the last survey for interior least terns and piping plovers on the Loup River was conducted by Nebraska Public Power District in June 2009 and by the U.S. Fish and Wildlife Service (FWS) in 2010. The 2009 data was included in the information filed with the Commission on December 13, 2010. Please also file the FWS' 2010 bird survey data with the Commission to update the record.

Table 1-1 outlines the distribution and abundance of interior least terns based on the 2005 surveys conducted by the U.S. Army Corps of Engineers. However, after staff review of the reference material listed, we were unable to locate the source of the numbers listed for total adults and colonies reported in the table. Further, the percentages generated for the "Loup River % of Nebraska Total" seem incorrect based on the accompanying numbers provided for both adults and colonies in the table. Please explain what numbers are being used to generate these percentages in Table 1-1, or where the percentages are located in the reference material.

The study clearly identifies cross-sectional measurements that were taken at sites both upstream and downstream of the diversion weir. Yet, it was difficult for us to discern which sites (if any) are located on the Platte River below the Loup River confluence and above the project tailrace. These three reaches are listed in the Director's Study Plan Determination as sites that are required to be studied. Please clarify or explain any variances to the Study Plan, which in this instance, appears to only include the collection of cross-sectional data from two stream reaches (i.e., those located above and below the diversion weir).

Lastly, staff was unable to locate two of the references cited for Table 1-2, specifically: Dinan, John J., 2001; and Ferland, C.L., and S.M. Haig, 2002. Please file these references with the Commission as described above in Study 1.0, paragraph 2.

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April 11, 2011

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

Dear Ms. Bose,

Nebraska Game & Parks Commission staff members have reviewed the Second Initial Study Report (SISR) for the **Loup River Hydroelectric Project, Nebraska, FERC Project No. 1256.** The SISR provided study reports for Sedimentation, Hydrocycling, Water Temperature in Loup River Bypass Reach, Flow Depletion and Diversion, Recreational Use, and Ice Jam Flooding.

The Nebraska Game & Parks Commission has been involved with this re-licensing effort from the beginning of the process. We have attended all of the meetings and provided letters which outlined a number of concerns and questions to include potential impacts to state-listed species. Please reference these for a detailed description of our earlier comments.

We appreciate the willingness of Loup Power District to undertake these studies. Specific comments on the SISR are provided below;

Comments on Study 4.0 – Water Temperature in the Loup River Bypass Reach

The goal of this study was "to determine if Project operations (flow diversion to the Loup Power Canal) materially affect water temperature in the Loup River bypass reach (with particular emphasis on the reach between the Diversion Weir and the confluence of Beaver Creek with the Loup River) or in the Platte River bypass reach". Water temperature in the bypass reach of the Loup River was identified as a potential issue due to the repeated occurrence of fish kills in this reach. The Nebraska Department of Environmental Quality (NDEQ) identified low flows and thermal stress as suspected causes of mortality in these fish kills. NDEQ has established temperature standards to support aquatic life in a warm water stream with a maximum limit of 90 degrees Fahrenheit (^{O}F). The SISR uses this standard as a threshold for possible fish mortality due to thermal stress.

The analyses reported in the SISR center around comparisons between the Merchiston site upstream of the Diversion structure and the Genoa site downstream of the Diversion. Flow data used for these comparisons included hourly flow discharge from USGS gaging stations for the period May through August 2010 (Table 4-1). Water temperature data was collected from USGS sensors and District data loggers for various periods between May 2 and August 30, 2010 (Table 4-1). Data on air and soil temperature, relative humidity and solar radiation were also collected for this time period from the High Plains Regional Climate Center station A255649 near Monroe.

Based on the analyses detailed in the SISR, the following conclusions were derived by HDR:

1. There is a statistically significant relationship between water temperature and air and soil temperatures.

2. There is not a statistically significant relationship between water temperature and flow, radiative flux or relative humidity.
3. The same relationships were found at the Merchiston site as found at Genoa site.
4. Synchronous daily oscillations in water temperature are seen between the stations.
5. A statistically significant relationship exists between the recorded water temperatures at the two stations.

In reviewing the analyses and results that led to these conclusions, the NGPC would like to make a number of comments regarding their applicability.

Relationship between Air temperature and Water Temperature

The statistically significant relationship between air and water temperatures reported in the SISR is commonly found in shallow, sand substrate prairie streams which lack significant cover providing shaded areas. Streams like the Loup River and the lower Platte River consistently demonstrate this relationship. This makes air temperature a good indicator for critical water quality issues like thermal stress that leads to fish kills.

Relationship between Flow and Water Temperature

The lack of a statistically significant relationship between stream discharge (flow) and water temperature as analyzed in the SISR is not surprising. The use of hourly discharge and temperature data for the entire period of May through August assures that such an insignificant relationship will be found. Discharge values for the period of record analyzed range from 997 to 28,420 cfs at Merchiston and 30 to 26,400 cfs at Genoa (Table 5.1). Water temperatures ranged from 48 to 93.2 degrees F at Merchiston and 48.2 to 94.8 degree F at Genoa during the same period. As the SISR states water temperatures can vary several degrees on a given day while flow remains relatively constant. This leads to a weak relationship and is further masked by the use of hourly data. Furthermore, the use of such broad temperature ranges and discharge ranges does not address the issue of Project impacts leading to fish kills which almost always occur during periods of high water temperatures and low flows. As the SISR states, "excursions above 90 degrees F occurred only when discharge was less than 5,000 cfs" at the Merchiston site while at Genoa, "excursions above 90 degrees F occurred when discharge were less than 1,500 cfs". Further analyses of the relationship between flow and water temperature for discharges less than 200 cfs (Figs 5-13 to 5-15) for the Genoa site suggest a more significant negative relationship may occur. Indeed, the examination of the relationship between air and water temperature at extremely low flows (Figs 5-19 through 5-24) suggest a tighter and slightly stronger relationship between these parameters as evidenced by the increase in model R^2 values given.

To further demonstrate the importance of focusing on low flows and high maximum temperatures, the SISR analyzed the probability of exceeding 90 degrees F based on flows. For the Merchiston data (above the diversion, there is a 45% probability of a temperature excursion occurring at flows less than 2,500 cfs and the probability increases as flow declines. For the Genoa data (below the diversion) there is approximately a 60% probability of a temperature excursion occurring at flows less than 150 cfs.

Water Temperature Relationships Between Sites

The stated conclusions that the relationships between water, soil and air temperatures and flow respond in the same manner between sites on the river is to be expected. However, this conclusion does not directly address the question whether or not there is a difference in the degree of change that might occur between sites dependent upon flow. The synchronous daily oscillations in water temperature that occur between the two sites are a testament to the influence of daily air temperatures and its similarity at both sites.

Figures 5-39 through 5-41 demonstrate that as temperatures increase in the river during the warmest portion of the year, the trend is for daily water temperature points at Genoa to increasingly be greater than those at Merchiston. This is seen in both the higher peaks of the daily oscillations as seen in Figure 5-39 as well as the trend towards more points being above the 1:1 Line as seen in Figures 5-40 and 5-41.

In a preliminary analysis, NGPC examined the maximum daily water temperatures from the two sites for days exhibiting water temperatures greater than the 90 degree F water quality standard. A total of 13 dates from the 2010 sampling period (May – August) qualified under these constraints. Daily maximum water temperatures at the Genoa site ranged from 1.08 to 4.14 degrees F greater than those measured at Merchiston. In addition, the relationship between daily maximum temperatures differences for the two sites and flow (measured at Genoa) is a negative one. As the flow declines, the difference between daily maximum water temperatures at the two sites increases. This suggests that at these higher temperatures, water temperatures reach a higher maximum on a given day below the diversion than above it. The fact that there is a statistically significant relationship between the recorded water temperatures at the two stations confirms that water temperature is reacting in a similar manner to the changes in air temperature. The absolute difference in daily maximum water temperatures between the two sites at high temperatures and relatively low flows suggests a potential impact due to water diversion.

Temperature, Flow and Fish Kills

This relationship described above seems to have been manifested during Loup River fish kills in 1988 and 1995. On both occasions, catastrophic fish kills occurred below the diversion and upstream of the confluence of Beaver Creek. During the June 20, 1988 fish kill, the water temperature in the Loup River immediately above the headgates diversion was 85 degrees F while the water temperature in the Loup River at the Genoa bridge was 96.8 F. The air temperature at the Monroe weather station was 101 F. River gage flow at Genoa was 13-17 cfs during the fish kill. During the July 1995 fish kill, water temperature in the Loup River below the headgates at the Genoa Bridge was 98 F with a river gage flow of 27 cfs and an air temperature of 104 F. Staff from DNR (at that time Dept of Water Resources) measured a flow of 22.7 cfs on July 13 while conducting the investigation of the fish kill. At that time DNR stated "Personnel at the headgate contend that the Power Canal had been diverting all the flow in the Loup River into the canal for the past couple weeks. It appears to me that a seam leak in the headgates and seepage is what produced the majority of the measured flow (22.7 CFS) in the Loup River."

In reviewing flow data compared to ambient air temperatures when fish kills did and did not occur, NGPC District staff came to the conclusion that fish kills occurred when river flows below the diversion were less than 50 cfs and air temperatures exceeded 98-100 F. NGPC staff advised LPPD in a letter dated November 15, 1995 that in order to avert fish kills, NGPC recommended a minimum flow of 50 cfs in the river below the diversion on days when the air temperature exceeded 98 F. This recommendation seemed to become a "gentlemen's agreement" between LPPD headgates operators and NGPC managers to alleviate fish kills below the diversion in summer months. NGPC staff have not investigated a catastrophic fish kill in this reach of river since 1995. This does not imply that fish kills have not occurred since 1995, but certainly no large scale fish kills followed by public reports and phone calls.

Further Recommendations

Study 4.0 – Water Temperature in the Loup River Bypass Reach data should be re-analyzed by HDR to determine the extent of any relationship between data for high daily air temperature and high daily water temperature, difference between sites in high daily water temperatures as measured at Merchiston and Genoa, and the effect flow has on this temperature difference (paying particular attention to high daily water temps above 90 F and bypass flows less than 200 cfs). Also, the relationship between flow, maximum daily air temperature and maximum daily water temperature, specifically on those days where the water temperatures are above 90 F and flows are less than 200 cfs, should be re-examined.

It is also recommended that the temperature study continue for at least one more season to gather additional data concentrated on the warm weather months of June through August and assuring that river water temperatures are collected during low flow periods. Due to the loss of data from temperature loggers for a variety of reasons in 2010, there simply may not be enough data points from the 2010 study to determine significant relationships under low flow, high temperature scenarios.

Comments on Study 2.0 --- Hydrocycling

Objective 2 of the Hydrocycling Study was to "To determine the potential for nest inundation due to both hydrocycling (current operations) and run-of-river operations".

The study was based on developing a conceptual theoretical-predictive model in effort to simplify the complex interrelationships in the Loup-Platte River system. The study, as it was initially devised, has been successfully completed. Now that the modeling component of the study has been completed and presented for review, the results must be validated by comparing it with empirical data. Following a review of the theoretical model results with empirical data, it is clear that the theoretical model bears little resemblance to what is happening in Loup-Platte River system. We take this opportunity to evaluate the theoretical model and identify some of the major problems. Specifically, we identify key assumptions that are unrepresentative on review and require modification if the study results are to be considered useful. These assumptions need to be revised if the study results are to be considered informative.

Assumptions unrepresentative on review that require revision

Assumption #1 – The analysis uses the highest flow event between 1 February and 25 April in a year as the benchmark flow for the breeding season in that year. While, on the surface this may appear to be a reasonable assumption, it is flawed as it makes the model inputs far too limiting. For example, A) this pre-nesting season sub-daily peak flow may be inadequate, in any one or even most years, to create the macro-form sandbar habitat that Interior Least Tern and Piping Plovers use for nesting, B) habitat forming flow events can and do occur outside this period, and, C) birds may be forced to delay the onset of breeding when high flow events occur early in the nesting season. The result is that the Study ignores high flow events that are critically important to terns and plovers and consider flows in the Study that are inconsequential.

Assumption # 2 –The model assumes that using a single point value for nest distributions is adequate; this means that if a benchmark flow occurs at single value, all nests (the actual variable of interest) also occur at a single benchmark value. In actuality, tern and plover nests are found at a variety of benchmark values. Indeed, the report acknowledges this point on page 24, under the first bullet point where it states:

> *"It is also assumed that nesting can occur above the highest pre-season flow due to pre-existing, higher sandbars. If habitat is available, nesting may also occur below this benchmark."*

While the report states that this point of fact is "assumed", it does not incorporate this assumption into the analysis (in fact, the assumption in the model is that all nests occur at a single point value). This sets up the analysis as an all or nothing question (effectively, a 'straw man') regarding the "possibility" of inundation at run-of-river or current operations. Effectively, the analysis avoids addressing the question of whether nests have a lower or higher *__probability__* of inundation from current operations compared to run-of-river. There is also a temporal distribution of nests that should be considered in the model.

Assumption # 3–The analysis assumes a "60-day period for successful nesting". This is an appropriate choice for Piping Plover; even though "breeding" is a more appropriate term rather than "nesting". More important is that the period in which Least Terns can fledge young is much shorter, approximately 25% shorter or 40-45 days. This is important because many more (4–20 times more) Least Tern pairs than Piping Plover pair have nested on the Lower Platte River in recent decades.

<u>Testing theoretical results with empirical data</u>

The opportunity exists to test the model with data collected in 2006–2009 by the Nebraska Game and Parks Commission Nongame Bird Program and the Tern and Conservation Partnership. Nesting data collected was provided to HDR and the District with the expectation that they would be used in their studies. Additionally, preliminary research results were also summarized in the following documents also made available to HDR and the District online:

Brown, M.B., and J.G. Jorgensen. 2010. "2010 Interior Least Tern and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

Brown, M.B., and J.G. Jorgensen. 2009. "2009 Interior Least Tern and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

Brown, M.B., and J.G. Jorgensen. 2008. "208 Interior Least Tern and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

Assumption #1 -The analysis uses the highest flow event between 1 February and 25 April in a year as the benchmark flow for the breeding season in that year.

A) This pre-nesting season sub-daily peak flow in most years is likely inadequate in some years to create macro-form sandbar habitat that Interior Least Tern and Piping Plovers use for nesting.

   Parham (2007, *Hydrologic Analysis of the lower Platte River from 1954-2004, with special emphasis on habitats of the endangered Least Tern, Piping Plover, and Pallid Sturgeon*) stresses the importance of high flow events. High flows events of a certain magnitude are necessary to create the macro-form sandbars that are used by terns and plovers. Parham (2007) identified 38,170 cubic feet per second (cfs) as the critical threshold necessary to create habitat of sufficient quality for nesting birds. Thus, flow events below this value, especially those well below this value, will be inconsequential in creating sandbars that birds would use for nesting. If sandbars of a certain size and relative elevation are not available, birds may select other sites or even systems for nesting. The Study uses benchmark flows under current operations of 9,077 and 26,523 for the years 2006 and 2007, respectively, in the model analysis. However, the data (in the possession of HDR and LPPD) show that no nesting was observed between river miles 50–103 in those years; a point not recognized by the Study. River Miles 50–103 is the section that includes the LPD diversion return and extends approximately fifty miles downstream from the diversion return.

B) Habitat forming flow events can and do occur outside this period

The highest flow events more often occur outside the pre-nesting season sub-daily peak (benchmark) flow period of 1 February to 25 April. Specifically, only 24% of the annual peak stream flow events occurred during that period at Louisville from 1953–2009 (Figure 1). A similar pattern can be expected throughout the Loup-Platte River system. Furthermore, peak stream flow only occurred in the 1 February to 25 April period during one year (2006) of the study. As noted above, this was a year when no nesting was observed in the portion of the river proximal to the project. Parham (2007) used a moving window analysis and identified the greatest discharge within 1.5 years of each nesting season as the appropriate habitat-forming flow. Although recent information suggests that, in some instances, macro-form sandbars used for nesting and created by habitat-forming high flow events may persist longer than the 1.5 year period (see Brown and Jorgensen 2010, pages 38–45).

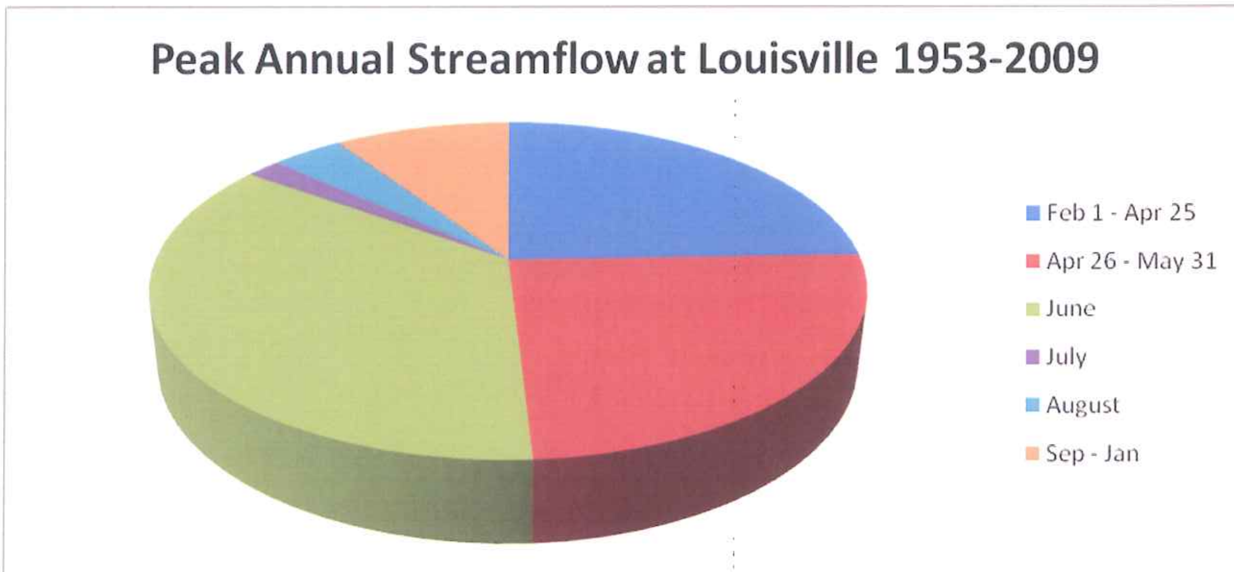

Figure 1.Proportion of annual peak streamflows that occur during temporal periods at Louisville, 1953–2009. The graphic shows that more than 75% of peak flow events occur outside the pre-nesting season sub-daily peak flow period.

C) Birds may be forced to delay the onset of breeding when high flow events occur early in the nesting season.

This occurs regularly when there are high flow events early in the nesting season. In fact, Least Terns are well adapted to such events. In 2008, a high flow event occurred during late May and early June. Following the high flow event, 150 Interior Least Tern and three Piping Plover nests were located on the Lower Platte River from River Mile 7 to 99 and the earliest initiation date for any nest on the Lower Platte River based on egg-floating data was 16 June. Parham (2007) correctly identified the highest discharge within 1.5 years of each nesting season as the appropriate flow relative to bird nesting, regardless of when it occurred.

Assumption #2 - The model assumes that using a single point value for nest distributions is adequate; this means that if a benchmark flow occurs at single value, all nests (the actual variable of interest) also occur at a single benchmark value.

Flow events that create habitat have maximum values, but these values do not represent the relative elevations of the sandbars or of all nests in the system. In 2009, we measured sandbar elevations. Figure 3 shows the benchmarks for individual transects on sandbars where nesting was observed between River Miles 60 and 102. Note: this is not a distribution of nest benchmarks. The graphic only shows that there is a wide range of benchmarks and that the data generally follow a normal distribution. It should be noted that most of the benchmarks in Figure 3 are greater than the Study's 2009 pre-nesting benchmark.

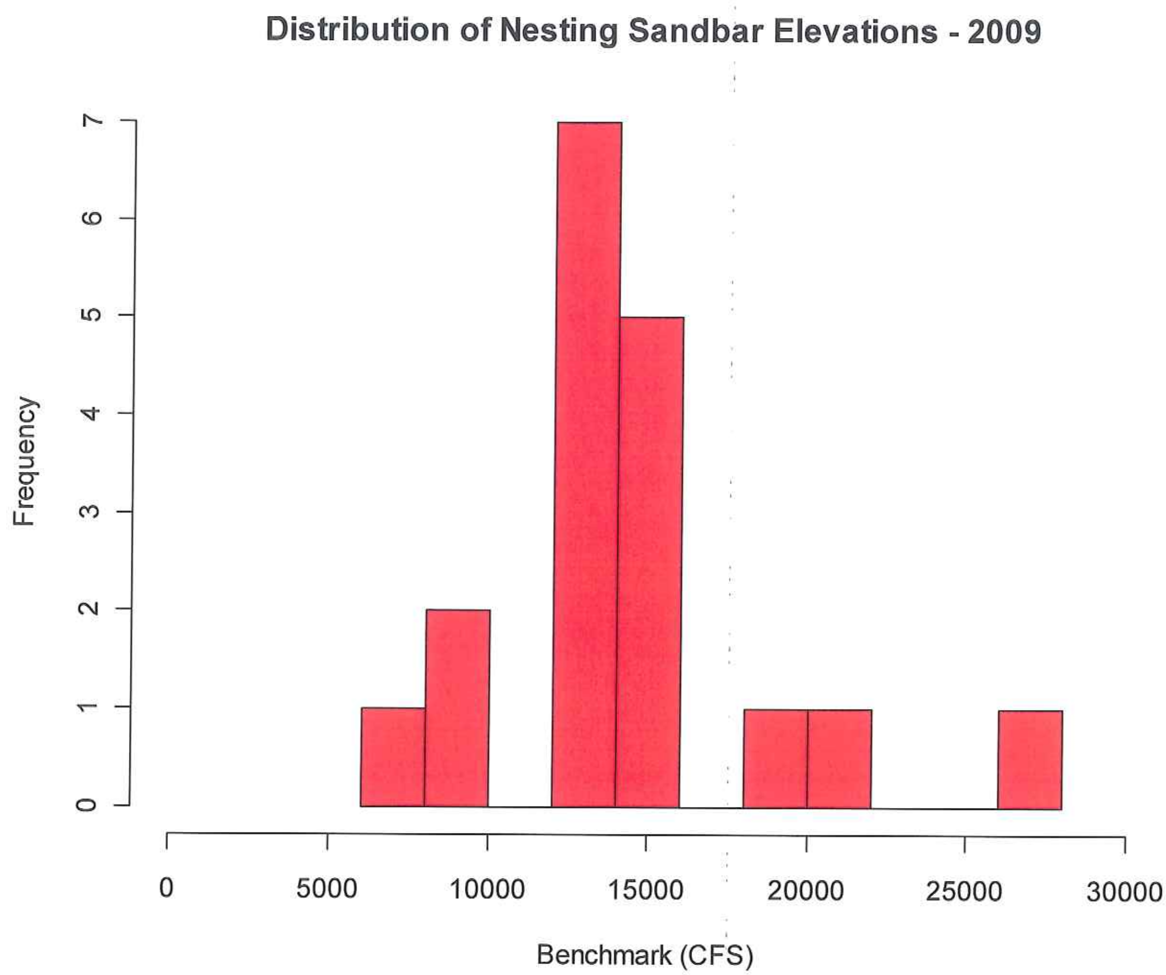

Figure 2. Distribution of nesting sandbar elevations in lower Platte River in 2009 between River Mile 60 – 102.

We were making regular visits to colonies in 2008–2009 and our observations show that inundation events do not necessarily have all or nothing consequences for the birds, as the Study assumes. In 2008, out of 153 nests (150 tern, 3 plover), only one nest was inundated and this was below the Salt Creek confluence. This is notable because Salt Creek flows were responsible for a substantial rise in Platte River levels on approximately 21 July 2008. In 2009, out of 311 (264 tern, 47 plover), 67 were known to be inundated, thus, it was only a partial inundation event. We do not have benchmark information for nests. Importantly, we can isolate the actual high flow event that actually resulted in the inundation of nests (it occurred during the third week of June and is highlighted in Figure 3, which is a graphic provided in the Study report).

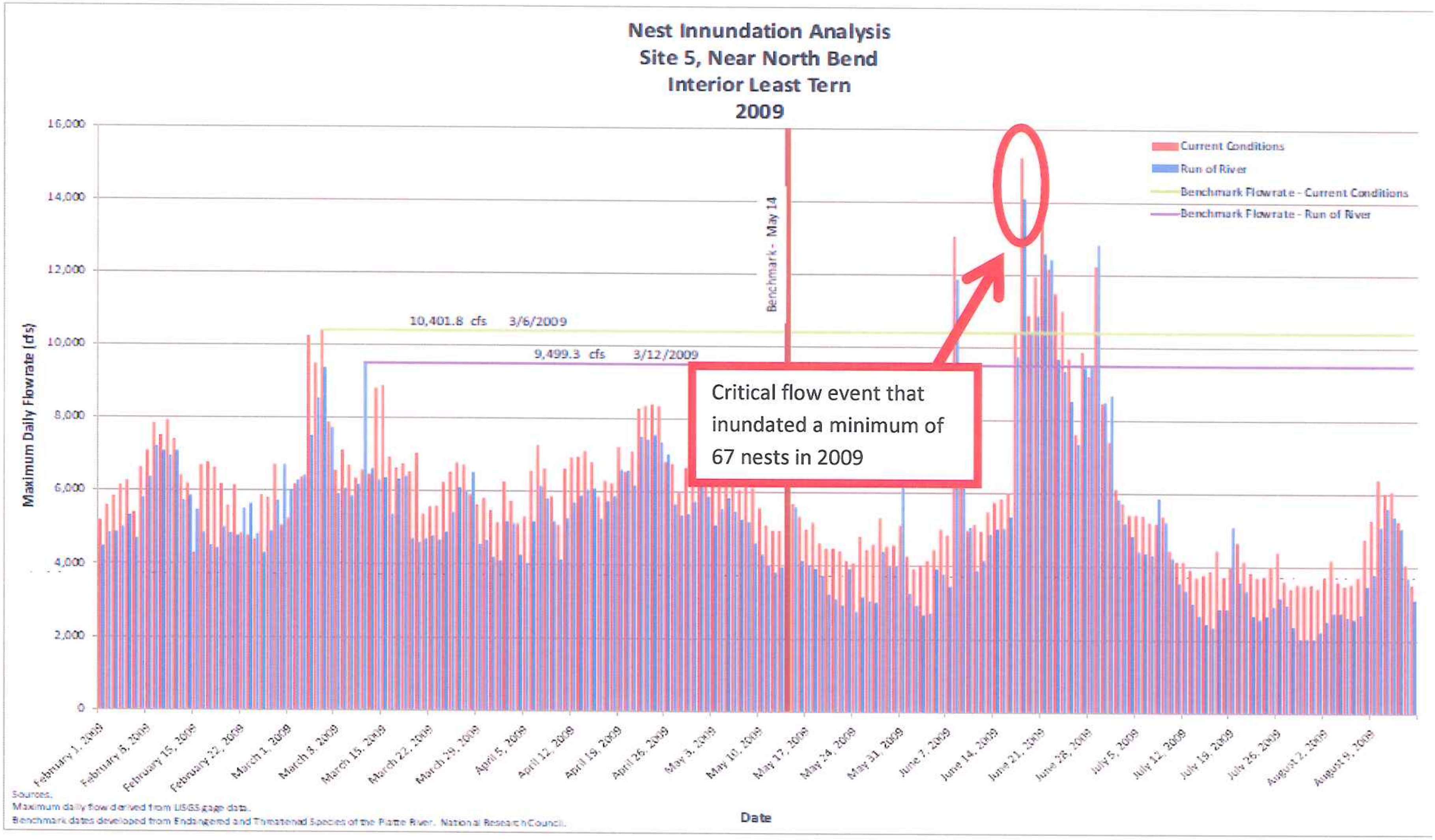

Figure 3: 2009 hydrograph from the 2009 study highlighting the high flow event that caused actual nest inundation. The Study results show that the difference in the peak of the current operations was 1122 cfs greater than the run of the river. Hydrocycling **did** inundate nests.

Alternative Analysis A

Here we provide that an additional analysis be considered. The objective of this analysis is to show the probability that a nest/chick will remain inundation free for a 45-day period during the breeding season over the range of benchmarks. Once this relationship is determined, we will be able to show how average changes in nesting season maximum peak sub-daily flows (we use the same terminology as the District's hydrocycling study) will change probabilities.

METHODS

The analysis is for Least Terns only. The 45-day period was selected because this is the time period required for a pair of terns to produce fledged young. Least Terns respond to changing conditions and are flexible in regard to when they initiate nests. We used the complete history (1949–2009) of river flow data from the USGS gage near North Bend. We conducted a moving window analysis for all years for a 45-day inundation free period from 1 May to 15 Aug at benchmark values of 2500, 5000, 7500, 10000, 12500, 15000, 17500, 20000, 25000. We make no assumptions regarding initial benchmarks because we have no information with which to make an informed decision. The moving window searches for uninterrupted 45-day during the 1 May to 15 Aug period. We used results from the analysis to determine the proportion of years where the benchmark value includes a 45-day inundation free period. We then used Generalized Additive Model (GAM) in Program R to model the relationship between a particular benchmark value and the probability that a benchmark will remain inundation free for 45 days during the 1 May to 15 Aug nesting season. GAMs are extensions of Generalized Linear Models that can be used to evaluate non-linear relationships. We refer to the initial relationship as run of river. Once the initial relationship was determined, we tested how inundation probabilities would change by adding 2,000 cfs to nesting season maximum peak sub-daily flows. In the analysis, based on a review of gage data we chose 2,000 cfs as the amount that hydrocycling increases peak sub-daily flows. This value is referred to as current operations.

RESULTS

Results of the analysis are shown in Table 1 and Figure 4.

Table 1. Predicted probabilities whether a benchmark would remain inundation free for a 45-day period during the breeding season at North Bend, Nebraska gage data 1949–2009.

Discharge (CFS)	Current Operations	Run of river
2500	0.115	0.279
5000	0.377	0.459
7500	0.574	0.705
10000	0.689	0.852
12500	0.852	0.934
15000	0.934	0.951
17500	0.951	0.967
20000	0.967	0.984

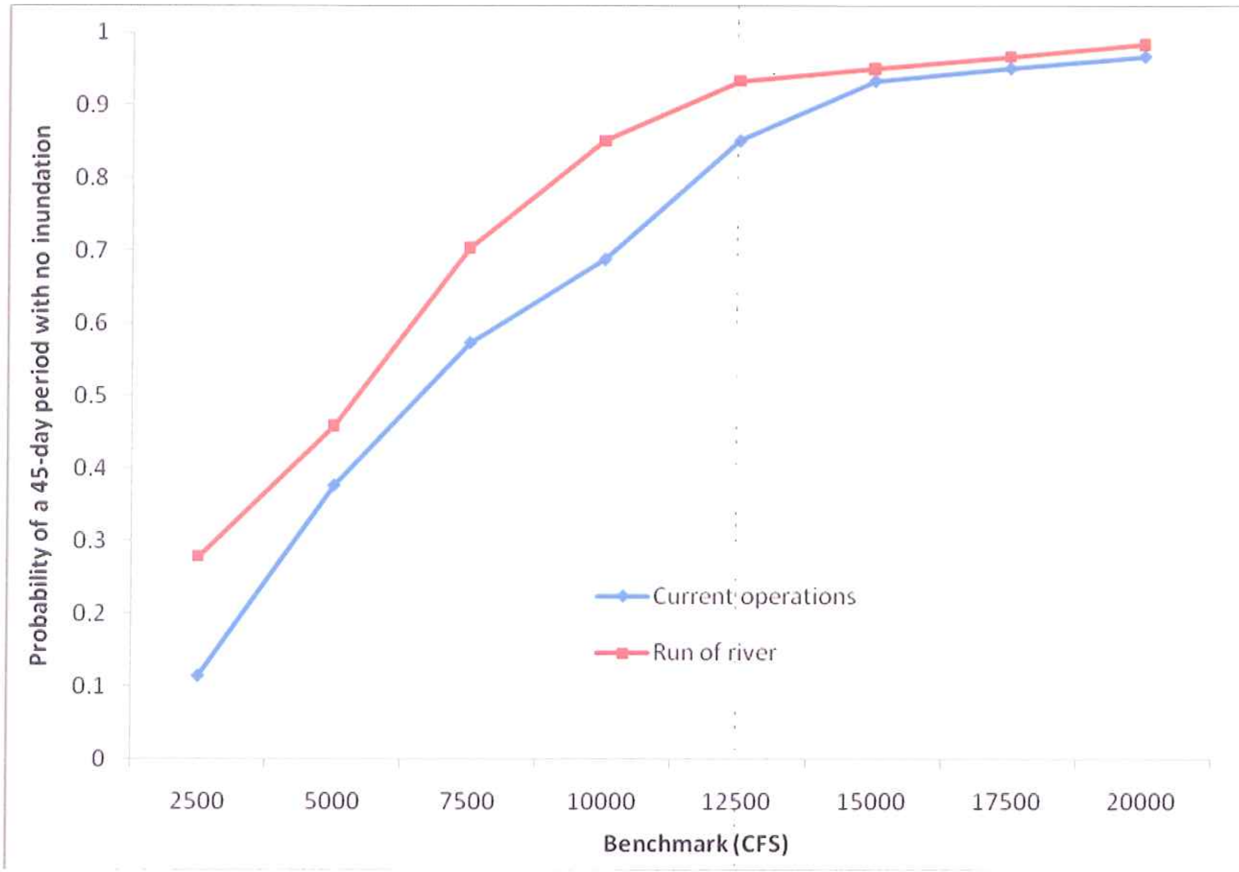

Figure 4. Probability of a 45-day inundation free period for current operations and run of river over the range of values observed at the North Bend Gage 1949–2009.

DISCUSSION

This analysis illustrates that changes in the nesting season maximum peak sub-daily flows will change probability of a 45-day inundation free period during the breeding season. A review of the District's Hydrocycling Study results show that average nesting season maximum peak sub-daily flows were 1289.4 ± 546.7 cfs (range 12.9 – 4452.6) greater for current operations (hydrocycling) than run-of-river operations (no hydrocycling) during the years 2003-09. While the precise value that hydrocycling increases maximum peak sub-daily flows requires additional study, the relationship and the sensitivity of the change in probability of inundation at different flows are what are most important to evaluate. Probability of inundation appears to be most sensitive to increases in nesting season maximum peak sub-daily flows in the mid-range values (7,500 to 12,500 cfs). Inundation probabilities change very little at upper thresholds at the North Bend Gage study site. The empirical data show that Least Terns rarely nest at some of the lower values (e.g., < 5,000). However, it is impossible to identify a lower threshold at this time.

Alternative Analysis B

After reviewing results from Analysis A, we conducted a second analysis to refine our understanding of how inundation probabilities are affected by hydrocycling. The objective of Analysis B is to determine whether and how much inundation probabilities change if nesting season maximum peak sub-daily flows are altered by the mean amount (1289.4 cfs) identified in the Hydrocycling Study report.

METHODS

The analysis is applicable for both Interior Least Terns and Piping Plovers. We used the complete history (1949–2009) of data from the USGS gage near North Bend. We used benchmark values of 7500, 10000, 12500, 15000, 17500, 20000 cfs. We determined whether the benchmark was exceeded at all benchmarks in all years during June and July; we refer to these exceedences as inundation events. Even though tern and plover breeding can and does occur outside of these months, June and July represent the period when breeding activities are at their peak. Thus, this period is critical and inundation events during this period will have the greatest impact on nesting terns and plovers. If high flows that exceed benchmarks occur early in the breeding season, the birds will delay nest initiation because no habitat is available to them. We only considered an inundation event to have occurred if there was a minimum ten day long period during which flows did not exceed the individual benchmark; this allowed birds to initiate breeding. If flows exceeded benchmarks persistently through the study period and no ten day periods below individual benchmarks occurred, inundation was considered to not have occurred, because there was a low likelihood that birds initiated nesting in the area.

We determined the proportion of years where inundation events occurred at each benchmark. We then used a Generalized Additive Model (GAM) in Program R to model the relationship between benchmark values and inundation probability. We then adjusted benchmark values by mean difference to represent the difference (1289.4 cfs) in nesting season maximum peak sub-daily flows between current operations and run of river. We then used the GAM to predict values in Program R at the adjusted benchmarks.

RESULTS

Results are shown in Figures 5-6 and Table 2.

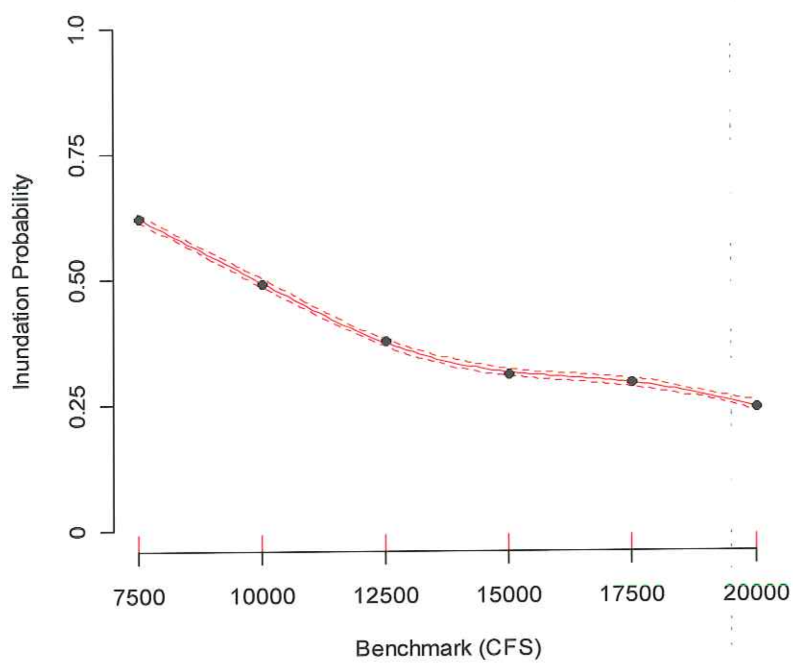

Figure 5. Generalized Additive Model (GAM) model and 95% confidence intervals (dashed lines) of inundation probability at benchmarks developed from North Bend Gage data 1949–2009.

Table 2.Predicted inundation probabilities at the individual benchmarks for current operations and run of river.

Discharge (CFS)	Current operations	Run of river
7500	0.688	0.623
10000	0.560	0.492
12500	0.431	0.377
15000	0.337	0.311
17500	0.304	0.295
20000	0.274	0.246

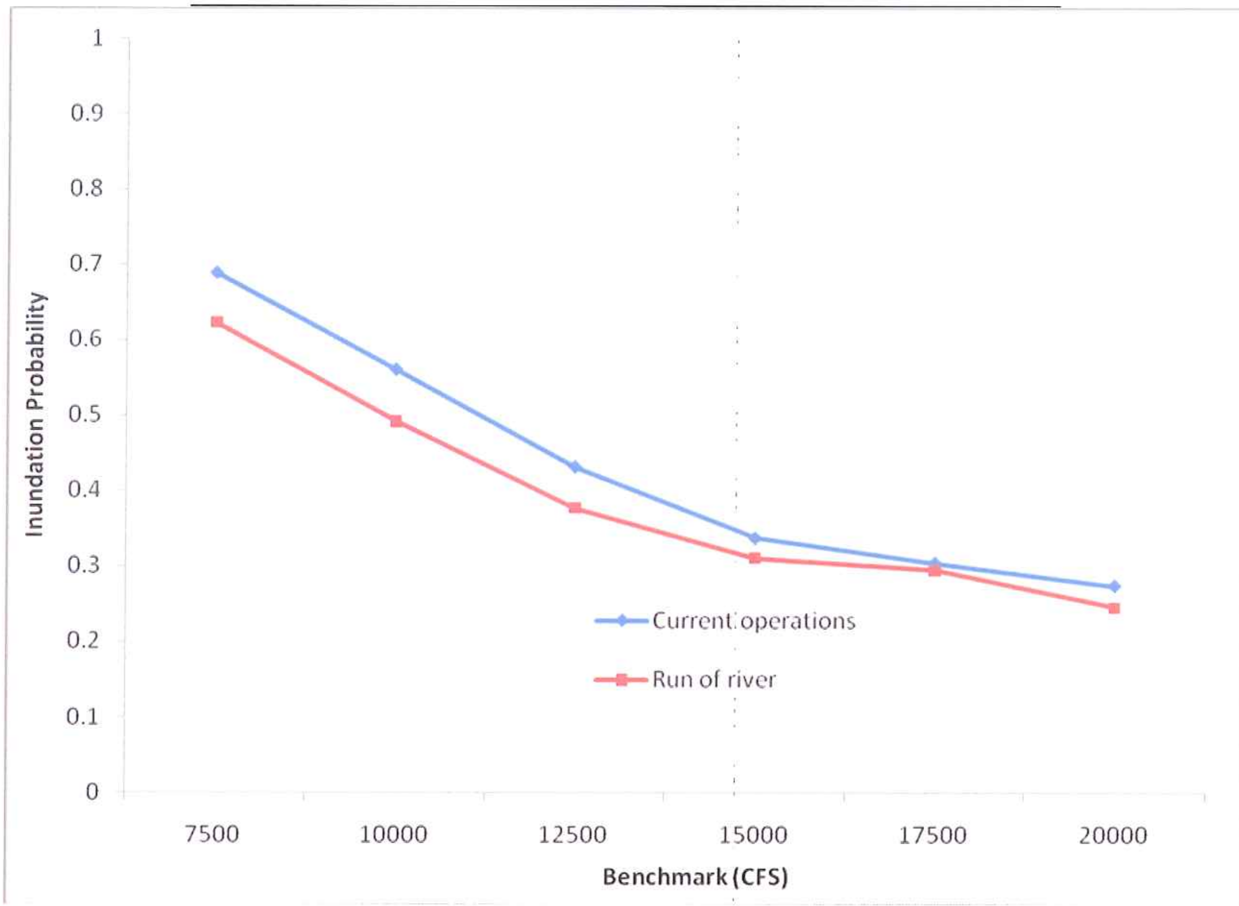

Figure 6.Predicted inundation probabilities for current operations and run of river over the range of benchmarks at the North Bend Gage 1949–2009

DISCUSSION

Analysis B produces results similar to Analysis A. Changes in benchmarks as a result of alterations in nesting season maximum peak sub-daily flows affects inundation probabilities. Specifically, increases in nesting season maximum peak sub-daily flows increase the probability of inundation.

CONCLUSION

Based on the comments above, the Hydrocycling Study should be reexamined by HDR. We show that the greater the change in nesting season maximum peak sub-daily flows due to hydrocycling, the greater the change in the probability of nest inundation. If hydrocycling increases nesting season maximum peak sub-daily flows, nests/chicks are more likely to be inundated. A higher level of inundation occurred in 2009 as a result of hydrocycling.

Thank you for considering these comments as part of the FERC relicensing of the Loup River Hydroelectric Project. If you have any questions or need additional information, feel free to contact me at 402-471-5422.

Sincerely,

Frank J. Albrecht

Frank Albrecht
Assistant Division Administrator

Cc Joel Jorgensen, NGPC
Jeff Schuckman NGPC
Dave Tunink, NGPC
Michelle Koch, NGPC
Gene Zuerlein, NGPC
Jeff Runge, USFWS
Bob Harms, USFWS

Document Content(s)

LOUP POWER DISTRICT "SERVING YOU ELECTRICALLY"

GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

April 28, 2011

Mr. Robert Harms
U.S. Fish and Wildlife Service
Nebraska Field Office
203 West Second Street
Federal Building, Second Floor
Grand Island, Nebraska 68801

RE: 2009 and 2010 Loup River Tern and Plover Information Request

Dear Mr. Harms:

As you are aware, Loup Power District (the District) is currently seeking a new operating license with the Federal Energy Regulatory Commission (FERC) for its hydroelectric facilities located on the Loup River near Genoa and Columbus, Nebraska. I would like to take this opportunity to thank you for your responses to our prior requests for information and for your involvement thus far in the re-licensing process.

The District has completed one year of studies as they relate to the re-licensing effort and have presented these study results. To date, the District has obtained tern and plover survey data from Nebraska Game and Parks Commission (NGPC), as the agency tasked with updating and managing the Nebraska Least Tern and Piping Plover Database. Per a request from FERC at the second Initial Study Results meeting, we have received the updated database from NGPC through the 2010 nesting season. It has been brought to our attention through discussions with Joel Jorgensen, Nongame Bird Program Manager at NGPC, that the USFWS conducted interior least tern and piping plovers surveys on the Loup River in 2009 and 2010 and that data for these surveys has not yet been provided to NGPC for input into the database.

At this time, I would like to request any and all 2009 and 2010 interior least tern and piping plover population, nesting, chick counts, fledge counts, productivity information, nest and adult locations, trend information, and any habitat information collected by the USFWS during the 2009 and 2010 breeding seasons for the Loup River (both on- and off-river data). This information would be used to update existing studies and is critical to completion of the biological assessment and continuation of the environmental review of the Project. Please provide this data electronically (excel, database, shapefiles, etc) to expedite our review of the data.

I appreciate your assistance in providing information for the relicensing effort as quickly as possible. The information requested will be used for analytical purposes and the only information that will be published is information related to general trends and observations. Location specific information will not be made available to the general public without the consent of the USFWS and NGPC.

Please submit the requested information electronically as soon as possible to HDR Engineering, the District's relicensing consultant:

> Matt Pillard
> HDR Engineering
> 8404 Indian Hills Drive
> Omaha, NE 68114
> Matt.pillard@hdrinc.com

Please feel free to contact Matt Pillard (402-399-1186) or Melissa Marinovich (402-399-1317) of HDR if you have any questions or clarifications regarding this information request. Thank you for your assistance.

Sincerely,

Neal D. Suess
President/CEO
Loup Public Power District

cc: Lee Emery, FERC
Joel Jorgensen, NGPC
Matt Pillard, HDR

Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Tuesday, May 10, 2011 7:21 PM
To: Thompson, Wendy
Subject: FW: Loup Power District - Data Request

Follow Up Flag: Follow up
Flag Status: Flagged

For PW & the DB. Thx!

From: Robert_Harms@fws.gov [mailto:Robert_Harms@fws.gov]
Sent: Tuesday, May 03, 2011 10:51 AM
To: Pillard, Matt
Cc: Richardson, Lisa (Omaha); Neil Suess
Subject: Re: Loup Power District - Data Request

Thanks--yes, we did the survey work, but only in 2010; I will provide the survey information to you as requested. The survey data is still in rough format and needs to be compiled and summarized--that will take approximately 2-4 weeks. I'll be in touch.

Bob

Robert R. Harms
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 West Second Street
Grand Island, Nebraska 68801
Phone: 308-382-6468, Extension 17
Fax: 308-384-8835
robert_harms@fws.gov

"Pillard, Matt" <Matt.Pillard@hdrinc.com>

"Pillard, Matt" <Matt.Pillard@hdrinc.com>

04/29/2011 12:58 PM

To"'robert_harms@fws.gov'" <robert_harms@fws.gov>

ccNeil Suess <nsuess@loup.com>, "Richardson, Lisa (Omaha)" <Lisa.Richardson@hdrinc.com>

SubjectLoup Power District - Data Request

Hi Bob.

Please see attached letter. Let me know if you have any questions. Have a great weekend.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate
HDR | **One Company** | ***Many Solutions***

Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Tuesday, May 10, 2011 6:50 PM
To: Thompson, Wendy
Subject: FW: Loup Power District - Data Request

Follow Up Flag: Follow up
Flag Status: Flagged

Please put on PW and in the DB. Thanks!

From: Robert_Harms@fws.gov [mailto:Robert_Harms@fws.gov]
Sent: Tuesday, May 10, 2011 12:35 PM
To: Pillard, Matt
Cc: Richardson, Lisa (Omaha); Neil Suess
Subject: Re: Loup Power District - Data Request

Matt:

A staff member has recently been assigned to compile and summarize the requested tern and plover survey information. I will have a copy of the information to you by May 27, 2011.

Bob

Robert R. Harms
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 West Second Street
Grand Island, Nebraska 68801
Phone: 308-382-6468, Extension 17
Fax: 308-384-8835
robert_harms@fws.gov

"Pillard, Matt" <Matt.Pillard@hdrinc.com>

"Pillard, Matt" <Matt.Pillard@hdrinc.com>

04/29/2011 12:58 PM

To "'robert_harms@fws.gov'" <robert_harms@fws.gov>

cc Neil Suess <nsuess@loup.com>, "Richardson, Lisa (Omaha)" <Lisa.Richardson@hdrinc.com>

Subject Loup Power District - Data Request

Hi Bob.

Please see attached letter. Let me know if you have any questions. Have a great weekend.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate

From: Pillard, Matt
To: "frank.albrecht@nebraska.gov"; "john.bender@nebraska.gov"; "jeff_runge@fws.gov"; "robert_harms@fws.gov"; "barbara.j.friskopp@usace.army.mil"; "abaum@upperloupnrd.org"; "randy_thoreson@nps.gov"; "bob.puschendorf@nebraska.gov"; "mkuzila1@unl.edu"; "david.jundt@dhhs.ne.gov"; "jmiyoshi@lpnnrd.org"; "steve.chick@ne.usda.gov"; "pcclerk@megavision.com"; "cityadmin@cablene.com"; "ncpza@hamilton.net"; "rbishop@cpnrd.org"; "jwinkler@papionrd.org"; "lpsnrd@lpsnrd.org"; "jmangi@columbusne.us"; "cgenoa@cablene.com"; "monroe@megavision.com"; "calms@neb.rr.com"; "danno@nohva.com"; "mbrown9@unl.edu"; "rtrudell@santeedakota.org"; "jblackhawk@aol.com"; "vwills@pawneenation.org"; "Brian.Dunnigan@nebraska.gov"; "msittler@lpsnrd.org"; "butchk@nctc.net"; "robertm@llnrd.org"; "jmsunne@nppd.com"; "jalexand@usgs.gov"; "jjshadl@nppd.com"; "cothern.joe@epa.gov"; "justin.lavene@nebraska.gov"; "bobbie.wickham@nebraska.gov"; "kennyj@headwaterscorp.com"; "mferguson@gp.usbr.gov"; "Willie_Taylor@ios.doi.gov"; "Robert_F_Stewart@ios.doi.gov"; "jeddins@achp.gov"; "kenneth.sessa@dhs.gov"; "peggy.harding@ferc.gov"; "djjarecke@clarkswb.net"; "al.berndt@nebraska.gov"; "astuthman@leg.ne.gov"; "ksullivan@leg.ne.gov"; "clangemeier@leg.ne.gov"; "adubas@leg.ne.gov"; "chairmanrhodd@ponca.com"; "asheridan@omahatribe.com"; "don_simpson@blm.gov"; "nicholas.jayjack@ferc.gov"; "jill.dolberg@nebraska.gov"; "prescott.brownell@noaa.gov"; "marvp@megavision.com"; "lewrightjr@gmail.com"; "thowe@ponca.com"; "zach_nelson@bennelson.senate.gov"; "julias@poncatribe-ne.org"; "todd.crawford@mail.house.gov"; "louis-pofahl@mail.house.gov"; "emily_brummund@johanns.senate.gov"; "deb.vanmatre@mail.house.gov"; "tpetr@loup.com"; "mike.black@bia.gov"; "janet.hutzel@ferc.gov"; "isis.johnson@ferc.gov"; "lee.emery@ferc.gov"; "paul.makowski@ferc.gov"
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Teresa Petr; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Richardson, Lisa (Omaha); Sigler, Bill; Waldow, George; White, Stephanie
Subject: Loup Power District - FERC Relicensing: Web Posting
Date: Friday, May 13, 2011 4:32:24 PM
Attachments: image001.jpg

Relicensing Participants:

On May 11th the District filed responses to all comments received on the Second Initial Study Report (SISR) and SISR meeting notes with FERC. These responses are available on the District's Relicensing website as well as on the FERC e-Library (Docket No. P-1256-029).

Thank you and please let me know if you have any questions.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate
HDR | **One Company** | ***Many Solutions***
8404 Indian Hills Drive | Omaha, NE | 68114-4098
Phone: 402.399.1186 | Fax: 402.399.1111
Email: Matt.Pillard@hdrinc.com

Please consider the environment before printing.

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Via Electronic Filing

May 11, 2011

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

Subject: Loup River Hydroelectric Project
SISR Meeting Comments
FERC Project No. 1256
Docket 1256-029

Dear Secretary Bose,

Loup River Public Power District (Loup Power District or District) herein electronically files its responses to comments received on the Second Initial Study Results (SISR) Meeting Summary and the Second Initial Study Report for relicensing the Loup River Hydroelectric Project, FERC Project No. 1256 (Project). The District is the owner, operator, and original licensee of the Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

In accordance with 18 CFR §5.15, the District presented the Second Initial Study Results to FERC and other relicensing participants during the Second Initial Study Results Meeting held on February 23 and 24, 2011. After the meeting, comments were received the following:

- Commission Staff
- U.S. Fish and Wildlife Service
- Nebraska Game and Parks Commission

Attached please find the District's responses to the comments received on the SISR. Reponses to each agency's comments are provided separately in Attachments A through C, respectively. No comments were received on the SISR Meeting Summary.

If you have any questions regarding the District's responses, or any information provided by the District, please contact me at (402) 564-3171 ext. 268.

Respectfully Submitted,

Neal D. Suess
President/CEO
Loup Power District

Attachments

Attachment A

District response to Commission Staff comments on the Second ISR dated April 8, 2011.

District General Comments

District responses to each of the Commission's April 8 comments are provided below. Because most of the comments relate to the fundamental question of whether hydraulic dredging and hydrocycling adversely impact habitat, the District believes that the following general comment is appropriate to all or most of the Commission's comments:

General Comment 1 – Body of Evidence on Project Impacts on Morphology

The District believes that in wording its comments, FERC seeks to understand what impact hydraulic dredging of sediments at the Project Diversion Weir and hydrocycling at the Columbus Powerhouse for optimal power production, has on habitat. The District also believes that it has demonstrated that the appropriate (and FERC approved) measure of impacts on habitat is properly interpreted through measures of Project impacts on river morphology.

The District performed several separate analyses in the Sedimentation and Hydrocycling studies. These analyses included:

- review of existing literature which identified conclusions of dynamic equilibrium by USACE and others
- sediment transport and parameter calculations
- sediment budget development, including sediment yield adjustments
- specific gage analyses (by the District and USGS)
- regime analysis (by the District and others).

Separately, the results of these analyses provide useful insights into the state of the rivers' morphology. However, when all of the District's analyses from both studies are compiled; they culminate in a complete body of evidence which consistently and irrefutably demonstrates the following:

- the supply of sediment by far exceeds the capacity (not supply limited even with continued hydraulic dredging);
- both the Loup River bypass reach and lower Platte River are in dynamic equilibrium;
  both the Loup River bypass reach and the lower Platte River are well seated in the braided morphology regime for flow hydrographs of all operating scenarios.

1. **Comments on Studies 1.0, 2.0, and 5.0 Goals and Methodology Discussion**
   Commission Comment 1
   "Studies 1.0, 2.0, and 5.0 reference an Attachment A, Cross-Section Surveys – Ungaged Sites. Attachment A includes plots of the cross sections for five ungaged sites - two sites on the Loup River and three sites on the Platte River. Cross sections were surveyed either two or three times (depending on the location), to assess changes in the cross sections of the rivers over time. The cross-sectional information obtained from the surveys was used in hydraulic modeling, characterization of the stream morphology, and for calculating sediment transport indicators.

   "When we reviewed the plotted cross sections, we noticed a difference between the position of one or both of the end points (bank stations) used for measuring the cross sections. For example, at Site 3, XS 6, we observed that the cross section surveyed in September appeared to be about 6 percent wider than the same cross section surveyed in May. At the study results meeting, we asked whether the difference between measurements for XS 6 represented a widening of the channel through erosion of the river banks. Loup Power District explained that end points of the cross sections were not monumented so location of the bank stations of subsequent survey(s) may differ from previous survey(s). We need to better understand the possible differences in the cross section that result from variations in the bank station locations. Therefore, please describe how the locations of the bank stations were determined and the expected accuracy of the method used to determine the locations for subsequent survey(s). In addition, please describe how the coordinates of the points along the cross sections were obtained. Lastly, please discuss how the survey accuracy would affect assessment of changes in the cross section of the river over time."

   District Response
   A GPS grade survey instrument (Leica GS09 GNSS) was used to perform the survey. The vertical and horizontal tolerances for this equipment are approximately 1 centimeter. The cross section endpoints were established using the latitude and longitude in the GPS equipment. Based on a review of the survey points, and the equipment tolerances, it was determined that the points as reported are accurate. Regarding cross section 6 at site 3, it appears that some bank erosion did occur on the left bank, most likely resulting from the large flow event that moved through the reach after the May survey. However, on the right bank, the end point elevation for the May survey was approximately 5 feet lower in May than in August. This suggests that the survey performed in May did not extend to the actual high bank. The August and September surveys showed no difference in the cross section endpoints. All differences in cross-section width that may be attributed to bank erosion or accretion, occurred upstream of the Project Tailrace Return. There were negligible changes in the cross-section widths at locations

downstream of the Tailrace Return. This suggests that Project return flows had no impact on bank erosion or accretion based on the cross section-measurements. The most important data are the “in channel” elevation differences, which indicate unconstrained and dynamic bed material re-distribution typical of braided systems.

Commission Comment 2

“Further, while studies 1.0, 2.0, and 5.0 are separately defined by the Commission’s study plan determination, the effects of each process on project resources are inextricably linked. You discuss the effects of hydrocycling on sediment transport parameters in section 4.5 of study 2.0, as well as sediment indicators in relation to current and the no-diversion scenarios in section 4.6.4 of study 5.0. However, in both cases the discussion is limited to the modeling parameters and geometric relationships. The results of sedimentation transport, hydrocycling, and water diversion do not exist in isolation, and therefore, the results of each individual study could have cumulative impacts on select resources (i.e., piping plovers and interior least terns). As such, please provide a summary that synthesizes the results of the aforementioned studies to discuss how the results obtained from each study has the potential to collectively impact the presence, absence, and/or nesting success of piping plovers and interior least terns.”

District Response

The District understands the need to evaluate the total Project effects in relation to environmental resources, particularly threatened or endangered species. As such, it has been the District’s intent to provide a summary of all study results and other information gathered for each species in the Draft License Application (to be filed November 18, 2011) as well as in the Draft Biological Assessment to be included with the Draft License Application. Based on the Commission’s request, the District will also provide a summary related to each species in the Updated Study Report to be filed on August 26, 2011.

2. Comments on Study 1.0, Sedimentation

Commission Comment 1

“In the Initial Study Report, dated August 26, 2010, Loup Power District identified Study 1.0, Sedimentation as substantially complete and included the Sedimentation Study Report as Appendix A. The Second Initial Study Report, dated February 11, 2011, provided additional analyses and included an Addendum to the Sedimentation Study, identified as Appendix A. However, the Sedimentation Addendum did not integrate the results included in the earlier Sedimentation Study Report. Because data and analysis for the tasks are included in two separate documents, it is difficult for us to review and interpret the methodology and results for the entire Sedimentation Study. Therefore, the Updated Study Report, which is scheduled to be filed by August 26, 2011, should be prepared as a stand-alone comprehensive document that consolidates the new and previously filed information to clearly address the stated objectives for the Sedimentation Study."

District Response
The District will prepare a single sedimentation report that includes all analyses from the First and Second Initial Study Reports as well as analyses that are currently ongoing. This all-inclusive report will be filed on August 26, 2011, unless analysis from additional study determinations is still ongoing, in which case the report will be filed upon completion of the additional analysis.

Commission Comment 2
"In our "Determination on Requests for Modifications to the Loup River Hydroelectric Project Study Plan," dated December 20, 2010, we required that two referenced publications, which are either out-of-print or not otherwise in general circulation, be included with the Updated Study Report. These two documents should be filed with the Commission so that that may be entered into the record and, therefore, be available for our use in the proceeding and for agency and stakeholder review. Additionally, all publications that are out of general circulation and were referenced subsequent to the Initial Study Report should also be filed with the Commission so that that may be entered into the record. Please note that if you also provide various documents to other interested entities about the project, you should also file these documents with the Commission to ensure they will be put in the public files for the project and so that staff will also be kept aware of any pertinent issues relating to environmental resources that could be affected by the proposed project."

District Response
The District filed the following supplemental information with the Commission on April 21, 2011:

- Trends in Channel Gradation in Nebraska Streams, 1913-95; U.S. Geological Survey Water-Resources Investigations Report 99-4103 (Chen, Rus, and Stanton, 1999)
- Platte River Basin, Nebraska, Level B Study; "Land Conservation and Sedimentation"; Missouri River Basin Commission; September 1975
- 2001 Piping Plover and Least Tern Census – Nebraska; Nebraska Game and Parks Commission (Dinan, John J. 2001)
- 2001 International Piping Plover Census; U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center (Ferland, C.L., and S.M. Haig, 2002)

Commission Comment 3

"In our Study Plan Determination for the project issued on August 26, 2009, we required that Loup Power District prepare a sediment budget. The sediment budget would: (a) characterize sediment production and routing through river reaches in the project area; (b) describe the relative importance of various sediment sources; and (c) provide a basic framework to evaluate the relative magnitude of project effects on sediments. The sediment (budget) equation is based on continuity and is expressed as:

$$I + \Delta S = O$$

where I is input, ΔS is change in storage, and O is output.

"The sediment budget is constructed for discrete "cells" or segments along the length of the river, with boundaries corresponding to important changes. For each cell, inputs generally include sediment carried from upstream, point source contributions, and sediment contributed from the watershed. Changes in storage typically include erosion or deposition within the stream channel or floodplain. Outputs can include point source withdrawals and sediment transported downstream from the cell.

"Your sediment budget results presented in the "Sedimentation Addendum" (dated February 11, 2011) do not provide continuity. It does not appear to us that the cell-to-cell interaction of the sediment budget is currently linked in a cumulative, downstream direction. As a result, the net sediment contribution (or deficits caused by project dredging) from upstream reaches (cells) are not being factored into the subsequent downstream cells. Further, it does not appear to us that you have included the sediment flux resulting from floodplain and in-channel storage as a factor in the sediment budget.

"For us to assess the potential cumulative effects of the project on aquatic and riparian habitat, please revise your sediment budget, as appropriate[1], to ensure that continuity is satisfied and sediment flux resulting from floodplain and channel storage is factored into all cells of the sediment budget.

"In addition, please revise the sediment budget data presented in table 5.1 and figures 5-1 and 5-2 of the Sedimentation Addendum so that they include every "node" or "process" within the sediment budget, and each node or process contains all the input information necessary to allow us to make a full examination

[1] Please provide the revised sediment budget to us in an Excel-format spreadsheet that contains all formulas, data, and results in a modifiable format. Include any and all related hydraulic computational spreadsheets or any ancillary analyses used to drive the sediment budget.

of the budget's components and variables. Please revise the aforementioned table and figures to include:

a. the total annual volume of sediment contributed by each source; and

b. the annual sediment flux for all other sources and sinks in the reach (cell)."

District Response

The District developed a sediment budget as required in the Study Plan Determination (SPD) and included the results in Section 5.3 of the Updated Initial Study Report. The District's sediment budget was developed based on the methodology described in the Revised Study Plan (RSP) and the modifications noted by the Commission in the SPD as noted below:

RSP:

> "An updated sediment budget will be determined based on the sediment budget and sediment yield analysis completed by the Missouri River Basin Commission in September 1975. In that report, the Platte River Basin was divided into subwatersheds, one of which was the Loup River Basin. Annual sediment yields for each subwatershed were calculated by determining the sediment production from all erosion processes (sheet and rill, gully, and streambank). The sediment yield analysis was then used to create an annual sediment supply available to the river system."
>
> "Since 1975, various studies have provided updated sediment yield estimates on the sediment budget completed by the Missouri River Basin Commission. Information from these studies will be used to revise the sediment budget as appropriate. Updated information includes the sediment transported upstream of the Loup River confluence at Duncan (U.S. Department of the Interior, Bureau of Reclamation, August 2004) and District dredge records, which are recorded and summarized annually."
>
> "The results of the sediment budget will be compared to the total sediment transport calculation described below to assist in determining whether the reach is "flow limited" or "supply limited" for each flow period or alternative analyzed." (RSP (pp. 1-18 & 1-19).

SPD:

> "Therefore as part of Task 2, the District shall adjust the sediment yield calculated for the Loup River and its tributaries downstream of the project's diversion dam as well as the Project's tailrace based on

> documented reductions in dredged material from the project's settling basin." (SPD, page 6)
>
> "At all sites (USGS gage and non-USGS gage sites), the District shall compare the capacity of the flows for total bed material transport to the sediment budget updated under Task 2 and make a determination as to whether the rivers at the sites are currently in states of dynamic equilibrium, degradation, or aggradation." (SPD pp. 10-11, paraphrased for brevity).

The above language makes it clear that the use of the phrase "sediment budget," at least at this reference, is in regard to sediment yield. The paragraph states that the "adjusted budget" would be compared with the capacity of the flows for total bed material transport, which was performed. The District's proposed sediment budget methodology in the RSP did not mention nor include use of the continuity equation, nor did the Commission's SPD specify its use. Furthermore, the phrase, "sediment budget" is not commonly likened in the literature to routing of sediment using the continuity equation. Literature citations regarding sediment budgets generally include comparisons of yield with total bed material transport calculations but do not involve reach-by-reach routing of sediment using the continuity equation. Instead, the term "sediment budget" has a supply/demand connotation, referring to whether the supply matches the transport capacity. Its use in the literature does not normally incorporate details of how the transport occurs through the system or where the sediment is ultimately disposed.

Therefore, the District interprets the Commission's reference to the continuity equation to be a request for additional analysis. As stated in FERC's comments, the method requires knowledge of sediment carried from upstream of the study area (both on the Loup and Platte Rivers), point source contributions, and sediment contributed from the watershed between the study sites. Data for evaluating these important input parameters for a continuity equation analysis do not exist. Earlier discussions with FERC and USFWS of incorporating tributary sources of sediment in the study plan ended when FERC did not require this as a study revision in their SPD. The District believes that evaluations of non-point sources, which are even more complex and time-consuming processes, should be considered nonessential on the same basis.

Applications of the continuity equation require the user to select a time increment for step-by-step solutions of the equation. Applications with river flow and sediment transport data generally use daily time increments, allowing the user to accumulate them over time in order to obtain annual and average annual balances. The April 8, 2011 letter requests that the District supply tables and figures showing the total annual volume of sediment contributed by each source and the annual sediment flux for all other sources and sinks in the reaches. Data collection or generation to perform this using either daily, monthly, seasonal, or in particular annual, inputs was not included in the study plan and is not readily available.

The District believes that by requesting the continuity equation analysis, FERC seeks to understand what impact hydraulic dredging of sediments at the Project Diversion Weir has on habitat, as measured by analyses of sediment supply and demand and river morphology. The District believes that the "body of evidences" described in General Comment 1 above addresses this concern. All of the data from sediment transport calculations, aerial photo interpretations, sediment yield calculations, independent plots of bed profiles and cross sections, conclusions regarding dynamic equilibrium by the District and other investigators, and data on use by the species show that the supply of sediment by far exceeds the capacity of flows to change the braided river morphology under all operating scenarios.

3. Comments on Study 5.0, Flow Depletion and Flow Diversion

Commission Comment 1

"In section 1.1.2, you state that the last survey for interior least terns and piping plovers on the Loup River was conducted by Nebraska Public Power District in June 2009 and by the U.S. Fish and Wildlife Service (FWS) in 2010. The 2009 data was included in the information filed with the Commission on December 13, 2010. Please also file the FWS' 2010 bird survey data with the Commission to update the record."

District Response

The District has requested and received the updated database of bird survey data from the Nebraska Game and Parks Commission (NGPC) that includes the 2010 survey data that has been provided to NGPC to date. However, the District was informed by NGPC that they have not received the 2009 or 2010 Loup River survey data from USFWS; therefore, the District has requested the 2009 and 2010 data from USFWS. The District will file the additional data with the commission when it is received.

Commission Comment 2

"Table 1-1 outlines the distribution and abundance of interior least terns based on the 2005 surveys conducted by the U.S. Army Corps of Engineers. However, after staff review of the reference material listed, we were unable to locate the source of the numbers listed for total adults and colonies reported in the table. Further, the percentages generated for the "Loup River % of Nebraska Total" seem incorrect based on the accompanying numbers provided for both adults and colonies in the table. Please explain what numbers are being used to generate these percentages in Table 1-1, or where the percentages are located in the reference material."

District Response

Upon review of the Commission's comment regarding Table 1-1 from the Flow Depletion and Flow Diversion Study, the District realized that the table contained typographical and footnote errors. The District has provided a corrected Table 1-1 below (corrections noted with yellow highlight). Although there were typographical errors in the original table (as included in the study report), the conclusion provided in the text that the significance of the Loup River to the overall recovery of the interior least tern is minimal remains valid. As shown by the corrected values, the Loup River constitutes less than 10 percent of the total interior least tern population in Nebraska and less than 0.5 percent of the total population.

Table 1-1. Comparative Analysis of Interior Least Tern Range-wide Survey Data

	2005	
	Adults	Colonies
Total[1]	17,591	489
Nebraska Total[2]	1,071	51
Loup River[3]	73	2
North Loup River[4]	14	2
Lower Platte River[5]	381	15
Loup River % of Total Population	0.42%	0.41%
Loup River % of Nebraska Total	6.82%	3.92%

Source: Lott, C.A., November 2006, Distribution and Abundance of the Interior Population of the Least Tern (*Sternula antillarum*), 2005. U.S. Army Corps of Engineers. EDRC/EL TR-06-13.

Notes:

1 Total bird numbers are for breeding population surveys only. For more information, see Lott, November 2006 summaries.

2 Nebraska total includes birds counted at both on- and off-river habitat throughout Nebraska, but does not include birds counted on the Missouri River within the Nebraska boundaries.

3 Loup River total includes birds counted at both on- and off-river habitat.

4 North Loup River total includes only birds counted at off-river habitat. No birds were documented on-river.

5 Lower Platte River total includes birds counted at both on- and off-river habitat.

Because of the typographical errors found in Table 1-1, the District also reviewed the data in Table 1-2 and identified two instances in which numbers in the table were transposed between 1991 and 2001. The District has provided a corrected Table 1-2 below (corrections noted with yellow highlight).

Table 1-2. Comparative Analysis of International Piping Plover Census Data

	1991		1996		2001		2006	
	Adults	Pairs	Adults	Pairs	Adults	Pairs	Adults	Pairs
Total[1]	5,482	2,441	5,913	2,668	5,945	2,747	8,092	3,516
NGP&PC Total	3,467	1,486	3,284	1,377	2,953	1,291	4,662	1,879
Nebraska Total[2]	398	139	366	155	308	133	909	341
Loup River	14	5	29	6	21	7	19	3
North Loup River	10	5	4	1	2	1	12	0
Lower Platte River	67	20	53	23	62	21	52	2
Loup River % of Total Population	0.26%	0.20%	0.49%	0.22%	0.35%	0.25%	0.23%	0.09%
Loup River % of NGP&PC Total	0.40%	0.34%	0.88%	0.44%	0.71%	0.54%	0.41%	0.16%
Loup River % of Nebraska Total	3.52%	3.60%	7.92%	3.87%	6.82%	5.26%	2.09%	0.88%

Sources: Dinan, John J., 2001, "2001 Piping Plover and Least Tern Census – Nebraska," NGPC.
Elliott-Smith, E., S.M. Haig, and B.M. Powers, 2009, Data from the 2006 International Piping Plover Census, U.S. Geological Survey Data Series 426.
Ferland, C.L., and S.M. Haig, 2002, 2001 International Piping Plover Census, USGS, Forest and Rangeland Ecosystem Science Center, Corvallis, Oregon.
Haig, S.M., and J.H. Plissner, 1993, "Distribution and Abundance of Piping Plovers: Results and Implications of the 1991 International Census," *Condor* 95:145-156.
Plissner, J.H., and S.M. Haig, 2000, Status of a Broadly-Distributed Endangered Species: Results and Implications of the Second International Piping Plover Census, *Canadian Journal of Zoology* 78:1-12.

Notes:

[1] Total bird numbers are for breeding population surveys only. For more information, see Piping Plover Census summaries.

[2] Nebraska total includes birds counted in both on- and off-river habitat throughout Nebraska and includes the Missouri River within the Nebraska boundaries.

Commission Comment 3

"The study clearly identifies cross-sectional measurements that were taken at sites both upstream and downstream of the diversion weir. Yet, it was difficult for us to discern which sites (if any) are located on the Platte River below the Loup River confluence and above the project tailrace. These three reaches are listed in the Director's Study Plan Determination as sites that are required to be studied. Please clarify or explain any variances to the Study Plan, which in this instance, appears to only include the collection of cross-sectional data from two stream reaches (i.e., those located above and below the diversion weir)."

District Response

The District conducted cross-section surveys at Site 3 (lower Platte River downstream of the Loup River confluence and upstream of the Tailrace Return) per the Study Plan Determination, as noted in Section 3 of the Second Initial Study Report (SISR). Additionally, the District included Site 3 in the HEC-RAS analysis to identify the percent exposed channel width at this Site. However, this information was not included in the District's SISR because the District's evaluation of habitat for the Flow Depletion and Flow Diversion Study focused on a comparison between Sites 1 and 2 (Loup River upstream and downstream of the Diversion Weir) since those two sites provide the most direct comparison of the effects of flow diversion on flow depletion. The District did not perform comparative analysis with Site 3 because Site 3 is located on the Platte River and is affected by incoming Platte River flows and other factors not associated with Project operations, thus the Site 3 information was omitted from the SISR. The District has provided the percent exposed channel width for Site 3 in the following table. Note that the years of analysis for Site 3 are different than those used for Sites 1 and 2 because the wet/dry/normal classification is different for the Platte and Loup rivers.

Percentage of Exposed Channel Width
Site 3, Lower Platte River downstream of the Loup River confluence and upstream of the Tailrace Return

Calendar Year of Analysis	Low Flow (75% Exceedance)				Medium Flow (50 % Exceedance)				High Flow (25% Exceedance)			
	Current Operations		No Diversion Condition		Current Operations		No Diversion Condition		Current Operations		No Diversion Condition	
	Early Summer	Late Summer	Early Summer	Late Summer	Early Summer	Late Summer	Early Summer	Late Summer	Early Summer	Late Summer	Early Summer	Late Summer
2006 (Dry)	66%	73%	23%	23%	46%	58%	16%	18%	24%	25%	13%	17%
2009 (Normal)	28%	31%	13%	17%	19%	19%	10%	15%	13%	17%	7%	11%
2008 (Wet)	24%	25%	13%	17%	20%	20%	11%	16%	13%	17%	8%	11%

Commission Comment 4
"Lastly, staff was unable to locate two of the references cited for Table 1-2, specifically: Dinan, John J., 2001; and Ferland, C.L., and S.M. Haig, 2002. Please file these references with the Commission as described above in Study 1.0, paragraph 2."

District Response
The District filed the following supplemental information with the Commission on April 21, 2011:

- Trends in Channel Gradation in Nebraska Streams, 1913-95; U.S. Geological Survey Water-Resources Investigations Report 99-4103 (Chen, Rus, and Stanton, 1999)
- Platte River Basin, Nebraska, Level B Study; "Land Conservation and Sedimentation"; Missouri River Basin Commission; September 1975
- 2001 Piping Plover and Least Tern Census – Nebraska; Nebraska Game and Parks Commission (Dinan, John J., 2001)
- 2001 International Piping Plover Census; U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center (Ferland, C.L., and S.M. Haig, 2002)

Attachment B

District response to U.S. Fish and Wildlife Service (USFWS) comments on the Second ISR, dated April 7, 2011.

District General Response 1 – Project Effects to Federally Listed Species

The District believes that any opinion regarding affect to species is premature at this time. The studies requested by FERC with regard to the District's relicensing are not yet complete; therefore, USFWS does not yet have all of the scientific and commercial data that the District is compiling. Furthermore, it is the District's understanding that a "may adversely affect" determination is a term legally reserved for the Federal action agency pursuant to the ESA (16 U.S.C. 1531 et seq.) – in this case FERC. Therefore, the District respectfully disagrees with USFWS' determination that the Project "may adversely affect" whooping crane, interior least tern, piping plover, and pallid sturgeon.

The District, as FERC's Designated non-Federal Representative for informal consultation under Section 7 of the Endangered Species Act, will prepare a biological assessment that will consider all available information and make an affect determination to be submitted to USFWS. This determination will include an assessment of the results of the analysis from all of the studies prepared for relicensing, results of studies prepared by others, and other scientific data available about the species, including migratory patterns, habitat ranges, and population dynamics. The District looks forward to coordinating with USFWS during preparation of the Biological Assessment.

District General Response 2 – Long-Term Effects

The relicensing process requires evaluations of proposed conditions against existing conditions – not existing or proposed conditions against pre-Project conditions. USFWS' reference to "long-term change in the channel morphology of the Loup River bypass reach" implies that their stated "may adversely affect" determination [a term legally reserved for the Federal action agency pursuant to the ESA (16 U.S.C. 1531 et seq.) – in this case FERC] is based on a comparison of pre-Project conditions – a comparison outside the purview of the relicensing process. If the phrase "long-term change" is a reference to the future, the District's studies show that no morphological changes have occurred in the 25 year (and longer) study period. The specific gage analysis, sediment transport indicators, and regime analyses all show that the Loup River bypass reach channel is in dynamic equilibrium and well seated in the braided river regime, and this would not change under the District's proposal to continue existing operating conditions. Because there is no trend toward a change in morphology, the proposed relicensing of the Project would not impact morphology or instream habitat suitability.

Cumulative effects, which will consider past, present, and reasonably foreseeable future actions, will be evaluated with Project effects as part of the license application.

1. **Comments on Project Effects to Whooping Crane**
   USFWS Comment 1
   "The Service has determined that Project operations may adversely affect the whooping crane (*Grus americana*) within the bypass area of the Loup River. Adverse effects include a long-term change in the channel morphology of the Loup River bypass reach and Project diversion-related effects to instream habitat suitability."

   District Response
   The District believes that USFWS' determination of "may adversely affect" is premature as noted in District General Response 1. Additionally, the District interprets USFWS' use of the phrase "long-term effects" as referencing a comparison to pre-Project conditions, which the District believes is outside the purview of relicensing as noted in the District General Response 2.

   Additionally, the District provides the following information: 1) whooping cranes do not inhabit the Project Boundary, 2) there are only three recorded whooping crane sightings on the Loup River or its tributaries, 3) the population of the western (natural) flock of whooping cranes has increased exponentially since 1940, and 4) results of the Flow Depletion and Flow Diversion Study indicate that the Loup River does not contain preferred whooping crane roosting habitat either above or below the Project Diversion Weir. Details on these statements are as follows:

   1) There are no documented whooping crane sightings in the Project Boundary (NGPC, October 2, 2008). The nearest point of the Project Boundary lies approximately 35 miles east of the USGS-delineated whooping crane primary migration corridor, an area in which 82 percent of all confirmed post-1949 sightings in Nebraska occur (USGS, August 3, 2006). USGS determined the primary migration corridor through Nebraska to be between 100 and 120 miles wide by plotting all of the confirmed sightings in the state during the last 30 years and drawing straight lines to enclose 70 to 100 percent of the sightings at each latitude (USGS, August 3, 2006). USGS goes on to state that "the remaining sightings [outside of the primary migration corridor] are primarily to the west [of the primary migration corridor]." As stated previously, the Project Boundary is 35 miles east of the primary migration corridor.

   2) Documented whooping crane sightings on the Loup River and its tributaries include (NGPC, October 2, 2008):

- 2006 – documented sighting of an isolated family group of whooping cranes on the Loup River, approximately 8 miles upstream of the Diversion Weir (NGPC, October 2, 2008). This sighting was an isolated occurrence during the spring migration season.

- 1999 – confirmed sighting during fall migration near Fullerton, Nebraska, on the Loup River.

- 1996 – confirmed sighting near Belgrade, Nebraska, on the Cedar River.

Whooping cranes do not typically frequent the study area and are usually found on the central Platte River, west of Grand Island, Nebraska. However, in 2010, an isolated family group of whooping cranes was sighted on the lower Platte River upstream of Rogers, Nebraska (approximately 21 miles downstream of the Project Tailrace Return (USFWS, 2010).

3) The population of the western (natural) whooping crane flock has increased from 22 whooping cranes in 1940 to 279 whooping cranes in 2011 (Journey North, May 10, 2011). This represents an increase of 1,168%. The District notes that the decline of the species occurred primarily prior to the period of Project operation which began in 1938 and that the species increase is coincident with the period of Project operation (although the District in no way implies that the population increase is linked to Project operations).

4) Results of Study 5.0 Flow Depletion and Flow Diversion related to whooping crane roosting habitat indicate that the unobstructed widths and shallow water channel percentages of the Loup River both upstream and downstream of the Diversion Weir are outside of the range observed at whooping crane roost sites in Nebraska as shown in the following table.

	Unobstructed Width Feet	Shallow Water Percentage
Nebraska Range	1,165 to 2,625	40
Upstream of the Diversion	1,050 to 1,077	34 to 38
Downstream of the Diversion	652 to 669	20 to 30

Additionally, the average percentages of the channel upstream (11 to 24 percent) and downstream of the Diversion Weir (10 to 16 percent) that consisted of shallow water/wet sand are both well below the 40 percent of the channel with shallow water depths that have been noted at preferred whooping crane roost sites in Nebraska.

USFWS Comment 2

"Diversion of water at the Project diversion has resulted in long-term effects to the channel morphology in the Loup River bypass reach. Study sites upstream of the Project diversion have wider channel widths compared to study sites downstream of diversion (see General Comment 1). Differences in channel widths are relatively stable with less than 3 percent change for the five years of evaluated data (Table 5-7, SISR Flow Depletion/Diversion). This reduction in channel width for the Loup River bypass reach constrains maximum "wetted widths" (or inundated channel width) (see General Comment 2). Study sites upstream have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars. Mid-channel bars provide roosting habitat (i.e., water less than 0.8 feet) that is higher in suitability compared to point pars (see General Comment 3)."

District Response

The District interprets USFWS' use of the phrase "long-term effects" as referencing a comparison to pre-Project conditions, which the District believes is outside the purview of relicensing as noted in District General Response 2.

In response to USFWS' comments on channel and wetted widths upstream and downstream of the Diversion Weir, and to the incidence of mid-channel versus point bars, see the District's responses to USFWS General Comments 2 and 3 below. The differences being addressed in these comments are due to different flow hydrographs passing through each location. The District acknowledges the differences but believes that the studies show that both channels are in dynamic equilibrium. USFWS acknowledges that the different channel conditions are "relatively stable." Because no trend toward a different morphology is occurring nor will occur under the District's proposed operating scenario (current operations), the proposed scenario cannot impact morphology, habitat, or its suitability.

The District notes that while more mid-channel bars were observed upstream of the Diversion Weir in the photo interpretation, other factors linked to whooping crane habitat are also different between upstream and downstream of the Diversion Weir:

- There are more sandbars upstream of the Diversion Weir than downstream, but they are smaller in size; therefore, downstream bars have a higher percentage of bare sand area per river mile and bare sand area per sandbar.

- There is a higher percentage of vegetation on sandbars downstream than on those upstream of the diversion.
- Downstream sandbars have an overall higher percentage of shallow water/wet sand per river mile.

Based on these results, there are both positive and negative conditions relative to potential whooping crane habitat when comparing upstream and downstream conditions. Furthermore, as noted in the District's response to Whooping Crane Comment 1 above, unobstructed widths (another important feature of whooping crane roost sites) both upstream and downstream of the Diversion Weir, are less than the minimum observed widths at whooping crane roost sites in Nebraska.

As identified in the SISR, this analysis is based on the available aerial imagery and represents a snap-shot in time and the observed conditions on that day.

USFWS Comment 3
"Information provided by the SISR has been helpful in quantifying long-term changes in the channel morphology. Outside of effective (or dominant) discharge and transport capacity, the SISR provides no information that explains differences in channel morphology for the Loup River upstream of the Project diversion and within the bypass reach. It was identified in the February 24, 2011, SISR meeting transcript that, in absence of diverted water, the Loup River bypass area would have similar characteristics as the Loup River upstream of the diversion (Page 153, Lines 23-25 and Page 154, Lines 1-9). The Service has proposed modifications in the Proposed Modifications to Studies section of this document. Service recommendations for a longitudinal (spatial) comparison of all Loup River study sites would be essential in quantitatively assessing how differences in effective (or dominant) discharge would explain differences in channel morphology."

District Response
See the District's General Response 2 above in reference to the use of the phrase long-term effects and/or changes.

The District agrees with USFWS that the cross sections and other data in the SISR accurately disclose differences in channel and hydraulic characteristics upstream and downstream of the Diversion Weir, although not all of their conclusions are corroborated.

However, the District disagrees that the differences are not explained. As clearly shown in the SISR, the differences are primarily the result of changes in the flow hydrographs resulting from the Diversion Weir. Nothing in the SISR or earlier reports suggests that these characteristics would be expected to be the same. As noted in earlier reports and presentations, sediment transport and morphology are related to the flow hydrographs, and different flow hydrographs produce different transport and morphological results.

Two close-proximity, similar areas experiencing different hydrographs acting on the same medium (river bed and banks) would be expected to, and did, produce different channel and hydraulic characteristics. Ample rather than “no” explanations of the differences in sediment transport, morphology, channel geometry, channel hydraulics, and other parameters at the two locations have been provided. In particular, the cross sections and hydraulic model results readily document the differences.

With regard to the comment about changes expected under the no diversion condition, it is not only intuitively but morphologically correct that under the no diversion condition, the Loup River bypass reach would over time develop characteristics similar to the upstream location. The District refers USFWS to the SISR statement on page 79, 3rd paragraph, where in comparing channel characteristics, the statement is made, “As expected the Width, Depth, and Velocity below the diversion weir would be different [than existing] under the no diversion option due to increased flow rates.” Additional text is provided in SISR Study 5.0, paragraphs 3 through 5 on page 79 in Study 5.0 Flow Depletion and Flow Diversion.

With regard to the proposed modifications to studies described in Whooping Crane Comment 3, the SISR already performed and included the longitudinal (spatial) analysis of the Loup River study sites (see SISR Study 5.0, Tables 5-11 through 5-14). The tables and supporting text show that the observed (and reported) differences in channel geometries are consistent with the effective and dominant discharges resulting from the combination of different flow hydrographs acting in shaping the channel differently at each location. The morphology at each site is in dynamic equilibrium.

Based on the above, the District believes that USFWS’ “Proposed Modifications to Studies” are unnecessary.

USFWS Comment 4

“SISR results have also indicated that flow changes in Loup River bypass affect channel metrics used as indices for whooping crane habitat. The Service supports the use of the SISR variables channel width with water less than 0.8 feet recognizing its limitations in addressing all habitat suitability indices (see General Comment 3). When compared to the Current Operation condition, the No Diversion condition improves shallow water habitat at relatively lower flows while decreasing shallow water habitat at higher flows (see General Comment 3). Maximum channel width with water less than 0.8 feet is also constrained by the channel's maximum wetted channel widths (see General Comment 3). Based on information from General Comment 2, the No Diversion condition provides for wider wetted widths at Study Site 2 compared to the Current Operations condition. In summary, changes in flow bypass would result in both positive and negative effects to whooping crane habitat suitability criteria."

District Response
The differences between the no diversion condition and current operations for flow bypass are well within the range of flows that occur in the Loup River bypass reach under existing conditions. Under current operations, flows that are associated with the no diversion condition can, and do occur. For example, the median discharge for a normal year under the no diversion condition occurs annually, on average, 10 percent of the time under current operations. Therefore, a range of conditions for shallow water habitat for whooping crane exists under current operations. The District believes that because USFWS concludes that "changes in bypass flows would result in both positive and negative effects on whooping crane habitat suitability criteria," the conclusion in Whooping Crane Comment 1, that "Project operations may adversely affect the whooping crane within the bypass area of the Loup River," is neither scientifically sound nor appropriate. See also the District's General Response 1 regarding USFWS' comparison of pre-Project conditions with current operations, and District General Response 2 regarding their premature opinion on adverse effects.

2. **Comments on Project Effects to Interior Least Tern and Piping Plover**
USFWS Comment 1
"The Service has determined that Project operations may adversely affect the Interior least tern (*Sternula antillarum*) and piping plover (*Charadrius melodus*) within the bypass area of the Loup and Platte rivers. Diversion of water at the Project diversion has resulted in long-term effects to the channel morphology of the Loup River and Platte River bypass reach. Project diversion may also increase the probability of high temperature exceedances which may affect the food source for least terns. Project hydrocycling operations may also increase the risk of least tern and piping plover nest and chick mortality from water inundation. Limitations in the Sedimentation and Hydrocycling methods limit the Service's ability to discern Project sediment and hydrocycling effects to channel habitat, sandbar formation, and sandbar permanence."

District Response
The District believes that USFWS' determination of "may adversely affect" is premature as noted in District General Response 1. Additionally, the District interprets USFWS' use of the phrase "long-term effects" as referencing a comparison to pre-Project conditions, which the District believes is outside the purview of relicensing as noted in the District General Response 2.

USFWS Comment 2
"Diversion of water at the Project diversion has resulted in long-term effects to the channel morphology of the Loup River and Platte River bypass reach. Study sites upstream of the Project diversion have wider channel widths compared to study sites downstream of diversion (see General Comment 1). This reduction in channel width for the Loup River bypass reach constrains maximum wetted channel widths (see General Comment 2). Study sites upstream of the Project diversion also have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars (see General Comment 3). Study Site 3, located within the Platte River bypass area, has narrower channels compared to study sites downstream of the Project's tailrace return (see General Comment 4)."

District Response
See the District's General Response 2 above in reference to the use of the phrase "long-term effects."

Interior least tern and piping plover Comment 2 contains two categories of USFWS' comments that are nearly identical to topics addressed in response to USFWS's Whooping Crane Comment 2, namely, channel and wetted width differences across the Diversion Weir site and incidence of mid-channel versus point bars. The District's response to each was presented in our responses to USFWS's Whooping Crane Comment 2 as well as in our responses to General Comments 2 and 3 below. In reference to the comparison of channel widths at Sites 3 and 4, the District refers USFWS to the District's response to USFWS' General Comment 4 below.

USFWS Comment 3
"Project temperature-related events are addressed in the Interior least tern section because of the potential for catastrophic fish kills affecting least tern food availability. Exceedances of the Nebraska Department of Environmental Quality water quality standard to support warm water aquatic life (i.e., 90 degrees Fahrenheit) represent an increased risk for fish kills. Table 5-16 of the SISR - Temperature clearly shows the relationship between flow and the probability of temperature exceedances. Subsequent multivariate approaches add too much variability to their analyses which diminishes any relationship between flow and water temperature exceedances. To address limitations to the temperature methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document. The Service supports SISR conclusions that it is difficult to predict the relationship between streamflow and temperature at the Platte bypass area because of the influence of Platte River streamflow. The Service is still concerned about how streamflow could affect probability of

temperature exceedances in the Platte River bypass area, but recognizes that there is a limited ability for studies to quantify effects with a within the time constrained study period."

District Response
The District acknowledges that three fish kills have been documented in the Loup River bypass reach; however, the District disagrees with the use of the word "catastrophic" to describe these incidents. Neither the NGPC reports nor the NDEQ reports use the term catastrophic.

Furthermore, the District provides the following information related to the fish kills that have occurred to provide perspective on each incident:

- July 1995 – report indicates an "unknown" number of fish died
- July 1999 – report indicates "large numbers of mixed species"
- July 2004 – report indicates that 15 channel catfish, 14 minnows, and 1 river carpsucker died, for a total of 30 fish.

USFWS references Table 5-16 (District assumes USFWS meant Figure 5-16) as clearly showing the relationship between flow and temperature exceedances. Figure 5-16 shows the Sinokrot and Gulliver analysis specifically requested by USFWS. The District disagrees with USFWS' conclusion that the Sinokrot and Gulliver method established a correlation between low flows and water temperature excursions. The District believes that the exceedance probability results support the District's conclusion that there is not a significant relationship between low flows and water temperature excursions. For example, using linear interpolation between the data points on the exceedance probability plots at Merchiston (Figure 5-3), the 75 percent exceedance flow rate is 2,000 cfs, while at Genoa (Figure 5-16), the 75 percent exceedance flow rate is approximately 120 cfs. If flow was a primary factor in water temperature, the District would expect a 2,000 cfs flow to have a percent exceedance of approximately 13 percent at Merchiston, rather than a 75 percent.

Furthermore, as noted in their comment, USFWS originally supported the multivariate analysis proposed by the District (USFWS June 24, 2009, p. 13). The District analyzed hourly data, daily maximum data, and all data above 63degree F by using linear regression, multiple regression, and logistic regression. The logistic regression was specifically chosen to reduce variability as the 75th percentile range of maximum daily water temperature readings (88.55 degree F) was used as the cut point to code the daily maximum water temperature values for a binary contrast. All values below the 75th percentile range (n = 59) received a contrast code of 0, and all values above the cut point (n = 19) received a contrast code of 1. By reducing the data down to a binary 1 or 0, objections to 'variability' are addressed.

Based on the above and additional information provided in relation to USFWS' proposed methods provided below in USFWS Comment 3 – Conduct Temperature Analysis for Platte River Bypass Area, the District believes that USFWS' "Proposed Modifications to Studies" are unnecessary.

USFWS Comment 4
"Project hydrocycling operations may directly affect individuals via nest inundation. The Service has enclosed a review of by Joel Jorgensen, Nongame Bird Program Manager of the Nebraska Game and Parks Commission (NGPC), Objective 2 methods. In the review, Mr. Jorgensen identifies several shortcomings of the SISR nest inundation analysis. After reviewing Mr. Jorgensen's review, the Service has identified two shortcomings that affect the SISR method's ability to accurately model the potential for nest inundation. The model incorrectly assumes that the high flow event February 1 through April 25 sets the peak stage for nest inundation. The model also incorrectly assumes that all birds nest on bars at a single, uniform elevation. The inclusion of these assumptions, some of which were originally promoted by the Service, could not pass a validation test using recently collected nesting data. The Service supports the alternate methods developed by Mr. Jorgensen because the proposed methods represent a means of addressing the shortcomings in the prior assumptions. By evaluating inundation risk based on incremental ranges of potential nest elevations, the alternate methods is better able to predict nest inundation risks associated with hydrocycling."

District Response
As noted in their comment, USFWS based their comments related to nest inundation on the analysis provided by Joel Jorgensen, NGPC. Mr. Jorgensen's analysis is also provided in NGPC's comments dated April 11, 2011. Since USFWS' comments are identical to those raised by NGPC, the District refers USFWS to the District's response to NGPC comments in Attachment C.

USFWS Comment 5
"It is currently not known if Project hydrocycling operations affect nesting habitat via sandbar erosion. Limitations in the hydrocycling methods also limit the Service's ability of to discern Project hydrocycling effects to sandbar formation and permanence. Hydrocycling has resulted in exposed channels widths in the Platte River that were narrower downstream from the tailrace than what was calculated for run-of-river operations (SISR Hydrocycling, page 40). However, this effect is likely the result of a fixed bed analysis evaluating only changes in river stage associated with hydrocycling. It is difficult for the Service to assess sandbar erosion rates for Study Site 3 because a June peak flow redistributed

sandbars between cross-section measurement dates. The redistribution of sandbars eliminates any ability to assess sandbar erosion rates at Study Site 3. Since Study Site 3 represents a no hydrocycling condition, it is difficult to compare erosion rates of sandbars at Study Site 3 to Study Sites 4 and 5. To address limitations to the hydrocycling methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document."

District Response

The District believes that the data and analyses provided to date are adequate for a determination of whether hydrocycling affects habitat. All the study reaches are well seated within standard definitions of braided rivers, and sandbar formation and permanence (or lack of) are the results of physical processes operating in any braided river. Sandbars and channel braids are constantly shifting in location and geometry, which is shown in the cross sections taken as part of this study. The District notes that USFWS' reference to "permanence" of sandbars is misleading because permanent sandbars are subject to vegetative establishment, resulting in formation of islands. Additionally it is high flows, which the District does not affect, that can remove vegetation from islands.

The District notes that the statement "exposed channel widths in the Platte River were narrower downstream from the tailrace than what was calculated for run-of-river" is not correct. The SISR states that the modeled ***percentage*** of exposed channel width was less under current operations, at Sites 4 and 5.

The cross-section data clearly documents the dynamic and rapid response of sediments in the active channel to flows passing through each reach. Shifts in braid locations and the sandbar sizes and rates of sandbar erosion and re-construction, are readily evident in the data. The data also show that these highly mobile sandbar erosion and re-construction conditions occur under discharge hydrograph conditions far less than those USFWS has stated as being needed for maintenance of the morphology and habitat.

Cross-section data at Site 3 showed similar dynamic impacts of flows on channel geometry as Site 4. Since Site 3 experienced essentially the same high flows as Site 4 it is not clear why USFWS cannot assess bar erosion rates at that site in order to evaluate the run-of-river condition.

The sediment transport indicators revealed that the effective and dominant discharges downstream of the Tailrace Return under hydrocycling conditions at Site 4 were slightly greater than under run-of-river operations. Because the relationship between equilibrium active channel width and these indicators (Q_e and Q_d) is upward sloping, the equilibrium channel widths would be, and are, greater under current operations.

See also the District's responses USFWS Comment 1 – Expand Platte River One Dimensional HEC-RAS Modeling to Include July. Based on the above, the District believes that USFWS' "Proposed Modifications to Studies" are unnecessary.

USFWS Comment 6

"Project diversion operations may not affect sediment balance at the Loup River bypass area. The 1,445,000 tons of sediment removed by dredging operations is similar to the 1,480,000-ton sediment surplus at Study Site 2 (See General Comment 5). Total sediment transported downstream of the Project diversion is equivalent to sediment transported from upstream of the diversion. This similarity may imply that Project does not affect the Loup River sediment balance although Project effects to physical habitat exist via the reduction in effective discharge in the Loup River bypass area."

District Response

The District acknowledges that the data show that Project operations do not affect the sediment balance in the Loup River bypass reach. Because this comment and General Comment 5 – Loup River Sediment Transport refer to sediment "surplus" at Site 2, the District has composed its response under General Comment 5 – Loup River Sediment Transport.

USFWS Comment 7

"Project diversion operations have resulted in sediment deficits at the Project's tailrace return. The cumulative sediment deficit as a result of Project flow diversion and hydrocycling operations is approximately 1,606,000 tons per year (see General Comment 6). The volumes of sediment deficit, assuming a bulk density of sand at 1.9 tons per cubic yard (Kinzel, 2009) is 845,263 cubic yards of sediment per year. This represents 845,263 cubic yards of sediment that is removed from the available sediment supply (i.e., riverbed and sandbars) near the Project tailrace return on a yearly basis. Limitations in the Sedimentation methods limit the Service's ability to discern Project sediment-related effects channel habitat. One sedimentation study product was the longitudinal (spatial) comparison of all sites on the Loup and lower Platte River study sites starting at the most upstream site on each river, and progressing downstream. The Service has determined that a longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel morphology. To address limitations to the sedimentation methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document."

District Response

As discussed in the District's response to USFWS General Comment 6, the District notes that the no diversion and run-of-river conditions are mutually exclusive (i.e., if the District is not diverting water, they will be unable to hydrocycle); therefore, the effects cannot be accumulated, as is implied in the 1,606,000 tons per year value USFWS uses. Because this comment and General Comment 6 refer to a sediment "deficit" at Site 4, the District has composed its response under General Comment 6 below.

Based on the facts presented in its response to General Comment 6, the District believes that USFWS' "Proposed Modifications to Studies" are unnecessary.

3. Comments on Project Effects to Pallid Sturgeon
USFWS Comment 1
"The Service has determined that the Project hydrocycling operations may adversely affect the pallid sturgeon (*Scaphirhynchus albus*). The SISR evaluated Project hydrocycling effects to on the pallid sturgeon suitable habitat as defined by Peters and Parham (2008). The Service would like to note that the applied microhabitat metric of Percentage of Suitable Pallid Sturgeon Habitat (Sturgeon Habitat) is not truly habitat unless it is available to the species. Parham (2007) identified that the lower Platte River is generally unconnected at discharge rates below 4,400 cubic feet per second (cfs) and rapidly becomes connected as discharges reaches 6,300 cfs. The river can be considered fully connected at a discharge of 8,100 cfs. Conclusions from the Lower Platte River Stage Change Study also validate conclusions from Parham (2007). The Lower Platte River Stage Change Study identified Run and Plunge habitats (i.e., pallid sturgeon microhabitat) are mostly connected across the width of the river at 6,000 cfs (HDR et a1., 2009). Discharges less than 6,000 cfs may lower water elevations enough to limit access for pallid sturgeon since they will not or cannot move through Flat or Slackwater habitat. In summary, Sturgeon Habitat identified in the SISR may not represent habitat that is accessible by the species."

District Response
The District believes that USFWS' determination of "may adversely affect" is premature as noted in District General Response 1.

The District concurs that connectivity plays an important role in accessing any habitat that may be available to the pallid sturgeon. However, it is important to note that the Lower Platte River Stage Change Study identified Run and Plunge Habitat as pallid sturgeon habitat solely based on depth and velocity. From simple depth and velocity information, the study made the assumption that Flat or Slackwater habitat may not be used by pallid sturgeon. However, these areas (as defined in the Lower Platte River Stage Change Study) have been found to provide foraging areas (Hurley et al., 2004; USFWS, 1993) and movement pathways for the pallid sturgeon (Peters and Parham 2007; Mark Pegg, personal communication). It is also important to note that the Lower Platte River Stage Change Study scope did not include connectivity or temporal availability issues.

USFWS Comment 2

"The Service used information in the Hydrocycling Attachment J of the SISR to evaluate Project effects to connectivity of Sturgeon Habitat using connectivity thresholds developed by Parham (2007). Optimal habitat represents fully connected habitat at 8,100 cfs and is equivalent to Sturgeon Habitat at 27-percent or higher. Habitat with moderate connectivity occurs when flow is greater or equal to 6,300 cfs but less than 8,100 cfs (i.e., Sturgeon Habitat ≥ 24-percent but < 27-percent). Habitat with a minimum level of connectivity occurs when flow is greater or equal to 4,400 cfs but less than 6,300 cfs (i.e., Sturgeon Habitat ≥ 15-percent but < 24-percent). Habitat that is completely unconnected occurs when discharge falls below 4,400 cfs (Sturgeon Habitat < 15%)."

"The Service applied levels of Optimal Connectivity, Moderate Connectivity, Minimum Connectivity, and No Connectivity to Current Operations and Run-of-River Operations values using data from Tables 5-18 through 5-29 in the SISR Hydrocycling Section. The Service developed the following classification system to compare changes in connectivity for Current and Run-of-River Operations.

"1 = No Connectivity for Current and Run-of-River Operations
2 = No Connectivity Current Operations, Minimum Connectivity Run-of-River Operations
3 = Minimum Connectivity Current and Run-of-River Operations
4 = Minimum Connectivity Current Operations and Moderate Connectivity Run-of-River Operations
5 = Moderate Connectivity Current and Run-of-River Operations
6 = Moderate Connectivity Current Operations and Optimal Connectivity Run-of-River Operations
7 = Optimal Connectivity Current and Run-of-River Operations
8 = Minimum Connectivity Current Operations and Optimum Connectivity Run-of-River Operations"

"Results of the pallid sturgeon habitat connectivity evaluation are in Tables 1 through 12 of this document. Project effects to pallid sturgeon habitat connectivity are infrequent during the winter months of December and January. Project effects to pallid sturgeon habitat connectivity during the low flow months of July through October are primarily limited to the Ashland and Louisville study sites. The most prominent Projects effects to connectivity occur from February through June and in November. For certain months, Projects effects to connectivity occur upstream to Study Site 4. Additionally for the months of March, April, May, June, and November, there is some level of connectivity at

Study Site 4 for the Run-of-River operations, but this connectivity is not present at Study Site 3. These losses of connectivity at Study Site 3 could imply Project diversions potentially affecting pallid sturgeon habitat in the Platte River Bypass area."

District Response

The District concurs that pallid sturgeon will utilize habitat that is available if they can access it, but USFWS has not provided analysis that shows that run-of-river operations would improve the habitat available to the pallid sturgeon, especially above the Elkhorn confluence. Furthermore, the District notes that as flows naturally start to decline in the stream during the summer months, pallid sturgeon will move out of the Platte River into deeper waters (i.e. the Missouri River). The District notes that to date, there have been no reported cases of pallid sturgeon mortality due to stranding within the Study Area.

The District also recognizes that connectivity will increase as higher discharges increase connectivity pathways within the lower Platte River. Parham (2007) define connectivity as

> "…like a large maze with no "solutions" (fully connected paths) at low discharges. As discharge increases more paths are provided at the beginning of the maze starting at the confluence of the Platte River with the Missouri River and increase access upriver longitudinally. The paths through the maze increase as additional areas become connected at higher discharge until a path is "optimized" from the mouth of the Platte River to the mouth of the Elkhorn River."

Based on this definition, more pathways become available as discharge increases. As conditions become favorable, pallid sturgeon and other fish will utilize the sections of the river that contain habitat suitable for them. As flow increases and connectivity increases, fish will migrate into and out of the area. However, the District disagrees with USFWS' analysis of connectivity for the following reasons.

First, the District would like to note that USFWS' analysis used minimum percent suitable habitat (thus minimum flows), rather than average or maximum percent suitable habitat. The District notes that analysis of average or maximum percent suitable habitat would yield different results that would likely indicate equal or more connectivity under current operations than under run-of-river operations.

Second, the District questions the validity of the Peters and Parham (P&P) connectivity analysis. The P&P connectivity analysis is based on information from aerial photo interpretation for years ranging from 1993 through 2002. Table 10.3 in Chapter 10 of P&P (2008) lists the data that was used to develop the P&P

connectivity equation (Equation 10.6) which USFWS in turn used to identify their flow rates for optimal, moderate, and minimal connectivity. The District notes that although Equation 10.6 may yield full connectivity at 8,100 cfs, the data in Table 10.3 identify full connectivity at much lower discharges. Table 10.3 of the report includes data for 29 contiguous segments of the Platte River with discharges ranging from 0 to 21,000 cfs, of those 29 segments, 20 are listed as being 100 percent connected representing flows from 5,610 cfs to 21, 000 cfs. Furthermore, there were only 4 segments with discharges above 5,610 that are listed as less than 100 percent connected (connectivity values of 72.3, 92.7, 96.6, and 91.1). Additionally, the 5 segments with discharges less than 5,610 had connectivity values as shown in the following table.

Connectivity vs. Discharge

Discharge (cfs)	Percent Connected
0	0
1,440	13.8
2,450	19.3
2,840	13.5
4,080	31.2

Source: Table 10.3, Peters and Parham (2008)

The District believes that the raw data points used by P&P to develop Equation 10.6 illustrate fully connected habitat at much lower discharges than noted by USFWS in their connectivity analysis. Based on this information, the District believes USFWS' connectivity analysis is not valid.

USFWS Comment 3

"The pallid sturgeon may also be affected by Project bypass operations. Study Site 3, located within the Platte River bypass area, has narrower channels compared to study sites downstream of the Project's tailrace return (see General Comment 4). This reduction in channel area reduces the proportionate area of pallid sturgeon habitat. Additionally, sediment deficits at the tailrace return (see General Comment 6) may also affect habitat suitability for the pallid sturgeon. However, aforementioned limitations in Sedimentation methods limit the Service's ability to assess how sediment deficits at the project's tailrace affects pallid surgeon habitat. To address limitations to the sedimentation methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document."

District Response

The District has demonstrated that sediment is not a limiting factor, there is no sediment deficit, and that the river is in a dynamic equilibrium at all locations (see District Response to USFWS General Comment 6). Furthermore, the District notes that, primarily due to lack of discharge, Pallid sturgeon habitat has been shown to be limited above the Elkhorn confluence regardless of current operations or run-of-river operations. However, the District does not dispute that diversion of Loup River flows into the Loup Power Canal has reduced flow in the Platte River bypass reach. This reduction of flow, not a narrower channel, likely results in the loss of "minimal connectivity" in the Platte River bypass reach in March through June under minimum flow conditions.

Based on the above, the District believes that USFWS' "Proposed Modifications to Studies" are unnecessary.

4. Comments on Project Effects to Fish and Wildlife Coordination Act Resources

"FWCA requires consultation with the Service and State fish and wildlife agency for the purpose of giving equal consideration to fish and wildlife resources in the planning, implementation, and operation of federal and federally funded, permitted, or licensed water resource development projects. The FWCA requires that federal agencies take into consideration the effect that water related projects may have on fish and wildlife resources, to take action to avoid impact to these resources, and to provide for the enhancement of these resources. While Project temperature-related events are addressed in the Interior least tern section because of the potential for catastrophic fish kills, Project effects to fish habitat are addressed under FWCA."

USFWS Comment 1

"Table 13 summarizes of number years from April through September that the mean monthly flow is categorized as Fair, Poor, or Degraded. Table 13 represents a tabular version of Figures 5-14 to 5-19 which summarizes the percent of tota1 categorized as Fair, Poor, or Degraded for the 56 year period of record from 1954 to 2009. There are large differences in the proportion of Fair, Poor, or Degraded conditions for each of the respective months when comparing Site 1 to Genoa. The percentage of years categorized as Fair, Poor, or Degraded for the months from April though June ranged from 0 to 1.8 percent for Site 1 while percentages at Genoa ranged from 37.5 to 48.2 percent. From July through September, the percentage of years categorized as Fair, Poor, or Degraded ranged from 1.8 to 19.6 percent for Site 1 while percentages at Genoa ranged from 71.4 to 82.1 percent. Most notably, approximately half of the years at Genoa were categorized as degraded for the months of July though September."

District Response
The information presented by USFWS is included in the SISR and no comments are needed at this time.

USFWS Comment 3
"Table 14 summarizes of number years from October through March that the mean monthly flow is categorized as Fair, Poor, or Degraded. Table 14 also summarizes the percent of total categorized as Fair, Poor, or Degraded for the 56 period of record. There is an obvious difference in October when the Site 1 has zero years in a degraded condition while Genoa has 46.4% of the years categorized as degraded. The percentage of years categorized as Fair, Poor, or Degraded for the months from November though March ranged from 0 to 1.8 percent for Site 1 while percentages at Genoa ranged from 0 to 16.1 percent."

District Response
The information presented by USFWS is included in the SISR and no comments are needed at this time.

USFWS Comment 4
"Limitations in the Flow Depletion/Diversion methods limit the Service's ability to discern Project's flow diversion effects to the fish community in the Platte River bypass area because of the absence of a No Diversion condition Study Site 3. The Platte River near Duncan is not a surrogate for a No Diversion condition, so a comparison of the study site near Duncan to the Study Site 3 – Current Operation is inadequate in identifying Project diversion effects to the fish community. To address limitations to the Flow Depletion/Diversion methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document."

District Response
This comment is addressed under "Comments on Proposed Modifications to Studies" USFWS Comment 4 – Conduct Montana Method for No Diversion Alternative in the Platte River Bypass Area.

USFWS Comment 5
"The Service has determined that continued District operations would continue to impact the fish community for the bypass area of the Loup River and possibly the bypass area of the Platte River. While the SISR identify the July through October as the months of severe degradation for the Loup River, the Service also considers the months of April through June being severely impacted by Project diversions. The Service does not support the SISR conclusion that fish habitat is available both above and below the weir based on results of the NGPC fish data collection report (NGPC, June 1997 and April 1998). Fish sampling occurred in 1996 and

1997 which represented the 19.40 and 7.46 exceedance levels, respectively, for mean annual discharge using a 66-year period of record (Attachment C of the SISR Sedimentation Addendum). In other words, NGPC sampled during years when flows were relatively high within the 66-year period of record. The Service cautions the application of NGPC collected data within SISR conclusions."

District Response
The District acknowledges that 1996 and 1997 were wet years for the Loup River at Genoa gage; however, the District notes that the exceedance probability for 1997 was 8.96, rather than 7.46 as noted by USFWS.

The District concurs that the NGPC studies should not be used to make definitive statements about fish population upstream and downstream the Diversion Weir. However, although the study was only performed for two years, it provides an idea of what type of habitat is available upstream and downstream the Diversion Weir. The District would like to emphasize that fish community structure, rather than condition of fish population, can be taken from the NGPC studies. The NGPC two-year study illustrated that similar fish were using the river upstream and downstream the Diversion Weir, which helps to show that similar fish habitat is available.

The District also notes that diversion of water into the Loup Power Canal has created an excellent fishery that is highly used by anglers throughout the east-central region of Nebraska, a fact that has not been disputed by any agencies. The District suggests the combined fishery of the Loup Power Canal and the Loup River bypass reach has resulted in more fish habitat and better overall conditions for sport fishing than would exist if water was not diverted into the Loup Power Canal.

5. **General Comments on ISR and SISR**
USFWS General Comment 1 – Loup River Channel Widths
"The SISR has identified differences in channel width when comparing river reach upstream of the district diversion versus conditions in the Loup River bypass reach. A comparison of average channel widths from Table 5-7 (Study 5.0) shows that channel widths at locations upstream of the diversion (Mean 1,061 feet ± SD 8 feet) are wider than locations downstream (Mean 664 feet± SD 8 feet). A similar conclusion was derived from Table 5-10 (Study 5.0) with channel width at Site 1 of 825 feet exceeding widths of 640 feet at Site 2. Outside of effective (or dominant) discharge and transport capacity, the SISR provides no information that explains differences in channel morphology for the Loup River upstream of the Project diversion and within the bypass reach. It was identified in the February 24, 2011, SISR meeting transcript that, in absence of diverted water, the Loup

River bypass area would have similar characteristics as the Loup River upstream of the diversion (Page 153, Lines 23-25 and Page 154, Lines 1-9)."

District Response

General Comment 1 addresses three topics requiring the District's response: differences in channel width, differences in channel morphology in the Loup River, and the no diversion condition for the Loup River bypass reach. These topics have been addressed in the District's response to USFWS' Whooping Crane Comments 2 and 3 and Tern and Plover Comments 1 and 2.

USFWS General Comment 2 – Loup River Wetted Channel Widths

"The SISR has identified differences in wetted channel width when comparing river reach upstream of the district diversion versus conditions in the Loup River bypass reach. Figure 5-11 in the SISR Flow Depletion/Flow Diversion identified wider wetted widths for the No Diversion condition for all Loup River bypass areas (i.e., Study Site 2, Genoa Study Site, and Columbus Study Site). Table 15 is a revision to Table 5-10 in the SISR Flow Depletion/Flow Diversion. Percent of exposed channel was converted to wetted width (i.e. percent of width inundated by flow). An evaluation of HEC-RAS data was preferred to the aerial interpretation because of its ability to model No Diversion conditions in the bypass reach. A comparison of the Current Operation condition to No Diversion condition for Study Site 2 shows an increase in average wetted channel widths with a corresponding increase in streamflow under the No Diversion condition.

A comparison of wetted channel Site 1 to Site 2-No Diversion in Table 15 shows narrower channel widths associated with Site 2 result in narrower wetted widths. Average wetted widths for the Site 1 dry, normal, and wet time period are greater than the average channel width for Site 2. As demonstrated in General Comment 1, differences in channel width are consistent when comparing study sites upstream and downstream of the Project diversion. Figure 5-11 in the SISR Flow Depletion/Flow Diversion also shows that the No Diversion condition for study sites in the Loup Bypass area have the same streamflow as Study Site 1 but do not have the ability to achieve comparable wetted widths."

District Response

The cross-section data provided by the District reveals the extreme variability in cross-section geometry that occurs over relatively short periods of time, so once-in-time snap-shots should not be the basis for conclusions in this regard. Transverse bars are highly subject to dissection into multiple mid-channel bars even during low flow periods (Smith, 1971).

The cross sections that were taken in 2010, as shown in Attachment A of Study 1.0 Sedimentation in the SISR, reveal that the width of the channel at Site 2 is narrower than at Site 1. Figure 5-11 also shows that for a given discharge, Site 2 has a narrower wetted width than Site 1. The no diversion condition results shown in Figure 5-11 represent HEC-RAS model output using “no diversion” flows through the “current operations” shaped channel. As the USFWS has pointed out, the HEC-RAS model is a fixed bed model and therefore the no diversion wetted widths for Site 2 are lower than the wetted widths at Site 1. The no diversion scenario was modeled as if the Project diversion were suddenly shut down, and analysis was based on the immediate aftermath, for a relatively short (geomorphologically) period of time.

USFWS General Comment 3 – Loup River Instream Flow and Habitat Suitability

“Page 101 of the SISR Flow Depletion/Diversion identifies the limitations of the analysis when assessing whooping crane suitable habitat. The analysis did not factor in conditions such as unobstructed view from bank to bank, location and configuration of the shallow water areas, presence or absence of vegetation, proximity to human development and feeding sites, and potential for predation. The predominance of point bars for the Loup River bypass area, as identified in the imagery review section of the SISR Flow Depletion/Diversion, would indicate that the available shallow water habitat would be located next to the inside bends (i.e., tips of point bars). Submerged point bars, compared to submerged mid-channel bars, would have shallow water habitat that is closer to visual obstructions and would have an increased likelihood of land predator access.

“The Service has identified important relationships between instream flow and channel width with water depths of 0.8 foot or less. Table 16 compares the increase (or decrease) in Channel Width with Water Depths of 0.8 Foot or Less when comparing the Current Operations condition to No Diversion condition for the Loup River bypass area only. The No Diversion condition increases the amount of shallow water habitat at lower flows (i.e., 75-percent exceedance) but decreases the amount of shallow water habitat at higher flows (i.e., 25-percent exceedance). The No Diversion condition shows the greatest increase in shallow water habitat for the dry year of 2006 but the greatest decrease in shallow water habitat for the wet year of 2008. Keep in mind that the increases and decreases in shallow water habitat due to flow is relative based on the positioning of this habitat adjacent to point bars. Similar to discussions in General Comment 2, reduced channel widths for the Loup River downstream also constrains channel width with water depths of 0.8 foot or less (Table 5-19, SISR Flow Depletion/Diversion).

“Similar to the whooping crane habitat evaluation, indices used to assess least tern and piping plover habitat may not address all factors used to identify suitable habitat. The evaluation of exposed channel area (Figure 5-11 in the SISR Flow

Depletion/Flow Diversion) does not address all suitability criteria discussed on Table 4-5 of the SISR Flow Depletion/Flow Diversion. The sandbar position upstream of the Project diversion compared to position downstream would affect least tern and piping plover habitat suitability. The higher percentage of point bars downstream of the diversion provides less suitable habitat conditions for the least tern and piping plover because both species select for mid-channel bars for nesting. Point bars represent habitat that is easily accessed by land predators compared to mid-channel bars that have flowing water around its perimeter. Mid-channel sandbars would also be located further from visual obstructions such as woody riparian vegetation compared to point bars."

District Response
The District's analysis of increases and decreases in shallow water habitat for the SISR were based on the cross sections taken at Sites 1 and 2. These cross sections did not indicate point bars verses mid-channel bars, nor assess the habitat suitability for whooping crane, interior least terns, or piping plover. Increases and decreases in shallow water habitat are a function of channel width, channel depth, distribution of material within the channel, and how flows change the sandbar and channel characteristics (elevations) based on those parameters. The cross-section data reveals that this is a highly dynamic system, with significant changes occurring over relatively short periods of time. Analysis of other habitat suitability criteria was accomplished via aerial interpretation.

See the District's response to USFWS Whooping Crane Comment 2 for additional information related to whooping crane habitat suitability.

Additionally, as discussed in the SISR, the limited amount of documented nesting on the Loup River upstream or downstream of the Diversion Weir combined with the documented differences in habitat parameters (specifically valley width) support the conclusion that the Loup River is a less desirable portion of the Platte River valley for nesting.

USFWS General Comment 4 – Platte River Instream Flow and Habitat Suitability
"An understanding of Project diversion effects to the Platte River bypass area is less evident. A study of aerial imagery was not conducted for the Platte River bypass area. The Study Site 3 in the bypass portion of the Platte River was consistently narrower than Study Sites downstream of the Project's tailrace return (Table 17) which uses cross-section information from page 39 and 40 from the SISR Hydrocycling.

"The Service in an October 20, 2010, letter ranked the sedimentation studies based on criteria of importance to the fish and wildlife species under our authorities.

The Service has ranked the longitudinal comparison of geomorphic characteristics from cross-sections as the most important of all of the sedimentation studies. A longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel geomorphic features. To address limitations to the sedimentation methods, the Service has proposed modifications in the Proposed Modifications to Studies section of this document."

District Response
The District notes that a study of aerial imagery for Site 3 was not included in the RSP, nor was it required by FERC in the SPD. Therefore, Site 3 was not included in the aerial imagery review.

The SISR already performed and included the longitudinal (spatial) analysis of the Platte River Study Sites 1, 2, and 3 (see SISR Tables 5-11 through 5-14, pg. 72 of the Study 5.0 Flow Depletion and Flow Diversion), Sites 3, 4, and 5 (Tables 5-9 through 5-12 on pg. 59 and Figure 5-15 of Study 2.0 Hydrocycling), and all sites (Study 1.0 Sedimentation Addendum Figures 5-1 and 5-2). The table and supporting text shows that the observed (and reported) differences in channel geometries are consistent with the effective and dominant discharges resulting from the combination of different flow hydrographs acting in shaping the channel differently at each location. The morphology at each site is in dynamic equilibrium.

The sediment supply to all study sites is "virtually unlimited" (USACE, 1990). Differences in transport capacity and total sediment transported at successive downstream study sites should not be used to draw conclusions regarding "surplus" or "deficit" conditions, nor should they by used to draw conclusions regarding aggradation or degradation trends. Two successive sites having different effective or dominant discharge values can co-exist and remain "in regime" if each is in dynamic equilibrium, which is the case here. Major rivers like the Platte and Loup generally exhibit increasing values of the sediment transport parameters in the downstream direction, which was also documented in the SISR.

See also the District's responses to General Comment 6 and USFWS Comment 2 – Conduct Longitudinal (Spatial) Comparisons of All Loup and Platte River Sites below.

Based on the above, the District believes that USFWS' "Proposed Modifications to Studies" are unnecessary.

USFWS General Comment 5 – Loup River Sediment Transport
"Table 5-11 of the SISR – Flow Depletion/Flow Diversion identified sediment transport capacity for Study Site 2 was 890,000 and 2,370,000 tons per year for the Current Operation condition and the No Diversion condition, respectively. This equates to sediment transport surplus of approximately 1,480,000 tons per year because sediment transport capacity is lost due to flow diverted into the project canal. According to Table 4-3 of the ISR – Sedimentation, approximately 2,005,000 tons per year of sediment is hydraulically dredged from the Project settling basin of which 560,000 tons of sediment per year is returned to the Loup River via the South Sand Management Area. Net sediment removed from the Loup River system by the Project's dredging operation is 1,445,000 tons per year. The 1,445,000 tons of sediment removed by dredging operations is remarkably similar to the 1,480,000-ton sediment surplus at Study Site 2 which implies that total sediment transported downstream of the Project diversion is equivalent to sediment transported from upstream of the diversion (i.e., Project does not affect the Loup River sediment balance)."

District Response
The District acknowledges that the Project does not affect the Loup River sediment balance and that net amount of sediment hydraulically dredged is similar in magnitude to USFWS's calculated "surplus" at Site 2. Although not defined, it appears that USFWS' term "surplus" was calculated as the difference in normal-year (2005) transport capacities at Site 2 for the current and no diversion condition.

Table 5-11 of the SISR – Flow Depletion/Flow Diversion references values for 2005, which are intended to represent normal hydraulic years. Values from Table 5-14 would be more appropriate to use as those values cover a longer time period and include wet, dry, and normal years. This is especially important when comparing 1985-2009 values from Table 4-3 of the ISR – Sedimentation.

The District believes that USFWS is mistaken in comparing sediment transport capacities in order to conclude that a "surplus" exists here, in the same way that they conclude that a "deficit" exists at Site 4 in General Comment 6. USFWS' estimate of the "surplus" at Site 2, based on transport capacity calculations, should instead be based on MRBC yield estimates. In both cases a "surplus" exists, but it should be understood that the primary cause of, and magnitude of, the surplus is the watershed yield to the sites. Other than the net hydraulically dredged amounts, all sediment produced by the watershed above Site 1 reaches Site 2. In either case (MRBC versus differences in transport capacity) the amounts of sediment hydraulically dredged do not affect the sediment balance at Site 2 downstream of the Diversion Weir.

The adjusted MRBC sediment yield estimates, rather than transport capacities, should be used in assessing any “surplus” or “deficits.” Reaches having different transport capacities and effective discharge values can be still be (and are) in a state of dynamic equilibrium (no long-term aggradation or degradation). While the District believes that indirect estimates of yield like those in the MRBC report should not be used to assess whether a river is aggrading or degrading, they are very appropriate for assessing the question of whether the river is ‘flow’ versus ‘supply’ limited (surplus versus deficit). The surplus of sediment being supplied to both Sites 1 and 2 originates from the watersheds and even with hydraulic dredging, ample amounts reach both sites. All the calculations and the other elements of the body of evidence reveal that no shortages exist of sediment being supplied to all the study sites.

With regard to the reduction in effective and dominant discharges at Site 2, the reductions are the direct result of the reductions in the downstream hydrograph due to Project Diversion Weirs, and as shown in the SISR, they essentially match Site 1 values in the no diversion condition. For current operations, the channel geometry is consistent with the dominant discharge (which along with other body of evidence data provided, indicate a state of dynamic equilibrium), and the braided morphology, which defines the habitat, is well seated in a braided river regime. Neither of the alternative operating conditions adversely impacts the acknowledged sediment balance or braided morphologic regime (which provides the habitat).

USFWS [General] Comment 6 – Platte River Sediment Transport
“Attachment J of the SISR – Flow Bypass/F10w Diversion projected sediment transport for Study Site 3 and Study Site 4. Cumulative sediment transport for Study Site 3 averaged 1,040,000 tons for years 2003 to 2009. Cumulative sediment transport for Study Site 4 averaged is 2,553,000 tons. Sediment transport at Study Site 4 is 1,493,000 tons higher then Study Site 3. The sediment transport deficit using the Seasonal data (i.e., May 1st through August 15th) is 452,571 tons per year using the 2003 to 2009 average. The 1,493,000-ton increase in sediment transport at Study Site 4 represents a sediment deficit because the higher sediment transport is due to flow inputs from the Project’s tailrace return. The sediment deficit of 1,493,000 tons at Study Site 4 is similar to the 1,480,000-ton sediment surplus at Study Site 2. In other words, sediment deficits at the Project tailrace return can be attributed to sediment dredged at the Project diversion.

“Attachment J of the SISR – Flow Bypass/Flow Diversion projected sediment transport based on Current Operations and Run-of-River Operations. Cumulative sediment transport for Run-of-River Operations at Study Site 4 averaged 2,440,000 tons for years 2003 to 2009. Cumulative sediment transport for Current

Operations at Study Site 4 averaged 2,553,000 tons. Therefore, hydrocycling operations, in the study represented as Current Operations, result in an 113,000-ton increase in sediment transport. The 113,000-ton increase in sediment transport at Study Site 4 is represented as a sediment deficit because hydrocycled flow comes from the Project's tailrace return. The sediment transport deficit using the Seasonal data (i.e., May 1st through August 15^{th}) is 30,714 tons per year using the 2003 to 2009 average.

"The cumulative sediment deficits as a result of Project flow diversion and hydrocycling operations is approximately 1,606,000 tons per year – the sum of 1,493,000 and 113,000. The volumes of sediment deficit, assuming a bulk density of sand at 1.9 tons per cubic yard (Kinzel, 2009) is 845,263 cubic yards of sediment per year. This represents 845,263 cubic yards of sediment that is removed from the available sediment supply (i.e., riverbed and sandbars) near the Project tailrace return on a yearly basis."

District Response

First, the District notes a typographical error in USFWS' comments: the cumulative sediment transport for current operations at Ungaged Site 4 is 2,533,000 tons per year as a result, the remainder of the calculated numbers are incorrect as well.

The District believes that USFWS is mistaken in comparing sediment transport capacities in order to conclude that either a "deficit" (General Comment 6) or a "surplus" (General Comment 5) exists. USFWS is basing the alleged "deficit" at Site 4 on transport capacity calculations rather than by comparing transport capacities with MRBC yield estimates. For all alternative operations, the transport capacity at Site 4 does not exceed the adjusted sediment yield at Site 4, so no deficit exists. Other than the net dredged amounts, all sediment produced by the watershed above Site 3 reaches Sites 3 and 4. As noted in the District's response to General Comment 5, the amounts of sediment hydraulically dredged do not affect the sediment balance at Site 2 downstream of the Diversion Weir. Further, upstream water management activities in the Platte basin influence hydrology and channel morphology at all Platte River study sites.

The adjusted MRBC sediment yield estimates, rather than transport capacities, should be used in assessing any "surplus" or "deficits." The adjusted MRBC sediment yields significantly exceed the transport capacity at all of the study sites, including Sites 3 and 4, so there is no "deficit." Reaches having different transport capacities and effective discharge values can still be (and are) in a state of dynamic equilibrium (no long-term aggradation or degradation). While the District believes that indirect estimates of yield like those in the MRBC report should not be used to assess whether a river is aggrading or degrading, they are very appropriate for assessing the question of whether the river is 'flow' versus 'supply' limited (surplus versus deficit). The surplus of sediment being supplied to both Sites 3 and 4 originates from the watersheds and even with hydraulic dredging, ample amounts reach both sites. All the calculations and the other elements of the body of evidence reveal that no shortages exist of sediment being supplied to all the study sites, so there are no deficits.

With regard to the increase in effective and dominant discharges at Site 4, these are the direct result of the increase in the downstream hydrograph due to Project return flows, and as shown in the SISR, they closely match Site 3 values in the no diversion condition. For current operations, the channel geometry at both sites is consistent with the dominant discharge (which, along with other body of evidence data provided, indicate a state of dynamic equilibrium), and the braided morphology, which defines the habitat, is well seated in a braided river regime.

An increase (or decrease) in transport capacity does not equate to channel degradation (or aggradation) or other adverse morphological impacts. This is a misunderstanding evident in several of USFWS' comments. Instead, the channel morphologies upstream and downstream of the Tailrace Return were shown to be in dynamic equilibrium with sediment supplies, and the channel geometries were found to match equilibrium values associated with the respective dominant discharges. The District's studies, as well as other studies cited in the ISR and SISR, show that the entire system is in a state of dynamic equilibrium.

Indirect estimates of yield like those in the MRBC report should not be used to assess whether a river is aggrading or degrading but are appropriate for assessing the question of whether the river is 'flow' versus 'supply' limited. The sediment budget analysis revealed that neither of Sites 3 or 4 are supply limited. Ample sediments to supply the capacity demand are either being delivered to the sites or in such great abundance locally that no net degradation is occurring. In a related study of the entire river, USACE (1990, p. 5) concluded that "Bed material transport for the [Platte] river was found to be capacity limited with a virtually unlimited source."

The District notes that the no diversion and run-of-river conditions are mutually exclusive (i.e., if the District is not diverting water, they will be unable to hydrocycle); therefore, the effects cannot be accumulated, as is implied in the 1,606,000 tons per year value USFWS uses.

USFWS [General] Comment 7 – Consideration of Regime Theory Analyses
"USFWS agrees that Regime theory is a useful technology to determine potential changes in stream morphology. However, with the lack of hydrologic and geomorphologic data for the Loup River at Columbus and other locations, actual

streambed measurements are more useful in determining changes in stream morphology. As stated in the February 24, 2011, SISR meeting transcript, a braided plan form and represent river conditions representing various ranges of suitability for federally listed species (page 137, line 12 through page 139, line 8)."

District Response

Regime theory is not only useful in assessing changes in stream morphology, it is the standard of the industry (see references cited in the ISR). By definition, a braided stream that is in a state of dynamic equilibrium is constantly changing its cross section geometry, so even a large number of cross-section and streambed measurements taken over several years' time would not be as effective in assessing changes in morphology.

Many rivers and many years of study went into developing the regime charts used by the District. The body of scientific literature supports the validity of the charts. The combination of dominant discharge and hydraulic slope used in these charts has been demonstrated to be the best indicators of morphology.

On the other hand, the District is not aware of any prevailing literature that suggests that measurements of channel and streambed geometry can be used to assess either the state of existing, or potential changes in, overall morphology.

6. Comments on Proposed Modifications to Studies

USFWS Comment 1 – Expand Platte River One Dimensional HEC-RAS Modeling to Include July

"The Service originally proposed the development of a steady-state one dimensional (1-D) HEC-RAS model to better understand the effects of hydrocycling on sandbar erosion. The Service, in a June 24, 2009, letter originally proposed that cross section surveys be measured during the 1st week of March, 1st week of May, 1st week of July, and the 1st week of August. The Service considered these time frames for cross-sectional measurements as a necessary means of collecting enough data to assess erosion rates when considering the variable timing of peak flows. In the Final Study Determination, timing of cross-sectional measurements was reduced to the first week in May and the first week in August.

"The Service has found that the timing intensity for the 2010 cross-sectional measurements is inadequate in measuring erosion rates. Streamflow at the North Bend streamgage for the 2010 calendar year peaked on June 14. Table 4.4 of the SISR – Hydrocycling shows the survey dates for the cross-sectional measurements. Two of the three measurement dates for Study Site 3 occurred prior to the peak flow of June 14. It is difficult to measure sandbar erosion rates for Study Site 3 because it is likely that the June 14 peak flow redistributed sandbars between measurement dates. Since Study Site 3 represents a no hydrocycling condition, it is difficult to compare erosion rates of sandbars at Study Site 3 to Study Sites 4 and 5. The Service recommends the measurement of cross-sections in 2011 for the first week in May, first week in July, and first week in August. The addition of July measurement would allow for post-peak flow comparison of erosion rates if a mid to late June peak flow is observed in 2011.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service has determined that cross-sectional measurements collected in 2010 is inadequate in assessing erosion rates of sandbars above and below the Project tailrace return.
3) The proposed change in methods is necessary to allow for post-peak flow comparison of erosion rates if a mid to late June peak flow is observed in 2011. A survey during the first week in July and the first week in August would allow for two time periods post June peak flow.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA."

District Response
The District believes that USFWS' proposal to "Expand Platte River One Dimensional HEC-RAS Modeling to Include July" is unnecessary. USFWS made the request based on the supposition that only one of three cross-sections surveys at Site 3 (upstream of the Tailrace Return) were taken after the peak flow that occurred on June 14. USFWS references Table 4-4 from Study 2.0 Hydrocycling, regarding survey dates. The District notes that USFWS referenced the incorrect table regarding when surveys were taken. Table 4-4 notes the discharges that were used to calibrate the HEC-RAS model; the District used the flows from the Spring and Fall surveys at each site to calibrate the HEC-RAS model. The District directs USFWS to Table 4-1 that identifies the dates that cross sections were taken at each location; this table identifies surveys at Site 3 on May 2/3, August 11, and September 29. The District also notes that per the SPD (pg. 17), FERC determined that cross-sectional measurements were not necessary in July and only required surveys pre- and post-nesting.

The District reminds USFWS that the purpose of the cross-sectional measurements was for use in calibrating the HEC-RAS model. The District does not believe that USFWS has provided sufficient evidence that cross-sectional measurements collected in 2010 were inadequate. See the District's Response to Tern and Plover Comment 5.

USFWS Comment 2 – Conduct Longitudinal (Spatial) Comparisons of All Loup and Platte River Sites

"Page 11 of FERC's Final Study Determination identified the additional analyses required to address Sedimentation Objective 2.

> Using the findings on the current state of river morphology at each site, the District shall make longitudinal (spatial) comparisons of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream. In performing this spatial analysis, the District shall ensure that it uses cross-sectional geomorphic data from the USGS gage sites that are reasonably comparable to the cross-sectional geomorphic data taken at the non-USGS sites (i.e., the data taken at both USGS gage and non-USGS gage sites shall be obtained as close in time as possible).

"Page 30 of the SISR – Sedimentation Addendum identified that a longitudinal comparison was not conducted because it was determined that the Loup Bypass reach and lower Platte River was in dynamic equilibrium. However, the FERC's Final Study Determination required a longitudinal comparison of cross-sectional geomorphic data regardless of whether the river is/is not in dynamic equilibrium. Although it was not entirely clear as to what represented a longitudinal comparison in the Final Study Determination, the Service has determined that a longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel morphology.

"Page 1-22 of the Revised Study Plan - Sedimentation identified the following study commitment:

> In addition, the channel morphology associated with the effective discharges will be calculated according to the methodology described in Leopold and Maddock (1953) and Karlinger et al. (1983). Leopold and Maddock developed general stream morphology relationships between effective discharge and channel characteristics, and Karlinger et al. (1983) calibrated and applied Parker's regime equations (similar to Leopold and Maddock's) to the central Platte River. Channel characteristics include channel cross

sectional area changes, width changes, channel aggradation/degradation changes, and the rate at which these changes, if any, occur over time.

“This commitment was partially fulfilled in the ISR and SISR. The above channel characteristics (i.e., channel cross sectional area changes, width changes, channel aggradation/degradation changes, and the rate at which these changes, if any, occur over time) associated with gaged sites were provided, in part, as attachments to the ISR - Sedimentation. Attachment J of the SISR provided limited channel characteristic information for ungaged sites on the Platte River. The Service recommends that channel characteristic information be performed for ungaged sites for the Loup River and the Platte River. The Service also requests that all channel characteristic information for the Loup and the Platte River be presented as longitudinal (spatial) comparisons of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service’s October 20, 2010, comments on the ISR identified the longitudinal comparison of study sites as the highest ranked study to address Project affects to channel morphology. The Service has determined that a longitudinal comparison of sediment transport, as represented in Table 5-1 of the Sedimentation Addendum, is not adequate in relating sediment transport effects to channel morphology.
3) The proposed change in methods was not made earlier because the Service assumed that the SISR would include a comprehensive longitudinal (spatial) comparison of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives. The Service assumed that the SISR would include a comprehensive longitudinal (spatial) comparison of all sites on the Loup and lower Platte Rivers starting at the most upstream site on each river, and progressing downstream.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.”

District Response
The District believes that USFWS' proposal to "Conduct Longitudinal (Spatial) Comparisons of All Loup and Platte River Sites" is unnecessary.

The District has performed and included the requested longitudinal (spatial) analysis of the Platte River study Sites 1, 2, and 3 (see SISR Tables 5-11 through 5-14, page 72 of the Study 5.0 Flow Depletion and Flow Diversion) and Sites 3, 4, and 5 (Tables 5-9 through 5-12 on page 59 and Figure 5-15 of Study 2.0 Hydrocycling). The table and supporting text shows that the observed (and reported) differences in channel geometries are consistent with the differences in effective and dominant discharges resulting from the different flow hydrographs acting in shaping the channel differently at each location. The morphology at each site is consistent with the sediment transport parameters and in dynamic equilibrium.

The District would like to clarify statements on page 30 of the SISR Sedimentation Addendum as referenced by USFWS. District did not state "that a longitudinal comparison was not conducted because it was determined that the Loup Bypass reach and lower Platte River was in dynamic equilibrium." The text on page 30 is as follows:

> "…if the current condition morphology analysis indicates that the Loup River bypass reach and lower Platte River are in dynamic equilibrium, or are not supply limited based on the adjusted yields and sediment transport capacity calculations, then no alternatives relative to sediment augmentation would be evaluated."

As noted above, the District completed the longitudinal (spatial) analysis of the gaged and ungaged sites on the Loup and Platte rivers. Additionally, the District arrived at the conclusion that the Loup River Bypass reach and lower Platte River are in dynamic equilibrium.

Rivers in dynamic equilibrium are defined as "being in regime," which is the subject of Leopold and Maddock as well as the paper by Karlinger et al. cited by USFWS. Because the effective and dominant discharges are accepted as indicators of the flows that do the most work in shaping the channel, the District's W, D, and V charts (derived from numerous USGS measurements at the effective discharge rates) provide accurate measures of the "regime" conditions obtained by entering the dominant discharge into each relationship. The District, as well as other investigators referenced in the ISR and SISR, adopted this methodology for developing relationships between effective discharge and "regime" channel characteristics that would be associated with those discharge values. Other than attempting to calibrate Parker's regime equations, the District's methods match not only those of Karlinger et al. (1983) but also other investigator's choices of methods cited in the ISR and SISR.

Other 1980's USGS reports published as companion reports to Karlinger et al. used procedures matching those used by the District, particularly effective discharge. One of Karlinger's colleagues at the USGS (Kircher, 1981) determined effective discharges for the North Platte, South Platte, and Central Platte Rivers. He concluded (p. 25), "Changes in the channel characteristics of the Platte River can be examined by considering the effective discharge at each site. The formation and maintenance of channel cross-sectional characteristics are accomplished by sediment movement; and, as defined earlier, the water discharge that transports the most sediment is the effective discharge. Therefore, a direct relationship exists between [regime] channel size and effective discharge. If effective discharge is changed because of hydrologic changes, then a similar direction of change in channel cross-sectional area could be expected."

Based on Kircher's and other investigators' work cited in the ISR and SISR, the District appropriately selected the effective discharge method rather than Parker's method to provide relationships among discharge and regime channel dimensions. The single, once-in-time attempt by the USGS (Karlinger) to calibrate Parker's equation (which was originally derived for gravel bed rivers) in a sand bed river was not adopted as a useful tool by any subsequent investigation of regime conditions in the Platte River system. Karlinger notes that Parker's method assumes a uniform channel bed with center depth equaling maximum depth, which is not physically relevant anywhere in the Platte River. Further, he found that vegetation on the banks limited the width and depth combinations provided by Parker's equations, and the method may be "inappropriate" if there is constraining vegetation.

Instead of applying Parker's equation in any other studies of regime in the Platte system, the resource agencies adopted and confirmed the same regime methods employed by the District (see for example, USACE, 1990, Kircher, 1981). Parker's original method was developed for gravel-bed streams, and even Karlinger discusses the difficulty of calibrating it, along with its limitations, for use on sand-bed, braided rivers.

USFWS Comment 3 – Conduct Temperature Analysis for Platte River Bypass Area

"The Service recommends a simpler approach of assessing flow-related effects at Merchiston and at Genoa. The Service recommends a table listing the maximum daily temperature and corresponding flow for both study sites. In addition to the table, the Service recommends a summary of the number of days above 90° F for each respective location on a month-by-month basis. Proposed methods are similar to those conducted by Sinokrot and Gulliver (2000). In the study, the authors stated “the occurrence of these high water temperatures can be reduced with an increased in-stream flow.” Because times of missing temperature data occurred during low flow conditions in the Loup River bypass area, the Service recommends another year of temperature monitoring within the Loup River at Merchiston and Genoa.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. Because the probability of thermal temperature exceedances at Merchiston and Genoa were conducted independently, there is no evaluation of the No Diversion condition for the Loup Bypass area that relates streamflow to temperature exceedances.
3) The proposed change in methods was not made earlier because the Service needed a stepwise means of addressing temperature-related effects of flow bypass. Now it is determined that there is a relationship between Loup River streamflow and temperature exceedances in the Loup River bypass area, Service proposed methods would allow for an estimation of No Diversion condition effects on probability of temperature exceedances.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives. The Service proposal reflects slight alterations as to how the data is organized.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.”

District Response
The District believes that USFWS’ proposal to “Conduct Temperature Analysis for Platte River Bypass Area” is unnecessary.

USFWS requested a table listing of the maximum daily temperature and corresponding flow for both study sites. USFWS also requested a summary of days above 90 degrees F. The District has provided this information in tables at the end of this document:

The District believes that USFWS’ proposal to conduct another year of temperature monitoring at Merchiston and Genoa is unnecessary. USFWS makes this recommendation based on the statement “because times of missing temperature data occurred during low flow conditions in the Loup River bypass area." The District acknowledges in the SISR that temperature data was missing during a portion of the study period at both Merchiston and Genoa; however, the District disputes USFWS' assertion that the missing data occurred during low flow conditions.

At Merchiston, flow data was missing from June 27 through June 30; since temperature exceedances at Merchiston are not related to flow diversion, the District believes that this data gap is insignificant. At Genoa, flow data was missing from June 11 through July 18, a time period that corresponded with the highest flows of the summer. The District acknowledges that even though this period experienced high flows, there was a period of 2 days from July 3 to July 4 when flows were less than 500 cfs. However, the District believes that the water temperature data gap during this period is also insignificant to the analysis since maximum ambient temperatures during this period were 84.4 degrees F and 80.7 degrees F. The District notes that the analysis in Study 4.0 Water Temperature in the Project Bypass Reach clearly shows that water temperature is highly correlated to ambient temperature, as such, relatively low ambient temperatures during these 2 days of low flows would not substantially alter the conclusions of the study.

Additionally, USFWS notes that "because the probability of thermal temperature exceedances at Merchiston and Genoa were conducted independently, there is no evaluation of the No Diversion condition for the Loup Bypass area that relates streamflow to temperature exceedances." The District notes that the statistical analysis of water temperature exceedances above the Diversion Weir at Merchiston was intended to be a surrogate for a no diversion condition. Furthermore, the only way to analyze a synthetic no diversion hydrograph at Genoa would be to use the relationships established between water temperature and ambient temperature, soil temperature, etc in Study 4.0 – Water Temperature in the Project Bypass Reach. Therefore, the District believes that the analysis conducted in Study 4.0 – Water Temperature in the Project Bypass Reach is sufficient to provide information related to a no diversion condition and no additional analysis is warranted.

USFWS notes that "Service proposed methods would allow for an estimation of No Diversion condition effects on probability of temperature exceedances." The District is unclear what methods USFWS is proposing to evaluate the no diversion condition. The District interpretation of USFWS' proposed method includes two components: preparation of tables showing raw data (provided above) and conducting a second year of temperature data collection. The District does not see the relationship between these two requests and evaluation of a no diversion condition.

In their justification of this study modification request, USFWS also asserts that "now it is determined that there is a relationship between Loup River streamflow and temperature exceedances in the Loup River bypass area," The District assumes USFWS makes this assertion based on the results of the exceedance probability analysis presented in the SISR. The District disagrees with USFWS' conclusion that this method established a correlation between low flows and water temperature excursions. The District believes that the exceedance probability results support the District's conclusion that there is not a significant relationship between low flows and water temperature excursions. For example, using linear interpolation between the data points on the Sinokrot and Gulliver exceedance probability plots at Merchiston from Study 4.0 (Figures 5-3 and 5-16), the 75 percent exceedance flow rate is 2,000 cfs, while at Genoa, the 75 percent exceedance flow rate is approximately 120 cfs. If flow was a primary factor in water temperature, the District would expect a 2,000 cfs flow to have a percent exceedance of approximately 13 percent, rather than a 75 percent.

USFWS Comment 4 – Conduct Montana Method for No Diversion Alternative in the Platte River Bypass Area

"The Service recommends a Montana Method evaluation for the No Diversion condition of the Platte River bypass area. The Service has determined that a comparison of results at the Duncan study site to results at Study Site 3 does not provide an adequate evaluation of the No Diversion condition. An evaluation of the No Diversion condition is critical in understanding Project diversion-related effects to the Platte River bypass area.

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. An evaluation of the No Diversion condition is critical in understanding Project diversion-related effects to the Platte River bypass area.
3) The proposed change in methods was not made earlier because the Service assumed that the study plan would include an evaluation of the No Diversion condition for the Platte River bypass area.
4) Service proposed modification was not a result of significant changes in the project proposal or that significant new information material to the study objectives has become available. The Service assumed that the study plan would include an evaluation of the No Diversion condition for the Platte River bypass area.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA."

District Response
The District believes that USFWS' Proposal to "Conduct Montana Method for No Diversion Alternative in the Platte River Bypass Area" is unnecessary.

As presented in the SISR, the Montana Method bases flow requirements on the assumption that a percentage of mean annual flow is needed to maintain a healthy stream environment. To say it another way, the Montana Method is intended to provide guidelines for minimum instream flows based on the average of flows that a stream experiences throughout the year, essentially assuming that the average flows provide a representation of the habitat that supports aquatic life in the stream during "normal" flow conditions. Thus evaluating habitat conditions using the Montana Method is essentially comparing a stream to itself and does not require comparison to other locations.

Furthermore, the District notes that the Montana Method evaluation of habitat at the Duncan gage, clearly illustrates that flows are degraded on the Platte River upstream of the Loup River confluence and that habitat conditions as predicted by the Montana Method are generally improved at Site 3. To support this assertion, the District reviewed the monthly Montana Method analysis presented in Attachment K of Study 5.0 – Flow Depletion and Flow Diversion and identified the number of months during the period of record when flow conditions were better at Duncan than at Site 3 and vice versa:

- Months Duncan conditions were more favorable than Site 3: 10
- Months Site 3 conditions were more favorable than Duncan: 49

The District also notes that during the period of record evaluated (1954 to 2009), the Platte River contributed an average of 64 percent of the total flows at Site 3 each year. Based on all of the above, the District does not believe additional analysis is warranted.

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Daily Temperature and Flow at Genoa and Merchiston

Date	Maximum Air Temperature Degrees F	Genoa Maximum Water Temperature Degrees F	Merchiston Maximum Water Temperature Degrees F	Genoa Mean Daily Flow (cfs)	Merchiston Mean Daily Flow (cfs)
6-May	61.8	59.7	63.0	98	1966
7-May	53.5	59.2	58.5	256	2204
8-May	57.3	64.9	61.9	232	2160
9-May	59.6	61.2	59.4	304	2272
10-May	51.5	55.8	56.3	133	2281
11-May	52.7	55.0	54.9	119	2277
12-May	46.1	52.9	53.2	105	2273
13-May	59.2	62.4	59.4	183	2631
14-May	69.7	66.4	67.3	102	2410
15-May	70.1	67.8	68.9	103	2301
16-May	60.9	63.7	65.1	100	2148
17-May	67.5	68.0	68.4	101	2059
18-May	74.0	73.6	73.4	343	2271
19-May	67.7	68.2	69.1	160	2278
20-May	60.1	63.1	63.5	112	2290
21-May	74.9	74.8	73.0	143	2581
22-May	87.4	78.6	77.4	128	2606
23-May	90.5	83.5	81.1	126	2534
24-May	88.3	82.4	80.6	105	2263
25-May	78.5	79.0	78.3	141	2129
26-May	78.9	81.0	79.0	109	2107
27-May	85.3	82.4	80.8	152	2550
28-May	89.2	86.0	83.5	110	2998
29-May	90.5	86.4	83.8	105	2223
30-May	72.5	77.0	79.0	105	2143
31-May	81.7	81.1	77.7	491	3269
1-Jun	89.1	79.2	76.3	628	3822
2-Jun	74.5	80.8	77.2	901	4065
3-Jun	85.2	81.5	79.3	144	3058
4-Jun	85.5	88.5	82.9	106	2860
5-Jun	81.7	85.5	82.0	509	3283
6-Jun	80.1	82.9	79.2	473	3307
7-Jun	73.7	80.2	74.5	180	2904
8-Jun	78.7	80.8	78.1	1520	4374
9-Jun	82.5	77.7	79.2	5790	8514
10-Jun	80.5	76.1	77.4	5030	7704
11-Jun	82.0		77.5	9030	11554
12-Jun	78.2		75.9	14800	17304
13-Jun	69.7		72.7	25000	27414
14-Jun	74.0		70.5	24100	26744
15-Jun	75.7		72.7	22500	25134
16-Jun	87.4		77.2	13800	16604
17-Jun	89.9		80.4	11300	14294

Date	Maximum Air Temperature Degrees F	Genoa Maximum Water Temperature Degrees F	Merchiston Maximum Water Temperature Degrees F	Genoa Mean Daily Flow (cfs)	Merchiston Mean Daily Flow (cfs)
18-Jun	87.4		80.6	9570	12694
19-Jun	81.5		78.8	7630	10734
20-Jun	77.8		76.6	7580	10344
21-Jun	83.4		79.3	9830	12714
22-Jun	87.0		81.7	10400	13454
23-Jun	80.5		80.1	10500	13344
24-Jun	81.7		82.0	6360	9294
25-Jun	92.6		85.5	4710	7734
26-Jun	94.2		88.3	3790	6884
27-Jun	83.9			3860	6674
28-Jun	87.0			3600	6214
29-Jun	80.1			2510	4644
30-Jun	85.0			2250	4144
1-Jul	85.2		83.8	829	3065
2-Jul	87.3		82.8	597	2813
3-Jul	84.4		81.0	373	2549
4-Jul	80.7		80.8	263	2429
5-Jul	78.0		79.5	1080	3716
6-Jul	85.1		84.9	1890	4836
7-Jul	77.2		81.7	2140	5206
8-Jul	80.1		78.1	2270	5466
9-Jul	84.2		84.2	1650	4626
10-Jul	87.9		85.5	1270	4146
11-Jul	82.7		82.8	2000	4986
12-Jul	75.1		80.4	2270	5466
13-Jul	90.7		82.9	4750	7976
14-Jul	93.4		86.4	5350	8686
15-Jul	83.0		84.9	4410	7196
16-Jul	90.4		88.3	3470	5926
17-Jul	92.5		90.9	2640	5076
18-Jul	85.5		89.1	1850	4296
19-Jul	84.1	86.5	85.1	1470	3966
20-Jul	83.2	86.5	85.3	1710	4216
21-Jul	82.9	81.3	83.3	1647	4193
22-Jul	90.7	90.1	87.3	1584	4020
23-Jul	88.7	90.9	88.7	1520	3956
24-Jul	80.8	87.4	86.4	2510	5136
25-Jul	82.8	87.6	85.6	2760	5256
26-Jul	90.1	91.9	88.2	1180	3496
27-Jul	92.9	92.5	89.1	853	3089
28-Jul	82.5	88.7	86.9	569	2695
29-Jul	85.4	88.0	87.3	260	2286
30-Jul	90.5	94.8	91.0	108	2044
31-Jul	88.4	91.8	91.9	44	1920
1-Aug	89.0	92.1	89.2	32	1898
2-Aug	96.2	91.4	86.9	25	1901

Date	Maximum Air Temperature Degrees F	Genoa Maximum Water Temperature Degrees F	Merchiston Maximum Water Temperature Degrees F	Genoa Mean Daily Flow (cfs)	Merchiston Mean Daily Flow (cfs)
3-Aug	86.4	89.1	88.3	135	2121
4-Aug	85.1	86.7	87.6	331	2377
5-Aug	84.1	86.5	86.9	290	2316
6-Aug	88.4	88.5	87.3	473	2429
7-Aug	90.9	90.7	88.3	582	2768
8-Aug	94.9	93.9	91.2	1350	3686
9-Aug	92.1	92.3	91.8	897	3103
10-Aug	91.9	91.0	90.0	595	2701
11-Aug	98.1	94.3	93.2	327	2363
12-Aug	98.2	94.6	91.8	147	2113
13-Aug	92.6	92.3	88.5	186	2192
14-Aug	83.8	82.9	84.0	262	2328
15-Aug	81.5	84.4	80.8	248	2344
16-Aug	86.2	86.5	82.9	208	2154
17-Aug	70.7	77.5	78.8	277	2273
18-Aug	83.9	81.5	79.3	1370	3796
19-Aug	90.8	86.5	84.4	1710	4106
20-Aug	86.0	87.4	85.1	1190	3476
21-Aug	92.4	89.6	87.6	833	3019
22-Aug	92.3	89.8	88.0	907	3143
23-Aug	90.1	87.1		1420	3026
24-Aug	78.7	82.6		1490	2946
25-Aug	84.5	84.2		1030	2476
26-Aug	85.0	81.7		698	2154
27-Aug	86.2	80.6		1190	2496
28-Aug	89.7	79.7		782	2188
29-Aug	90.6	77.9		531	2017

Number of Days with Daily Maximum Water Temperature Above 90 Degrees F

	Genoa	Merchiston
May	0	0
June	0	0
July	6	3
August	9	4
Total	15	7

May 11, 2011

Attachment C

District response to Nebraska Game and Parks Commission (NGPC) comments on the Second ISR dated April 11, 2011.

1. **Comments on Study 4.0 – Water Temperature in the Loup River Bypass Reach**

   NGPC Comment 1
   Relationship between Air temperature and Water Temperature
   "The statistically significant relationship between air and water temperatures reported in the SISR is commonly found in shallow, sand substrate prairie streams which lack significant cover providing shaded areas. Streams like the Loup River and the lower Platte River consistently demonstrate this relationship. This makes air temperature a good indicator for critical water quality issues like thermal stress that leads to fish kills."

   District Response
   This is the same conclusion the District came to after analyzing the data. By using linear regression, multiple regression, and logistic regression on hourly data, daily maximum data, and all data above 63 degrees Fahrenheit (F), the District found that air temperature is not only a good indicator of water temperature, it is also a very good predictor of water temperature exceedances.

   NGPC Comment 2
   Relationship between Flow and Water Temperature
   "The lack of a statistically significant relationship between stream discharge (flow) and water temperature as analyzed in the SISR is not surprising. The use of hourly discharge and temperature data for the entire period of May through August assures that such an insignificant relationship will be found. Discharge values for the period of record analyzed range from 997 to 28,420 cfs at Merchiston and 30 to 26,400 cfs at Genoa (Table 5.1). Water temperatures ranged from 48 to 93.2 degrees F at Merchiston and 48.2 to 94.8 degree F at Genoa during the same period. As the SISR states water temperatures can vary several degrees on a given day while flow remains relatively constant. This leads to a weak relationship and is further masked by the use of hourly data. Furthermore, the use of such broad temperature ranges and discharge ranges does not address the issue of Project impacts leading to fish kills which almost always occur during periods of high water temperatures and low flows. As the SISR states, "excursions above 90 degrees F occurred only when discharge was less than 5,000 cfs" at the Merchiston site while at Genoa, "excursions above 90 degrees F occurred when discharge were less than 1,500 cfs". Further analyses of the relationship between

flow and water temperature for discharges less than 200 cfs (Figs 5-13 to 5-15) for the Genoa site suggest a more significant negative relationship may occur. Indeed, the examination of the relationship between air and water temperature at extremely low flows (Figs 5-19 through 5-24) suggest a tighter and slightly stronger relationship between these parameters as evidenced by the increase in model R^2 values given."

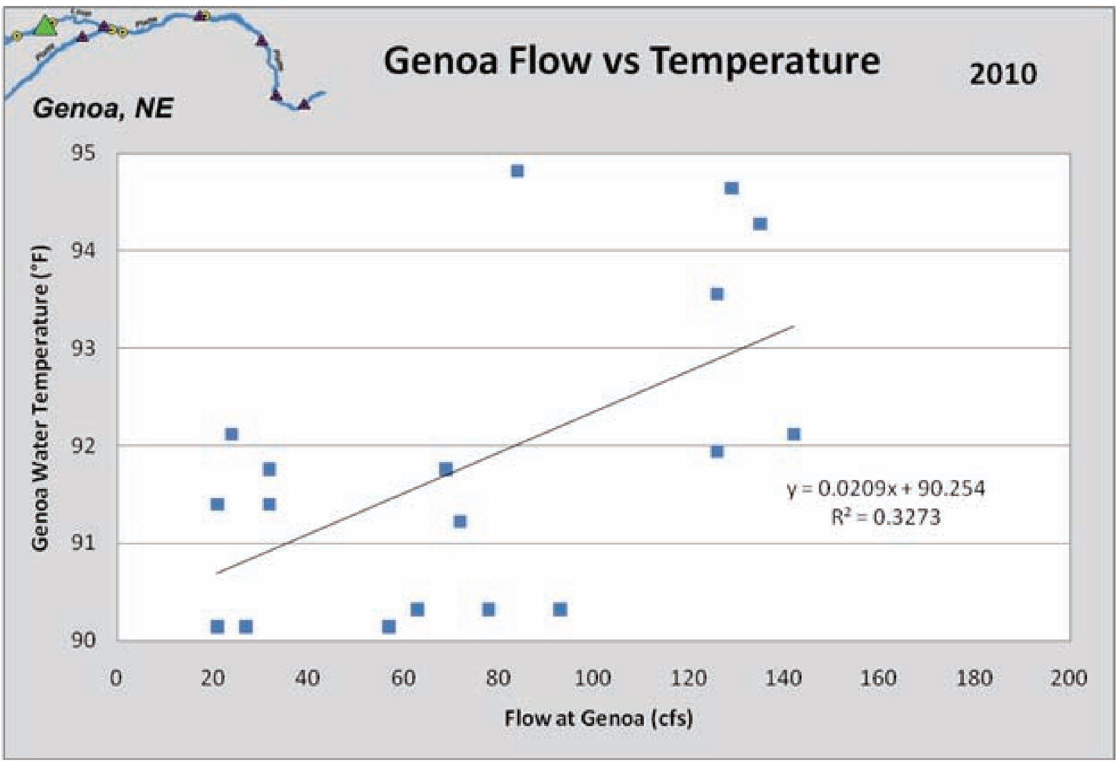
"To further demonstrate the importance of focusing on low flows and high maximum temperatures, the SISR analyzed the probability of exceeding 90 degrees F based on flows. For the Merchiston data (above the diversion, there is a 45% probability of a temperature excursion occurring at flows less than 2,500 cfs and the probability increases as flow declines. For the Genoa data (below the diversion) there is approximately a 60% probability of a temperature excursion occurring at flows less than 150 cfs."

District Response

First, the District notes that NGPC is both suggesting that the use of hourly temperature data assures an insignificant relationship when analyzing the entire data set, yet points to a "significant negative relationship" when analyzing hourly data in Figures 5-13 through 5-15. The District believes that the analysis of daily data is inappropriate due to the low number of data points with exceedances (15 days total) and that the more data points available for analysis, the more likely the analysis will identify any relationships that exist.

Furthermore, the District disagrees that the use of hourly discharge and temperature assures an insignificant relationship. If there were a strong relationship, it would be obvious in the analyses. The fact that using hourly discharge and temperature shows no statistically significant relationship means that any possible relationship between flow and temperature would be slight at best. Additionally, the District notes that because the hourly data did not show a statistically significant relationship between flow and water temperature, the District expanded the statistical analyses to more completely address the study goals. The District performed linear regression, multiple linear regression, and multiple logistic regression on the daily maximum temperatures at Genoa and found no statistically significant relationship between flow and water temperature. The District also performed multiple linear regression and multiple logistic regression on a subset of the hourly flow and temperature data (water temperatures above 63 degrees F) and again found no statistically significant relationship between water temperature and flow.

Additionally, a problem with focusing only on water temperatures above 90 degrees F and flows less than 200 cfs is that few events meet these criteria. In the Genoa data set, for example, only 18 records (occurring on 5 separate days), representing 1.1 percent of the total number of paired hourly observations, contain temperatures above 90 degrees F and flows below 200 cfs. This small sample exhibits a weak linear relationship which accounts for 33 percent of the variance in the sample (R^2=0.33). Not only is the relationship weak, it is positive and suggests that as flow increases, temperature also increases, thus increased flow does not significantly mediate water temperature. This is the exact opposite effect NGPC has noted. These trends are shown on the scatter plot below; with n = 18 and degrees of freedom = 16, the relationship could be called statistically significant, but it is not practically significant.



*P value not show as this example is for an illustrative point only, and not an actual statistical significance test.

While the District calculated the exceedance probabilities using Sinokrot and Gulliver's method (Figures 5-3 and 5-16) as requested by USFWS. The District disagrees with the conclusions that NGPC draws from these graphs. The District believes that the Sinokrot and Gulliver results support the District's conclusion that there is not a significant relationship between low flows and water temperature excursions. For example, using linear interpolation between the data points on the Sinokrot and Gulliver exceedance probability plots at Merchiston (SISR Study 2.0 – Hydrocycling, Figure 5-3), the 75 percent exceedance flow rate is 2,000 cfs, while at Genoa (SISR Study 2.0 – Hydrocycling, Figure 5-16), the 75 percent exceedance flow rate is approximately 120 cfs. If flow was a primary factor in water temperature, the District would expect a 2,000 cfs flow to have a percent exceedance of approximately 13 percent at Merchiston, rather than 75 percent. Furthermore, the District notes that the exceedance probability plots have very few data points and it is typically inappropriate to develop conclusions using so few data points.

NGPC Comment 3
Water Temperature Relationships Between Sites

"The stated conclusions that the relationships between water, soil and air temperatures and flow respond in the same manner between sites on the river is to be expected. However, this conclusion does not directly address the question whether or not there is a difference in the degree of change that might occur between sites dependent upon flow. The synchronous daily oscillations in water temperature that occur between the two sites are a testament to the influence of daily air temperatures and its similarity at both sites. Figures 5-39 through 5-41 demonstrate that as temperatures increase in the river during the warmest portion of the year, the trend is for daily water temperature points at Genoa to increasingly be greater than those at Merchiston. This is seen in both the higher peaks of the daily oscillations as seen in Figure 5-39 as well as the trend towards more points being above the 1:1 Line as seen in Figures 5-40 and 5-41."

District Response

The District believes the analyses performed (linear regression, multiple linear regression, and logistic regression on hourly data, hourly data above 63 degrees F, and daily max data) clearly show that synchronous daily fluctuations have an overwhelming influence from ambient air temperature and minimal, if any, influence from flow. With respect to the higher peaks on Figure 5-39 noted by NGPC, there were 15 days that daily max Genoa temperature was above 90 degrees F and 7 days that Merchiston was above 90 degrees F (see table below). Figure 5-39 shows that there are 9 days when the temperature at Genoa is above 90 degrees F and the temperature at Merchiston is not. On 7 of those 9 days, the water temperature at Merchiston was less than 2 degrees F lower than the water temperature at Genoa.

Number of Days with Daily Maximum Water Temperature Above 90 Degrees F

Month	Genoa	Merchiston
May	0	0
June	0	0
July	6	3
August	9	4
Total	15	7

The slope of the regression line on Figure 5-41, using hourly temperature data (errant data removed) with Merchiston on the x-axis and Genoa on the y-axis is 1.025. Although not shown on Figure 5-41, the District calculated the 95 percent confidence interval around the slope of the regression line as 1.017 and 1.035. By using Merchiston as the predictor, if Merchiston is 90 degrees F then the temperature at Genoa could be anywhere from 89.27 to 90.89 degrees F.

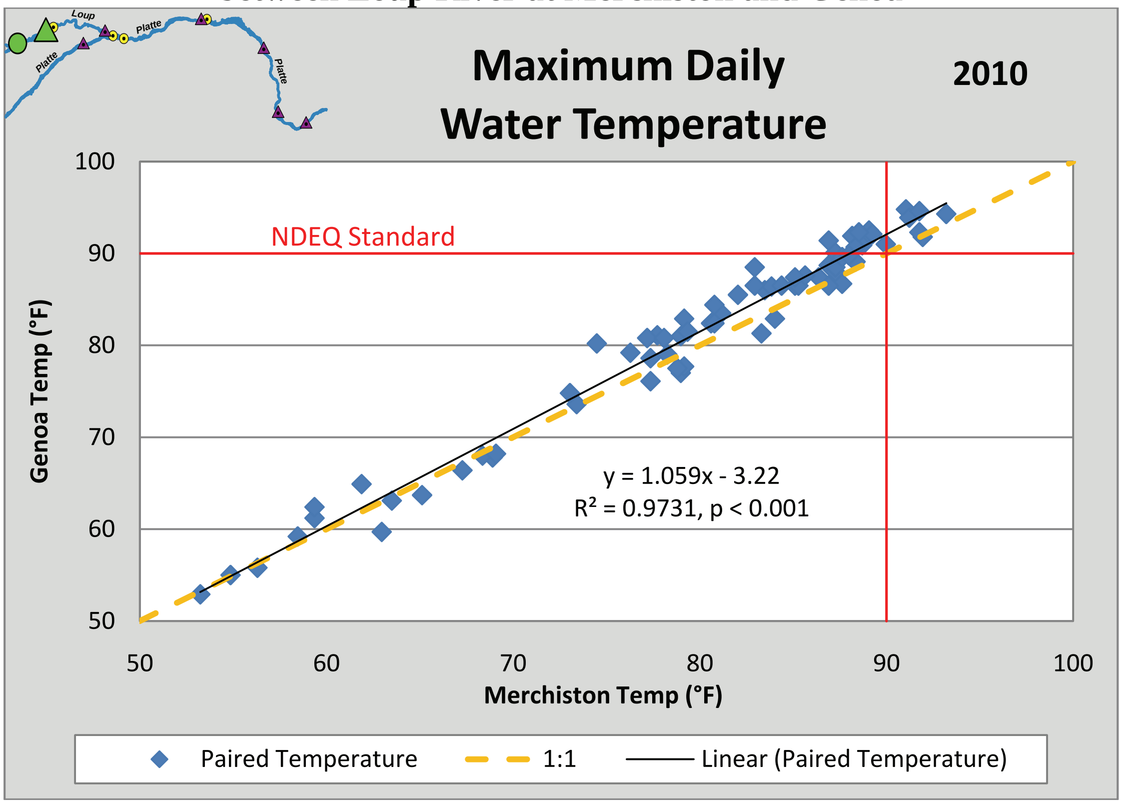
Therefore, using hourly data and a 95 percent confidence interval, the analysis shows that there is only a 1 degree F swing of temperature at Genoa around the temperature at Merchiston (90±1 degree F). These differences in temperature, between Genoa and Merchiston, are further reduced when taking into account a 0.36 degree F variability in temperature instrumentation.[1] The combined error of the two instruments can be up to 0.72 degree F, which would almost completely eliminate any actual temperature differences using hourly data.

NGPC Comment 4
Water Temperature Relationships Between Sites
"In a preliminary analysis, NGPC examined the maximum daily water temperatures from the two sites for days exhibiting water temperatures greater than the 90 degree F water quality standard. A total of 13 dates from the 2010 sampling period (May – August) qualified under these constraints. Daily maximum water temperatures at the Genoa site ranged from 1.08 to 4.14 degrees F greater than those measured at Merchiston. In addition, the relationship between daily maximum temperatures differences for the two sites and flow (measured at Genoa) is a negative one. As the flow declines, the difference between daily maximum water temperatures at the two sites increases. This suggests that at these higher temperatures, water temperatures reach a higher maximum on a given day below the diversion than above it. The fact that there is a statistically significant relationship between the recorded water temperatures at the two stations confirms that water temperature is reacting in a similar manner to the changes in air temperature. The absolute difference in daily maximum water temperatures between the two sites at high temperatures and relatively low flows suggests a potential impact due to water diversion."

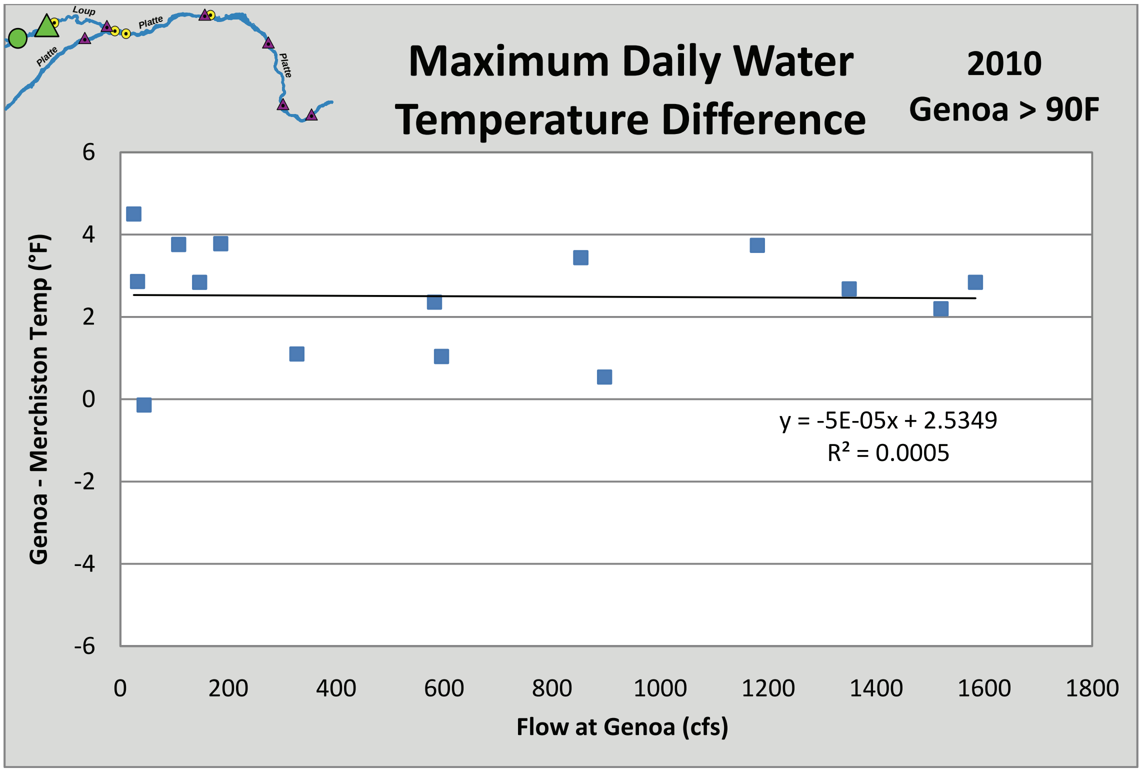
[1] Design Analysis Associates, Inc. *WaterLOG Thermistor Temperature Probe Model H-377 , Owner's Manual Revision 1.0*. Available at http://waterlog.com/media/pdfs/H-377-Manual-v1-0.pdf.

District Response
The fact that there is a statistically significant relationship is important, but it is more important that the relationship is near 1:1, as shown in the following graph.

Maximum Daily Water Temperature Relationship between Loup River at Merchiston and Genoa

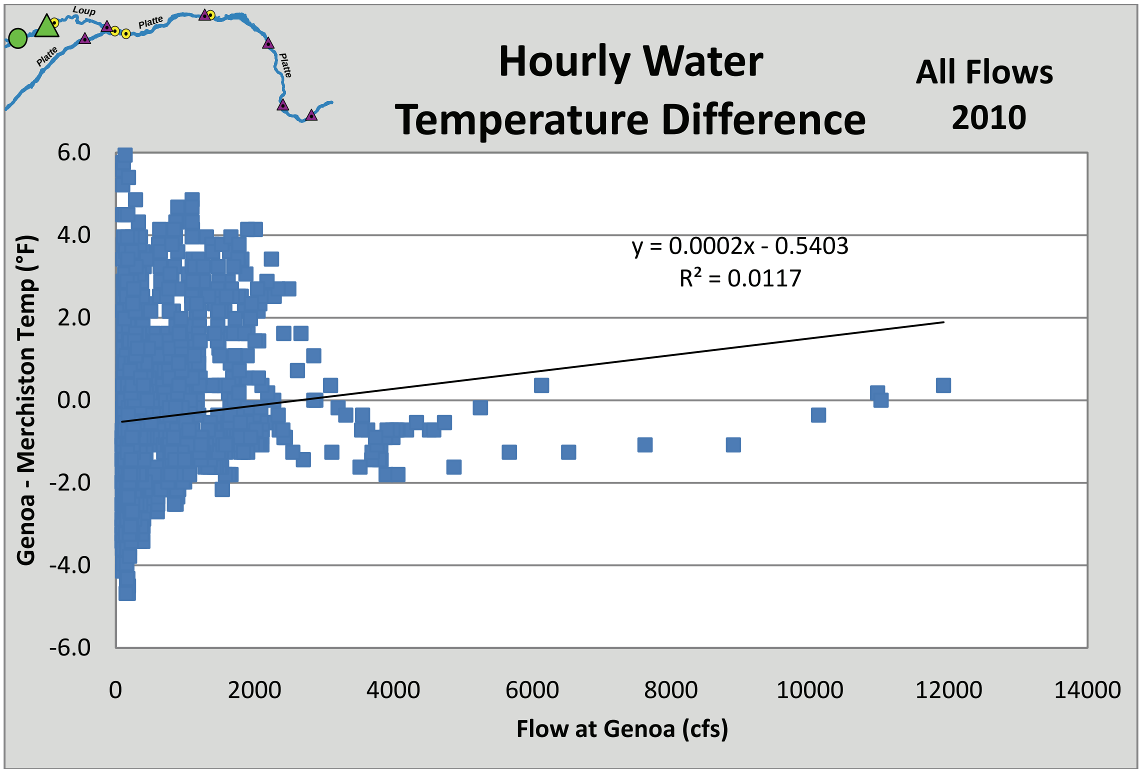


District records show that there were 15 total days that the daily maximum temperature at Genoa was greater than 90 degrees F. Of these 15 days, the difference between Merchiston temperature and Genoa temperature ranged from -0.14 to 4.5 with an average of 2.5. As shown in the graph below, on days with exceedances, the difference between the maximum daily water temperatures does not increase as flow decreases, in fact the difference is nearly constant as indicated by the slope of the regression line.

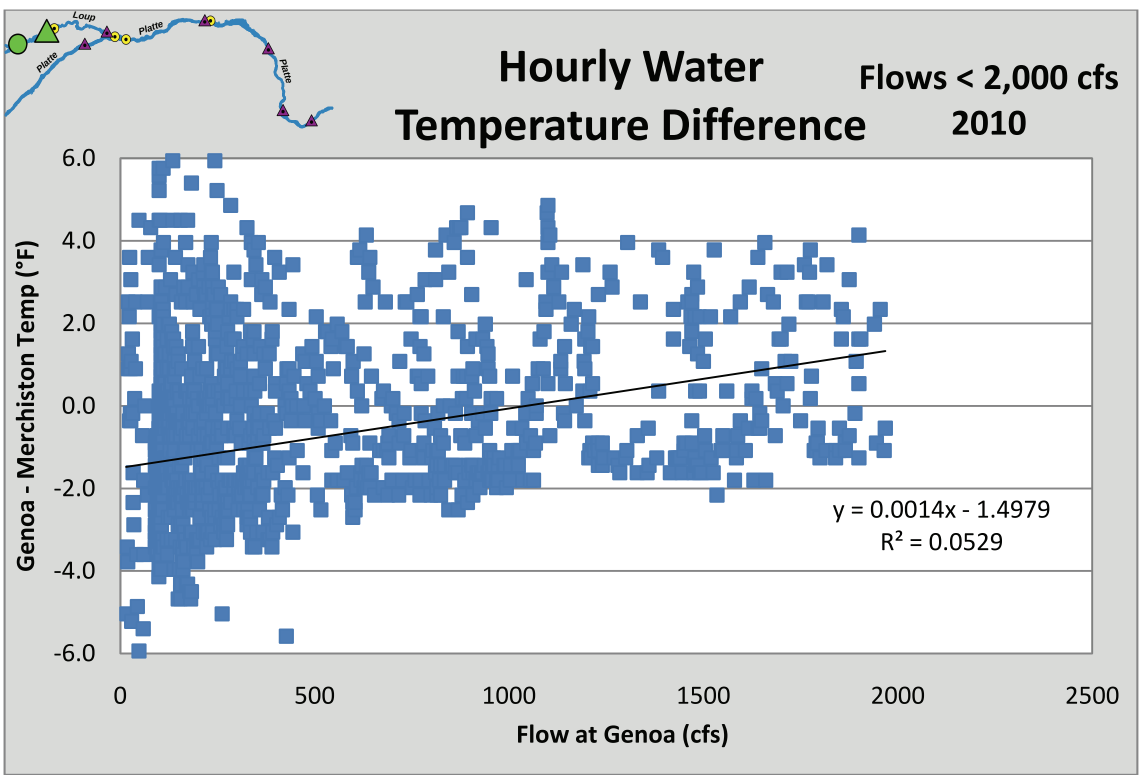


The District's records show that there are 6 total days that the daily maximum temperature at Genoa was greater than 90 degrees F and the flow at Genoa was less than 200 cfs. Of these 6 days, the difference between Merchiston temperature and Genoa temperature ranged from -0.14 to 4.5 with an average of 2.9.

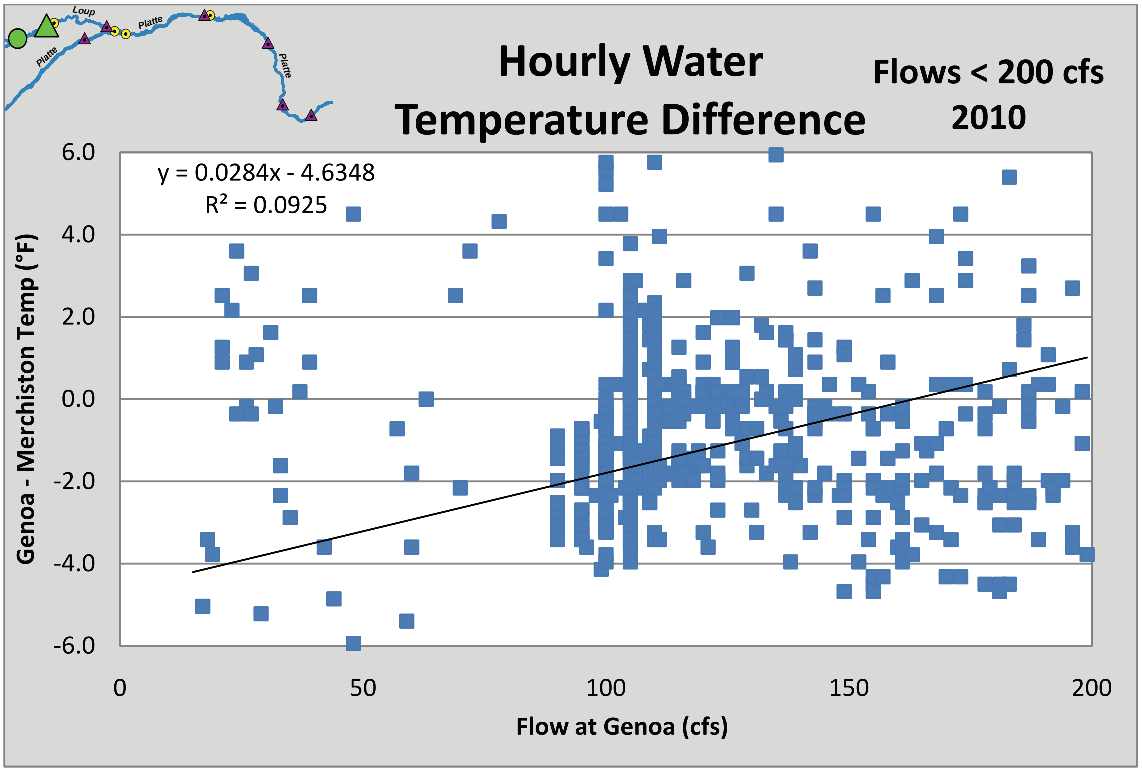
The District created a new dataset for the difference between the daily maximum temperatures at Genoa and the daily maximum temperatures at Merchiston. The mean of that dataset for all flows is 1.47. With an accuracy band of the instrumentation of up to 0.72 degree F, the mean of the differences could be less than one degree F. The graphs below show the difference between temperature at Genoa and Merchiston plotted against flow for all flows, flows less than 2,000 cfs and flows less than 200 cfs. In all three cases, the plots show a wide range of variability in temperature difference between Genoa and Merchiston, both positive and negative. Furthermore, the resulting regression equations exhibit a weak correlation of 9 percent or less.



Loup
Platte
Platte
Platte
Hourly Water Temperature Difference
All Flows 2010
y = 0.0002x - 0.5403
R² = 0.0117
Genoa - Merchiston Temp (°F)
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
0
2000
4000
6000
8000
10000
12000
14000
Flow at Genoa (cfs)



Loup
Platte
Platte
Platte
Hourly Water Temperature Difference
Flows < 2,000 cfs 2010
y = 0.0014x - 1.4979
R² = 0.0529
Genoa - Merchiston Temp (°F)
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
0
500
1000
1500
2000
2500
Flow at Genoa (cfs)



NGPC Comment 5
Temperature, Flow and Fish Kills
"This relationship described above seems to have been manifested during Loup River fish kills in 1988 and 1995. On both occasions, catastrophic fish kills occurred below the diversion and upstream of the confluence of Beaver Creek. During the June 20, 1988 fish kill, the water temperature in the Loup River immediately above the headgates diversion was 85 degrees F while the water temperature in the Loup River at the Genoa bridge was 96.8 F. The air temperature at the Monroe weather station was 101 F. River gage flow at Genoa was 13-17 cfs during the fish kill. During the July 1995 fish kill, water temperature in the Loup River below the headgates at the Genoa Bridge was 98 F with a river gage flow of 27 cfs and an air temperature of 104 F. Staff from DNR (at that time Dept of Water Resources) measured a flow of 22.7 cfs on July 13 while conducting the investigation of the fish kill. At that time DNR stated "Personnel at the headgate contend that the Power Canal had been diverting all the flow in the Loup River into the canal for the past couple weeks. It appears to me that a seam leak in the headgates and seepage is what produced the majority of the measured flow (22.7 CFS) in the Loup River."

"In reviewing flow data compared to ambient air temperatures when fish kills did and did not occur, NGPC District staff came to the conclusion that fish kills occurred when river flows below the diversion were less than 50 cfs and air temperatures exceeded 98-100 F. NGPC staff advised LPPD in a letter dated

November 15, 1995 that in order to avert fish kills, NGPC recommended a minimum flow of 50 cfs in the river below the diversion on days when the air temperature exceeded 98 F. This recommendation seemed to become a "gentlemen's agreement" between LPPD headgates operators and NGPC managers to alleviate fish kills below the diversion in summer months. NGPC staff have not investigated a catastrophic fish kill in this reach of river since 1995. This does not imply that fish kills have not occurred since 1995, but certainly no large scale fish kills followed by public reports and phone calls.

District Response

Over the course of relicensing, the District has requested and received a variety of data from various resource agencies, including fish kill information from NGPC and the Nebraska Department of Environmental Quality (NDEQ). However, the District does not have any information regarding the fish kill in 1988 other than a reference to the incident in a November 15, 1995 letter from Jeff Schuckman, NGPC to Dennis Bachman, LPD. The information that the District has related to fish kills has been included in all pertinent relicensing documents to date, including the Pre-Application Document (page 5-46) and the Revised Study Plan (page 4-1).

Although, the District acknowledges that three fish kills have been documented in the Loup River bypass reach; the District disagrees with the use of the word "catastrophic" to describe these incidents. Neither the NGPC reports nor the NDEQ reports use the term catastrophic.

The District provides the following information related to the fish kills that have occurred to provide perspective on each incident:

- July 1995 – report indicates an "unknown" number of fish died
- July 1999 – report indicates "large numbers of mixed species" died
- July 2004 – report indicates that 15 channel catfish, 14 minnows, and 1 river carpsucker died, for a total of 30 fish.

The District has no knowledge of where or how temperature data was collected related to any of these incidents. Further, the District notes that the temperature data collected by USGS in 2010 show that for days in which the max daily temperature at Genoa was above 90 degrees F, the largest difference between Genoa temperature and Merchiston temperature was 4.5 degrees F, far less than the 11.8 degrees F difference noted by NGPC in relation to the 1988 fish kill.

As noted by NGPC, in 1995, in response to the NGPC request and the documented fish kills in the Loup River bypass reach, the District began voluntarily allowing for a flow of 50 to 75 cfs in the Loup River bypass reach when ambient air temperatures warrant. However, in 2008, the District suspended this practice due to water accounting issues raised by the Nebraska Department of Natural Resources (NDNR). The District is currently working with NDNR to resolve these issues.

NGPC Comment 6
Further Recommendations
"Study 4.0 – Water Temperature in the Loup River Bypass Reach data should be re-analyzed by HDR to determine the extent of any relationship between data for high daily air temperature and high daily water temperature, difference between sites in high daily water temperatures as measured at Merchiston and Genoa, and the effect flow has on this temperature difference (paying particular attention to high daily water temps above 90 F and bypass flows less than 200 cfs). Also, the relationship between flow, maximum daily air temperature and maximum daily water temperature, specifically on those days where the water temperatures are above 90 F and flows are less than 200 cfs, should be re-examined."

"It is also recommended that the temperature study continue for at least one more season to gather additional data concentrated on the warm weather months of June through August and assuring that river water temperatures are collected during low flow periods. Due to the loss of data from temperature loggers for a variety of reasons in 2010, there simply may not be enough data points from the 2010 study to determine significant relationships under low flow, high temperature scenarios."

District Response
Contrary to the NGPC assertion, the SISR Study 4.0 Temperature in the Project Bypass Reach did analyze daily maximum temperature at Genoa. The District performed linear regression, multiple linear regression, and multiple logistic regression on the daily maximum temperatures at Genoa and found no statistically significant relationship between flow and water temperature. The District also performed multiple linear regression and multiple logistic regression on a subset (water temperatures above 63 degrees F) of the hourly flow and temperature data and again found no statistically significant relationship between water temperature and flow (see SISR Study 4.0 – Temperature in the Project Bypass Reach, Section 5).

As noted previously in the District's responses to NGPC comments 2, 3 and 4, data collected by USGS in 2010 shows that there were 15 total days that the daily maximum temperature at Genoa was greater than 90 degrees F. Of these 15 days, the difference between the daily maximum Merchiston temperature and daily maximum Genoa temperature ranged from -0.14 to 4.5 with an average of 2.5 degrees F. Our records show that there are 6 total days that the daily maximum temperature at Genoa was greater than 90 degrees F and the flow at Genoa was less than 200 cfs. Of these 6 days, the difference between Merchiston temperature and Genoa temperature ranged from -0.14 to 4.5 with an average of 2.9 degrees F.

An important point that should be emphasized is that there can be exceedances of the temperature standard at high flows. All of the temperature exceedances at Merchiston occurred during flows that were higher than at Genoa. Additionally, of the 15 total days that the daily maximum temperature at Genoa was greater than 90 degrees F, four of those days occurred when the average daily flow at Genoa was above 1,000 cfs.

Furthermore, the District is concerned that paring down the data set would do two things:

1. Reduce the power of the analysis by reducing the amount of data available and the degrees of freedom, and
2. Alter the dataset to get spurious results by focusing solely on those rare occurrences when flow is less than 200 cfs, ambient air temperature is high, and water temperature is greater than 90 degrees F.

The District believes that NGPC's proposal to conduct another year of temperature monitoring at Merchiston and Genoa is unnecessary and will not lead to conclusions different than those found using the 2010 dataset. NGPC makes this recommendation based on a need to gather temperature data during low flow periods and because of missing temperature data during the 2010 data collection. With respect to assuring that temperature data be gathered during low flow periods, the District notes that temperature data during low flow periods was gathered during 2010 and gathering additional data in 2011 does not guarantee that there will be more data points with high ambient air temperature and low flow.

With regard to missing temperature data, the District acknowledges in the SISR that temperature data was missing during a portion of the study period at both Merchiston and Genoa; however, the District provides the following information to support a conclusion that missing data did not substantially alter the conclusions of the study.

At Merchiston, flow data was missing from June 27 through June 30; since temperature exceedances at Merchiston are not related to flow diversion, the District believes that this data gap is insignificant. At Genoa, flow data was missing from June 11 through July 18, a time period that corresponded with the highest flows of the summer. The District acknowledges that even though this period experienced high flows, there was a period of 2 days from July 3 to July 4 when flows were less than 500 cfs. However, the District believes that the water temperature data gap during this period is also insignificant to the analysis since maximum ambient air temperatures during this period were 84.4 degrees F and

80.7 degrees F. The District notes that the analysis in Study 4.0 Water Temperature in the Project Bypass Reach clearly shows that water temperature is highly correlated to ambient air temperature, as such, relatively low ambient air temperatures during these 2 days of low flows would not substantially alter the conclusions of the study.

Based on the above information, the District believes that NGPC's proposal to conduct additional analysis related to Loup River bypass reach temperature is unnecessary.

2. Comments on Study 2.0 – Hydrocycling
NGPC Comment 1
"Objective 2 of the Hydrocycling Study was to "To determine the potential for nest inundation due to both hydrocycling (current operations) and run-of-river operations".

"The study was based on developing a conceptual theoretical-predictive model in effort to simplify the complex interrelationships in the Loup-Platte River system. The study, as it was initially devised, has been successfully completed. Now that the modeling component of the study has been completed and presented for review, the results must be validated by comparing it with empirical data. Following a review of the theoretical model results with empirical data, it is clear that the theoretical model bears little resemblance to what is happening in Loup-Platte River system. We take this opportunity to evaluate the theoretical model and identify some of the major problems. Specifically, we identify key assumptions that are unrepresentative on review and require modification if the study results are to be considered useful. These assumptions need to be revised if the study results are to be considered informative."

District Response
The nest inundation study concept was developed in coordination with resource agencies and approved in the SPD. The District believes that all parties understood the limitations of the theoretical model when the idea was developed. The District believes that the analysis in the SISR is valid and provides a reasonable comparison of current operations to run-of-river operations.

NGPC Comment 2
Assumptions unrepresentative on review that require revision
"*Assumption #1* – The analysis uses the highest flow event between 1 February and 25 April in a year as the benchmark flow for the breeding season in that year. While, on the surface this may appear to be a reasonable assumption, it is flawed as it makes the model inputs far too limiting. For example, A) this pre-nesting season sub-daily peak flow may be inadequate, in anyone or even most years, to

create the macro-form sandbar habitat that Interior Least Tern and Piping Plovers use for nesting, B) habitat forming flow events can and do occur outside this period, and, C) birds may be forced to delay the onset of breeding when high flow events occur early in the nesting season. The result is that the Study ignores high flow events that are critically important to terns and plovers and consider flows in the Study that are inconsequential."

District Response
The purpose of the inundation study was to determine the potential for nest inundation due to both hydrocycling and run-of-river operations. As such, a theoretical pre-nesting benchmark was used to compare to nesting season flows to identify occurrences in which that value was exceeded. It was not intended to be used to identify habitat forming flows. While a habitat forming flow may create bars, other factors such as dominant and effective discharge, shape the river over time. Therefore, the District believes that flows prior to the nesting season serve as a reasonable indicator of potential habitat available.

NGPC Comment 3
Assumptions unrepresentative on review that require revision
"*Assumption # 2* – The model assumes that using a single point value for nest distributions is adequate; this means that if a benchmark flow occurs at single value, all nests (the actual variable of interest) also occur at a single benchmark value. In actuality, tern and plover nests are found at a variety of benchmark values. Indeed, the report acknowledges this point on page 24, under the first bullet point where it states:

> *"It is also assumed that nesting can occur above the highest pre-season flow due to preexisting, higher sandbars. If habitat is available, nesting may also occur below this benchmark."*

"While the report states that this point of fact is "assumed", it does not incorporate this assumption into the analysis (in fact, the assumption in the model is that all nests occur at a single point value). This sets up the analysis as an all or nothing question (effectively, a 'straw man') regarding the "possibility" of inundation at run-of-river or current operations. Effectively, the analysis avoids addressing the question of whether nests have a lower or higher *probability* of inundation from current operations compared to run-of-river. There is also a temporal distribution of nests that should be considered in the model."

District Response
The District's analysis was set up to determine inundation "events" for both operating conditions, i.e. identifying times when a relative benchmark was exceeded under each condition. The analysis was not intended to identify specific

numbers of inundated nests. Further, the District notes that the same assumption was used for analysis of current operations and the run-of-river operations; thus any the analysis for each condition is affected in the same way. The assumption was thoroughly discussed and agreed to by all parties during study plan development. NGPC interpretation is inconsistent with the intent of the study which is to compare with and without hydrocycling operations.

NGPC Comment 4
Assumptions unrepresentative on review that require revision
"*Assumption # 3* – The analysis assumes a "60-day period for successful nesting". This is an appropriate choice for Piping Plover; even though "breeding" is a more appropriate term rather than "nesting". More important is that the period in which Least Terns can fledge young is much shorter, approximately 25% shorter or 40-45 days. This is important because many more (4-20 times more) Least Tem pairs than Piping Plover pair have nested on the Lower Platte River in recent decades."

District Response
The intent of using a 60-day period for successful breeding was to evaluate whether timing of a benchmark exceedance allowed enough time for re-nesting/breeding before the end of the nesting season. A 60-day period was used for both species and provided a conservative value for interior least terns since, as noted by NGPC, the time required for interior least terns to re-nest and fledge is 45 days.

Based on NGPC's comment, the District has reevaluated the potential for re-nesting for interior least terns as shown in Table 5-7 in the SISR. The initial analysis indicated that exceedances of pre-nesting season benchmarks occurred in 2007, 2008, and 2009. The original analysis indicated that renesting/breeding was only possible in 2007 and 2008 based on benchmark exceedance dates of June 1 and June 14, respectively. In 2009, the last benchmark exceedance occurred on June 28, using a 45-day re-nesting/fledging period, re-nesting also would have been possible in 2009.

NGPC Comment 5
Testing theoretical results with empirical data
"The opportunity exists to test the model with data collected in 2006–2009 by the Nebraska Game and Parks Commission Nongame Bird Program and the Tern and Conservation Partnership. Nesting data collected was provided to HDR and the District with the expectation that they would be used in their studies. Additionally, preliminary research results were also summarized in the following documents also made available to HDR and the District online:

Brown, M.B., and J.G. Jorgensen. 2010. "2010 Interior Least Tem and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tem and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.
Brown, M.B., and J.G. Jorgensen. 2009. "2009 Interior Least Tem and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tem and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.
Brown, M.B., and J.G. Jorgensen. 2008. "208 Interior Least Tem and Piping Plover monitoring, research, management, and outreach report for the lower Platte River, Nebraska. Joint report of the Tern and Plover Conservation Partnership and the Nebraska Game and Parks Commission Non-game Bird Program, Lincoln, NE.

District Response
First, although the District does not dispute that the above noted references are currently available online, the District makes the following points regarding the availability of this research:

- The District understands that these reports were posted; however, without notification the District was unaware of their availability. The District would appreciate it if, in the future, when research pertinent to relicensing is underway and/or completed, resource agencies could notify the District.
- Brown, M.B., and J.G. Jorgensen. 2010 – although this document is currently available online, it was not available at the time when the District was developing the SISR.

While the District agrees that the opportunity for comparison with empirical data does exist, the District does not believe that the available nest inundation data can be used for comparison due to the limitations in data collection. For example, nesting sites are not visited on a frequent enough basis to draw definitive conclusions on why a nest was unsuccessful.

NGPC Comment 6
Testing theoretical results with empirical data
"*Assumption #1* -The analysis uses the highest flow event between 1 February and 25 April in a year as the benchmark flow for the breeding season in that year.

A) This pre-nesting season sub-daily peak flow in most years is likely inadequate in some years to create macro-form sandbar habitat that Interior Least Tem and Piping Plovers use for nesting.

Parham (2007, *Hydrologic Analysis of the lower Platte River from 1954-2004, with special emphasis on habitats of the endangered Least Tern, Piping Plover, and Pallid Sturgeon*) stresses the importance of high flow events. High flows events of a certain magnitude are necessary to create the macro-form sandbars that are used by terns and plovers. Parham (2007) identified 38,170 cubic feet per second (cfs) as the critical threshold necessary to create habitat of sufficient quality for nesting birds. Thus, flow events below this value, especially those well below this value, will be inconsequential in creating sandbars that birds would use for nesting. If sandbars of a certain size and relative elevation are not available, birds may select other sites or even systems for nesting. The Study uses benchmark flows under current operations of 9,077 and 26,523 for the years 2006 and 2007, respectively, in the model analysis. However, the data (in the possession of HDR and LPPD) show that no nesting was observed between river miles 50–103 in those years; a point not recognized by the Study. River Miles 50–103 is the section that includes the LPD diversion return and extends approximately fifty miles downstream from the diversion return.

District Response

The District appreciates that nest inundation will not occur if suitable habitat is not available for nesting. However, the District's study made no attempt to determine if suitable habitat was present or absent. The goal of the nest inundation study was "to determine the potential for nest inundation due to both hydrocycling (current operations) and run-of-river operations." It was a theoretical study and was not intended to evaluate the presence, absence, or frequency of actual nesting on the river. As noted in the study, several factors can and do affect nest location selection and success. These factors include nest inundation, predation, human disturbance, and alternative available habitat.

NGPC Comment 7

Testing theoretical results with empirical data

B) Habitat forming flow events can and do occur outside this period

The highest flow events more often occur outside the pre-nesting season sub-daily peak (benchmark) flow period of 1 February to 25 April. Specifically, only 24% of the annual peak stream flow events occurred during that period at Louisville from 1953–2009 (Figure 1). A similar pattern can be expected throughout the Loup-Platte River system. Furthermore, peak stream flow only occurred in the 1 February to 25 April period during one year (2006) of the study. As noted above, this was a year when no nesting was observed in the portion of the river proximal to the project. Parham (2007) used a moving window analysis and identified the greatest discharge within 1.5 years of each nesting season as the appropriate habitat-forming flow. Although recent information suggests that, in some instances, macro-form sandbars used for nesting and created by habitat-forming high flow events may persist longer than the 1.5 year period (see Brown and Jorgensen 2010, pages 38–45).

District Response

The District acknowledges that peak flow events can and do occur outside the pre-nesting season period used in the inundation study (February 1st to April 25th for piping plovers and February 1st to May 15th for interior least terns). Additionally, the District acknowledges that the highest flow events do occur more often outside the pre-nesting season period on the Platte River at Louisville. However, the District disagrees that a similar pattern can be expected throughout the Loup-Platte River system. A review of the Platte River at North Bend gage, the Platte River at Duncan gage, and the Loup River at Genoa gage (using USGS website annual peak stream flow) reveals that the highest percentage of peak flow events at these gages occur within the flow period of February 1st to April 25th as shown in the following tables.

Peak Annual Stream Flow (1953 to 2009) – Piping Plover Nesting Season

	Loup at Genoa	Platte at Duncan	Platte at North Bend
Feb 1 – Apr 25	30 %	54%	37%
Apr 26-May 31	20%	19%	19%
June	26%	19%	30%
July	5%	4%	2%
August	5%	2%	7%
Sep-Jan	14%	2%	5%

Peak Annual Stream Flow (1953 to 2009) – Interior Least Tern Nesting Season

	Loup at Genoa	Platte at Duncan	Platte at North Bend
Feb 1 – Apr 25	33 %	59%	42%
Apr 26-May 31	17%	14%	14%
June	26%	19%	30%
July	5%	4%	2%
August	5%	2%	7%
Sep-Jan	14%	2%	5%

At North Bend, the study captured 56 percent of the peak flows during the pre-nesting and nesting periods for piping plover as defined in the SISR (37 percent pre-nesting and 19 percent during the nesting period).

In addition, for the Study period of 2003 to 2009, the peak discharge occurred during the February 1st to April 25th piping plover time frame three times at the Platte at Duncan gage and once at the Loup at Genoa gage (the two gages affecting flows in the reach considered in the study – Tailrace Return to North Bend).

For the interior least tern nesting season, a review of the gage data shows that the highest percentage of annual peak stream flows occurs between February 1st and May 14th for the Platte River gages at North Bend and Duncan, as well as the Loup at Genoa gage. In addition, at least 50 percent of peak flows occur during the pre-nesting and nesting periods identified in the study. Furthermore, approximately 30 percent of the peak flows at the North Bend gage occur in June,

With respect to the inundation study, during the Study period of 2003 to 2009, the peak discharge occurred during the February 1st to May 14th time frame once at the Platte River at North Bend gage, five times at the Platte River at Duncan gage and twice at the Loup at Genoa gage. At North Bend, the study as presented captured 86 percent of the peak flows (42 percent pre-nesting and 44 percent during the nesting period of May 15-July 1).

NGPC Comment 8
Testing theoretical results with empirical data

C) Birds may be forced to delay the onset of breeding when high flow events occur early in the nesting season.

   This occurs regularly when there are high flow events early in the nesting season. In fact, Least Terns are well adapted to such events. In 2008, a high flow event occurred during late May and early June. Following the high flow event, 150 Interior Least Tern and three Piping Plover nests were located on the Lower Platte River from River Mile 7 to 99 and the earliest initiation date for any nest on the Lower Platte River based on egg-floating data was 16 June. Parham (2007) correctly identified the highest discharge within 1.5 years of each nesting season as the appropriate flow relative to bird nesting, regardless of when it occurred.

District Response
The District notes that the inundation study accounted for the fact that onset of breeding can be delayed by high flow events by evaluating the potential for re-

nesting. Furthermore, the District is unclear how the delay of nesting due to high flows is related to Parham's theory regarding the 1.5-year flow as noted by NGPC.

NGPC Comment 9
Testing theoretical results with empirical data
"*Assumption #2* - The model assumes that using a single point value for nest distributions is adequate; this means that if a benchmark flow occurs at single value, all nests (the actual variable of interest) also occur at a single benchmark value.

"Flow events that create habitat have maximum values, but these values do not represent the relative elevations of the sandbars or of all nests in the system. In 2009, we measured sandbar elevations. Figure 3 shows the benchmarks for individual transects on sandbars where nesting was observed between River Miles 60 and 102. Note: this is not a distribution of nest benchmarks. The graphic only shows that there is a wide range of benchmarks and that the data generally follow a normal distribution. It should be noted that most of the benchmarks in Figure 3 are greater than the Study's 2009 pre-nesting benchmark."

"We were making regular visits to colonies in 2008–2009 and our observations show that inundation events do not necessarily have all or nothing consequences for the birds, as the Study assumes. In 2008, out of 153 nests (150 tern, 3 plover), only one nest was inundated and this was below the Salt Creek confluence. This is notable because Salt Creek flows were responsible for a substantial rise in Platte River levels on approximately 21 July 2008. In 2009, out of 311 (264 tern, 47 plover), 67 were known to be inundated, thus, it was only a partial inundation event. We do not have benchmark information for nests. Importantly, we can isolate the actual high flow event that actually resulted in the inundation of nests (it occurred during the third week of June and is highlighted in Figure 3, which is a graphic provided in the Study report)."

The Figure 3 captions states "Figure 3: 2009 hydrograph from the 2009 study highlighting the high flow event that caused actual nest inundation. The Study results show that the difference in the peak of the current operations was 1122 cfs greater than the run of the river. Hydrocycling **<u>did</u>** inundate nests."

District Response
The District agrees that nesting can and does "occur above the highest pre-season flow due to pre-existing, higher sandbars" as noted in the SISR Study 2.0 – Hydrocycling report (pg. 24). The intent of the inundation analysis was not to identify all inundated nests, but to identify the relative difference in inundation between current operations and run-of-river operation. Furthermore, the District notes that the relative range of available habitat, if derived from the assumption

that high flows are creating the habitat, would be comparable under both operating scenarios (current operations and under run-of-river operations).

The District would also like to point out that while most of the benchmarks shown in NGPC's Figure 2 are higher than the pre-nesting season benchmark in study year 2009 (10,400), the highest flow of the season (approximately 15,100 cfs) occurred on June 17. For interior least terns, as shown in NGPC's Figure 3, re-nesting opportunities where available within the 45-day window required to fledge young before the end of the nesting season on August 15.

In the caption for Figure 3, NGPC states that "hydrocycling **did** inundate nests" (emphasis is theirs) and points to a critical flow event that inundated a minimum of 67 nests in 2009. The District believes this statement is misleading. As noted in Figure 3, the June 2009 peak discharge at North Bend under current operations was estimated as approximately 15,100 cfs, as compared to a run-of-river estimate of 14,000 cfs (note that both current operations and run-of-river were based on synthetic hydrographs created for the study). According to the USGS rating curve at North Bend, the difference in stage between 15,100 cfs and 14,000 cfs is 0.13 ft, or 1.5 inches. Furthermore, in reviewing the NGPC data related to nest inundation, the District notes that approximately 18 nests identified as inundated were located upstream of North Bend (RM 99 and RM 90) and the remaining nests identified as inundated were located between Leshara and Ashland. As noted in the District's SISR Study 2.0 Hydrocycling report, the increase in stage associated with hydrocycling is reduced as distance increases downstream from the Tailrace Return. Additionally, sub-basin precipitation in the lower reaches of the Platte River can, and do, contribute to hydrograph fluctuations.

As previously stated, under storm event discharges, the effect of hydrocycling on flow (and stage) decreases with increasing discharges due to standard operating procedures. The differences in flow (and stage) between current operations and run-of-river operations diminish with increased flow and it becomes harder to separate the singular effect of hydrocycling. This is due to many factors, including, sub-basin precipitation events affecting tributary inflow and hydrocycling upstream in the Platte River basin. Therefore, while hydrocycling does result in varying degrees of increased stage, the effect on bird nests is not necessarily a direct relationship.

NGPC Comment 11
Alternative Analysis A
"Here we provide that an additional analysis be considered. The objective of this analysis is to show the probability that a nest/chick will remain inundation free for a 45-day period during the breeding season over the range of benchmarks. Once this relationship is determined, we will be able to show how average changes in

nesting season maximum peak sub-daily flows (we use the same terminology as the District's hydrocycling study) will change probabilities.

"METHODS
The analysis is for Least Terns only. The 45-day period was selected because this is the time period required for a pair of terns to produce fledged young. Least Terns respond to changing conditions and are flexible in regard to when they initiate nests. We used the complete history (1949-2009) of river flow data from the USGS gage near North Bend. We conducted a moving window analysis for all years for a 45-day inundation free period from 1 May to 15 Aug at benchmark values of 2500, 5000, 7500, 10000, 12500, 15000, 17500, 20000, 25000. We make no assumptions regarding initial benchmarks because we have no information with which to make an informed decision. The moving window searches for uninterrupted 45-day during the 1 May to 15 Aug period. We used results from the analysis to determine the proportion of years where the benchmark value includes a 45-day inundation free period. We then used Generalized Additive Model (GAM) in Program R to model the relationship between a particular benchmark value and the probability that a benchmark will remain inundation free for 45 days during the 1 May to 15 Aug nesting season. GAMs are extensions of Generalized Linear Models that can be used to evaluate non-linear relationships. We refer to the initial relationship as run of river. Once the initial relationship was determined, we tested how inundation probabilities would change by adding 2,000 cfs to nesting season maximum peak sub-daily flows. In the analysis, based on a review of gage data we chose 2,000 cfs as the amount that hydrocycling increases peak sub-daily flows. This value is referred to as current operations.

"RESULTS
Results of the analysis are shown in Table 1 and Figure 4.

"DISCUSSION
This analysis illustrates that changes in the nesting season maximum peak sub-daily flows will change probability of a 45-day inundation free period during the breeding season. A review of the District's Hydrocycling Study results show that average nesting season maximum peak sub-daily flows were 1289.4 ± 546.7 cfs (range 12.9 – 4452.6) greater for current operations (hydrocycling) than run-of-river operations (no hydrocycling) during the years 2003-09. While the precise value that hydrocycling increases maximum peak sub-daily flows requires additional study, the relationship and the sensitivity of the change in probability of inundation at different flows are what are most important to evaluate. Probability of inundation appears to be most sensitive to increases in nesting season maximum peak sub-daily flows in the mid-range values (7,500 to 12,500 cfs). Inundation probabilities change very little at upper thresholds at the North Bend Gage study

site. The empirical data show that Least Terns rarely nest at some of the lower values (e.g., < 5,000). However, it is impossible to identify a lower threshold at this time."

District Response

The concept presented by NGPC in Alternative Analysis A, of identifying the probability of a given benchmark remaining inundation free for a 45-day window (based on interior least terns) is reasonable. However, NGPC's application of the concept is flawed, specifically with respect to current operations. The District provides the following comment on NGPC's assumptions and analysis:

Run-of-River conditions - The District developed a synthetic hydrograph for run-of-river conditions and used that for all comparisons to current operations and believes that this provides the best information for comparison ; however, in the absence of a full synthetic hydrograph, such as the one used by the District, use of the mean daily flow is a reasonable assumption for run-of-river.

Current operations – NGPC's addition of 2,000 cfs to the mean daily flow across all flows is inappropriate. As show in the synthetic hydrographs used for the inundation analysis (see Figure 5-4 and Appendix I of SISR Study 2.0) the Project's affect on the hydrograph decreases with increasing flows, this is primarily due to standard operating procedure to cease diversion during high flow events to prevent tree limbs and other debris from flowing into the canal system.

Benchmarks – It appears that NGPC's analysis added 2,000 cfs to a daily flow to create the current operations discharge, and then compared the current operations value to the run-of-river benchmark to evaluate inundation free periods. It only seems logical that when comparing a current operations hydrograph to a run-of-river benchmark, that current operations would exceed the benchmark more often than would the run-of-river flow (i.e. 2,000 cfs less). The District believes that a separate benchmark should be established for each operating scenario (as was done in the District's analysis).

Affect of Discharge on Stage – NGPC's analysis does not account for the fact that as discharge increases, the change in stage decreases; thus, although the hydrocycling flow is relatively consistent, the actual impact on water surface elevation is diminished as base flows increase, as shown in the following table.

Stage Comparison for NGPC Benchmark Flows at North Bend

Flow 1 cfs	Stage feet	Flow 2 cfs	Stage feet	Stage Delta feet	Stage Delta inches
2500	3.65	4500	4.23	0.58	7.0
5000	4.34	7000	4.73	0.39	4.7
7500	4.81	9500	5.11	0.30	3.6
10000	5.17	12000	5.42	0.24	2.9
12500	5.47	14500	5.68	0.21	2.5
15000	5.73	17000	5.92	0.18	2.2
17500	5.96	19500	6.13	0.17	2.0
20000	6.16	22000	6.31	0.15	1.8

In addition, it is a requirement of the Integrated Licensing Process that requests for studies (or major modifications to studies approved in the Study Plan Determination) shall be qualified using the 7 Study criteria specified by FERC. Also, as emphasized by FERC during the February 23/24 meeting, requests for additional studies or major modifications to completed studies will be held to a higher standard of justification. NGPC's request for a new study does not address the 7 criteria.

NGPC Comment 12
Alternative Analysis B
"After reviewing results from Analysis A, we conducted a second analysis to refine our understanding of how inundation probabilities are affected by hydrocycling. The objective of Analysis B is to determine whether and how much inundation probabilities change if nesting season maximum peak sub-daily flows are altered by the mean amount (1289.4 cfs) identified in the Hydrocycling Study report.

"METHODS
The analysis is applicable for both Interior Least Terns and Piping Plovers. We used the complete history (1949–2009) of data from the USGS gage near North Bend. We used benchmark values of 7500, 10000, 12500, 15000, 17500, 20000 cfs. We determined whether the benchmark was exceeded at all benchmarks in all years during June and July; we refer to these exceedences as inundation events. Even though tern and plover breeding can and does occur outside of these months, June and July represent the period when breeding activities are at their peak. Thus, this period is critical and inundation events during this period will have the greatest impact on nesting terns and plovers. If high flows that exceed benchmarks occur early in the breeding season, the birds will delay nest initiation

because no habitat is available to them. We only considered an inundation event to have occurred if there was a minimum ten day long period during which flows did not exceed the individual benchmark; this allowed birds to initiate breeding. If flows exceeded benchmarks persistently through the study period and no ten day periods below individual benchmarks occurred, inundation was considered to not have occurred, because there was a low likelihood that birds initiated nesting in the area.

"We determined the proportion of years where inundation events occurred at each benchmark. We then used a Generalized Additive Model (GAM) in Program R to model the relationship between benchmark values and inundation probability. We then adjusted benchmark values by mean difference to represent the difference (1289.4 cfs) in nesting season maximum peak sub-daily flows between current operations and run of river. We then used the GAM to predict values in Program R at the adjusted benchmarks.

"RESULTS
Results are shown in Figures 5-6 and Table 2.

"DISCUSSION
Analysis B produces results similar to Analysis A. Changes in benchmarks as a result of alterations in nesting season maximum peak sub-daily flows affects inundation probabilities. Specifically, increases in nesting season maximum peak sub-daily flows increase the probability of inundation."

"CONCLUSION
Based on the comments above, the Hydrocycling Study should be reexamined by HDR. We show that the greater the change in nesting season maximum peak sub-daily flows due to hydrocycling, the greater the change in the probability of nest inundation. If hydrocycling increases nesting season maximum peak sub-daily flows, nests/chicks are more likely to be inundated. A higher level of inundation occurred in 2009 as a result of hydrocycling.

District Response
The District's comments on Alternative Analysis B are the same as Alternative Analysis A relative to the assumptions and analysis by NGPC.

References

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Mark Ivy, PhD.
Outdoor Recreation Planner
Division of Hydropower Administration & Compliance
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Mr. Ivy:

Subject: 2010 Annual Conveyance Report

Enclosed are copies of the easements which the District conveyed to Platte County, NE for an approved road project which parallels the District's project. Highlighted is the language the District deemed necessary to protect the project's recreational use and safety.

It is the District's practice to review the easement and, if there are concerns that could impact the project's safety or recreational use, to address these issues with specific language, as was done with the attached easement.

Sincerely,

Ronald J. Ziola

Ronald J. Ziola, P.E.
V.P. of Engineering

RZ:ar
Enc.
C: N. Suess
J. Frear

bc: L. Richardson

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON D.C. 20426
June 10, 2011

OFFICE OF ENERGY PROJECTS

Project No. 1256-029-Nebraska
Loup River Hydroelectric Project
Loup Power District

Mr. Neal Suess, President/CEO
Loup Power District
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Reference: Determination on Requests for Modifications to the Loup River Hydroelectric Project Study Plan

Dear Mr. Suess:

Pursuant to 18 CFR § 5.15(c), this letter contains my determination on requests for modifications to Loup Power District's Study Plan for the Loup River Hydroelectric Project (Loup River Project or project).

Background

Loup Power District filed its Second Initial Study Report on February 14, 2011, and held meetings on February 23 and 24, 2011, to discuss the study results presented in the report. Loup Power District subsequently filed revisions to its Second Initial Study Report on March 10, 2011, and a summary of the meetings on March 11, 2011.

The Second Initial Study Report provided results for the following approved studies:

- Study 1.0 – Sedimentation (describes additional sedimentation studies completed after submittal of the Initial Study Report)
- Study 2.0 – Hydrocycling
- Study 4.0 – Water Temperature in the Project Bypass Reach
- Study 5.0 – Flow Depletion and Flow Diversion
- Study 8.0 and Study 9.0 – Recreation Use and Creel Survey
- Study 12.0 – Ice Jam Flooding on the Loup River

Written comments on the Second Initial Study Report were filed by the U.S. Fish and Wildlife Service (FWS) on April 7, 2011; Federal Energy Regulatory Commission staff (Commission staff) on April 8, 2011; and the Nebraska Game and Parks Commission (Nebraska Game and Parks) on April 11, 2011. None of the commenting entities requested that new studies be conducted; however, the FWS and the Nebraska Game and Parks recommended modifications to four of the previously approved studies: Study 1.0 – Sedimentation, Study 2.0 – Hydrocycling, Study 4.0 – Water Temperature in the Project Bypass Reach and Study 5.0 – Flow Depletion and Flow Diversion. Loup Power District responded to all comments and recommendations on May 11, 2011.

Study Determination

Commission staff reviewed the recommended modifications to the approved study plan, comments on the Second Initial Study Report, and other related elements on the record and made recommendations on the need to modify the Study Plan. Based on staff's analysis and recommendations, I am not requiring the agency recommended modifications for three of the studies (Study 2.0 – Hydrocycling, Study 4.0 – Water Temperature in the Project Bypass Reach, and Study 5.0 – Flow Depletion and Flow Diversion); however, I am modifying Study 1.0 (Sedimentation) to require Loup Power District to:

- Relate effective discharge to channel geomorphologic characteristics (mean velocity, flow width, flow depth and flow area).
- Using each of the four channel geomorphologic characteristics developed at each of the seven gaged sites and five ungaged sites, make longitudinal (spatial) comparisons of all of the sites on the Loup and Lower Platte rivers starting at the most upstream site on each river, and progressing downstream.

The procedures for implementing these modifications and my reasons for requiring them as well as for not making other recommended modifications are explained in detail in Appendix A. The Updated Study Report, including the results of the approved modifications above, is due by August 26, 2011.

If you have any questions, please contact Lee Emery at (202) 502-8379 or Lee.Emery@ferc.gov.

Sincerely,

Jeff C. Wright
Director
Office of Energy Projects

cc: Mailing List
Public File

APPENDIX A

Staff's Recommendations and Findings on Requested Study Modifications

Below, we discuss the comments on the Second Initial Study Report, filed on February 14, 2011, and provide our reasons for requiring or not requiring certain requested modifications to the Study Plan.

Study 1.0 – Sedimentation

Requested Modification

FWS recommended that Loup Power District compare the river geomorphology at all sites on the Loup and Lower Platte rivers starting at the most upstream site on each river, and progressing downstream. FWS referenced our August 26, 2009 Study Plan Determination, where we required a spatial analysis of the geomorphologic data. Additionally, FWS referenced the Revised Study Plan, dated July 27, 2009, where Loup Power District stated that the channel geomorphology associated with the effective discharges would be calculated. FWS stated that this commitment was partially satisfied in the Initial Study Report, filed on August 27, 2010, and the Second Initial Study Report, filed on February 14, 2011. However, FWS stated that Table 5-1 of the Sedimentation Addendum in the Second Initial Study Report does not adequately relate sediment transport effects to channel geomorphology. FWS requests that all channel geomorphologic characteristic information for the Loup and the Lower Platte rivers be presented as longitudinal (spatial) comparisons starting at the most upstream site on each river, and progressing downstream.

Loup Power District responded by stating that the requested spatial analyses have been performed and are presented in the appendices of the Second Initial Study Report (Appendix B, Study 2.0 - Hydrocycling and Appendix D, Study 5.0 - Flow Depletion and Flow Diversion). Loup Power District stated that "differences in channel geometries are consistent with the differences in effective and dominant discharges resulting from the different flow hydrographs acting in shaping the channel differently at each location."

Discussion and Conclusions

Loup Power District has developed the channel geomorphologic characteristic information requested by the FWS, including effective discharge, dominant discharge, mean velocity, flow width, and flow depth. This information was developed for seven U.S. Geological Survey (USGS) gages (two sites are on the Loup River and five sites are on the Lower Platte River) and five ungaged sites (two sites are on the Loup River and three are on the Lower Platte River). This information is contained in numerous documents, including the Initial Study Report's Sedimentation Study Report and the

Second Initial Study Report's Sedimentation Addendum, Hydrocycling, and Flow Depletion and Flow Diversion reports. However, absent is a comprehensive and cohesive spatial comparison and analysis of geomorphologic data as was originally required by our August 26, 2009 Study Plan Determination and now recommended by the FWS. This information is still needed for us to assess the geomorphologic conditions on the Loup and Lower Platte rivers, which are part of the project's affected environment. Although we agree with Loup Power District that "differences in channel geometries are consistent with the differences in effective and dominant discharges resulting from the different flow hydrographs acting in shaping the channel differently at each location," our analysis also needs to include an evaluation of the relationship between discharge and mean velocity, flow width and flow depth between the sites.

Therefore, for each of the seven USGS sites and five ungaged sites, we recommend that Loup Power District relate effective discharge to mean velocity, flow width, flow depth, and flow area.[1] Using each of the four channel geomorphologic characteristics (mean velocity, flow width, flow depth and flow area) developed at each of the seven gaged sites and five ungaged sites, Loup Power District should make longitudinal (spatial) comparisons of all sites on the Loup and Lower Platte rivers starting at the most upstream site on each river, and progressing downstream. The Loup River analysis should include comparisons of ungaged site 1, ungaged site 2, USGS gage no. 06793000 (Genoa gage), and USGS gage no. 06794500 (Columbus gage).[2] Similarly, the Lower Platte river analysis should include comparisons of USGS gage no. 06774000 (Duncan gage), ungaged site 3, ungaged site 4, USGS gage no. 06796000 (North Bend gage), ungaged site 5, USGS gage no. 06796500 (Leshara gage), USGS gage no. 06801000 (Ashland gage) and USGS gage no. 06805500 (Louisville gage) progressing upstream to downstream. To facilitate the spatial analysis, we recommend that Loup Power District present the information graphically similar to figure 5-2 of the Sedimentation Addendum, dated February 11, 2011 (filed on February 14, 2011).

Our justification for the recommended modification is that we still need this information as part of our assessment of project effects on sedimentation and any related effects on plover and tern habitat, and that this previously approved study was not completed as required by the August 26, 2009 Study Plan Determination (18 C.F.R. §5.15(d)(1)).

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[1] Flow area can be obtained by dividing the discharge and mean velocity.

[2] In other words, ungaged site 1 should be compared to ungaged site 2, ungaged site 2 should be compared to the Genoa gage, and so on and so forth progressing downstream.

Study 2.0 – Hydrocycling

Requested Modification

FWS recommended that Loup Power District resurvey the stream cross sections at sites 3, 4, and 5 during the first week in May, first week in July, and first week in August 2011. FWS stated that the dates of the cross-sectional surveys as provided in table 4-4 of the Hydrocycling Report[3] indicate that the measurements would be inadequate in assessing rates of erosion. The FWS stated that it would be difficult to measure sandbar erosion rates using the existing data in the report because of a peak discharge that occurred on June 14, 2010 that likely redistributed sandbars between the 2010 cross-sectional surveys. The FWS stated that the addition of a July cross-sectional survey would allow comparisons of erosion rates associated with a flood (peak) event should one occur during mid to late June 2011.

Loup Power District responded that FWS' requested modification is unnecessary, because FWS made this request with the understanding that only one of the cross-sectional surveys was collected after the peak discharge that occurred on June 14, 2010. Loup Power District stated that FWS referenced the incorrect table in the hydrocycling report. Loup Power District stated that the correct dates of the survey are presented in table 4-1[4] and that table 4-4 includes the flow rates used to calibrate the HEC-RAS model. As identified in table 4-2, site 3 was surveyed three times, two of which were after the June 14 peak discharge event.

Discussion and Conclusions

FWS' requested modification to Study 2.0 – Hydrocycling was based on the assumption that the results of only one cross-sectional survey were collected at site 3 following the June 14, 2010 event. However, as noted above, table 4-2 indicates that site 3 was surveyed on two occasions following the June 14 event: August 11 and September 29. Therefore, existing survey information meets the study objectives as approved on August 26, 2009. For this reason, we find that there is a lack of a showing of good cause for making the requested modification (18 C.F.R. §5.15(d)).

[3] Filed as appendix B of the Second Initial Study Report on February 14, 2011.

[4] The survey dates are specifically contained in table 4-2.

Study 4.0 – Water Temperature in the Project Bypass Reach

Requested Modification

The FWS and Nebraska Game and Parks recommended that Loup District conduct an additional year of temperature monitoring at the Merchiston and Genoa sampling sites. The resource agencies stated that the additional year of temperature monitoring in the Loup River bypassed area was needed, because missing temperature data occurred during low flow conditions in the bypassed reach when exceedances of water temperature standards likely occurred. The resource agencies concluded that this missing data prevents an adequate determination of the relationship between Loup River streamflow and temperature exceedances in the Loup River bypassed reach, and the collection of additional data would allow them to make an estimate of the "No Diversion" condition effects on temperature exceedances.

Loup Power District acknowledged that temperature data were missing during a portion of the study period at the Merchiston and Genoa sites.[5] However, Loup Power District noted that because Study 4 clearly showed that water temperature is highly correlated to ambient air temperature, and air temperature data are available during the water temperature data gap, the missing water temperature data do not substantially alter the conclusions of the study. The Loup Power District also noted that a statistical analysis of water temperature exceedances above the project diversion weir at Merchiston was intended to be a surrogate for the "No Diversion" condition. Thus, Loup Power District concludes that another year of temperature sampling at the Merchiston and Genoa sites is unnecessary.

Discussion and Conclusions

Based on our review of Loup Power District's response and the study results, we agree with Loup Power District that the failure of the gages to collect temperature data at the Merchiston and Genoa sites for short periods did not significantly affect the study results. Ambient air temperature data can be used to inform an analysis on whether water temperature exceedances likely occurred during the period when the gages were inoperable. We therefore find that there is a lack of a showing of good cause for making the requested modification (18 C.F.R. §5.15(d)).

[5] On page 5 of Study 4.0 - Water Temperature in the Project Bypass Reach, there is a discussion of the data gap in temperature recordings from June 28 to 30, 2010 at the Merchiston site. The discussion indicates that the data gap was likely the result of the probe being exposed to the atmosphere from low water levels. On June 10, 2010 the temperature sensor at the Genoa gage was washed away as a result of high flows, causing the data gap at this gage; a replacement sensor was installed on July 19, 2010.

Study 5.0 – Flow Depletion and Flow Diversion

Requested Modification

The FWS recommends that the "Montana Method" be used to evaluate the "No Diversion" aquatic resource condition of the Platte River bypassed reach. The FWS bases this request on a comparison of the Montana Method results of the Duncan study site to the results at Site 3. The Duncan site is located on the Platte River upstream from the bypassed reach of the Platte River, and Site 3 is located within the bypassed reach of the Platte River. The FWS contends that an evaluation of the No Diversion condition is critical to understanding the project's diversion-related effects on the health of aquatic resources in the bypassed reach of the Platte River.

The Loup Power District concludes that there is no need to conduct the requested analysis, because: (a) the Montana Method is used to determine minimum flows in a stream based on the average of flows in the stream over the course of a year; (b) evaluating habitat conditions using the Montana Method is essentially comparing a stream to itself and does not require comparisons to other locations or streams; and (c) using the Montana Method evaluation of habitat at the Duncan gage illustrated that flows are degraded on the Platte River upstream of the Loup River confluence and that habitat conditions are generally improved at Site 3 (i.e., Site 3 had 49 months of "favorable" flows versus 10 months of favorable flows for the Duncan site).

Discussion and Conclusions

The Platte River is a braided stream, and as such, has wide fluctuations in river flows and aquatic habitat. The Montana Method does not model the dynamics or complexity of a river system; rather it provides the percentages of mean annual flows needed to maintain a healthy stream environment. The bypassed section of the Platte River is a relatively short stream section of about 2 miles.

The morphology of the Platte River has changed over the long period of time that the project has been operating due to the stream hydrograph that has resulted under project operations. The use of the Montana Method under the "No Diversion" scenario for the bypassed reach would require application of a pre-project mean annual flow to the computation, which would be a misapplication of the methodology given that the current channel morphology reflects today's mean annual flow rather than the pre-project mean annual flow. In any event, we find that the existing information for Site 3 is sufficient for our analysis of the effects of different flows on stream health in the Platte River bypassed reach, and therefore, there is a lack of a showing of good cause for making the requested modification (18 C.F.R. §5.15(d)).

Selzle, Lydia

From: Pillard, Matt
Sent: Wednesday, July 13, 2011 2:45 PM
To: shuhai.zheng@nebraska.gov; frank.albrecht@nebraska.gov; jalexand@usgs.gov; calms@neb.rr.com; cgenoa@cablene.com; abaum@upperloupnrd.org; john.bender@nebraska.gov; al.berndt@nebraska.gov; rbishop@cpnrd.org; mike.black@bia.gov; jblackhawk@aol.com; mbrown9@unl.edu; prescott.brownell@noaa.gov; emily_brummund@johanns.senate.gov; cothern.joe@epa.gov; todd.crawford@mail.house.gov; jill.dolberg@nebraska.gov; adubas@leg.ne.gov; Brian.Dunnigan@nebraska.gov; lee.emery@ferc.gov; mferguson@gp.usbr.gov; barbara.j.friskopp@usace.army.mil; peggy.harding@ferc.gov; robert_harms@fws.gov; thowe@ponca.com; vwills@pawneenation.org; janet.hutzel@ferc.gov; djjarecke@clarkswb.net; nicholas.jayjack@ferc.gov; lpsnrd@lpsnrd.org; isis.johnson@ferc.gov; david.jundt@dhhs.ne.gov; kennyj@headwaterscorp.com; butchk@llnrd.org; cityadmin@cablene.com; monroe@megavision.com; bobbie.wickham@nebraska.gov; mkuzila1@unl.edu; clangemeier@leg.ne.gov; justin.lavene@nebraska.gov; pcclerk@megavision.com; ncpza@hamilton.net; paul.makowski@ferc.gov; jmangi@columbusne.us; jmiyoshi@lpnnrd.org; robertm@llnrd.org; jeddins@achp.gov; danno@nohva.com; marvp@megavision.com; tpetr@loup.com; bob.puschendorf@nebraska.gov; chairmanrhodd@ponca.com; jeff_runge@fws.gov; julias@poncatribe-ne.org; kenneth.sessa@dhs.gov; jjshadl@nppd.com; asheridan@omahatribe.com; don_simpson@blm.gov; msittler@lpsnrd.org; Robert_F_Stewart@ios.doi.gov; ksullivan@leg.ne.gov; jmsunne@nppd.com; Willie_Taylor@ios.doi.gov; randy_thoreson@nps.gov; rtrudell@santeedakota.org; deb.vanmatre@mail.house.gov; jwinkler@papionrd.org; lewrightjr@gmail.com
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District – FERC Relicensing Updated Study Report and Meeting – Save the Date

Relicensing Participants:

This e-mail is to inform you of the timing for the Updated Study Report and Updated Study Results Meeting for the Loup River Hydroelectric Relicensing.

Work on the study phase of the Loup River Hydroelectric Relicensing is nearly complete. The District will file the Updated Study Report on August 26, 2011 and will hold a meeting to discuss remaining study results in September. Here are some key dates to remember:

- August 26, 2011 – District will file the Updated Study Report (USR) with FERC and post on the relicensing website at http://www.loup.com/relicense. The report will include results of study modifications requested by FERC in their Study Determination Letters dated 12/20/10 and 06/11/11

- Updated Study Results Meeting
  - September 8, 2011
  - ~8:30 AM to 4:30 PM
  - New World Inn
  - 265 33rd Ave, Columbus, NE
  - RSVP to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275 by Sept 2nd.
  - For those not able to attend in person, conference call capabilities will be available.

We appreciate your time and input on this relicensing effort. If you have any questions regarding the upcoming reports or meetings, please call me at (402) 399-1186.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate

HDR | **One Company** | ***Many Solutions***

8404 Indian Hills Drive | Omaha, NE | 68114-4098
Phone: 402.399.1186 | Fax: 402.399.1111
Email: Matt.Pillard@hdrinc.com

Please consider the environment before printing.

Selzle, Lydia

From: Pillard, Matt
Sent: Wednesday, August 17, 2011 11:33 AM
To: shuhai.zheng@nebraska.gov; frank.albrecht@nebraska.gov; jalexand@usgs.gov; calms@neb.rr.com; cgenoa@cablene.com; abaum@upperloupnrd.org; john.bender@nebraska.gov; al.berndt@nebraska.gov; rbishop@cpnrd.org; mike.black@bia.gov; jblackhawk@aol.com; mbrown9@unl.edu; prescott.brownell@noaa.gov; emily_brummund@johanns.senate.gov; cothern.joe@epa.gov; todd.crawford@mail.house.gov; jill.dolberg@nebraska.gov; adubas@leg.ne.gov; Brian.Dunnigan@nebraska.gov; lee.emery@ferc.gov; mferguson@gp.usbr.gov; barbara.j.friskopp@usace.army.mil; peggy.harding@ferc.gov; robert_harms@fws.gov; thowe@ponca.com; vwills@pawneenation.org; janet.hutzel@ferc.gov; djjarecke@clarkswb.net; nicholas.jayjack@ferc.gov; lpsnrd@lpsnrd.org; isis.johnson@ferc.gov; david.jundt@dhhs.ne.gov; kennyj@headwaterscorp.com; butchk@llnrd.org; cityadmin@cablene.com; monroe@megavision.com; bobbie.wickham@nebraska.gov; mkuzila1@unl.edu; clangemeier@leg.ne.gov; justin.lavene@nebraska.gov; pcclerk@megavision.com; ncpza@hamilton.net; paul.makowski@ferc.gov; jmangi@columbusne.us; jmiyoshi@lpnnrd.org; robertm@llnrd.org; jeddins@achp.gov; danno@nohva.com; marvp@megavision.com; tpetr@loup.com; bob.puschendorf@nebraska.gov; chairmanrhodd@ponca.com; jeff_runge@fws.gov; julias@poncatribe-ne.org; kenneth.sessa@dhs.gov; jjshadl@nppd.com; asheridan@omahatribe.com; don_simpson@blm.gov; msittler@lpsnrd.org; Robert_F_Stewart@ios.doi.gov; ksullivan@leg.ne.gov; jmsunne@nppd.com; Willie_Taylor@ios.doi.gov; randy_thoreson@nps.gov; rtrudell@santeedakota.org; deb.vanmatre@mail.house.gov; jwinkler@papionrd.org; lewrightjr@gmail.com
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District – FERC Relicensing Updated Study Report and Meeting – Save the Date

Categories: Green Category

Relicensing Participants:

This e-mail is to remind you of the Updated Study Results meeting scheduled for September 8th at the New World Inn, 265 33rd Ave, Columbus, Nebraska. Please RSVP to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275 by September 2nd, 2011. The meeting agenda is available on the Project website: http://www.loup.com/relicense/html/agencymeetingsresources.html

For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to the above noted Project website in advance of the meeting (by end of day 9/7/11). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

On August 26, 2011, the District will submit the Updated Study Report (USR) to FERC, it will also be posted on the website at http://www.loup.com/relicense. This report will include the updated Sedimentation and Hydrocycling studies.

Please come ready to discuss; we will start promptly at 8:30 AM.

Please bring your own copy of the Updated Study Report. It can be found online after 8/26/11.

We look forward to seeing you on September 8th.

Thanks.

MATT PILLARD
AICP

HDR Engineering, Inc
Sr. Environmental Planner

8404 Indian Hills Drive | Omaha, NE 68114
402.399.1186 | c: 402.660-7998
matt.pillard@hdrinc.com | hdrinc.com

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Selzle, Lydia

From: Pillard, Matt
Sent: Friday, August 26, 2011 4:16 PM
To: shuhai.zheng@nebraska.gov; frank.albrecht@nebraska.gov; jalexand@usgs.gov; calms@neb.rr.com; cgenoa@cablene.com; abaum@upperloupnrd.org; john.bender@nebraska.gov; al.berndt@nebraska.gov; rbishop@cpnrd.org; mike.black@bia.gov; jblackhawk@aol.com; mbrown9@unl.edu; prescott.brownell@noaa.gov; emily_brummund@johanns.senate.gov; cothern.joe@epa.gov; todd.crawford@mail.house.gov; jill.dolberg@nebraska.gov; adubas@leg.ne.gov; Brian.Dunnigan@nebraska.gov; lee.emery@ferc.gov; mferguson@gp.usbr.gov; barbara.j.friskopp@usace.army.mil; peggy.harding@ferc.gov; robert_harms@fws.gov; thowe@ponca.com; vwills@pawneenation.org; janet.hutzel@ferc.gov; djjarecke@clarkswb.net; nicholas.jayjack@ferc.gov; lpsnrd@lpsnrd.org; isis.johnson@ferc.gov; david.jundt@dhhs.ne.gov; kennyj@headwaterscorp.com; butchk@llnrd.org; cityadmin@cablene.com; monroe@megavision.com; bobbie.wickham@nebraska.gov; mkuzila1@unl.edu; clangemeier@leg.ne.gov; justin.lavene@nebraska.gov; pcclerk@megavision.com; ncpza@hamilton.net; paul.makowski@ferc.gov; jmangi@columbusne.us; jmiyoshi@lpnnrd.org; robertm@llnrd.org; jeddins@achp.gov; danno@nohva.com; marvp@megavision.com; tpetr@loup.com; bob.puschendorf@nebraska.gov; chairmanrhodd@ponca.com; jeff_runge@fws.gov; julias@poncatribe-ne.org; kenneth.sessa@dhs.gov; jjshadl@nppd.com; asheridan@omahatribe.com; don_simpson@blm.gov; msittler@lpsnrd.org; Robert_F_Stewart@ios.doi.gov; ksullivan@leg.ne.gov; jmsunne@nppd.com; Willie_Taylor@ios.doi.gov; randy_thoreson@nps.gov; rtrudell@santeedakota.org; deb.vanmatre@mail.house.gov; jwinkler@papionrd.org; lewrightjr@gmail.com; mark@cpnrd.org
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Grennan, Dennis E.; Hunt, George; Pillard, Matt; Richardson, Lisa (Omaha); Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District – FERC Relicensing Updated Study Report and Meeting

Relicensing Participants:

Loup Power District has electronically filed its Updated Study Report (USR) with FERC. The report is available on FERC's e-library and on the District's relicensing website: http://www.loup.com/relicense/.

The USR includes updated study reports for Sedimentation and Hydrocycling.

The District will hold the Updated Study Results meeting on September 8th at the New World Inn, 265 33rd Ave, Columbus, Nebraska. Please RSVP by Sept. 2nd to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275.

For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to: http://www.loup.com/relicense/html/agencymeetingsresources.html in advance of the meeting (by end of day 9/7/11). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

Please bring your own copy of the Updated Study Report and come ready to discuss; we have a lot of material to cover and will start promptly at 8:30 AM on the 8th.

We look forward to seeing you on September 8th.

MATT PILLARD
AICP

HDR Engineering, Inc
Sr. Environmental Planner

8404 Indian Hills Drive | Omaha, NE 68114
402.399.1186 | c: 402.660-7998

Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Monday, August 29, 2011 3:03 PM
To: Jeff_Runge@fws.gov
Cc: Thompson, Wendy; Pillard, Matt
Subject: FW: Loup Power District – FERC Relicensing Updated Study Report and Meeting
Attachments: Slingshot.txt

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Use the "Download Attachments" button after opening this message in Outlook to download attached files.

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Jeff,

There were three studies that we resubmitted reports and associated attachments to FERC:

- Sedimentation
- Hydrocycling
- Section 106 (no attachments)

All other reports and attachments are unchanged.

With Respect to Sedimentation, these are the changes that were made to the report attachments:

- Attachment A Cross-Section Surveys – Ungaged Sites (previously submitted as SISR Attachment A – no change)
- Attachment B Sediment Transport Tables (Previously submitted as ISR Attachment B – no change)
- Attachment C Sediment Transport Graphs (Previously submitted as ISR Attachment A – no change)
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Lisa

From: Jeff_Runge@fws.gov [mailto:Jeff_Runge@fws.gov]
Sent: Monday, August 29, 2011 12:25 PM
To: Pillard, Matt
Cc: Robert_Harms@fws.gov
Subject: Re: Loup Power District – FERC Relicensing Updated Study Report and Meeting

Matt,

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Jeff

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Jeff Runge
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 W. Second Street
Grand Island, NE 68801
(308) 382-6468, Ext. 22
(308) 379-8553 Cell
****

"Pillard, Matt" <Matt.Pillard@hdrinc.com>

08/26/2011 04:16 PM

To "shuhai.zheng@nebraska.gov" <shuhai.zheng@nebraska.gov>, "frank.albrecht@nebraska.gov" <frank.albrecht@nebraska.gov>, "jalexand@usgs.gov" <jalexand@usgs.gov>, "calms@neb.rr.com" <calms@neb.rr.com>, "cgenoa@cablene.com" <cgenoa@cablene.com>, "abaum@upperloupnrd.org" <abaum@upperloupnrd.org>, "john.bender@nebraska.gov" <john.bender@nebraska.gov>, "al.berndt@nebraska.gov" <al.berndt@nebraska.gov>, "rbishop@cpnrd.org" <rbishop@cpnrd.org>, "mike.black@bia.gov" <mike.black@bia.gov>, "jblackhawk@aol.com" <jblackhawk@aol.com>, "mbrown9@unl.edu" <mbrown9@unl.edu>, "prescott.brownell@noaa.gov" <prescott.brownell@noaa.gov>, "emily_brummund@johanns.senate.gov" <emily_brummund@johanns.senate.gov>, "cothern.joe@epa.gov" <cothern.joe@epa.gov>, "todd.crawford@mail.house.gov" <todd.crawford@mail.house.gov>, "jill.dolberg@nebraska.gov"

<jill.dolberg@nebraska.gov>, "adubas@leg.ne.gov" <adubas@leg.ne.gov>, "Brian.Dunnigan@nebraska.gov" <Brian.Dunnigan@nebraska.gov>, "lee.emery@ferc.gov" <lee.emery@ferc.gov>, "mferguson@gp.usbr.gov" <mferguson@gp.usbr.gov>, "barbara.j.friskopp@usace.army.mil" <barbara.j.friskopp@usace.army.mil>, "peggy.harding@ferc.gov" <peggy.harding@ferc.gov>, "robert_harms@fws.gov" <robert_harms@fws.gov>, "thowe@ponca.com" <thowe@ponca.com>, "vwills@pawneenation.org" <vwills@pawneenation.org>, "janet.hutzel@ferc.gov" <janet.hutzel@ferc.gov>, "djjarecke@clarkswb.net" <djjarecke@clarkswb.net>, "nicholas.jayjack@ferc.gov" <nicholas.jayjack@ferc.gov>, "lpsnrd@lpsnrd.org" <lpsnrd@lpsnrd.org>, "isis.johnson@ferc.gov" <isis.johnson@ferc.gov>, "david.jundt@dhhs.ne.gov" <david.jundt@dhhs.ne.gov>, "kennyj@headwaterscorp.com" <kennyj@headwaterscorp.com>, "butchk@llnrd.org" <butchk@llnrd.org>, "cityadmin@cablene.com" <cityadmin@cablene.com>, "monroe@megavision.com" <monroe@megavision.com>, "bobbie.wickham@nebraska.gov" <bobbie.wickham@nebraska.gov>, "mkuzila1@unl.edu" <mkuzila1@unl.edu>, "clangemeier@leg.ne.gov" <clangemeier@leg.ne.gov>, "justin.lavene@nebraska.gov" <justin.lavene@nebraska.gov>, "pcclerk@megavision.com" <pcclerk@megavision.com>, "ncpza@hamilton.net" <ncpza@hamilton.net>, "paul.makowski@ferc.gov" <paul.makowski@ferc.gov>, "jmangi@columbusne.us" <jmangi@columbusne.us>, "jmiyoshi@lpnnrd.org" <jmiyoshi@lpnnrd.org>, "robertm@llnrd.org" <robertm@llnrd.org>, "jeddins@achp.gov" <jeddins@achp.gov>, "danno@nohva.com" <danno@nohva.com>, "marvp@megavision.com" <marvp@megavision.com>, "tpetr@loup.com" <tpetr@loup.com>, "bob.puschendorf@nebraska.gov" <bob.puschendorf@nebraska.gov>, "chairmanrhodd@ponca.com" <chairmanrhodd@ponca.com>, "jeff_runge@fws.gov" <jeff_runge@fws.gov>, "julias@poncatribe-ne.org" <julias@poncatribe-ne.org>, "kenneth.sessa@dhs.gov" <kenneth.sessa@dhs.gov>, "jjshadl@nppd.com" <jjshadl@nppd.com>, "asheridan@omahatribe.com" <asheridan@omahatribe.com>, "don_simpson@blm.gov" <don_simpson@blm.gov>, "msittler@lpsnrd.org" <msittler@lpsnrd.org>, "Robert_F_Stewart@ios.doi.gov" <Robert_F_Stewart@ios.doi.gov>, "ksullivan@leg.ne.gov" <ksullivan@leg.ne.gov>, "jmsunne@nppd.com" <jmsunne@nppd.com>, "Willie_Taylor@ios.doi.gov" <Willie_Taylor@ios.doi.gov>, "randy_thoreson@nps.gov" <randy_thoreson@nps.gov>, "rtrudell@santeedakota.org" <rtrudell@santeedakota.org>, "deb.vanmatre@mail.house.gov" <deb.vanmatre@mail.house.gov>, "jwinkler@papionrd.org" <jwinkler@papionrd.org>, "lewrightjr@gmail.com" <lewrightjr@gmail.com>, "mark@cpnrd.org" <mark@cpnrd.org>

cc Angel Robak <arobak@loup.com>, Jim Frear <jfrear@loup.com>, Neil Suess <nsuess@loup.com>, Ron Ziola <rziola@loup.com>, "Damgaard, Quinn V." <Quinn.Damgaard@hdrinc.com>, "Engelbert, Pat" <Pat.Engelbert@hdrinc.com>, "Grennan, Dennis E." <Dennis.Grennan@hdrinc.com>, "Hunt, George" <George.Hunt@hdrinc.com>, "Pillard, Matt" <Matt.Pillard@hdrinc.com>, "Richardson, Lisa (Omaha)" <Lisa.Richardson@hdrinc.com>, "Thompson, Wendy" <Wendy.Thompson@hdrinc.com>, "Waldow, George" <George.Waldow@hdrinc.com>, "White, Stephanie" <Stephanie.White@hdrinc.com>

Subject Loup Power District – FERC Relicensing Updated Study Report and Meeting

Relicensing Participants:

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The USR includes updated study reports for Sedimentation and Hydrocycling.

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For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to: http://www.loup.com/relicense/html/agencymeetingsresources.html in advance of the meeting (by end of day 9/7/11). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

Please bring your own copy of the Updated Study Report and come ready to discuss; we have a lot of material to cover and will start promptly at 8:30 AM on the 8th.

We look forward to seeing you on September 8th.

Matt Pillard AICP	**HDR Engineering, Inc** Sr. Environmental Planner
	8404 Indian Hills Drive | Omaha, NE 68114 402.399.1186 | c: 402.660-7998 matt.pillard@hdrinc.com | hdrinc.com Follow Us – Facebook | Twitter | YouTube

Selzle, Lydia

From: Jeff_Runge@fws.gov
Sent: Monday, August 29, 2011 5:23 PM
To: Richardson, Lisa (Omaha)
Cc: Pillard, Matt; Thompson, Wendy
Subject: Re: FW: Loup Power District – FERC Relicensing Updated Study Report and Meeting
Attachments: Slingshot.txt

Lisa,

I was able to download all of the files. The below documentation is helpful when trying to keep track of multiple files. Thanks for your help.

Jeff

"Richardson, Lisa (Omaha)" <Lisa.Richardson@hdrinc.com>

08/29/2011 03:03 PM

To "Jeff_Runge@fws.gov" <Jeff_Runge@fws.gov>
cc "Thompson, Wendy" <Wendy.Thompson@hdrinc.com>, "Pillard, Matt" <Matt.Pillard@hdrinc.com>
Subject FW: Loup Power District – FERC Relicensing Updated Study Report and Meeting

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Non-HDR Recipients:
If you are not an HDR employee and this is your first time using Slingshot click here and follow the prompts to set your password.

Returning users click here to Download (files: USR_Sed_A.pdf; USR_Hydro_GthruK.pdf; USR_Hydro_A&B.pdf; USR_Sed_D.pdf; USR_Sed_G.pdf; USR_Sed_B&C.pdf; USR_Sed_F.pdf; USR_Sed_E.pdf; USR_Hydro_E&F.pdf; USR_Hydro_C&D.pdf;)

Notice: The link in this email will only work for up to 30 days (as set by the sender). If you need access to these files for longer, please download and save a copy locally. Recipients of forwarded emails WILL NOT have access to the files using this link.

Jeff,

There were three studies that we resubmitted reports and associated attachments to FERC:

- Sedimentation
- Hydrocycling
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cc Angel Robak <arobak@loup.com>, Jim Frear <jfrear@loup.com>, Neil Suess <nsuess@loup.com>, Ron Ziola <rziola@loup.com>, "Damgaard, Quinn V." <Quinn.Damgaard@hdrinc.com>, "Engelbert, Pat" <Pat.Engelbert@hdrinc.com>, "Grennan, Dennis E." <Dennis.Grennan@hdrinc.com>, "Hunt, George" <George.Hunt@hdrinc.com>, "Pillard, Matt" <Matt.Pillard@hdrinc.com>, "Richardson, Lisa (Omaha)" <Lisa.Richardson@hdrinc.com>, "Thompson, Wendy" <Wendy.Thompson@hdrinc.com>, "Waldow, George" <George.Waldow@hdrinc.com>, "White, Stephanie" <Stephanie.White@hdrinc.com>

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Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Wednesday, September 07, 2011 4:06 PM
To: Richardson, Lisa (Omaha); Jeff_Runge@fws.gov
Cc: Thompson, Wendy; Pillard, Matt
Subject: RE: Loup Power District – FERC Relicensing Updated Study Report and Meeting
Attachments: USR_Sed_H.pdf

Jeff,

I had previously sent you all of the attachments for the various studies for the Loup Power Relicensing. Yesterday the District submitted an additional attachment for the Study 1.0 – Sedimentation, Attachment H – SPSS Output for Statistical Analysis by River Mile. You should have received an e-mail from Matt Pillard about this submittal. So that your set of attachments is complete, I am sending this new attachment to you.

If you need anything else, don't hesitate to give me a call.

Regards,

Lisa

From: Richardson, Lisa (Omaha)
Sent: Monday, August 29, 2011 3:03 PM
To: 'Jeff_Runge@fws.gov'
Cc: Thompson, Wendy; Pillard, Matt
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Jeff

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Jeff Runge
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 W. Second Street
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"Pillard, Matt" <Matt.Pillard@hdrinc.com>

08/26/2011 04:16 PM

To "shuhai.zheng@nebraska.gov" <shuhai.zheng@nebraska.gov>, "frank.albrecht@nebraska.gov" <frank.albrecht@nebraska.gov>, "jalexand@usgs.gov" <jalexand@usgs.gov>, "calms@neb.rr.com" <calms@neb.rr.com>, "cgenoa@cablene.com" <cgenoa@cablene.com>, "abaum@upperloupnrd.org"

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Subject Loup Power District – FERC Relicensing Updated Study Report and Meeting

Relicensing Participants:

Loup Power District has electronically filed its Updated Study Report (USR) with FERC. The report is available on FERC's e-library and on the District's relicensing website: http://www.loup.com/relicense/.

The USR includes updated study reports for Sedimentation and Hydrocycling.

The District will hold the Updated Study Results meeting on September 8th at the New World Inn, 265 33rd Ave, Columbus, Nebraska. Please RSVP by Sept. 2nd to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275.

For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to: http://www.loup.com/relicense/html/agencymeetingsresources.html in advance of the meeting (by end of day 9/7/11). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

Please bring your own copy of the Updated Study Report and come ready to discuss; we have a lot of material to cover and will start promptly at 8:30 AM on the 8th.

We look forward to seeing you on September 8th.

Matt Pillard AICP	**HDR Engineering, Inc** Sr. Environmental Planner
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Cc:	Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Grennan, Dennis E.; Hunt, George; Pillard, Matt; Richardson, Lisa (Omaha); Thompson, Wendy; Waldow, George; White, Stephanie
Subject:	Loup Power District – FERC Relicensing Updated Study Report Addendum and Meeting Materials

Relicensing Participants:

Loup Power District has electronically filed an addendum to the Updated Study Report (USR) with FERC. It is available on FERC's e-library and on the District's relicensing website. The addendum includes the results of the statistical analysis of interior least tern nesting and Appendix J, Summary of Results Related to the Interior Least Tern and Piping Plover

The presentation for tomorrow's Updated Study Report meeting is now available on the website. The meeting will be held at the New World Inn in Columbus, NE. Call in instructions can also be found on the web. If you call in, we request that you send an alternate phone number to Wendy Thompson (wendy.thompson@hdrinc.com) in case of technical difficulties.

Thank you. Look forward to seeing you/hearing from you tomorrow.

MATT PILLARD
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Updated Study Results Meeting Summary

Project:	Loup River Hydroelectric Project FERC Project No. 1256		
Subject:	Updated Study Results Meeting Summary		
Meeting Date:	September 8, 2011, 8:30 am – 2:30 pm	Meeting Location:	New World Inn, Columbus, NE
Notes by:	Loup Power District		

Loup River Public Power District (Loup Power District or the District) filed its Updated Study Report (USR) with the Federal Energy Regulatory Commission (FERC) on August 26, 2011 and subsequent Addendum on September 7th, 2011, as part of relicensing the Loup River Hydroelectric Project (FERC Project No. 1256) and in accordance with the regulations of FERC's Integrated Licensing Process (ILP) (18 Code of Federal Regulations [CFR] 5). Subsequently, the Updated Study Results were presented to FERC and other relicensing participants during the Updated Study Results Meeting held on September 8, 2011, at the New World Inn (265 33rd Street) in Columbus, Nebraska. The proceedings of that meeting are presented in this Updated Study Results Meeting Summary, which follows the organization of the agenda for the meeting.

The meeting agenda and handout of the slide presentation are included as Attachments A and B, respectively.

Welcome and Introductions

Neal Suess (Loup Power District) and Stephanie White (HDR) provided those attending the Updated Study Results Meeting with an overview of the agenda and the goals for the meeting. The meeting goals and the list of attendees are provided below.

Meeting Goals

The goals of the Updated Study Results Meeting were the following:

- To present the updated results of the studies identified in the Revised Study Plan and Study Plan Determination.
- To discuss any proposals to modify the study plan (by the District or other participants) in light of study progress and data collected.

Attendees:

The following agency and District representatives attended the Updated Study Results Meeting:

Name	Organization	Name	Organization
John Bender	NDEQ	Janet Hutzel (via phone)	FERC
Shuhai Zheng	NDNR	Isis Johnson (via phone)	FERC
Frank Albrecht	NGPC	Paul Makowski (via phone)	FERC
Richard Holland	NGPC	Bob Clausen	Loup Power District
Joel Jorgensen	NGPC	Jim Frear	Loup Power District
Michelle Koch	NGPC	Thomas Kumpf	Loup Power District
Dave Tunink	NGPC	Theresa Petr	Loup Power District
Jim Jenniges	NPPD	Neal Suess	Loup Power District
John Shadle	NPPD	Ron Ziola	Loup Power District
Tom Econopouly	USFWS	Pat Engelbert	HDR
Robert Harms	USFWS	Marcus Grant (via phone)	HDR
Jeff Runge	USFWS	Dennis Grennan	HDR
Mary Bomberger-Brown	Tern and Plover Conservation Partnership	George Hunt	HDR
		Gary Lewis	HDR
		Matt Pillard	HDR
Mike Gutzmer	New Century Environmental LLC	Lisa Richardson	HDR
		Wendy Thompson	HDR
		George Waldow	HDR
		Stephanie White	HDR

Integrated Licensing Process Overview

Lisa Richardson (HDR) discussed the overall relicensing process for the Loup River Hydroelectric Project (Project). She reviewed the previous meetings held to get to this point and gave a brief summary of the studies completed to date and the study modifications required related to those studies.

The following studies were completed for the First and Second Initial Study Reports, submitted on August 26, 2010 and February 11, 2011:

- Sedimentation
- Hydrocycling
- Water Temperature in Loup River Bypass Reach
- Flow Depletion and Flow Diversion
- Fish Passage
- Recreation Use
- Land Use Inventory
- Section 106 Compliance
- Ice Jam Flooding on the Loup River
- PCB Fish Sampling (a full study was not required, sampling results were presented)

FERC's Determination after the Initial Study Results Meetings included:

- Studies Requiring No Revisions:
    - Study 4.0, Water Temperature in Loup River Bypass Reach
    - Study 5.0, Flow Depletion and Flow Diversion
    - Study 7.0, Fish Passage

- Study 8.0, Recreation Use
- Study 10.0, Land Use Inventory
- Study 11.0, Section 106 Compliance
- Study 12.0, Ice Jam Flooding on the Loup River

- Studies Requiring Revisions:
  - Study 1.0, Sedimentation
    - Add confidence limits for sediment rating curves.
    - Add aggradation/degradation analysis for Duncan, North Bend, Ashland, and Louisville (from Pre-Application Document [PAD]).
    - Add aggradation/degradation analysis for Genoa.
    - Complete the Kendall tau test to assess aggradation/degradation trends.
    - Perform supplemental spatial analysis of channel geomorphologic charachteristics.
    - Complete additional statistical analysis related to interior least tern and piping plover nesting.
    - Provide additional references (Chen et al., 1999, and Missouri River Basin Commission [MRBC] report) to FERC.
  - Study 2.0, Hydrocycling
    - Conduct sediment transport analysis using HEC-RAS.
    - Add species summary for Interior Least Tern and Piping Plover.

Finally, Richardson briefly discussed the next steps in the process, which include preparation of this Updated Study Results Meeting Summary and an opportunity for relicensing participants to submit comments.

Presentation of Study Results

Members of the Project team from HDR provided results for the study determination modifications:

- Study 1.0, Sedimentation
- Study 2.0, Hydrocycling
- Species Summary for Interior Least Tern and Piping Plover

After the results of each study were given, the other meeting attendees had an opportunity to ask questions and offer comments on the respective studies.

Study 1.0, Sedimentation

Study Results:

Pat Engelbert (HDR), George Hunt (HDR), Lisa Richardson (HDR) and Marcus Grant (HDR) presented the study results of the sedimentation study. The key points were as follows:

- Consistent with results of the spatial analysis in the ISR and SISR, there is a strong relationship between channel geomorphologic characteristics and effective discharge (Qe) (and dominant discharge [Qd]).
- A percent change in Qe corresponds to a proportionate change in flow width and flow area.
- The Loup River has no change between Genoa and Columbus for all four channel geomorphologic characteristics, revealing dynamic equilibrium
- The Platte River has a strong relationship between Qe (and Qd) and flow width consistent with Kircher findings that relate Qe and width. In addition, there is a strong relationship between Qe and flow area.
- Kendall Tau analysis showed no overall aggradational or degradational trends.

- Statistical analysis of interior least tern nest counts and hydrologic parameters showed the following:
    - Nest counts were weakly associated with number of data collection visits per year.
    - Nest counts were strongly associated with number of adult terns.
    - No measurable relationship between nest counts and distance from tailrace.
    - No measurable relationship between presence of nests and distance from tailrace, year, PMDF, percent diverted.
    - Potential relationship identified between nest counts and low flow years preceded by high flow years.
    - No significant changes in flow between river miles in a given year.

Discussion:

- Q: Jeff Runge (USFWS) asked why looking at Site 2 and comparing to Genoa and Columbus (referencing Figure 5.13) effective (Qe) and dominant discharge (Qd) were pretty equal, but other variables were different.
  A: Pat Engelbert (HDR) explained that one reason is the difference in data record. Genoa has long term gage data, but Site 2 is based on data obtained in 2010.
- Q: Runge also asked why the widths/velocity/depths/areas were different between Site 2 and Genoa/Columbus when Qe and Qd are very similar.
  A: Gary Lewis (HDR) replied that HEC-RAS requires fixed bed evaluation. The actual river bed changes constantly, but HEC-RAS assumes a rigid bed. The single set of cross-sections gave intermediate morphology; if more data were available then the measurements would be more similar. As shown in the ISR graphs, the effective discharges each year of the seven year period vary from 1,500 to 3,000 cfs, and there are high fluctuations at the Genoa station so the morphology is constantly changing. The bed geometry from the 2010 data would not be likely to match the equilibrium geometry.
- Q: Paul Makowski (FERC) asked if the relationships plotted for the Platte River between Qe and flow width and flow area were plotted for the Loup River as well
  A: Lewis stated that the locations were plotted for the Loup but didn't show much because 3 of 4 locations had the same Qe, and there is only one gaged site. To develop the defining morphology curve, more than one gaged site on a river is needed. When the 3 points were plotted, they all show up as the same data point and the only other data point is at ungaged site 1. He said there was a proportional change in channel width and area from Site 1 to 2 with effective discharge, but the effective discharges at Site 2, Loup at Genoa, and Columbus were within 100 cfs of each other.
- Q: Runge asked if the team saw similar relationships with the Platte or whether the relationships are very generalized and have a similar linear form regardless of the river systems and asked if the Loup could be overlaid with the Platte.
  A: Lewis explained that there is a steeper slope between Sites 1 and 2 on the Loup, and that it's flatter on the Platte. He stated that in addition to needing more than one gaged site, the morphology-defining Qe versus width relationship is for a truly unconstrained river, and that the Loup and the Platte are both affected by lateral constraints. Site 3 was found to have lateral restraints on both sides, which was not the case at adjacent study sites up or down the river. The Qe versus width relationship does aid in defining the morphology, but cannot be translated between rivers.
- Q: Joel Jorgenson (NGPC) asked how the data were summarized for analysis and if the data was adjusted for effort intensity?
  A: Richardson responded that for the analysis of nest counts vs. data collection visits, the data was not changed but that for the subsequent analysis compared to year, river mile, flow, etc., that only the highest nest count at a specific location within a year was used.

- Q: Mary Bomberger-Brown (Tern and Plover Conservation Partnership) asked what statistics were being looked at and whether the statistic is r (correlation) or r^2 (regression).

A: Marcus Grant (HDR) responded that the slides were generalized but are reporting the coefficient of determination, r^2.

- Q: Jorgenson asked if the analysis performed was a regression analysis.
  A: Grant responded, yes, this was a regression analysis - multiple regression using two independent variables.
- Q: Jorgenson asked why river miles from 72 to 102 where chosen for analysis of distance from the tailrace.
  A: Richardson stated that this area was chosen in order to limit the effects of inflows and other factors not associated with the project, this is the area closest to the tailrace. River mile 72 (North Bend) was chosen because that is a USGS gaging station and hydrology data is available. She also explained that limiting the analysis to the area closest to the tailrace was discussed during the March meeting with NGPC and TPCP.
- C: Jorgenson noted that if an effect was identified it would be attenuated downstream and analysis further downstream would show that, but he agreed that decisions have to be made regarding limiting the analysis.
- C: With respect to the significant change in nest count number pre- and post-1995, Jorgensen noted that there are numerous other variables that affect tern and plover nesting numbers in this system.
  C: Richardson agreed but noted that there was also an analysis performed beyond river mile 72 when it appeared there was something significant happening, but that the additional analysis did not show a significant difference in nest counts pre- and post-1995.
- Q: Bomberger-Brown asked if the District could send her the test statistics.
  A: Richardson noted that all of the SPSS output from the statistical analysis is available in Attachment H of the Updated Sedimentation Study Report and that she would provide that attachment directly to Mary and Joel.
- C: Jorgenson commented that he thought the District was making a conclusion that a constant variable (the project) isn't affecting the terns and he reiterated that there are a number of variables to look at, but that the data is too noisy and there are other variables at play, so a concise conclusion cannot be made.
  C: Richardson agreed that many factors affect nesting habits but noted that this is the best data available and that several types of analysis were done and nothing identified something that could be attributed the Project.
- Q: Runge asked why this portion of the Sedimentation Study used peak mean daily flow instead of Qe that was used in the other analyses.
  A: Richardson/Grant explained that the correlation and factor analysis of the hydrologic data indicated that Qe, Qd and peak mean daily flow were loaded on the same factor, indicating they were very similar. However, for analysis by river mile, Qe and Qd were not available, so the flow data was used.
- Q: Runge asked if the fact that the three factors were determined to be similar for this analysis but other analyses in sedimentation identified them to be different with respect to other parameters, if this means that the statistical analysis isn't a good measure of project effects.
  A: Richardson answered that analysis of Qe and Qd could not be done for the statistical analysis because the data isn't available to do a calculation at each river mile – that is essentially the course spatial analysis that was done in the Initial Study Report. She also noted that sediment transport is related to flow and that was the only variable that could be used at a more refined spatial scale. Engelbert added that Qe and Qd is the long-term analysis relative to sediment transport based on a long term analysis of the river.
- Q: Runge asked if the re was an aggregate comparison that looks at changes in the Qe and Qd on the longitudinal, and does that affect nesting over the long-term as well?
  A: Richardson/Hunt responded that the factor analysis used the annual flow, Qe and Qd, not the long term Qe and Qd and analysis of changes in Qe and Qd on the longitudinal were not done for this

analysis [*NOTE: Longitudinal analysis of Qe and Qd was conducted for the Initial Study Report at a course longitudinal scale (between USGS gage stations)]*

Study 2.0: Hydrocycling

Study Results:

Pat Engelbert (HDR) presented the study results of the hydrocycling study. The key points were as follows:

- Model Conclusions:
  - Reaches are stable – consistent with prior findings – dynamic equilibrium.
  - Modeled Sediment Transport Rate matched previous sediment discharge rating curve.
  - Transport rate at capacity in all cases – not supply limited.
- Considerations: Model can be unstable. Great care must be taken when making simulations. Modifying and executing between 32-bit and 64-bit machines can produce different results. In addition, modifying the plan or quasi unsteady flow file on different computers would at times produce differing results. Finally, differing end of simulation dates can produce different results.

Discussion:

- Q: Runge noted that he thought the USGS report on gradation only described methods and not sediment gradation results. He thought a contractor had been hired to sort the data, but he did not find the data in the PDF when he reviewed the information.
  A: Engelbert noted that the report he received has the results and he will look up the information after this meeting and provide it to Jeff.
- Q: Runge asked if the sediment gradation line was the average over the length of the simulation.
  A: Engelbert explained it was the sediment gradation at end of the simulation.
- Q: Runge asked if the transport rate was higher than the capacity.
  A: Engelbert explained that there are times during the simulation where the transport rate is greater than transport capacity at a given cross section, and there are times where the transport rate is less than the transport capacity at a given cross section. However, over the entire simulation the rates and capacity are all clustered around the sediment discharge rating curve using Yang's equation, suggesting the system is transporting at capacity.
- C: George Waldow (HDR) stated that the scenario Runge suggests is consistent with dynamic equilibrium; a braided system will show both aggradational and degradational sections over time.
- Q: Runge asked if the sites looked at an aggregate average elevation of all the cross sections.
  A: Engelbert explained that, yes, it was an average of the cross sections within the study area.
- Q: Runge asked if any model could evaluate supply from the basin as well as evaluate the capacity of the river to transport sediment.
  A: Engelbert said he was not aware of a single model that would evaluate the sediment supply from the basin as well as the transport capacity of the river.

Species Summary: Interior Least Terns and Piping Plovers

Study Results:

Matt Pillard (HDR) presented the results of the species summary for the Interior Least Terns and Piping Plovers. The key points were as follows:

- Sandbar formation:
  - System is not-supply limited.
  - Sediment removal from canal does not limit sediment supply for potential sandbar creation.
  - Sediment removal does not create a sediment deficit that would erode sandbars at a rate faster than normal.

  - System in a state of dynamic equilibrium indicates that channel morphology, that is a braided channel, exists under current operations and has shown to provide tern and plover habitat.
  - As a result of a not-supply limited system and a system seated in a braided river system, effects of hydrocycling was not shown to effect sediment supply available for sandbar creation.
- Suitable Habitat Availability
  - Nest distribution variability not related to proximity to Tailrace Return; appears that Tailrace is not a factor for nest site selection
  - A period of relatively high nest counts from 1987 to 1995 was followed by a period of lower but also static nest counts from 1995 to 2008 between RM 102 and RM 72; Project operations have remained the same during this period.
  - Daily fluctuations in stage due to hydrocycling affect the wetted fringe of sandbars that serve as habitat. This effect is greatest when upstream Platte River flows are the lowest. This effect is expected to be the most evident nearest the Tailrace return. However, location to the Tailrace return was not a factor in explaining nest count variability.
  - Many factors in determining suitable habitat on a year-to-year basis (flows, predation, recreational disturbance, nesting success)
- Loup River Physical Characteristics
  - Differences in channel widths above and below the Diversion Weir (wider above and narrower below).
  - Project operational changes are limited with respect to altering physical parameters
  - No morphological changes in last 25 years
  - No change in morphology is expected

Discussion:

- C: Jorgenson referred to slide 153, and commented that he felt this was just an exploratory analysis and that there is too much variability and noise in the data that interferes with making a judgment. He noted that stating nest site selection implies habitat availability and noted that the analysis did not look at habitat.
- Q: Isis Johnson (FERC) referred to slide 151 and asked if there was any analysis of how the current equilibrium might change if the sediment was not removed. She asked if the river might be in a different state than it would be without hydrocycling and/or without removal of sediment and how might things change in the future. Is there any difference in what is happening above and below (the Tailrace return) and whether that difference is either beneficial, detrimental, or having no effect on terns and plovers? She noted that it would be helpful to understand the differences on the Platte River above and below the Tailrace return and how alternatives may affect bird habitat and then how they might be mitigated.
  A: Engelbert replied that the hydraulics associated with Site 3 differ from Site 4, but the survey results showed no long-term degradational trends. However, how it would respond without the elimination of sediment wasn't evaluated.
  C: Richard Holland (NGPC) noted that agency understanding was that a no-project scenario was not being considered.
  Q: Johnson stated that the assumption that the project would be there is correct, but she would like to have the information about no diversion or what happens if sediment removal is reduced.
  A: Richardson and Neal Suess (LPD) explained that removing less sediment at the headworks is not an option. The sediment that comes into the settling basin must be removed or the basin would fill up with sediment within a year or two and the District would not be able to take water into the canal and the project would not longer be able to operate.
- C: Runge noted that additional integration of the study results would be helpful - how do geomorphic effects affect habitat and how does that habitat then affect the species.

- C: Holland commented that the analysis that was done may be at too large of a scale to identify short stretches of river that may be impacted, but that a study at that scale is cost prohibitive.
- C: Runge noted that effects are not necessarily limited to only the areas studied and specifically noted activities on the North Sand Management Area.
- C: Pillard noted that information beyond the studies would be covered in the biological assessment that is being prepared.
- C: Runge commented that when the biological assessment is developed, that effects to any individuals of a species should be considered in an affect determination in relation to Section 7. The District will need to quantify the significance of the effect and FWS will review the significance related to the recovery of the species and analyze the rest of the species and cumulative effects.
- Q: Johnson requested clarification on the statement on slide 155 that "Project Operational Changes are limited with respect to altering physical parameters."
  A: Pillard explained that the intent of that statement is to note that although characteristics are different below the diversion weir, that there aren't any operational changes that could be made that would alter those current conditions.

Next Steps

Lisa Richardson (HDR) discussed the next steps in the relicensing process.

In relation to studies:

- September 23, 2011 – District submits meeting summary
- October 24, 2011– Agencies file meeting summary disagreements and submit requests for modification to on-going studies
- November 23, 2011 – District responds to summary comments and study modification requests
- December 23, 2011 – FERC resolves comments and study modification requests

In relation to the License Application:

- November 18, 2011 – District files Draft License Application
- April 16, 2012 – District files License Application

In relation to Section 7 Consultation:

- November 18, 2011 – District submits Draft Biological Assessment with Draft License Application
- February 16, 2012 – Agency Comments on Draft BA/Draft License Application due
- April 16, 2012 – District submits Biological Assessment with License Application
- July 1, 2012 – Application accepted and Ready for Environmental Analysis (REA)
- 60 days after REA – Comments, recommendations and preliminary terms and conditions or preliminary fishway prescriptions due
- May 2013 – FERC issues Environmental Assessment
- 135 days after EA issued – Biological Opinion due

Discussion:

- Q: Holland asked what is meant by Fishway prescriptions.
  A: Janet Hutzel (FERC) explained that it is related to the FWS Section 18 authority to prescribe fishways – basically it's FWS's ability to require structures or other structures for fishways.
- C: Makowski noted that any proposed mitigation measures the District wanted to suggest should be included in the Draft Application.

- C: Makowski noted that any references requested by individuals should also be submitted to FERC so they are available to all.
- C: Richardson told Runge that the USGS report would be emailed to him after the meeting.
- C: Richardson told Bomberger-Brown and Jorgensen that Appendix H information would be emailed to them after the meeting.

Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Tuesday, September 13, 2011 7:56 AM
To: Jorgensen, Joel; mbrown9@unl.edu
Cc: Thompson, Wendy; Pillard, Matt
Subject: Loup Hydro Relicensing
Attachments: USR_Sed_H.pdf

Joel & Mary,

Attached is the Sedimentation Study attachment (H) that includes all the SPSS output from the statistical analysis that was performed related to the bird nesting data.

Feel free to give me a call if you have any questions.

Regards,

Lisa

LISA M. RICHARDSON, P.E.

HDR Engineering, Inc
Associate Vice President

8404 indian Hills Drive| Omaha, NE 68114
o: 402.926.7026 | c: 402.618.9865
f: 402.399.1111
lisa.richardson@hdrinc.com | hdrinc.com

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup Power District - Memorandum of Understanding
Date:	Monday, October 03, 2011 6:02:00 PM

For the DB and PW

From: Nelson, Kirk [mailto:kirk.nelson@nebraska.gov]
Sent: Monday, September 26, 2011 2:17 PM
To: Richardson, Lisa (Omaha)
Cc: Albrecht, Frank
Subject: RE: Loup Power District - Memorandum of Understanding

Lisa
Frank Albrecht is the contact for NGPC on this project. Please coordinate with him and anyone else he suggests be on the call from the Commission.

Kirk Nelson
Western Region Parks Manager
Nebraska Game and Parks Commission
2200 N. 33rd St.
Lincoln, NE 68503
(402) 471-5513
cell phone 402-326-3426
Kirk.Nelson@nebraska.gov

******* Please Note New Email Address **********

From: Richardson, Lisa (Omaha) [mailto:Lisa.Richardson@hdrinc.com]
Sent: Sunday, September 25, 2011 6:18 PM
To: Jorgensen, Joel; martha_tacha@fws.gov; mbrown9@unl.edu
Cc: Pillard, Matt; Neal Suess; Robert_Harms@fws.gov; Albrecht, Frank; John_Cochnar@fws.gov; Nelson, Kirk
Subject: Loup Power District - Memorandum of Understanding

Joel, Mary and Martha,

As you are aware, HDR is assisting Loup Power District in preparing the Draft License Application for their Loup River Hydroelectric Project to be submitted to the Federal Energy Regulatory Commission (FERC). As part of the application we will be including a description of how the Memorandum of Understanding (MOU) [executed MOU is attached] related to nesting interior least terns and piping plovers on the District's North Sand Management Area is working. Each of you is listed as the principal contacts for your respective agencies. As such, we would like to discuss the past few years of operation with each of you to develop a summary for the application.

We would like to discuss the details of how things are working during a phone conversation. We will be having discussions with the agency representatives as well as Preferred and the District. If it is not possible to arrange a common conference call with agency representatives, we would be happy to have multiple discussions.

After discussing the MOU with the various participants, we will prepare a written summary that we will circulate to the participants for comment. The summary will eventually be used in the discussion of Project Operations in the Draft License Application which is a publicly available document. It is important that the application include a detailed and accurate description of activities related to the MOU - If there are portions of the summary that agencies would prefer be kept privileged and not available to the general public, we would be happy to file that portion of the application as privileged.

Please provide me with a list of dates/times between now and October 14th when you would be available to discuss the MOU, as I noted, it is not necessary for everyone to be available at the same time as everyone will be afforded an opportunity to review the summary.

Thanks in advance for your assistance.

Regards,

Lisa Richardson
Relicensing Project Manager

LISA M. RICHARDSON, P.E.

HDR Engineering, Inc
Associate Vice President

8404 indian Hills Drive| Omaha, NE 68114
o: 402.926.7026 | c: 402.618.9865
f: 402.399.1111
lisa.richardson@hdrinc.com | hdrinc.com

Selzle, Lydia

From: Pillard, Matt
Sent: Tuesday, September 27, 2011 8:00 AM
To: shuhai.zheng@nebraska.gov; frank.albrecht@nebraska.gov; jalexand@usgs.gov; calms@neb.rr.com; cgenoa@cablene.com; abaum@upperloupnrd.org; john.bender@nebraska.gov; al.berndt@nebraska.gov; rbishop@cpnrd.org; mike.black@bia.gov; jblackhawk@aol.com; mbrown9@unl.edu; prescott.brownell@noaa.gov; emily_brummund@johanns.senate.gov; cothern.joe@epa.gov; todd.crawford@mail.house.gov; jill.dolberg@nebraska.gov; adubas@leg.ne.gov; Brian.Dunnigan@nebraska.gov; lee.emery@ferc.gov; mferguson@gp.usbr.gov; barbara.j.friskopp@usace.army.mil; peggy.harding@ferc.gov; robert_harms@fws.gov; thowe@ponca.com; vwills@pawneenation.org; janet.hutzel@ferc.gov; djjarecke@clarkswb.net; nicholas.jayjack@ferc.gov; lpsnrd@lpsnrd.org; isis.johnson@ferc.gov; david.jundt@dhhs.ne.gov; kennyj@headwaterscorp.com; butchk@llnrd.org; cityadmin@cablene.com; monroe@megavision.com; bobbie.wickham@nebraska.gov; mkuzila1@unl.edu; clangemeier@leg.ne.gov; justin.lavene@nebraska.gov; pcclerk@megavision.com; ncpza@hamilton.net; paul.makowski@ferc.gov; jmangi@columbusne.us; jmiyoshi@lpnnrd.org; robertm@llnrd.org; jeddins@achp.gov; danno@nohva.com; marvp@megavision.com; tpetr@loup.com; bob.puschendorf@nebraska.gov; chairmanrhodd@ponca.com; jeff_runge@fws.gov; julias@poncatribe-ne.org; kenneth.sessa@dhs.gov; jjshadl@nppd.com; asheridan@omahatribe.com; don_simpson@blm.gov; msittler@lpsnrd.org; Robert_F_Stewart@ios.doi.gov; ksullivan@leg.ne.gov; jmsunne@nppd.com; Willie_Taylor@ios.doi.gov; randy_thoreson@nps.gov; rtrudell@santeedakota.org; deb.vanmatre@mail.house.gov; jwinkler@papionrd.org; mark@cpnrd.org
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Grennan, Dennis E.; Hunt, George; Pillard, Matt; Richardson, Lisa (Omaha); Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District – FERC Relicensing Updated Study Report Meeting Summary

Relicensing Participants:

Loup Power District has electronically filed the Meeting Summary from the Updated Study Results Meeting held on September 8, 2011. The report is available on FERC's e-library and on the District's relicensing website: http://www.loup.com/relicense/html/documents.html.

Thank you.

MATT PILLARD
AICP

HDR Engineering, Inc
Sr. Environmental Planner

8404 Indian Hills Drive | Omaha, NE 68114
402.399.1186 | c: 402.660-7998
matt.pillard@hdrinc.com | hdrinc.com

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Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Monday, October 03, 2011 6:02 PM
To: Thompson, Wendy
Subject: FW: ESA and FPA discussions Loup Power District
Attachments: Draft Meeting Agenda 10032011.doc

Follow Up Flag: Follow up
Flag Status: Flagged

For the DB and PW.

From: Robert_Harms@fws.gov [mailto:Robert_Harms@fws.gov]
Sent: Monday, September 26, 2011 11:16 AM
To: frank.albrecht@nebraska.gov; jeff_runge@fws.gov; Richardson, Lisa (Omaha); Pillard, Matt; nsuess@loup.com; joel.jorgensen@nebraska.gov; richard.holland@nebraska.gov; Michelle.Koch@nebraska.gov
Cc: John_Cochnar@fws.gov
Subject: Re: ESA and FPA discussions Loup Power District

All:

I have scheduled the Endangered Species Act and Federal Power Act discussions for October 3, 2011, from 1-3:00 pm--a date and time that works for the majority of people who completed the doodle poll. Our meeting location is at the Loup Power District office in Columbus. Neal--please advise me if this date and time will not work for you. A draft agenda is attached for your consideration--please take the time to review it and provide any suggestions to the agenda to me. Thanks.

(See attached file: Draft Meeting Agenda 10032011.doc)

Bob

Robert R. Harms
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 West Second Street
Grand Island, Nebraska 68801
Phone: 308-382-6468, Extension 17
Fax: 308-384-8835
robert_harms@fws.gov

Robert Harms/R6/FWS/DOI

Robert Harms/R6/FWS/DOI

09/20/2011 09:28 AM

ToNeil Suess, Matt Pillard, Frank Albrecht, Lisa Richardson, Jeff Runge

ccJohn Cochnar/R6/FWS/DOI@FWS

SubjectESA and FPA discussions Loup Power District

All:

This is to schedule a meeting to begin section 7 consultation pursuant to the Endangered Species Act and section 10j of the Federal Power Act processes for the proposed FERC relicensing of Loup Power District operations. Please complete the doodle poll link that I have attached by Thursday September 22 and I'll select a meeting date that works. Tentative agenda topics include the processes and purposes for section 7 consultation and section 10 j; species affects; protection, avoidance, and mitigation measures, monitoring; and next steps. I'll prepare a draft agenda prior to our meeting and circulate that for feedback. Plan for a 2-3 hour meeting; once a date is selected I'll be in touch with further logistical information including a meeting location and time--I am leaning toward a meeting at LPD offices in Columbus--Neil is that possible pending the selection of a meeting date?

Please call or E-mail me if you have any questions. Thanks much.

http://www.doodle.com/x5yv58gzvccnsyue

Bob

Robert R. Harms
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 West Second Street
Grand Island, Nebraska 68801
Phone: 308-382-6468, Extension 17
Fax: 308-384-8835
robert_harms@fws.gov

Draft Agenda

Loup Power District
FERC Relicensing
Section 7 Endangered Species Act
Section 10J of the Federal Power Act
October 3, 2011
1:00 pm – 3:00 pm

a) Introductions

b) Processes
- Section 7 of the Endangered Species Act
- Section 10J of the Federal Power Act

c) Environmental baseline

d) Species effects

e) Avoidance, minimization, and mitigation

f) Next steps

g) Adjourn

LOUP POWER DISTRICT
"SERVING YOU ELECTRICALLY"
GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988
Phone:
402/564-3171
Fax:
402/564-0970

September 26, 2011

Mr. Robert Harms
U.S. Fish and Wildlife Service
Nebraska Field Office
203 West Second Street
Federal Building, Second Floor
Grand Island, Nebraska 68801

RE: 2011 Loup River Tern and Plover Information Request

Dear Mr. Harms:

As you are aware, Loup Power District (the District) is currently seeking a new operating license with the Federal Energy Regulatory Commission (FERC) for its hydroelectric facilities located on the Loup River near Genoa and Columbus, Nebraska. I would like to take this opportunity to thank you for your responses to our prior requests for information and for your involvement thus far in the re-licensing process.

The District has completed one year of studies as they relate to the re-licensing effort and have presented these study results. To date, the District has obtained tern and plover survey data from Nebraska Game and Parks Commission (NGPC), as the agency tasked with updating and managing the Nebraska Least Tern and Piping Plover Database, and also from the USFWS as the agency responsible for collection of 2009 and 2010 tern and plover data on the Loup River.

At this time, I would like to request any and all 2011 interior least tern and piping plover population, nesting, chick counts, fledge counts, productivity information, nest and adult locations, trend information, and any habitat information collected by the USFWS during the 2011 breeding season for the Loup River (both on- and off-river data). This information would be used to update existing studies and is critical to completion of the biological assessment and continuation of the environmental review of the Project. Please provide this data electronically (excel, database, shapefiles, etc) to expedite our review of the data.

I appreciate your assistance in providing information for the relicensing effort as quickly as possible. The information requested will be used for analytical purposes and the only information that will be published is information related to general trends and observations. Location specific information will not be made available to the general public without the consent of the USFWS and NGPC.

Please submit the requested information electronically as soon as possible to HDR Engineering, the District's relicensing consultant:

Matt Pillard
HDR Engineering
8404 Indian Hills Drive
Omaha, NE 68114
Matt.pillard@hdrinc.com

Please feel free to contact Matt Pillard (402-399-1186) or Melissa Marinovich (402-399-1317) of HDR if you have any questions or clarifications regarding this information request. Thank you for your assistance.

Sincerely,

Neal D. Suess
President/CEO
Loup Public Power District

cc: Lee Emery, FERC
Joel Jorgensen, NGPC
Matt Pillard, HDR

LOUP POWER DISTRICT
"SERVING YOU ELECTRICALLY"
GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988
Phone:
402/564-3171
Fax:
402/564-0970

September 26, 2011

Mr. Robert Harms
U.S. Fish and Wildlife Service
Nebraska Field Office
203 West Second Street
Federal Building, Second Floor
Grand Island, Nebraska 68801

Re: Loup River Hydroelectric Project
FERC Project Number 1256
Request for an Updated Species List

Dear Mr. Harms:

As you are aware, Loup Power District (the District) filed a Notice of Intent (NOI) and a Pre-Application Document (PAD) in October 2008 to begin the Federal Energy Regulatory Commission (FERC) relicensing process for its hydroelectric facilities located on the Loup River near Columbus, Nebraska (Project). In FERC's Notice of Commencement on December 16, 2008, FERC initiated informal consultation with the U.S. Fish and Wildlife Service (USFWS) and designated Loup Power District (the District) as the non-federal representative to conduct ESA section 7 consultation.

The District is currently preparing a draft Biological Assessment. In letters dated July 21, 2008 and September 18, 2008, the USFWS provided technical assistance to the District in determining the potential issues related to threatened or endangered species. In accordance with section 7 of the Endangered Species Act (ESA), USFWS developed a list of federally listed species that may occur in the Project area or may be affected by the proposed relicensing of the Project. These species were:

- Interior Least Tern
- Pallid Sturgeon
- Piping Plover
- Western Prairie Fringed Orchid
- Whooping Crane

I would like to request confirmation of the species listed in the aforementioned letter as the federally listed threatened and endangered species which may be applicable to the Project.

Please submit your concurrence by October 10, 2011, to HDR Engineering, the District's relicensing consultant:

Matt Pillard
HDR Engineering
8404 Indian Hills Drive
Omaha, NE 68114
Matt.pillard@hdrinc.com

Please feel free to contact Matt Pillard (402-399-1186) of HDR if you have any questions or clarifications regarding the updated species list request. Thank you for your assistance.

Sincerely,

Neal D. Suess
President/CEO
Loup Public Power District

cc: Kim Nguyen, FERC
Matt Pillard, HDR

Meeting Notes

Project:	Loup River Hydroelectric Project FERC Project No. 1256
Subject:	Section 7 ESA and Section 10J FPA
Meeting Date:	October 3, 2011 1:00 PM – 3:00 PM
Meeting Location:	Loup Public Power Headquarters – Columbus, NE
Notes by:	HDR

Attendees:

Robert Harms, USFWS
Jeff Runge, USFWS
Frank Albrecht, NGPC
Richard Holland, NGPC
Joel Jorgensen, NGPC
Neal Suess, LPD
Melissa Marinovich, HDR
Matt Pillard, HDR
Lisa Richardson, HDR

A meeting was held with the U.S. Fish and Wildlife Service and the Nebraska Game and Parks Commission to discuss Section 7 of the Endangered Species Act, the consultation process, potential effects of the Project, Section 10J of FPA, and begin discussions for working collaboratively on development of the Biological Assessment (BA).

Discussion at the meeting is documented according to the meeting agenda noted below.

Meeting Agenda:

1. Introductions/Opening – Harms/Suess
2. Processes
   - Section 7 of the Endangered Species Act - Harms
   - Section 10J of the Federal Power Act - Albrecht
3. Environmental baseline - Harms
4. Species effects/Avoidance, minimization, and mitigation - All
5. Monitoring – Harms
6. Next Steps – Harms

Discussion:

1. Processes

SECTION 7 - ESA

Bob Harms provided a brief summary of the ESA Section 7 formal consultation process and noted that the goal of this meeting and future meetings is to determine what concepts can be agreed upon for inclusion in the Biological Assessment (BA) prior to formal consultation, so that a Jeopardy call on the species can be avoided.

Bob emphasized the following points:

- The federal agency's action can not jeopardize the continued existence of the species or critical habitat.
- When a "may affect" decision is reached, Section 7 consultation is required; it was noted that USFWS expects the "may affect" standard to have been met, thus consultation will be required.

The Nebraska Field Office of the USFWS would like to work collaboratively to identify measures to be included in the BA to avoid a jeopardy call. USFWS noted that at this time, the USFWS does not know if a jeopardy call is warranted.

NGPC requested clarification on the timeline of the NEPA process. HDR provided the following general timeline:

- November – the draft license application (DLA) will be submitted to FERC; agencies will have an opportunity to provide comment on the DLA.
- April – License application will be filed with FERC; FERC will review and make a determination of whether the application is ready for Environmental Analysis (REA), typically within 30-60 days.
- If the application is ready, FERC initiates EA process
- FERC is expected to issue an EA in the Summer of 2013
- The final BA for consultation will be developed by FERC and issued with the NEPA document.

HDR re-iterated that the official Section 7 time clock does not start for quite a while. USFWS agreed and re-iterated the hope of getting the BA pulled together ahead of time and get early agreement on measures in the BA.

SECTION 10J – FPA

Section 10(J) provides fish and wildlife agencies an opportunity to make recommendations related to fish and wildlife issues. NGPC noted the similarities in language of all regulations involved (NEPA, FWCA, FPA 10(J)). All have similar processes and NGPC has recommendations to offer. NGPC was unsure if the Nebraska Nongame Endangered Species Act (NESCA) would have a tie to this project.

HDR noted that a Section 401 Water Quality Certification (WQC) is required for the Project and that provides a link that would tie in NESCA. USFWS asked if the 401 WQC would be requested soon. HDR noted that the 401 WQC is required for issuance of a new license and that Nebraska Department of Environmental Quality (NDEQ) has indicated a letter of request is required and that NDEQ can take up to one year to issue the certification. USFWS asked if there was a timeline for the 401 WQC. HDR indicated that FERC can not issue the license without it, so it will probably be submitted around the time of the license application.

USFWS pointed out that both Section 7 and Section 10J could be handled together and eliminate the need for separate processes.

2. Environmental Baseline

USFWS acknowledged that the Project has been in operation for many years but noted that endangered species issues are new to this relicensing with the exception of the whooping crane. Below is the general timeline related to Project licensing and endangered species listings:

Project Timeline

- Project was built in 1934 – initial license lasted 50 years
- Relicensed in 1984 – issued a 30 year license (current license)
- Next license would be issued in 2014 – expected to last 30 years
- Relicensing would be required in 2044

T&E Timeline

- Whooping crane listed in 1967
- Interior least terns and piping plovers listed in 1985
- Pallid sturgeon listed in 1990

USFWS noted that most of these species were not considered in the previous licenses because they were not listed at the time.

USFWS noted that the Environmental Baseline they will be considering for evaluation of Project effects is not pre-project, but what the environment would look like if there were no license and the Project was no longer operating. However, the project facilities would still be in place. With water no longer being diverted, over 30 years, USFWS would expect conditions in the bypass reach to improve. The beginning of the evaluation would be 2014 (new licensing period) and should look out 30 years compared to current conditions.

The District asked where the costs of no license would be evaluated. It was clarified that the "no license" scenario is not an alternative being considered, but is setting the baseline conditions of the river and decommissioning costs and impacts are not considered. USFWS noted that there may be differences in the environmental baseline yet to be considered.

3. Species Effects – Avoidance, minimization, and mitigation

USFWS noted that the better understanding they have of how the Project operates, then they are better able to pinpoint where mitigation could be useful and how. They want to get a better understand the District's limitations and gain an understanding of what is technically feasible for the Project.

USFWS categorized the effects to the afore-mentioned species in 3 categories:

1) Effects in the bypass reach – terns, plovers, whooping crane
    - Acknowledged the Project is at the periphery of the range for whooping crane
    - Noted that studies show that there are differences in flow area and flow width comparing upstream to downstream
    - Noted that the Montana Method indicated effects to fish
2) Effects at the North Sand Management Area
    - Preferred MOU
3) Hydrocycling effects – pallid sturgeon, terns, plovers
    - Focus on attenuation

HDR asked how the magnitude of effect came into play with respect to these categories and potential mitigation. USFWS responded that it was not their intent to discuss magnitude of effect at this meeting but they noted that effects are meaningful and the intent of the meeting is to start to identify how to offset.

USFWS encouraged the District to think about both limitations and flexibility with relation to effects and possible mitigation.

<u>Bypass Reach</u>

USFWS identified that they would like to work to restore/enhance habitat, noting the grooming and shaping existing sandbars to create mid-channel bars appropriate for the birds. USFWS noted that their intent is not construction of new habitat. Instead, they'd like to focus on managing flows to naturally enhance habitat.

USFWS noted three types of flows that maintain habitat:

- Minimum Flows – mainly related to fish species and mid-summer heat

- Sculpting/Maintenance Flows – flow to cause bank and bar erosion to keep the river dynamic – Jeff Runge suggested that maintenance flows might be defined as those that increase the overall effective discharge.
- Flood Flows – spring high flows and ice jam flows develop the sandbars – USFWS acknowledged that these are natural flows that are unaffected by the Project.

NGPC noted concern for the fish community in the bypass reach and a need for minimum flows. NGPC noted that the District has worked with NGPC in the past on a version of a "Maintenance Flow" for the bypass reach, but the DNR ruled it was a misuse of appropriations, so the agreement was canceled. NGPC asked if a bypass flow is possible and the District noted that any discussions of a minimum flow would need to involve the DNR to ensure the District's water right is not affected. Rick Holland pointed out that NGPC and the District have good relationships with the NRD's and suggested that the NRD could possibly get an instream flow water right since the District doesn't have authorization to get an instream flow. Jeff Runge mentioned that for the Kingsley Dam relicensing, the Department of Water Resources (later changed to DNR) was involved with the development of the environmental account that was created for the purposes of T&E management.

USFWS pointed out that these types of ideas, such as going through the NRD for a minimum maintenance flow, are creative and would be useful in moving forward.

<u>North Sand Management Area</u>

USFWS discussed the Memorandum of Understanding (MOU) that has been executed with USFWS, NGPC and Preferred Sands (on which the District and TPCP are cooperators – not signatories). Thus far, things have been working quite well. Terns and plovers are using the area and the agencies are working with Preferred. USFWS noted that this MOU has been a great template for other sand and gravel mines in Nebraska.

USFWS noted the only issue with the current MOU is that the District is not a signatory. They expressed concern about what would happen if Preferred decided to leave this site and mine elsewhere; then benefits of the MOU would cease. USFWS would like the District to become a signatory to the MOU.

The District noted that they have ceased dredging operations on the North SMA during the nesting season and are willing to continue to do so; however, they do not want to be obligated for additional effort since they leave the birds alone. HDR noted that since the District does not dredge or operate on the North SMA when the birds are there, the birds would not be affected if Preferred was not there and that is why the District is not a signatory.

<u>Hydrocycling</u>

USFWS cited the flow and stage fluctuations in the lower Platte River during hydrocycling and that limiting the variation of the cycle as it enters the river at critical times would be beneficial. Suggestions for limiting the variation could include a detention cell (re-regulating reservoir) or use of Lost Creek. However, USFWS noted that there appears to be limited space in the tailrace area for such a detention cell, but asked if a new area could be acquired to accommodate it and if this type of measure is feasible.

USFWS pointed out their major concerns related to hydrocycling:

- Accelerated erosion of bars, but not exactly sure how it effects terns, plovers, and pallid
- Timing of hydrocycling in relation to natural events
    - Rain event plus a hydrocycle peak overtops a bar – could cause loss of eggs, nests, chicks
- River connectivity for pallid
    - Pallid is a large river fish so they move a lot; more of an issue in spring and fall as there is less movement in the summer months

The following critical times were noted for species:

- Terns & plovers – June & July
- Pallid sturgeon – March - July & September - October

USFWS would like the District to consider what they can accomplish within those timeframes to maximize benefits.

USFWS asked about turbine limitations that would affect modifications to hydrocycling. The District noted that there are concerns for the equipment and it can not physically operate below a certain level.

Detention Cell

The agencies are looking for a way to decrease the magnitude of fluctuation without causing a depletion to the lower Platte River. NGPC noted that a detention cell could flatten out the hydrocycling hydrograph a little more, not necessarily all the way. In particular, it was noted that the stage variance disturbs edges of sandbars and decreases productivity of the river system, but if this could be dampened, that would be beneficial to the system.

Jeff Runge noted that a re-regulation reservoir is being considered at the J2 project to help attenuate the water, but that it would not totally flat-line the cycle.

The District asked if the discharge point back into the lower Platte River was significant to consider. NGPC noted the water should probably be put back into the system upstream of or within the tailrace. The District also pointed out that sedimentation would likely be an issue with a detention cell.

The District also asked about water being returned to the bypass. Does water in the bypass need to be with or without sediment? NGPC stated that water with sediment is as close to pristine conditions and means the river would not be eroding. Water without sediment could mean erosion. The District noted hat if bank/bar erosion is desired in this reach to return it to a more natural system, then water without sediment might accomplish that .

4. Monitoring

USFWS is advocating for monitoring of any mitigation measures for a period of time. Past projects have had included measures to off-set effects, but USFWS does not know how successful these measures have been due to lack of monitoring. USFWS would like monitoring conducted the bypass reach and below the tailrace to evaluate the benefit to habitat and species. At this point, the type of monitoring can't be determined since the measured haven't been determined, but USFWS is willing to assist with developing a monitoring plan.

5. Next Steps

USFWS noted that the District is now aware of their concerns and needs to evaluate the suggestions and think about ways that the effects could be off-set.

The next meeting was set for November 2nd, 2:00p.m. to 4:00pm.

LPPD explained water intake and dredging operations in the spring. Early in spring, LPPD is limited on water intake. Dredging occurs from ice-out until birds arrive. Typically, dredging occurs mid-March until early-June and then mid-August until ice returns. In the spring, until the settling basin can be dredge – the system is limited on how much water can be accepted.

Selzle, Lydia

From: Engelbert, Pat
Sent: Thursday, October 13, 2011 2:31 PM
To: Richardson, Lisa (Omaha)
Cc: Thompson, Wendy
Subject: FW: Sediment Delivery
Attachments: LoupSediment.pdf; Paul Makowski 2011_10_12 e-mail Response.docx; 2010 Dredging Information.xls

Follow Up Flag: Follow up
Flag Status: Flagged

Lisa,

Below is the e-mail and associated attachment (LoupSediment.pdf) I received from Paul Makowski regarding the District's dredge operations and the associated sediment calculations. Attached is the response to comments document as well as the spreadsheet with dredge amounts referenced in the response to comments. Please review and provide comment.

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114
402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com

Follow Us - Facebook | Twitter | YouTube

From: Paul Makowski [mailto:Paul.Makowski@ferc.gov]
Sent: Wednesday, October 12, 2011 2:58 PM
To: Engelbert, Pat
Subject: Sediment Delivery

Pat,

For me to understand table 5-1 of Study 1.0, Sedimentation, dated August 26, 2011, I have several questions. Note that there is overlap between some of the questions. To facilitate discussion I have attached a schematic showing the study area of the Loup River, Power Canal and Platte River. The attachment also includes sediment yield estimates for various points in the Study area. These estimates were developed by the Missouri River Basin Commission (MRBC) (September 1975) and Loup Power District (LPD) (August 26, 2011).

1. MRBC's 1975 sediment yield estimates were updated based on LPD's dredging records for the periods 1940-1974 and 1975-2009. The average annual sediment dredged from 1940-1974 was estimated at 3.75 million tons and at 2.00 millions tons for the period 1975-2009. The ratio of reduction was calculated as 0.534 and this ratio was applied to the Loup River watershed input. The updating of all the MRBC yields was made by "parlaying" the 0.534 adjustment downstream. Please describe this "parlaying" process (supporting calculations would be helpful).

2. It appears that the average annual sediment dredged from 1940-1974 was used to represent the MRBC's study timeframe. However, the MRBC study used a value of 1.9 million tons of sediment removed from the Settling Basin (table 4-4). It appears that the value of sediment removal used in the MRBC study is virtually identical to the value used in the LPD study (1.9 versus 2.0 million tons). The MRBC study does not mention or quantify dredged material directed to the South Sand Management Area. What are your thoughts concerning the application of the 0.534 reduction ratio to update MRBC yields?

3. LPD states that the cause of the reduction in sediment yield from the Loup River watershed is not known. However, if the cause is related to improved land conservation and management practices (as described in the MRBC study), shouldn't a similar reduction be applied to the other watersheds? MRBC recognized a phased implementation of land conservation and management practices and developed revised sediment yields for various watersheds for the years 1985, 2000 and 2020 (tables 4-7, 4-8, and 4-9, respectively). These watersheds include the Loup River, Elkhorn River, upper Platte River and lower Platte River. These revised sediment yields could be used with the recent dredging records to update MRBC yields. What are your thoughts?

4. Although the MRBC study provided continuity, it does not appear that continuity is provided in the new study total column of table 5-1. For example, referring to the schematic, the yield from the Loup River (LR1), upstream of the diversion, is divided between the Power Canal and the Loup River bypass. The new study total column of table 5-1 shows that the yield in the Loup River bypass (LR2), downstream of the diversion, as 2,030,000 tons. Therefore, 2,150,000 tons (4,180,000 – 2,030,000) would join the Power Canal (PC1). The new study total column of table 5-1 shows that 2,004,800 tons (PC2) are removed from the Settling Basin and that 700,000 tons (PC3) continues downstream. Therefore, 2,704,880 tons (2,004,800 + 700,000) must enter the Power Canal (PC1). The difference between the two estimates for PC1 is 554,800 tons or 27% of the value provided on line 5, table 5-1. Is continuity provided in the new study total column of table 5-1?

When we last spoke on September 14th, LPD was going to send dredging records that shows the amount of sediment directed to the North and South Sand Management Areas. Section 4.2.7 of the PAD states that from 1937 to 1960, all dredged material was direct to the South Sand Management Area. The PAD goes on to say that beginning in 1961, dredged material was also directed to the North Sand Management Area and beginning in 1975 the majority of dredged material was directed to the North Sand Management Area. What caused the need for the North Sand Management Area?

Thank you for your insights.

Paul Makowski

Federal Energy Regulatory Commission

Division of Hydropower Licensing

888 First Street, N.E.

Washington, D.C. 20426

(202) 502-6836 - telephone

(202) 219-0205 -fax

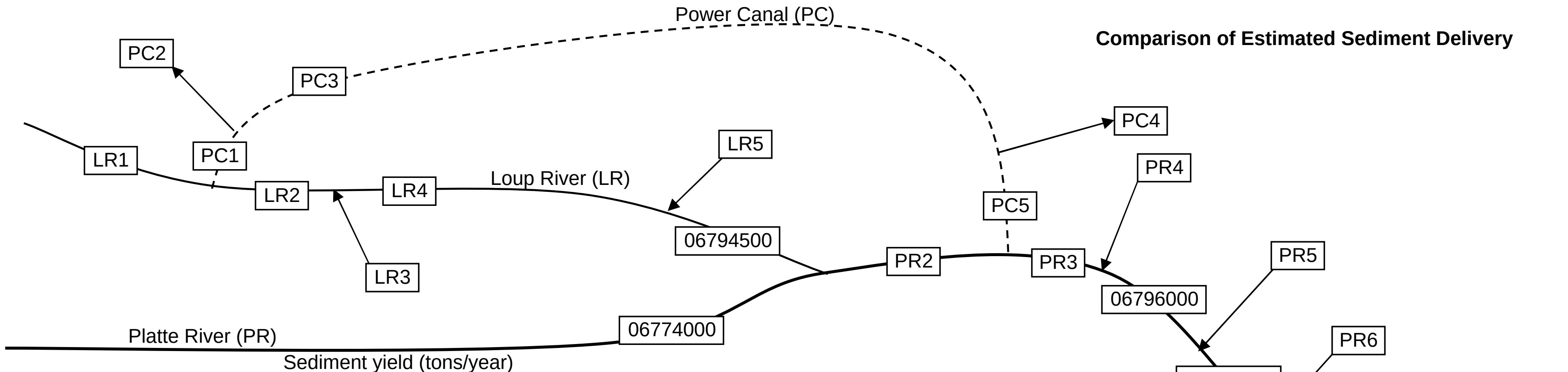
<<LoupSediment.pdf>>

DREDGE HISTORY

Year	Material Pumped to South Side	Material Pumped to North Side	Total Material Pumped	Dredging Hours	Dredging Yards per Hour
2010	433,522	682,564	1,116,086	2638	423
2009	603,781	750,123	1,353,904	2898	467
2008	466,155	844,157	1,310,312	3007	436
2007	496,670	673,900	1,170,570	3440	340
2006	391,743	634,002	1,025,745	3232	317
2005	327,226	774,813	1,102,039	3,424	322
2004	264,488	625,965	890,453	2,920	305
2003	235,004	827,073	1,062,077	3,272	325
2002	403,004	674,071	1,077,075	3,480	310
2001	169,371	939,665	1,109,036	3,228	344
2000	284,814	866,633	1,151,447	3,265	353
1999	565,924	1,065,627	1,631,551	3,854	423
1998	671,265	783,238	1,454,503	3,835	379
1997	381,595	1,091,218	1,472,813	3,687	399
1996	407,002	828,888	1,235,890	3,213	385
1995	311,963	897,997	1,209,960	3,178	381
1994	309,778	902,074	1,211,852	2,905	417
1993	345,913	986,687	1,332,600	2,937	454
1992	466,047	1,076,827	1,542,874	3,623	426
1991	224,313	1,136,398	1,360,711	3,071	443
1990	189,551	1,177,446	1,366,997	3,124	438
1989	200,835	976,037	1,176,872	3,141	375
1988	223,869	942,468	1,166,337	2,950	395
1987	541,471	755,800	1,297,271	3,678	353
1986	323,157	987,572	1,310,729	3,334	393
1985	372,859	920,279	1,293,138	3,549	364
1984	379,166	776,408	1,155,574	3,206	360
1983	470,470	1,125,526	1,595,996	5,221	306
1982	278,088	910,488	1,188,576	3,753	317
1981	202,728	976,288	1,179,016	3,601	327
1980	193,242	738,399	931,641	3,217	290
1979	86,141	850,972	937,113	2,974	315
1978	310,680	816,537	1,127,217	3,142	359
1977	266,998	1,197,860	1,464,858	3,640	402
1976	306,720	941,639	1,248,359	3,220	388
1975	431,737	737,672	1,169,409	3,068	381
1974	746,050	733,038	1,479,088	3,405	434
1973	878,563	801,729	1,680,292	3,547	474
1972	1,120,194	356,493	1,476,687	3,551	416
1971	957,501	433,309	1,390,810	3,100	449
1970	1,252,055	242,729	1,494,784	3,262	458
1969	1,109,118	296,877	1,405,995	2,863	491
1968	1,175,096	333,168	1,508,264	3,375	447
1967	1,025,852	692,196	1,718,048	3,548	484
1966	1,283,181	277,932	1,561,113	3,481	448
1965	1,484,449	268,239	1,752,688	3,534	496
1964	1,298,392	512,893	1,811,285	3,698	490

1963	1,195,471	243,595	1,439,066	3,524	408
1962	1,428,476	523,980	1,952,456	4,060	481
1961	1,174,312	558,982	1,733,294	3,357	516
1960	1,836,727	0	1,836,727	3,925	468
1959	2,016,229	0	2,016,229	4,241	475
1958	2,827,443	0	2,827,443	4,899	577
1957	3,173,330	0	3,173,330	3,704	857
1956	2,504,070	0	2,504,070	2,679	935
1955	2,419,914	0	2,419,914	2,561	945
1954	3,608,443	0	3,608,443	3,821	944
1953	3,258,338	0	3,258,338	3,308	985
1952	3,396,650	0	3,396,650	3,424	992
1951	4,373,774	0	4,373,774	4,405	993
1950	3,193,537	0	3,193,537	3,303	967
1949	3,210,191	0	3,210,191	3,419	939
1948	3,588,265	0	3,588,265	3,811	942
1947	4,140,312	0	4,140,312	4,330	956
1946	4,351,249	0	4,351,249	4,385	992
1945	2,073,500	0	2,073,500	3,625	572
1944	2,035,748	0	2,035,748	3,559	572
1943	1,739,452	0	1,739,452	3,041	572
1942	2,382,952	0	2,382,952	4,166	572
1941	1,824,680	0	1,824,680	3,190	572
1940	1,438,008	0	1,438,008	2,514	572
1939	1,767,480	0	1,767,480	3,090	572
1938	1,627,349	0	1,627,349	2,845	572
1937	363,220	0	363,220	635	572
Minimum	86,141	0	363,220	635	290
Maximum	4,373,774	1,197,860	4,373,774	5,221	993
Average	1,240,768	515,790	1,756,559	3,393	514

Comparison of Estimated Sediment Delivery



	Sediment yield (tons/year)				
	MRBC[1]		Updated Study Report[2]		
ID	Tons/yr[3]	Location in table[4]	Raw[3]	Line[5]	
LR1	**7,825,100**	35c-4	**4,180,000**	1	In Loup River upstream of diversion
LR2	**5,225,100**	35c-4	**2,030,000**	5	To Loup River Bypass (downstream of diversion)
PC1	*2,600,000*	LR1 - LR2	*2,150,000*	LR1 - LR2	To Power Canal downstream of diversion
PC1	*2,600,000*	PC2 + PC3	*2,704,800*	PC2 + PC3	In Power Canal downstream of diversion
PC2	**1,900,000**	35c-4	**2,004,800**	2	Removed from settling basin in Power Canal
PC3	**700,000**	35c-4	**700,000**	3	In Power Canal downstream of settling basin
PC4	**350,000**	35c-9	350,000		Assumed Deposition in Power Canal (removed from transport)
PC5	**350,000**	35c-9	350,000		Power Canal contribution to Platte River
LR2	**5,225,100**	35c-4	**2,030,000**	5	In Loup River Bypass (downstream of diversion)
LR3	0		**560,000**	4	Input from the South Sand Management Area
LR4	**5,225,100**	35c-4	*2,590,000*	LR2 + LR3	In Loup River Bypass (downstream of diversion)
LR5	**1,860,300**	35c-9	**993,500**	6	Indirect addition to Loup River Bypass between diversion and confluence
06794500	*7,085,400*	LR2 + LR5	**2,960,000**	7	Loup River Bypass contribution to Platte River (Columbus gage)
	7,435,400	35c-9	**3,373,500**	9	Combination of Loup River Bypass and Power Canal (contribution to Platte River)
06774000	**1,865,400**	&-19	**1,870,000**	10	Platte River Upstream of Loup River Bypass confluence (Duncan gage)
PR2	*8,950,800*	06794500 + 06774000	**4,900,000**	11	Platte River between Loup River Bypass and Power Canal
PR3	**9,300,800**	p 4-44	**5,243,500**	12	Platte River downstream of Power Canal
PR4	*555,100*	06796000 - PR3	*526,500*	06796000 - PR3	Indirect addition to Platte River between Loup System and North Bend
06796000[6]	**9,855,900**	35-26	**5,770,000**	15	Platte River at North Bend gage
PR5	**101,000**	35-27	*80,000*	06796500 - 06796000	Platte River Tributaries
06796500	**9,956,900**	35-27	**5,850,000**	16	Platte River at Leshara gage
PR6	**4,709,700**	35d-32	*4,760,000*	06801000 - 06796500	Elkhorn River contribution to Platte River
06801000	**14,666,600**	35-27	**10,610,000**	17	Platte River at Ashland gage
PR7	*2,174,300*	35e-13 + 35-28 + 35-30	*2,170,000*	06805500 - 06801000	Indirect addition to Platte River between Ashland and Louisville
06805500	**16,840,900**	35-30	**12,780,000**	18	Platte River at Louisville gage

1 - From Tables 4-4 - 4-6, MRBC Platte River Basin, Level B Study, September, 1975.
2 - From Table 5-1, Study 1.0, Sedimentation, August 26, 2011.
3 - Values presented in bold were obtained directly from the tables. Values in italics were calculated.
4 - Corresponding line number in tables 4-3 - 4-6. The yields in italics were calculated using the identified ID values.
5 - Corresponding line in Table 5-1. The yields in italics were calculated using the identified ID values.
6 - Table 4-6 has a typographical error in the Yield to Platte (reported as 9,885,900).

Pat,

For me to understand table 5-1 of Study 1.0, Sedimentation, dated August 26, 2011, I have several questions. Note that there is overlap between some of the questions. To facilitate discussion I have attached a schematic showing the study area of the Loup River, Power Canal and Platte River. The attachment also includes sediment yield estimates for various points in the Study area. These estimates were developed by the Missouri River Basin Commission (MRBC) (September 1975) and Loup Power District (LPD) (August 26, 2011).

1. MRBC's 1975 sediment yield estimates were updated based on LPD's dredging records for the periods 1940-1974 and 1975-2009. The average annual sediment dredged from 1940-1974 was estimated at 3.75 million tons and at 2.00 millions tons for the period 1975-2009. The ratio of reduction was calculated as 0.534 and this ratio was applied to the Loup River watershed input. The updating of all the MRBC yields was made by "parlaying" the 0.534 adjustment downstream. Please describe this "parlaying" process (supporting calculations would be helpful).

Response: In the August 26, 2009 Study Plan Determination from FERC, the District was directed to "adjust the sediment yield calculated for the Loup River and its tributaries downstream of the project's diversion dam as well as the project's tailrace based on documented reduction in dredged material from the project's settling basin". From Table 4-4 in the MRBC study, the amount of sediment yield upstream of the diversion is 7,825,100 tons/year. Based on the reduction in dredged material, the ratio of 0.534 (2.00/3.75) was applied to the yield listed in the MRBC study, resulting in an updated yield upstream of the diversion of 4,180,000 tons (7,825,100 * 0.534). By parlaying, it was meant to describe that the cumulative downstream sediment yields were adjusted based on the updated or changed Loup Basin sediment yield. This was done by adding the downstream basin sediment yields listed in Table 4-4 of the MRBC Study to the updated Loup Basin yield value. It is noted that FERC did not direct the District to adjust the basin yields downstream of the diversion. This is reasonable since there is no data to develop an adjustment factor for the downstream basins.

2. It appears that the average annual sediment dredged from 1940-1974 was used to represent the MRBC's study timeframe. However, the MRBC study used a value of 1.9 million tons of sediment removed from the Settling Basin (table 4-4). It appears that the value of sediment removal used in the MRBC study is virtually identical to the value used in the LPD study (1.9 versus 2.0 million tons). The MRBC study does not mention or quantify dredged material directed to the South Sand Management Area. What are your thoughts concerning the application of the 0.534 reduction ratio to update MRBC yields?

Response: The MRBC report does not state how the dredged value of 1.9 million tons/year listed in Table 4-4 was developed. The MRBC report was published in September,1975, and a review of the District's records shows that the amount dredged in 1975 was approximately 1.9 million tons per year (see Figure 5-1 in the Updated Study Report). Based on District records between 1940-1974, the average dredged amount was 3.75 million tons per year, and between 1975 and 2009, the average dredged amount was 2.00 million tons per year. It appears coincidental that the 1.9 million tons of dredged material listed in the MRBC report is similar to the average dredge value from 1975 to 2009. Application of the reduction ratio to sediment yield upstream of the diversion structure appears reasonable given the wide range of dredge amount variability pre-1974 and the relative stability of the dredge amount post-1975.

3. LPD states that the cause of the reduction in sediment yield from the Loup River watershed is not known. However, if the cause is related to improved land conservation and management practices (as described in the MRBC study), shouldn't a similar reduction be applied to the other watersheds? MRBC

recognized a phased implementation of land conservation and management practices and developed revised sediment yields for various watersheds for the years 1985, 2000 and 2020 (tables 4-7, 4-8, and 4-9, respectively). These watersheds include the Loup River, Elkhorn River, upper Platte River and lower Platte River. These revised sediment yields could be used with the recent dredging records to update MRBC yields. What are your thoughts?

Response: FERC did not direct the District to adjust the basin yields downstream of the diversion. This is reasonable since there is no data to develop an adjustment factor for the downstream basins.

4. Although the MRBC study provided continuity, it does not appear that continuity is provided in the new study total column of table 5-1. For example, referring to the schematic, the yield from the Loup River (LR1), upstream of the diversion, is divided between the Power Canal and the Loup River bypass. The new study total column of table 5-1 shows that the yield in the Loup River bypass (LR2), downstream of the diversion, as 2,030,000 tons. Therefore, 2,150,000 tons (4,180,000 – 2,030,000) would join the Power Canal (PC1). The new study total column of table 5-1 shows that 2,004,800 tons (PC2) are removed from the Settling Basin and that 700,000 tons (PC3) continues downstream. Therefore, 2,704,880 tons (2,004,800 + 700,000) must enter the Power Canal (PC1). The difference between the two estimates for PC1 is 554,800 tons or 27% of the value provided on line 5, table 5-1. Is continuity provided in the new study total column of table 5-1?

Response: Cumulative sediment yield is being maintained. The difference noted in comment 4 between the two estimates for PC1 is the amount of sediment that is dredged to the South Sand Management Area. Recall that dredged sediment to the South Sand Management Area (South SMA) is re-introduced to the Loup River Bypass Reach. As detailed in the PAD "After dredge material is deposited at the South SMA, the sand and water are conveyed adjacent to the settling basin in a northeasterly direction; a majority of the sand and water eventually flows back into the Loup River, as evidenced by establishment of large trees and only small changes in the elevation of the South SMA." This information, although presented in the PAD, was not re-iterated in the ISR or USR, which was an oversight. The 554,800 ton difference noted in Comment 4 is actually accounted for in the Loup Bypass Reach.

When we last spoke on September 14th, LPD was going to send dredging records that shows the amount of sediment directed to the North and South Sand Management Areas. Section 4.2.7 of the PAD states that from 1937 to 1960, all dredged material was direct to the South Sand Management Area. The PAD goes on to say that beginning in 1961, dredged material was also directed to the North Sand Management Area and beginning in 1975 the majority of dredged material was directed to the North Sand Management Area. What caused the need for the North Sand Management Area?

Response: According to the District, local property owners expressed concern in the late 1950's that the Loup River Bypass Reach was being pushed to the south due to the dredging operation (see spreadsheet 2010 Dredging Information.xls). Therefore, beginning in 1961, the District began dredging to both the South SMA as well as the North Sand Management Area (North SMA). According to District records, since 1975 approximately 70% of the material is dredged to the North SMA and approximately 30% of the material is dredged to the South SMA.

Thank you for your insights.

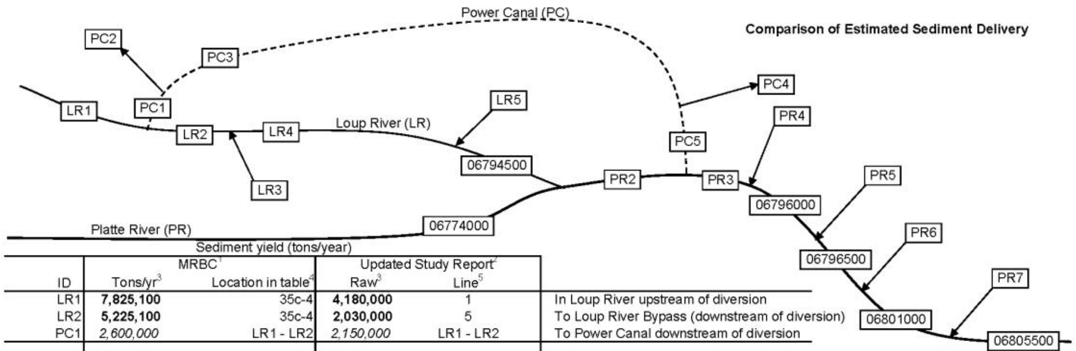
Paul Makowski

Subsequent e-mail question:

While we are talking about sediment, what is the relationship between the values in Table 4-4 and Table 5-1?

Response: Table 5-1 details the basin yield estimates provided by the MRBC Report, and the updated yield values based on the ratio of reduction upstream of the diversion structure. Table 4-4 details an analysis to confirm our capacity calculations at the Genoa gage using dredge and flow records. We assumed that the amount of sediment transport was proportional to the flow split. The results are detailed on page 46 of the USR.

Comparison of Estimated Sediment Delivery



Sediment yield (tons/year)

ID	MRBC[1] Tons/yr[3]	MRBC[1] Location in table[4]	Updated Study Report[2] Raw[3]	Updated Study Report[2] Line[5]	
LR1	**7,825,100**	35c-4	**4,180,000**	1	In Loup River upstream of diversion
LR2	**5,225,100**	35c-4	**2,030,000**	5	To Loup River Bypass (downstream of diversion)
PC1	*2,600,000*	LR1 - LR2	*2,150,000*	LR1 - LR2	To Power Canal downstream of diversion
PC1	*2,600,000*	PC2 + PC3	*2,704,800*	PC2 + PC3	In Power Canal downstream of diversion
PC2	**1,900,000**	35c-4	**2,004,800**	2	Removed from settling basin in Power Canal
PC3	**700,000**	35c-4	**700,000**	3	In Power Canal downstream of settling basin
PC4	**350,000**	35c-9	350,000		Assumed Deposition in Power Canal (removed from transport)
PC5	**350,000**	35c-9	350,000		Power Canal contribution to Platte River
LR2	**5,225,100**	35c-4	**2,030,000**	5	In Loup River Bypass (downstream of diversion)
LR3	0		**560,000**	4	Input from the South Sand Management Area
LR4	**5,225,100**	35c-4	*2,590,000*	LR2 + LR3	In Loup River Bypass (downstream of diversion)
LR5	**1,860,300**	35c-9	**993,500**	6	Indirect addition to Loup River Bypass between diversion and confluence
06794500	*7,085,400*	LR2 + LR5	**2,960,000**	7	Loup River Bypass contribution to Platte River (Columbus gage)
	7,435,400	35c-9	**3,373,500**	9	Combination of Loup River Bypass and Power Canal (contribution to Platte River)
06774000	**1,865,400**	&-19	**1,870,000**	10	Platte River Upstream of Loup River Bypass confluence (Duncan gage)
PR2	*8,950,800*	06794500 + 06774000	**4,900,000**	11	Platte River between Loup River Bypass and Power Canal
PR3	**9,300,800**	p 4-44	**5,243,500**	12	Platte River downstream of Power Canal
PR4	*555,100*	06796000 - PR3	*526,500*	06796000 - PR3	Indirect addition to Platte River between Loup System and North Bend
06796000[6]	**9,855,900**	35-26	**5,770,000**	15	Platte River at North Bend gage
PR5	**101,000**	35-27	*80,000*	06796500 - 06796000	Platte River Tributaries
06796500	**9,956,900**	35-27	**5,850,000**	16	Platte River at Leshara gage
PR6	**4,709,700**	35d-32	*4,760,000*	06801000 - 06796500	Elkhorn River contribution to Platte River
06801000	**14,666,600**	35-27	**10,610,000**	17	Platte River at Ashland gage
PR7	*2,174,300*	35e-13 + 35-28 + 35-30	*2,170,000*	06805500 - 06801000	Indirect addition to Platte River between Ashland and Louisville
06805500	**16,840,900**	35-30	**12,780,000**	18	Platte River at Louisville gage

1 - From Tables 4-4 - 4-6, MRBC Platte River Basin, Level B Study, September, 1975.
2 - From Table 5-1, Study 1.0, Sedimentation, August 26, 2011.
3 - Values presented in bold were obtained directly from the tables. Values in italics were calculated.
4 - Corresponding line number in tables 4-3 - 4-6. The yields in italics were calculated using the identified ID values.
5 - Corresponding line in Table 5-1. The yields in italics were calculated using the identified ID values.
6 - Table 4-6 has a typographical error in the Yield to Platte (reported as 9,885,900).

From:	Engelbert, Pat
To:	Paul Makowski
Cc:	Hunt, George; Richardson, Lisa (Omaha)
Subject:	RE: Loup
Date:	Friday, October 14, 2011 1:03:23 PM
Attachments:	FERC Paul Makowski 2011_10_12 e-mail Response.docx

Paul,

Attached are responses to most of your comments. We are looking into the MRBC Report Tables 4-7 through 4-9. We would like to discuss these in more detail on Tuesday morning. How does 8:30 central time sound for a conference call? Let me know if that will work.

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114

402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com
Follow Us - Facebook | Twitter | YouTube

From: Paul Makowski [mailto:Paul.Makowski@ferc.gov]
Sent: Friday, October 14, 2011 7:59 AM
To: Engelbert, Pat
Cc: Hunt, George; Richardson, Lisa (Omaha)
Subject: RE: Loup

Pat,
Hopeful your young one will feel better soon! I did get your away message so I knew not expect to hear from you. Email comments work for me. I am back in the office on Tuesday. I do not have any conflicts on my schedule that would preclude me from talking with you next week. So give me a heads up so I can be at my desk when you call.
Thank you for your prompt response.
Paul

Federal Energy Regulatory Commission
Division of Hydropower Licensing
888 First Street, N.E.
Washington, D.C. 20426
(202) 502-6836 - telephone
(202) 219-0205 -fax

From: Engelbert, Pat [mailto:Pat.Engelbert@hdrinc.com]
Sent: Friday, October 14, 2011 8:54 AM
To: Paul Makowski
Cc: Hunt, George; Richardson, Lisa (Omaha)
Subject: RE: Loup

Paul,

Unfortunately, I am home today with a sick child. Can we discuss your questions next week? I seem to recall that you were out Monday, but in the rest of the week. The only time I am not available next week is Wednesday morning and Friday afternoon. Let me know what days and times work for you. I will send responses to your comments via e-mail later this morning for your review prior to our call next week.

Sorry for the inconvenience.

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114

402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com
Follow Us - Facebook | Twitter | YouTube

From: Paul Makowski [mailto:Paul.Makowski@ferc.gov]
Sent: Friday, October 14, 2011 6:56 AM
To: Engelbert, Pat
Subject: Loup

Pat,

Would any time today work for you to discuss my questions on the Updated Study Report?

Thanks,

Paul

Federal Energy Regulatory Commission

Division of Hydropower Licensing

888 First Street, N.E.

Washington, D.C. 20426

(202) 502-6836 - telephone

(202) 219-0205 -fax

Nebraska Off Highway Vehicle Association **NOHVA**

TBQ Sport Club, Incorporated

A Non-Profit Association For All Terrain Vehicle, UTV and Off Road Motorcycle Users - Established 1987
Business Office: 2231 West 10th Street, Grand Island, Nebraska 68803
Web site: www.nohva.com Telephone: 308-381-2143 Email: danno@nohva.com

October 16, 2011

Lisa M. Richardson
Relicensing Project Manager
HDR Engineering, Inc
8404 Indian Hills Drive
Omaha, NE 68114

Dear Lisa,

Thank you for asking us to comment on the Draft Recreation Management Plan and allowing us to participate on the FERC relicensing project.

We find that the document as written does a good job of describing recreation opportunities and contains interesting data and observations. We have no objections to any of its contents. After review by our Board of Directors, we would like to offer these comments concerning the Draft Recreation Management Plan.

The members of our organization are honored to be part of the cooperative effort to provide ATV, dirtbike and UTV trails at the Headworks OHV Park.

While we truly enjoy the OHV trail system, the existing camping and park facilities at the Headworks recreation area are extremely important to our members. We thank Loup Power for considering to provide upgraded camper electrical outlets. Camping is a very popular family oriented activity among our members. No other governmental subdivision in Nebraska provides as fine of facilities with this much diversification to the public at no charge as Loup Power does.

Our members support improvements to restroom facilities in the OHV parking area. We understand the situation concerning showers, potable water and flush toilets. It would be very cost prohibitive to provide these amenities, let alone meeting minimum state and local standards involving the operation of the amenities. The Loup Power staff does an outstanding job of maintaining above average sanitary considerations of the existing vault toilets at Headworks Park.

About 70% of our members are family members. Many of our family members have children who already enjoy the playground facilities at Headworks Park. Additional improvements to playground equipment and areas would be greatly appreciated.

Our members welcome improvements to OHV area parking. Drainage can be a problem at times and the dispersed nature of the parking area for OHV users is not an efficient use of the land available. A good example of parking management at an OHV park would be the Little Sahara State Park near Waynoka Oklahoma where the parking areas are divided into separate parking spots. Many of us are very familiar with this operation. If further assistance is desired, NOHVA members would be happy to help provide input.

In closing, it is impossible to for us to adequately thank the Loup Power District and their staff for all that they have done to provide a badly needed recreation facility for ATVs, dirtbike and UTV enthusiasts in Nebraska. Please keep up the great work!

Sincerely,

Dan Nitzel, NOHVA Business Manager and President

Selzle, Lydia

From: Richardson, Lisa (Omaha)
Sent: Wednesday, October 19, 2011 6:57 PM
To: Thompson, Wendy
Subject: FW: Platte River Channel Document
Attachments: Slingshot.txt

Follow Up Flag: Follow up
Flag Status: Flagged

For the DB and PW – don't worry about the attachment, but please include the name of the attachment in the info in the DB. Thanks

---

From: Engelbert, Pat
Sent: Tuesday, October 18, 2011 9:35 AM
To: Paul Makowski
Cc: Richardson, Lisa (Omaha); Hunt, George
Subject: Platte River Channel Document

HDR Employees:
Use the "Download Attachments" button after opening this message in Outlook to download attached files.

Non-HDR Recipients:
If you are not an HDR employee and this is your first time using Slingshot click here and follow the prompts to set your password.

Returning users click here to Download (files: HF_PR0013_The Platte River Channel, History and Restoration, Apr 2004.pdf;)

Notice: The link in this email will only work for up to 30 days (as set by the sender). If you need access to these files for longer, please download and save a copy locally. Recipients of forwarded emails WILL NOT have access to the files using this link.

Paul,

Attached is the document you requested. It is quite large, so if it gets stripped, let me know and we will post the document on the project ftp site.

Pat

HDR Employees:
Use the "Download Attachments" button after opening this message in Outlook to download attached files.

Non-HDR Recipients:
If you are not an HDR employee and this is your first time using Slingshot click here and follow the prompts to set your password.

Returning users click here to Download (files: HF_PR0013_The Platte River Channel, History and Restoration, Apr 2004.pdf;)

Notice: The link in this email will only work for up to 30 days (as set by the sender). If you need access to these files for longer, please download and save a copy locally. Recipients of forwarded emails WILL NOT have access to the files using this link.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

October 20, 2011

FWS-NE: 2012-006

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: Comments on Updated Study Report; Loup River Hydroelectric Project; Federal Energy Regulatory Commission Project Number 1256; Nance and Platte Counties, Nebraska

Dear Ms. Bose:

Please make reference to the Updated Study Report (USR) filed by the Loup Power District with the Federal Energy Regulatory Commission (FERC) on August 29, 2011, that was prepared as part of the proposed relicensing of the Loup River Hydroelectric Project (Project), FERC Project Number 1256. The USR provided updated information pertaining to sedimentation and hydrocycling studies. A meeting was held on September 8, 2011, to discuss the USR results.

The following U.S. Fish and Wildlife Service (Service) comments are provided in accordance with regulations implementing the Federal Power Act (18 CFR § 5.9) and our authorities pursuant to the Endangered Species Act, Fish and Wildlife Coordination Act, National Environmental Policy Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and other executive orders and policies.

PROPOSED MODIFICATIONS TO THE SEDIMENT TRANSPORT ANALYSIS

Because of the inter-annual variability in flow and sediment transport, detection of trends in degradation or aggradation may require decades of observation as evidenced by Chen et al. (1999). Detection of aggradation/degradation is especially difficult for braided channels because large changes in sediment imbalance equates to relatively small changes in elevation compared to narrower channels. The Service has found that the 17-year assessment period for the sediment transport analysis is inadequate in assessing Project effects throughout the 30-year license period. The Service recommends that the sediment transport model simulate operations for a 30-year license period as opposed to the modeled 17 years of post-warm-up operation.

As discussed previously, braided channels are relative insensitive to changes in sediment imbalance because of their wide channel widths. Additionally, scientific literature has documented the coarsening of bed sediments from reductions in sediment supply (Eaton et al. 2010; Dietrich et al. 1989). The coarsening of bed sediments would lead to reduced sediment transport rates and reduced rates of change in mean bed elevations due to armoring of the channel (Murphy et al. 2006; Dietrich et al. 1989). Therefore, the main indice used in the sediment transport analysis (i.e., mean invert elevation) is insensitive to detecting changes in sediment transport, and the analysis does not consider possible bed sediment gradations. Because the sediment transport analysis does not report changes in sediment transport and bed gradations over time, it is difficult to determine the Project's sediment transport effects on lower Platte River channel morphology. For reference, the USR only reports averaged sediment gradations for the last year of the model run (pages 104-106 of the USR meeting transcript).

To address the above limitations in the USR, the Service recommends that the sediment transport analysis summarize changes in: a) sediment transport, b) mass balance, and c) bed gradation for Study Sites 3, 4, and 5. The Service recommends a mass balance assessment for Study Sites 3, 4, and 5 for each year of post-warm-up operation. The Service requests the following information: a) annual sediment transported at the transect representing the upstream boundary of the study site, and b) annual sediment transported at the transect representing the downstream boundary of the study site. The difference in sediment transport between the two transects would represent a change in mass balance within the study site whose differences could be summarized on an annual basis throughout the 30-year simulated license period. The Service also recommends an evaluation of the bed sediment gradation for Year 1 and Year 30 using data from Study Sites 3, 4, and 5. The Service suggests that a bed sediment gradation evaluation would represent the median and 90-percent confidence interval values obtained by summarizing sediment gradation data for transects in each respective study site.

In accordance with directives provided by FERC, the Service provides the following rationale to meet the five study criteria required when proposing a revised study:

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service has determined that modeled 17 years of post-warm-up operation and use of the indice, mean invert elevation, is inadequate in fully assessing effects of the Project tailrace return.
3) The proposed change in methods was is necessary to detect changes in sediment transport via the coarsening of bed sediments.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process.

Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA.

The Service appreciates the opportunity to provide comments on the USR. Should you have any questions regarding these comments, please contact Mr. Robert Harms within our office at (308) 382-6468, extension 17.

Sincerely,

John Cooper
for Michael D. George
Nebraska Field Supervisor

Enclosures

cc: LPD; Columbus, NE (Attn: Neil Suess)
FERC; Washington DC (Attn: Lee Emery)
EPA; Kansas City, KS (Attn: Larry Shepard)
NGPC; Lincoln, NE (Attn: Frank Albrecht)
FWS; Denver, CO (Attn: Dave Carlson)
FWS; Denver, CO (Attn: Tom Econopouly)

Literature Cited

Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. "Trends in Channel Gradation in Nebraska Streams, 1913-95." USGS Water-Resources Investigations Report 99-4103. Lincoln, Nebraska.

Dietrich, W.E., J.W. Kirchner, H. Ikeda, and F. Iseya. 1989. Sediment supply and the development of the coarse surface layer in gravel-bedded rivers. Nature. Volume 340, pages 215–217.

Eaton B.C., R.G. Millar, and S. Davidson. 2010. Channel patterns: Braided, anabranching, and single-thread. Geomorphology. Volume 120 (3-4), pages 353-364.

Murphy, P.J., Randle, T.J., Fotherby, L.M., and Daraio, J.A., 2004, The Platte River channel: history and restoration. U.S. Department of the Interior. Bureau of Reclamation. 310 pages.

From:	Engelbert, Pat
To:	Paul Makowski
Cc:	Richardson, Lisa (Omaha)
Subject:	RE: Loup
Date:	Thursday, October 20, 2011 2:43:43 PM

Paul,

Not a problem. Would it be possible to review your teleconference notes to compare with my notes prior to filing?

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114

402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com
Follow Us - Facebook | Twitter | YouTube

From: Paul Makowski [mailto:Paul.Makowski@ferc.gov]
Sent: Thursday, October 20, 2011 12:39 PM
To: Engelbert, Pat
Subject: RE: Loup

Pat,
I wanted to give you a heads up that I will be including a hardcopy of the dredging information with the teleconference record that I will be filing with the secretary. There is no need to respond unless there is a problem. Thanks again!
Paul

Federal Energy Regulatory Commission
Division of Hydropower Licensing
888 First Street, N.E.
Washington, D.C. 20426
(202) 502-6836 - telephone
(202) 219-0205 -fax

From: Engelbert, Pat [mailto:Pat.Engelbert@hdrinc.com]
Sent: Friday, October 14, 2011 5:08 PM
To: Paul Makowski
Subject: FW: Loup

Paul,

Attached is the dredging information referenced in the response.

Have a good weekend.

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114

402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com
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From: Engelbert, Pat
Sent: Friday, October 14, 2011 1:03 PM
To: 'Paul Makowski'
Cc: Hunt, George; Richardson, Lisa (Omaha)
Subject: RE: Loup

Paul,

Attached are responses to most of your comments. We are looking into the MRBC Report Tables 4-7 through 4-9. We would like to discuss these in more detail on Tuesday morning. How does 8:30 central time sound for a conference call? Let me know if that will work.

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114

402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com
Follow Us - Facebook | Twitter | YouTube

From: Paul Makowski [mailto:Paul.Makowski@ferc.gov]
Sent: Friday, October 14, 2011 7:59 AM
To: Engelbert, Pat
Cc: Hunt, George; Richardson, Lisa (Omaha)
Subject: RE: Loup

Pat,
Hopeful your young one will feel better soon! I did get your away message so I knew not expect to hear from you. Email comments work for me. I am back in the office on Tuesday. I do not have any conflicts on my schedule that would preclude me from talking with you next week. So give me a heads up so I can be at my desk when you call.
Thank you for your prompt response.
Paul

Federal Energy Regulatory Commission
Division of Hydropower Licensing
888 First Street, N.E.
Washington, D.C. 20426
(202) 502-6836 - telephone
(202) 219-0205 -fax

From: Engelbert, Pat [mailto:Pat.Engelbert@hdrinc.com]
Sent: Friday, October 14, 2011 8:54 AM
To: Paul Makowski
Cc: Hunt, George; Richardson, Lisa (Omaha)
Subject: RE: Loup

Paul,

Unfortunately, I am home today with a sick child. Can we discuss your questions next week? I seem to recall that you were out Monday, but in the rest of the week. The only time I am not available next week is Wednesday morning and Friday afternoon. Let me know what days and times work for you. I will send responses to your comments via e-mail later this morning for your review prior to our call next week.

Sorry for the inconvenience.

Pat

PATRICK J. ENGELBERT
P.E.

HDR Engineering, Inc.
Water Resources Section Manager

8404 Indian Hills Drive | Omaha, NE 68114

402.399.4917 | c: 402.679.4221
Pat.Engelbert@hdrinc.com | hdrinc.com
Follow Us - Facebook | Twitter | YouTube

From: Paul Makowski [mailto:Paul.Makowski@ferc.gov]
Sent: Friday, October 14, 2011 6:56 AM
To: Engelbert, Pat
Subject: Loup

Pat,

Would any time today work for you to discuss my questions on the Updated Study Report?

Thanks,

Paul

Federal Energy Regulatory Commission

Division of Hydropower Licensing

888 First Street, N.E.

Washington, D.C. 20426

(202) 502-6836 - telephone

(202) 219-0205 -fax

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
October 21, 2011

OFFICE OF ENERGY PROJECTS

Project No. 1256-029 – Nebraska
Loup River Hydroelectric Project
Loup Power District

Neal D. Suess, President/CEO
Loup Power District
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Reference: Commission Staff Comments on the Updated Study Report

Dear Mr. Suess:

Commission staff has reviewed the updated initial study report and meeting summary for the Loup Project No. 1256, filed on August 29, 2011 (supplemented on September 7, 2011) and September 23, 2011, respectively. We do not have any comments on the meeting summary. Our comments and recommendations with respect to the updated study report are provided in Appendix A.

If you have any questions, please contact Lee Emery at (202) 502-8379 or lee.emery@ferc.gov.

Sincerely,

Nicholas Jayjack, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosure: Schedule A

cc: Mailing List
Public Files

APPENDIX A

Commission staff has reviewed the updated study report (USR) pursuant to 18 CFR § 5.15(f), and has the following comments and recommendations pursuant to 18 CFR § 5.15(e).

The USR included the results of each study as required by the Commission's Study Plan Determination, issued on August 26, 2009, including the integration and modification of results that had previously been reported separately in the initial and second initial study reports. Based on staff's review of the USR, we find that although the USR illustrates that the Platte River is in dynamic equilibrium, the USR also shows that project operations result in a large reduction in sediment yield in the Loup River system. This reduction will likely impact sediment transport further downstream in the Platte River, which may affect channel dimensions and sandbar habitat for interior least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus*) nesting. Therefore, we recommend the additional study described below.

Operational Alternatives Study

<u>Goals and Objectives</u>

§5.9 (b)(1) — *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to analyze potential changes in sediment transport based on alternative project operations designed to mitigate project-related sediment depletion in the lower Platte River and/or enhance nesting habitat for interior least terns and piping plovers.

Specifically, the objectives of the study include:

- Analyze four alternatives to existing project operation.
- Determine the effects of the alternative operations on dominant and effective discharges in the Loup River bypassed reach and the lower Platte River.
- Explain all input parameters, assumptions, and computations used in analyzing the four alternatives.

§5.9(b)(2) — *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) — *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

The Commission must decide whether to issue a license to the Loup Power District for the Loup River Hydroelectric Project (project). Sections 4(e) and 10(a) of the Federal Power Act (FPA) require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Reduction in the sediment yield caused by project operations could adversely affect the formation of sandbar habitat necessary for interior least tern and piping plover nesting in the Loup and lower Platte Rivers. Properly analyzing operational alternatives will ensure that the necessary protection, mitigation and/or enhancement measures are considered to fulfill the Commission's responsibilities under sections 4(e) and 10(a) of the FPA, the National Environmental Policy Act, and Endangered Species Act.

Background/Existing Information and Project Nexus

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

The USR analyzes operational effects on sediment yield caused by the current operations of the project; however, there is no information on the potential beneficial effects of alternative operations on nesting habitat for interior least terns and piping plovers.

§5.9(b)(5) – *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

Existing project operation entails the removal of sediment from the Settling Basin located at the upstream end of the Loup Power Canal. According to table 5-1 of Study 1.0, *Sedimentation*, the sediment removed from the Settling Basin and deposited within the Loup Power Canal and Babcock and North lakes represents 53 percent of the annual sediment yield from the Loup River system to the Platte River via the Loup River bypassed reach and the Loup Power Canal.

Further downstream in the Platte River, this removal of sediment from the Loup River system corresponds to 31 percent of the sediment yield of the Platte River at North Bend and 14 percent of the sediment yield at Louisville. Table 5-1 also shows that the sediment yield of the Loup Power Canal to the Platte River is about 13 percent of the adjusted sediment yield of the Loup River upstream of the project's diversion weir.[1]

This reduction of the sediment yield of the Loup Power Canal is analogous to flow released from a dam where sediment is trapped in the reservoir. The clear water from the Loup Power Canal can adversely affect channel stability as the downstream erosive power is increased because the flows released from the project are no longer using energy to transport sediment removed from the system.[2] Further, the USR provides sedimentation data based on narrow operating constraints, without considering how alternative operation regimes might improve sediment yield, and thus improve tern and plover nesting habitat formation in the Loup River Basin and Platte River downstream of the project.

Proposed Methodology

§5.8(b)(6) – *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Our proposed study methodology is for you to apply the dominant and effective discharge methodology used in Study 2.0., *Hydrocycling*, to analyze the effects of the following alternative operations in the Loup River bypassed reach and the lower Platte River. You would document all input parameters, assumptions, and computations.

Alternative 1. Release all dredged material to the Platte River at its confluence with the Loup Power Canal.

This alternative would include construction and operation of a pipeline to convey dredged material from the Settling Basin to the confluence of the

[1] The sediment yield of the Loup River upstream of the diversion weir is adjusted based on the Loup Power Canal conveying 67 percent of the annual flow.

[2] Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. Trends in Channel Gradation in Nebraska Streams, 1913-95. USGS Water-Resources Investigations Report 99-4103. Lincoln, Nebraska.

Loup Power Canal with the Platte River. Neither the existing North nor South Sand Management Areas would be used.

Alternative 2. Release all dredged material to the South Sand Management Area.

Under this alternative, all dredged material from the Settling Basin would be directed to the South Sand Management Area. The North Sand Management Area would not be used.

Alternative 3. Release all dredged material to the South Sand Management Area and modify project operation to allow additional flow in the Loup River bypassed reach during high flow events.

This alternative would be identical to Alternative 2 except that project operations would be curtailed during the tern and plover nesting season to allow high-flow events to transport sediment to the Loup River bypassed reach.

Alternative 4. Release all dredged material to the South Sand Management Area, modify project operations to allow additional flow in the Loup River bypassed reach during high flow events, and modify project operation to maintain a minimum water level in the Loup River bypassed reach.

This alternative would be identical to Alternative 3 except that project operations would be modified during the tern and plover nesting season to provide a minimum flow in the Loup River bypassed reach to allow development and maintenance of tern and plover nesting habitat.

Level of Effort and Cost

§5.9(b)(7) – *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The estimated cost of this work is approximately $25,000. This desktop analysis may be completed for incorporation into the applicant's preliminary licensing proposal, if possible, or if time does not permit, the results should be included in the license application filed with the Commission.

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup River Hydroelectric Relicensing - October 3rd Meeting Notes
Date:	Tuesday, December 13, 2011 9:45:39 AM
Attachments:	nUSFWS.111003.ESA-10J.doc

For the DB and PW.

Thanks

From: Richardson, Lisa (Omaha)
Sent: Friday, October 21, 2011 9:51 AM
To: Bob Harms (robert_harms@fws.gov); 'Jeff_Runge@fws.gov'; 'Jorgensen, Joel'; 'Albrecht, Frank'; 'richard.holland@nebraska.gov'
Cc: 'Neal Suess'; Pillard, Matt; Marinovich, Melissa
Subject: Loup River Hydroelectric Relicensing - October 3rd Meeting Notes

Greetings!

Attached are notes from our meeting on October 3rd to discuss the Biological Assessment for the Loup River Hydroelectric Project. Please review these notes and provide any comments by October 28th. If you make your comments directly in the Word file, please use Track Changes.

Thanks,

Lisa

LISA M. RICHARDSON P.E.

HDR Engineering, Inc
Associate Vice President

8404 Indian Hills Drive| Omaha, NE 68114
o: 402.926.7026 | c: 402.618.9865
f: 402.399.1111
lisa.richardson@hdrinc.com | hdrinc.com

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
October 21, 2011

OFFICE OF ENERGY PROJECTS

Project No. 1256-029 – Nebraska
Loup River Hydroelectric Project
Loup Power District

Neal D. Suess, President/CEO
Loup Power District
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Reference: Commission Staff Comments on the Updated Study Report

Dear Mr. Suess:

Commission staff has reviewed the updated initial study report and meeting summary for the Loup Project No. 1256, filed on August 29, 2011 (supplemented on September 7, 2011) and September 23, 2011, respectively. We do not have any comments on the meeting summary. Our comments and recommendations with respect to the updated study report are provided in Appendix A.

If you have any questions, please contact Lee Emery at (202) 502-8379 or lee.emery@ferc.gov.

Sincerely,

Nicholas Jayjack, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosure: Schedule A

cc: Mailing List
Public Files

APPENDIX A

Commission staff has reviewed the updated study report (USR) pursuant to 18 CFR § 5.15(f), and has the following comments and recommendations pursuant to 18 CFR § 5.15(e).

The USR included the results of each study as required by the Commission's Study Plan Determination, issued on August 26, 2009, including the integration and modification of results that had previously been reported separately in the initial and second initial study reports. Based on staff's review of the USR, we find that although the USR illustrates that the Platte River is in dynamic equilibrium, the USR also shows that project operations result in a large reduction in sediment yield in the Loup River system. This reduction will likely impact sediment transport further downstream in the Platte River, which may affect channel dimensions and sandbar habitat for interior least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus*) nesting. Therefore, we recommend the additional study described below.

Operational Alternatives Study

Goals and Objectives

§5.9 (b)(1) — *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to analyze potential changes in sediment transport based on alternative project operations designed to mitigate project-related sediment depletion in the lower Platte River and/or enhance nesting habitat for interior least terns and piping plovers.

Specifically, the objectives of the study include:

- Analyze four alternatives to existing project operation.
- Determine the effects of the alternative operations on dominant and effective discharges in the Loup River bypassed reach and the lower Platte River.
- Explain all input parameters, assumptions, and computations used in analyzing the four alternatives.

§5.9(b)(2) — *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) — *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

The Commission must decide whether to issue a license to the Loup Power District for the Loup River Hydroelectric Project (project). Sections 4(e) and 10(a) of the Federal Power Act (FPA) require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Reduction in the sediment yield caused by project operations could adversely affect the formation of sandbar habitat necessary for interior least tern and piping plover nesting in the Loup and lower Platte Rivers. Properly analyzing operational alternatives will ensure that the necessary protection, mitigation and/or enhancement measures are considered to fulfill the Commission's responsibilities under sections 4(e) and 10(a) of the FPA, the National Environmental Policy Act, and Endangered Species Act.

<u>Background/Existing Information and Project Nexus</u>

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

The USR analyzes operational effects on sediment yield caused by the current operations of the project; however, there is no information on the potential beneficial effects of alternative operations on nesting habitat for interior least terns and piping plovers.

§5.9(b)(5) – *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

Existing project operation entails the removal of sediment from the Settling Basin located at the upstream end of the Loup Power Canal. According to table 5-1 of Study 1.0, *Sedimentation*, the sediment removed from the Settling Basin and deposited within the Loup Power Canal and Babcock and North lakes represents 53 percent of the annual sediment yield from the Loup River system to the Platte River via the Loup River bypassed reach and the Loup Power Canal.

Further downstream in the Platte River, this removal of sediment from the Loup River system corresponds to 31 percent of the sediment yield of the Platte River at North Bend and 14 percent of the sediment yield at Louisville. Table 5-1 also shows that the sediment yield of the Loup Power Canal to the Platte River is about 13 percent of the adjusted sediment yield of the Loup River upstream of the project's diversion weir.[1]

This reduction of the sediment yield of the Loup Power Canal is analogous to flow released from a dam where sediment is trapped in the reservoir. The clear water from the Loup Power Canal can adversely affect channel stability as the downstream erosive power is increased because the flows released from the project are no longer using energy to transport sediment removed from the system.[2] Further, the USR provides sedimentation data based on narrow operating constraints, without considering how alternative operation regimes might improve sediment yield, and thus improve tern and plover nesting habitat formation in the Loup River Basin and Platte River downstream of the project.

Proposed Methodology

§5.8(b)(6) – *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Our proposed study methodology is for you to apply the dominant and effective discharge methodology used in Study 2.0., *Hydrocycling*, to analyze the effects of the following alternative operations in the Loup River bypassed reach and the lower Platte River. You would document all input parameters, assumptions, and computations.

Alternative 1. Release all dredged material to the Platte River at its confluence with the Loup Power Canal.

This alternative would include construction and operation of a pipeline to convey dredged material from the Settling Basin to the confluence of the

[1] The sediment yield of the Loup River upstream of the diversion weir is adjusted based on the Loup Power Canal conveying 67 percent of the annual flow.

[2] Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. Trends in Channel Gradation in Nebraska Streams, 1913-95. USGS Water-Resources Investigations Report 99-4103. Lincoln, Nebraska.

Loup Power Canal with the Platte River. Neither the existing North nor South Sand Management Areas would be used.

Alternative 2. Release all dredged material to the South Sand Management Area.

Under this alternative, all dredged material from the Settling Basin would be directed to the South Sand Management Area. The North Sand Management Area would not be used.

Alternative 3. Release all dredged material to the South Sand Management Area and modify project operation to allow additional flow in the Loup River bypassed reach during high flow events.

This alternative would be identical to Alternative 2 except that project operations would be curtailed during the tern and plover nesting season to allow high-flow events to transport sediment to the Loup River bypassed reach.

Alternative 4. Release all dredged material to the South Sand Management Area, modify project operations to allow additional flow in the Loup River bypassed reach during high flow events, and modify project operation to maintain a minimum water level in the Loup River bypassed reach.

This alternative would be identical to Alternative 3 except that project operations would be modified during the tern and plover nesting season to provide a minimum flow in the Loup River bypassed reach to allow development and maintenance of tern and plover nesting habitat.

Level of Effort and Cost

§5.9(b)(7) – *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The estimated cost of this work is approximately $25,000. This desktop analysis may be completed for incorporation into the applicant's preliminary licensing proposal, if possible, or if time does not permit, the results should be included in the license application filed with the Commission.

Selzle, Lydia

From: Albrecht, Frank [frank.albrecht@nebraska.gov]
Sent: Monday, October 24, 2011 9:37 AM
To: Richardson, Lisa (Omaha); Damgaard, Quinn V.
Subject: FW: Loup Hydroelectric Project - Recreation Management Plan

Lisa and Quinn,

Dave Tunink, Fisheries Division, was part of the committee for the Recreation Management Plan (as a part of the LPD Relicensing). Below are his comments that we are submitting for your consideration.

Please call or email if you have questions.

Thank you,

Frank Albrecht
Assistant Division Administrator
Environmental Services Division
Nebraska Game and Parks Commission
2200 N. 33rd St.
Lincoln, NE 68503
402-471-5422
Visit us at http://www.ngpc.state.ne.us

From: Tunink, Dave
Sent: Thursday, October 13, 2011 2:23 PM
To: Albrecht, Frank
Cc: Richardson, Lisa (Omaha); Holland, Rick; Schuckman, Jeff
Subject: RE: Loup Hydroelectric Project - Recreation Management Plan

Frank,

I completed my review and thought that it was a good plan. Being a Fisheries Biologist I tend to look at the fishing opportunity side. There was no mention concerning the sedimentation issues in both Lake North and Lake Babcock which creates problems for water clarity, boating and fish production. I would think that in time that the Loup Power District would have to deal with the loss of water storage capacity as these lake become filled with sediment. Being an open system, where riverine fish species can enter the lake system, it limits management options for sport fish species on the lakes. One area that I feel needs to be addressed better concerns angler access along the canal especially along that section near the Columbus Powerhouse Park. Just creating some rocked hard points along selected locations along the canal would improve access along the steep banks.

Dave Tunink
Assist. Admin.
Fisheries Management Section

Thompson, Wendy

From: Randy_Thoreson@nps.gov
Sent: Friday, October 28, 2011 3:52 PM
To: lisa.richards@hdrinc.com
Cc: Damgaard, Quinn V.
Subject: preliminary draft Rec Management Plan - Loup Hydro Project 1256

Follow Up Flag: Follow up
Flag Status: Flagged

Randy Thoreson
National Park Service
Rivers,Trails, and Conservation Assistance Program
MN Office / Randy T. phone (651) 293-8450

Hi Lisa,
Here are my unofficial comments (ie not on NPS letterhead) regarding the preliminary draft Recreation Management Plan for the Loup Power District Project (FERC 1256). As we discussed, it is my understanding that these comments will be considered and incorporated in the draft Recreation Management Plan with a formal submittal to FERC in relation to the draft License Application. At that time, as I mentioned to you, a formal letter from NPS in accordance to the review period will be given.

Preliminary Draft Recreation Management Plan - Loup Hydro Project (FERC 1256)

Comments:

Section 1. Introduction

A number of comments were made both prior to and relating to Study 8.0 General Recreation Use Report. about the Loup River Bypass Reach. The NPS has been consistent in stating the need for recreation study for this area as it relates to the Loup Power District Project. . Although it is understood that much of the Bypass reach is not owned or managed by the District, a discussion of the area is felt warranted as part of the Recreation Management Plan. Reference is given to Section 5.7 and 5.8 of the Recreation Use Report that talks about the Loup River Bypass Reach Recreation Facility Inventory and Survey. A discussion of the Inventory and Survey is suggested as a new Section 11.4 Loup River Bypass Reach of the Recreation Management Plan. It is recommended that paragraph four (4) of the Introduction be moved to the new Section 11.4 with added discussion relating to findings and conclusions.

Section 2 Summary of Recreation Use Survey Results

2.1 Loup Canal Survey Responses. The fourth bullet (Do not stay overnight). The Loup Power District does offer many opportunities for camping at the various recreation facilities sites. It is presumed these sites are used during a regular basis within the summer months and other prime times. Is it concluded that the statement "Do not stay overnight" refers to other areas along the Loup Power Canal ? This is confusing when reviewing information within the Recreation Management Plan discussing survey results for the District's five developed recreation areas.

Section 3. Loup Power Canal Use, Capacity, and Demand

3.3 Demand for District Recreation Sites. It is understood that when calculating specific demand for acres of park and/or miles of trail it is difficult to arrive at any quantifiable measurements. Using guidelines as reflected in the National Recreation and Park Association (NRPA) and referring to Nebraska's Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2011-2015 seems logical. The difficulty in arriving at a consensus on measuring current and future demand is very difficult (as quoted by the Nebraska Game and Parks Commission - NGPC 2010). As such, and noting the application of guidelines and math for park acres/trail miles,the NPS has no disagreement on conclusions within Subsection 3.3 concluding that District Facilities meet NRPA guidelines. Also, the discussion of recreation demand, in the broad sense, is logical in terms of noting that projected recreation demand is not anticipated to increase ("During the entire applied-for-license period" is a bold statement since projections do not go out that far in the future).

Section 4 Headworks Park

4.41 Upgrade Camper Outlets. Although existing outlets will be upgraded to 50amps, a rationale for additional camper outlets is not given (Note Table 4-2 Requested Improvements - Headworks Park).

4.4.2 The NPS commends the District for plans to construct a new permanent restroom facility at Headworks OHV Park.

4.4.3 Stated throughout the Rec. Management Plan in relation to District Recreation Facilities, a budget of $20,000 annually is referred to for playground maintenance and upgrades. What will the determining factors be in undertaking these actions? Please explain.

4.4.4 The NPS commends the District for plans to install a sand volleyball court.

4.5 Requested Improvements Not Planned. Install Shower Facilities, Provide Potable Water. Improve Restrooms. The lack of installation and/or improvements of these facilities due to infrastructure challenges and proximity to the Loup River and Power Canal seems reasonable. Restroom doors. The request for installation of doors on restroom stalls seems warranted and appears that they should be included in improvements by the District.

Section 5 Lake Babcock Park (Loup Park)

5.4 Planned Improvements. See third bullet under Headworks Park.

5.5 Requested Improvements not planned. With the exception of potable water, see fifth bullet under Headworks Park.

Section 6 Lake North Park

6.4.1 The NPS commends the District on plans to construct a wheelchair accessible fishing pier, which would meet ADA guidelines, along the north shore of Lake North.

6.4.2 Lake North No-Wake Zone. The NPS commends the District on plans to designate a no-wake zone in the southeast corner of Lake North - to enhance the recognized fishing opportunities that exist in this portion of the lake.

6.4.3 Upgrade Camper Outlets. Although existing outlets will be upgraded to 50amps, a rationale for additional camper outlets is not given (Note Table 6-2 Requested Improvements - Lake North Park).

6.4.4 Improve Playground Equipment. See third bullet under Headworks Park.

6.4.5 Zebra Mussel Outreach. The identification and spread of Zebra Mussels is an important issue. The NPS commends the District on education and signage relating to the problem.

6.5 Requested Improvements Not Planned. The NPS has no disagreement with stated reasons for not providing fish cleaning station, restock of fish, additional fish structure, improvement of restrooms, and installation of shower facilities. The request for more sand on the beach may be addressed by some best management practices for sand stabilization techniques. The District may want to investigate such methods. Does the sand (dredged) from the north and south sand management areas meet specifications/needs.? The District may have already researched these possibilities. The NPS has no difference of opinion on installing additional camper capacity and outlets. The District rationale seems appropriate.

Section 7. Columbus Powerhouse Park

The NPS has no comments on this Section.

Section 8. Tailrace Park.

8.4 Planned Improvements toTailrace Park 8.5 Requested Improvements Not Planned. It is understood that Tailrace Park has recreational opportunities (fishing below the tailrace weir, playground area, etc..) and challenges (vandalism, public safety, etc..). The NPS has viewed this area many times on both sides of the Loup Power Canal.and been consistent in seeing Tailrace Park as an area in need of improvement(s). Although no capital improvements are planned, a creative approach to the Park may be a possibility. One such measure, as highlighted in the Rec. Management Plan, would be to restrict vehicular access to the park while maintaining pedestrian access. The placement of parking is pointed out as a possibility north of the barriers. The question arises, what more can be done with upgrading Tailrace Park and at the same time recognizing the great deal of existing vandalism, public safety, etc. ? A thought would be the development of a Master Tail Race Park Plan by a representative work group (ie. Loup Power Dist. Rep, City Rep, Law Enforcement Rep) showing needed improvements, timelines and costs. Creative approaches brought up during work group discussions may work toward a Plan that both upgrades the Park and also relates to the reduction of crime/vandalism. Park hours, added vandalism fines, park improvement elements with particularly sturdy material types, etc could be possibilities.

Section 9 Trails

The NPS commends the District on plans to construct a new 2,000 foot trail segment, consistent with CART's Master Plan, along the southeast shore of Lake Babcock.

Table 10-1 Planned Recreation Improvements

Please explain the reasoning behind the budgeted year and improvement(s) .

new Section 11.4 Loup River Bypass Reach.

This is recommended a s a new section discussing the Loup Bypass Reach. Conclusions drawn from Study 8. Recreation Use General Recreation Use Report (February 11. 2011) would be included. Specifically these would be 5.7 Loup Bypass Reach Recreation Facility Inventory and 5.8 Loup River Bypass Reach Survey Responses. As noted earlier, in this email, paragraph four, of Section 1 Introduction could be moved to this Section 11.4.

Map(s)

The map shown in Attachment A - Recreation Facility Location Sheets is good.

It is recommended that a companion map (or integrated within the Location Map) be developed showing the various planned Recreation Facilities Improvements and Locations.

Please feel to call me at 651-293-8450 or email me (randy_thoreson@nps.gov) if you have any questions on these comments.

thanks

Randy Thoreson

Meeting Notes

Project:	Loup River Hydroelectric Project FERC Project No. 1256
Subject:	Section 7 ESA and Section 10J FPA – Meeting #2
Meeting Date: November 2, 2011 1:00 PM – 3:00 PM	Meeting Location: Loup Public Power Headquarters – Columbus, NE
Notes by:	HDR

Attendees:

Robert Harms, USFWS
Jeff Runge, USFWS
Frank Albrecht, NGPC
Richard Holland, NGPC
Joel Jorgensen, NGPC
Michelle Koch (NGPC)
Neal Suess, LPD
Melissa Marinovich, HDR
Matt Pillard, HDR
Lisa Richardson, HDR

A meeting was held with the U.S. Fish and Wildlife Service and the Nebraska Game and Parks Commission to continue discussion of Section 7 of the Endangered Species Act, the consultation process, potential effects of the Project, Section 10J of FPA, and possible protection, mitigation or enhancement (PM&E) measures.

Discussion at the meeting is documented according to the meeting agenda noted below.

Meeting Agenda:

1. Intro/Summary
2. Species effects/Avoidance, minimization, and mitigation
   - Loup Bypass
   - Sculpting/Maintain Flow
   - Hydrocycling
3. Next Steps

1. Intro/Summary

OLD BUSINESS

The October 21, 2011 FERC letter to the District was discussed. USFWS indicated they view the letter as FERC's attempt to evaluate project operations to meet a variety of needs, specifically related to ESA. USFWS noted that the alternatives identified by FERC are not exactly what USFWS is interested in reviewing, but along similar lines.

CLARIFICATIONS

USFWS had provided clarifications to the October 3 meeting notes and those clarifications were discussed. HDR provided the following clarification to the first bullet on page 6, bullet 1, under Hydrocycling:

- Accelerated erosion of bars. Studies have shown that sediment transport is greater under current operations than under a run-of-the-river scenario. This indicates erosion of sandbar habitat that is used by terns plovers, and pallid sturgeon below the tailrace. This effect also may have a negative impact on riverine process and functions, which are beneficial to the three species, through channel entrenchment and reduction of river channel and floodplain connectivity.

2. Species Effects – Avoidance, minimization, and mitigation

North SMA MOU

USFWS would like the District to be a signatory to the Preferred MOU because the land that Preferred is mining is District property.

The District indicated that they can not be a signatory to the Preferred MOU because the adaptive management plan and other aspects of the MOU are specific to Preferred's activities and are not relevant to the District if Preferred is not operating. Further, the District noted that Preferred's lease agreement states that any company that takes over operations must take over Preferred's responsibilities under the MOU (also covered in Section D of the Preferred MOU).

The District indicated that they have ceased dredging operation annually during the nesting season in accordance with a verbal agreement and are willing to continue to do so, even though there is anecdotal evidence that continued dredging operations during nesting season is beneficial to bird numbers.

USFWS suggested an agreement between the District, USFWS and NGPC that covers just the cessation of dredging. It was discussed that a new MOU or a "parent" MOU could be developed for the District and USFWS/NGPC specific to dredging. The parties agreed in principle with this concept.

The District will prepare a draft MOU between District, NGPC and USFWS with the assistance of HDR. Timing would likely not be sooner than mid-January.

LOUP BYPASS

Minimum Flow:
Prior to the meeting USFWS had indicated to HDR that USFWS/NGPC were looking for 300 to 400 cfs as a minimum flow with primary focus on summer months (July/August). The District indicated that 300 to 400 cfs was not feasible for their operations. This flow represents 21 to 29 percent of average diverted flow in July and 23 to 31 percent of average diverted flow in August.

The District noted that the previous gentlemen's agreement did not require flow for all of July/August, but rather a few days during that period. The District asked why the change?

NGPC indicated that there are two issues related to minimum flow:

- One is to have minimum flows to keep water temperature at an acceptable level.
- Two is to provide minimum flow to keep fish from stranding. However, if the flow is raised on some days and drops on others, then the chance of stranding and mortality increase. Isolation of fish in pools can also result in fish kills.

HDR asked for clarification on how this relates to tern food source and didn't think the reason for doing this was for a food source for the terns and plovers. USFWS and NGPC clarified that this is an issue related to concern for the fish community and isolation of sandbar habitat. USFWS noted that HEC-RAS modeling indicates that depth changes with flow and that depths are not uniform

USFWS noted that a high proportion of the Loup River bypass reach is in a degraded to poor condition during the July/August timeframe and continues into October. USFWS noted that a flow of 372 cfs was needed to achieve a "good" rating relative to the Montana Method. HDR clarified that the flow required for a "good" rating according to Montana is 297cfs.

USFWS indicated that "Alternative 4" of the FERC letter of October 21, 2011, which includes modifying operations to maintaining a minimum or maintenance flow in the bypass reach. USFWS indicated that this alternate analysis could consider what the minimum flow should be. HDR noted that the October 21, 2011 FERC letter is a comment letter and that the District doesn't necessarily agree with the letter and intends to provide responses to it. A determination letter would be issued in December 2011.

USFWS stated that even if FERC agrees not to pursue "Alternative 4", USFWS would seek a minimum flow determination under ESA.

USFWS stated that they would consider alternate proposals from the District for minimum flow, but that the District needs to provide rationale to justify their proposal. USFWS indicated that they would need to consider what makes sense and consider the current science available to them – in this case, the study reports. They are willing to negotiate what the District needs vs. avoiding fish kills and are looking to the District to tell them what that amount is, recognizing that any proposal has to be defensible and supportable.

Sculpting/Maintenance Flow:
USFWS would like to see a sculpting or maintenance flow between May 22nd and June 29th to cause bar erosion and provide mid-channel bars to protect birds from predators. They indicated that this time period was chosen because historically the majority of high flows have occurred in this time period.

USFWS noted that minimum flow and sculpting flows are separate but not mutually exclusive. The intent is to move more sediment and shape bars. They would like to see a constant pre-determined flow during the May – June time period; the goal being to increase the effective discharge. Another measure of the sculpting flow would be to improve the active channel width – essentially shift point bars to mid-channel bars.

USFWS tried to recognize the limitations that the District is under when looking at the timeframe. USFWS noted that they would like a suggestion from the District/HDR on what the flow should be to increase the effective discharge.

Sandbar Shaping:
USFWS noted that there are 5 areas where they have seen repeat bird activity and that they would like have some mechanical sandbar shaping to convert existing point bars to mid-channel bars. They suggested that machinery can shape the bar and then the maintenance/sculpting flows could maintain what is constructed. They'd also like on-going maintenance to keep it vegetation-free. USFWS will provide a map of the areas they suggest.

The District noted that they do not own any land in the bypass reach - it's all private property. USFWS understood that property ownership could be a challenge and suggested that shaping could be accomplished under several scenarios:

- Purchase of property
- Purchase of easements
- Agreements with landowners

USFWS noted an example on the Central Platte where land clearing was wanted for hunting purposes and an agreement was reached with landowners to clear the islands, which the owners wanted for goose hunting areas. USFWS suggested identifying landowners in areas where lots of bends and turns occur because of a narrower channel. USFWS noted that in sinuous section of the channel that straightening associated with mechanical bar creation could increase stream power and transport more sediment.

The District indicated they would have to look at the sites before agreeing to this. USFWS noted they are willing to negotiate the areas; however, they feel that the suggested locations, such as the Lyman Richie sand and gravel pit area, would be the right areas for the birds based on past use.

HYDROCYCLING

USFWS inquired about the District's analysis of a potential reregulating reservoir and where it might be constructed. HDR stated that several alternatives had been reviewed at a preliminary level:

- Tailrace Park – there is some potential for attenuation at the tailrace. Tailrace Park can only hold ~100 acre-feet.
- Tailrace Canal – storage in the tailrace was also considered. For every one foot increase in water level in the canal, 100 acre-feet could be stored. However, due to infrastructure at the Columbus Powerhouse, there are limitations to how much the water level could be raised and thus how much water could be stored in the Tailrace canal. Additionally, it was noted that in 1952, the outlet weir was shortened 18 inches due to sedimentation issues in the canal. Trying to use the tailrace canal to store water would cause significant maintenance issues.
- Reregulating Reservoir – To provide full attenuation of the hydrocycling peak, 300 to 400 acres of land would be required. This option was deemed to be uneconomic – HDR estimated potential land cost at $20,000/acre, which equates to $6 to 8 million. The District noted that land along the tailrace is substantially more expensive – land near ADM recently sold for $40,000/acre – so the land cost would be double. In addition to cost issues, a reregulating reservoir would be difficult to maintain due to sedimentation issues.

The District asked what the critical time periods are for potential attenuation. USFWS noted May to July and September to October as the critical time periods.

The District asked what magnitude of attenuation USFWS and NGPC hope to achieve. USFWS agreed that full attenuation was likely not feasible, but would like to see some analysis of partial attenuation. NGPC suggested performing an analysis of 10, 20, and 50% attenuation of the hydrograph. That would provide a starting point to determine how reregulation might affect the lower Platte River. This type of analysis would inform the amount of storage needed.

The District indicated that just performed the suggested analysis represents a substantial cost, but that they would have HDR evaluate the cost of the analysis for the District's review.

The District asked what is the key issues are related to hydrocycling, i.e., what would attenuation accomplish? NGPC identified the following:

- Reduce potential for nest inundation due to hydrocycling is nest inundation
- Productivity of aquatic life – maintaining normal flows that provide habitat for various organisms and increase primary and secondary productivity
- Connectivity – providing stable flows that maintain connectivity
- Sandbars – providing more sand bars for bird nesting.

USFWS suggested that several things could be put in place to deal with Hydrocycling effects. One idea may be to touch base with PMRNRD about the water conservation program. These measures may help provide a less flashy system with less risk of nest inundation. USFWS also suggested as an example to look into the PMRNRD agreement with NRCS for water conservation by converting cropland into CRP. Although USFWS also noted that the conservation practices could be more costly than a re-regulation reservoir.

3. Next Steps

HDR will evaluate the effort required to developing the information requested that includes:

- Developing a MOU for the North Sand Management Area
- Minimum and Maintenance Flows
- Sandbar shaping

- Hydrocycling reductions

USFWS will provide a map of potential locations for sandbar shaping.

Lisa Richardson of HDR will contact Bob Harms to set up the next meeting.

The City of Columbus

RESPONSIBLE • RESPONSIVE • REPUTABLE

Administration Office (402) 562-4232 Fax (402) 563-1380

November 9, 2011

Mr. Neal Suess, President
Loup Power District
2404 15th Street
Columbus, NE 68601

Dear Mr. Suess:

The city of Columbus received a copy of the proposed recreation planning document prepared as part of the Loup recertification review. We appreciate being invited to look at the plan and are pleased with the information provided. The city will retain this information as a referral resource for future park development considerations as our city expands to the north.

Thank you for the opportunity to review the plan and for the care and concern for local resident services as the recertification process moves toward completion.

Sincerely,

Joseph A. Mangiamelli
City Administrator

Copy: Quinn V. Damgaard, HDR, Inc.

2424 14th Street • P.O. Box 1677 • Columbus, NE 68602-1677

EQUAL HOUSING OPPORTUNITY

Loup Power District - Preliminary Draft Recreation Management Plan
Comment/Response Matrix
November 13, 2011

Commenter*	Comment Summary	District Response
City of Columbus	The recreation management plan provides valuable information that the City will consider during future planning exercises.	City support is appreciated.
NOHVA	NOHVA supports the planned improvements to restroom facilities in the OHV parking area and playground equipment at Headworks Park.	NOHVA support is appreciated.
NOHVA	Our members welcome improvements to OHV area parking and the potential opportunity to provide input. Drainage can be a problem and the dispersed parking area is not an efficient use of the land available.	The District appreciates NOHVA's invitation for parking improvement coordination; however, the District is not proposing improvements to the OHV parking area at this time due to the limited occurrences when parking inefficiencies present a problem.
NGPC	Request some discussion of if/how the District plans to address sedimentation in the reservoirs, and associated affects to fisheries.	The District is continually evaluating methods of maintaining reservoir storage capacity for both recreational and operational benefit. At the present time, the District has no definitive plans that would be appropriate for incorporation into this document; however, the District welcomes cost-effective recommendations that would benefit both recreation and operations.
NGPC	Angler access along the canal, especially near the Columbus Powerhouse, could be improved via the creation of rocked hard points.	The District appreciates the need for angler access; however, the installation of rocked hard points in the canal is not considered feasible due to the amount of flow and the potential for bank sloughing, which could result. The District would consider alternate angler access recommendations that do not involve improvements within the canal.
NPS	NPS commends the District for the following planned improvements: 1) construction of a new permanent restroom facility and sand volleyball court at Headworks Park, 2) construction of a wheelchair accessible fishing pier along the north shore of Lake North, 3) designation of a no-wake zone in the southeast corner of Lake North, 4) education and signage relating to invasive species, 5) construction of a new 2,000 foot trail segment along the southeast shore of Lake Babcock.	NPS support is appreciated.
NPS	A discussion of the Loup River Bypass Reach, including the results of the District-performed facility inventory and user survey, is felt warranted as part of the Recreation Management Plan.	As noted by NPS, the District performed a recreation survey along the Loup River Bypass Reach. The findings and conclusions, including that of little recreational use, are documented in the District's Second Initial Study Report. As these study findings have been previously and formally filed in the FERC record, the District respectfully declines the request to repeat study findings and conclusions, related to the Loup River bypass reach, in the pertinent planning document. Because the District has no legal means to manage recreation along the Loup River Bypass reach, the District is not proposing recreation improvements in the Loup River bypass reach.
NPS	Plan content on survey results which indicate that respondents to not stay overnight is misleading. The District offers many fine opportunities for camping. It is presumed these sites are regularly used.	The District appreciates NPS's recognition of the many opportunities it provides for overnight camping. The noted plan content was provided as a broad summary and denotes that most commonly, persons surveyed in 2010 were partaking in day trips and were not camping at District facilities. That is not to say that the District's camping opportunities are not widely used (as accurately noted by NPS). The District has added a footnote to clarify this item.
NPS	NPS has no disagreement to the conclusion that District facilities meet NRPA recreation capacity guidelines. Also, statement that projected recreation demand is not anticipated to increase is logical; however, making this statement for the entire license period may not be accurate because population projections are not available beyond 2030.	The District appreciates NPS's concurrence with capacity and demand conclusions. The District will modify the plan to state that projected recreation demand is not anticipated to increase for at least the first 15 years of the license period (instead of the entire 30-year license period).
NPS	Rationale for not accommodating the public request for additional camper outlets at Tailrace Park is not provided.	Rationale has been added to plan: Outside of NOHVA jamboree weekends, camping demand does not warrant additional capacity/outlets.

Commenter*	Comment Summary	District Response
NPS	What factors will be evaluated during the determination of what playground equipment requires improvement or replacement?	The District has historically improved or replaced outdated playground equipment, as necessary. Plan content regarding playground equipment will be slightly revised although no formal "improvement determination procedure" is necessary.
NPS	The lack of installation showers and potable water at Headworks Park and Lake Babcock Park, due to infrastructure challenges and proximity to the Loup River and Power Canal, is understood. The request for installation of doors on restroom stalls seems to be a reasonable and warranted improvement.	The District appreciates NPS's understanding that additional infrastructure is not feasible at Headworks Park. Regarding restroom doors, the District intentionally omits them from their facilities. The District is of the opinion that restroom doors (in District convenience facilities) promote a sense of security for persons engaging in undesirable or illegal activity. For this reason, the District does not plan to install restroom doors.
NPS	Although existing outlets will be upgraded to 50 amps, a rationale for not providing additional camper outlets at Lake North Park, as requested by the survey respondents, is not given.	The District notes that this explanation is provided in the last bullet of Section 6.5. No additional plan content is necessary.
NPS	NPS has no disagreement with the District not implementing the following, requested improvements at Lake North Park: increase camper capacity, install fish cleaning station, restock fish, provide additional fish structure, improve restrooms, and install showers. The request for more sand on the beach may be addressed by some best management practices for sand stabilization techniques.	NPS's concurrence with District rationale is appreciated. The District also appreciates NPS input on sand stabilization; however, the District has exhausted these efforts and does not intend further attempts to provide more desirable material.
NPS	It is understood that Tailrace Park provides recreational opportunities and challenges (vandalism, public safety, etc.). One such measure to address the challenges, as highlighted in the Rec Management Plan, would be to restrict vehicular access to the park while maintaining pedestrian access. An additional recommendation would be the development of a Master Tail Race Park Plan by a representative work group (i.e.. Loup Power Dist. Rep, City Rep, Law Enforcement Rep). Park hours, added vandalism fines, park improvement elements with particularly sturdy material types, etc could be components of the plan.	The District appreciates NPS's understanding of the magnitude of vandalism at Tailrace Park and the difficulties it presents when considering recreation management. As indicated in the Draft Recreation Management Plan, the District is still evaluating whether or not it will end vehicular access. Should the District implement this measure and should the vandalism continue following implementation, the District would then evaluate further options.
NPS	Explain the reasoning behind the schedule/budgeted year for the proposed improvements.	The years for which these improvements are budgeted result from District planning/budgeting analysis and are generally scheduled for the near term in order to accelerate public access to improved amenities. No change to the plan document is necessary to explain this reasoning.
NPS	It is recommended that a map(s) be developed to show the planned improvements and locations.	The District respectfully declines this recommendation in order to maintain flexibility in ultimate improvement locations. The existing figures, in combination with the accompany text, are adequate in providing proximity of proposed improvements.

*NOHVA = Nebraska Off-Highway Vehicle Association; NGPC = Nebraska Game and Parks Commission; NPS = U.S. National Parks Service

LOUP POWER DISTRICT "SERVING YOU ELECTRICALLY"

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November 18, 2011

Mr. Robert Harms
U.S. Fish and Wildlife Service
Nebraska Field Office
203 West Second Street
Federal Building, Second Floor
Grand Island, Nebraska 68801

Re: Loup River Hydroelectric Project
FERC Project Number 1256
Request for an Updated Species List

Dear Mr. Harms:

As you are aware, Loup Power District (the District) filed a Notice of Intent (NOI) and a Pre-Application Document (PAD) in October 2008 to begin the Federal Energy Regulatory Commission (FERC) relicensing process for its hydroelectric facilities located on the Loup River near Columbus, Nebraska (Project). In FERC's Notice of Commencement on December 16, 2008, FERC initiated informal consultation with the U.S. Fish and Wildlife Service (USFWS) and designated the District as the non-federal representative to conduct Endangered Species Act (ESA) section 7 consultation.

The District is currently preparing a draft Biological Assessment. In letters dated July 21, 2008 and September 18, 2008, the USFWS provided technical assistance to the District in determining the potential issues related to threatened or endangered species. In accordance with Section 7 of the ESA, USFWS developed a list of federally listed species that may occur in the Project area or may be affected by the proposed relicensing of the Project. These species were:

- Interior Least Tern
- Pallid Sturgeon
- Piping Plover
- Western Prairie Fringed Orchid

In addition, coordination with the USFWS since the September 28, 2008 technical assistance letter has indicated that the federally listed whooping crane may also occur in the Project area.

I would like to request confirmation of the species listed in the aforementioned letter as the federally listed threatened and endangered species which may be applicable to the Project.

Please submit your concurrence by December 18, 2011, to HDR Engineering, the District's relicensing consultant:

Matt Pillard
HDR Engineering
8404 Indian Hills Drive
Omaha, NE 68114
Matt.pillard@hdrinc.com

Please feel free to contact Matt Pillard (402-399-1186) of HDR if you have any questions or clarifications regarding the updated species list request. Thank you for your assistance.

Sincerely,

Neal D. Suess
President/CEO
Loup Public Power District

cc: Lisa Richardson, HDR
Matt Pillard, HDR

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Via Electronic Filing

November 23, 2011

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

Subject: Loup River Hydroelectric Project
Updated Study Report Comments
FERC Project No. 1256
Docket 1256-029

Dear Secretary Bose,

Loup River Public Power District (Loup Power District or District) herein electronically files its responses to comments received on the Updated Study Report for relicensing the Loup River Hydroelectric Project, FERC Project No. 1256 (Project). The District is the owner, operator, and original licensee of the Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

In accordance with 18 CFR §5.15, the District presented the Updated Study Results to FERC and other relicensing participants during the Updated Study Results Meeting held on September 8, 2011. After the meeting, comments were received the following:

- Commission Staff
- U.S. Fish and Wildlife Service (USFWS)

Attached please find the District's responses to the comments received on the USR. Responses to comments from Commission Staff are provided in Attachment A and responses to comments from USFWS are provided in Attachment B. No comments were received on the USR Meeting Summary.

Additionally, the District is filing the following USGS report and data that were used in the development of the Updated Study Report as well as the attached responses:

- Sediment Samples and Channel-Geometry Data, Lower Platte River Watershed, Nebraska, 2010; U.S. Geological Survey Data Series Report 572 (including separate Zip file containing the report data)

If you have any questions regarding the District's responses, or any information provided by the District, please contact me at (402) 564-3171 ext. 268.

Respectfully Submitted,

Neal D. Suess
President/CEO
Loup Power District

Attachments

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Attachment A

District response to Commission Staff comments on the Updated Study Report dated October 21, 2011.

1. **Commission Introductory Comment on Updated Study Report**
"The USR included the results of each study as required by the Commission's Study Plan Determination, issued on August 26, 2009, including the integration and modification of results that had previously been reported separately in the initial and second initial study reports. Based on staff's review of the USR, we find that although the USR illustrates that the Platte River is in dynamic equilibrium, the USR also shows that project operations result in a large reduction in sediment yield in the Loup River system. This reduction will likely impact sediment transport further downstream in the Platte River, which may affect channel dimensions and sandbar habitat for interior least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus*) nesting. Therefore, we recommend the additional study described below."

District Response
Rivers that experience changes that deviate about average long-term morphologic characteristics are commonly said to be in dynamic equilibrium, quasi-equilibrium, or "in regime." Without exception, several independent investigations of long-term trends, as presented in Study 1.0 – Sedimentation, from the Updated Study Report (USR) conclude that the Loup and lower Platte rivers within the study area are neither aggrading nor degrading, are not supply limited, and have remained "in regime" (in a state of dynamic equilibrium) since the early 1950s. District removal of sediment has not caused a sediment deficiency at any of the sites studied in the USR.

Based on results presented in the Study 1.0 – Sedimentation and Study 2.0 – Hydrocycling, the District has demonstrated that the lower Platte River downstream of the Project Tailrace return is in dynamic equilibrium, is well seated within the braided regime, and is flow limited not supply limited. This conclusion is supported by all of the following analyses that were presented in the District's studies:

- sediment transport capacity relative to supply rates,
- flow area change at ungaged sites,
- HEC-RAS sediment modeling,
- specific and gage analysis,
- spatial gage analysis,
- regime analysis,

- photographic evidence of sandbars existing in the Platte River at the tailrace canal, and,
- analysis performed by others and presented in peer reviewed journals including USGS, USACE, Joekel, and Elliot.

There are two ways to affect sediment transport, the first is to affect capacity and the second is to affect supply. In the Platte River, downstream of the Tailrace Canal, the sediment carrying capacity is not affected by District operations (hydrocycling only very slightly increases capacity). The abundant supply of sediment from the watershed that is being transported from upstream in the Loup and Platte rivers enables the Platte River to transport sediment at its capacity. By all detailed standard-of-industry analyses already provided in the District's studies, the Platte River is able to carry sediment at its capacity, and it not being affected by District operations.

Therefore, the District respectfully disagrees with the statement that Project operations will likely impact sediment transport or morphology downstream.

2. Commission Suggested Operational Alternatives Study - Goals and Objectives

<u>Goals and Objectives</u>

§5.9 (b)(1) — Describe the goals and objectives of each study proposal and the information to be obtained.

"The goal of this study is to analyze potential changes in sediment transport based on alternative project operations designed to mitigate project-related sediment depletion in the lower Platte River and/or enhance nesting habitat for interior least terns and piping plovers."

"Specifically, the objectives of the study include:

- Analyze four alternatives to existing project operation.
- Determine the effects of the alternative operations on dominant and effective discharges in the Loup River bypassed reach and the lower Platte River.
- Explain all input parameters, assumptions, and computations used in analyzing the four alternatives."

§5.9(b)(2) — If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.

Not applicable.

§5.9(b)(3) — If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.

"The Commission must decide whether to issue a license to the Loup Power District for the Loup River Hydroelectric Project (project). Sections 4(e) and 10(a) of the Federal Power Act (FPA) require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses."

"Reduction in the sediment yield caused by project operations could adversely affect the formation of sandbar habitat necessary for interior least tern and piping plover nesting in the Loup and lower Platte Rivers. Properly analyzing operational alternatives will ensure that the necessary protection, mitigation and/or enhancement measures are considered to fulfill the Commission's responsibilities under sections 4(e) and 10(a) of the FPA, the National Environmental Policy Act, and Endangered Species Act.

District Response

First, the District notes that the analyses presented in Study 1.0 – Sedimentation and Study 2.0 –Hydrocycling show that the lower Platte River downstream of the Tailrace Canal return:

- is transporting sediment at capacity,
- is showing no signs of an aggradational or degradational trend,
- has a channel geometry that is consistent with the rest of the Platte River, and
- is well within the braided regime.

The District has shown that there is no morphologic impact from Project operations on the lower Platte River. As a result, no enhancement measures were evaluated during the study phase.

Second, in reference to the Commission's study objective related to calculating effective and dominant discharge for alternative scenarios, it should be noted that effective and dominant discharges will only change if either 1) the hydrograph changes, or 2) the hydrograph is the same but the sediment discharge rating curve changes. Adding or removing sediment to the Platte or Loup rivers will not affect the hydrograph, nor will it change the sediment discharge rating curve because the transport capacity does not change. The rating curves are based on hydraulic geometry relationships, which if changed would alter the effective discharge, but adding sediment would not change the depth-discharge or velocity-discharge relationships. Thus effective discharge will be no different for any alternatives that do not change the hydrograph or rating curves.

Further, the District notes that the District's studies showed that even with dredging, sediment yield at all study sites by far exceeds the capacity of the hydrograph to transport sediment. Project operations could only have an effect on morphology (and habitat) if yields were reduced below transport capacity.

3. Commission Suggested Operational Alternatives Study - Background/ Existing Information and Project Nexus

<u>Background/Existing Information and Project Nexus</u>

§5.9(b)(4) – Describe existing information concerning the subject of the study proposal, and the need for additional information.

"The USR analyzes operational effects on sediment yield caused by the current operations of the project; however, there is no information on the potential beneficial effects of alternative operations on nesting habitat for interior least terns and piping plovers."

§5.9(b)(5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

"Existing project operation entails the removal of sediment from the Settling Basin located at the upstream end of the Loup Power Canal. According to table 5-1 of Study 1.0, *Sedimentation*, the sediment removed from the Settling Basin and deposited within the Loup Power Canal and Babcock and North lakes represents 53 percent of the annual sediment yield from the Loup River system to the Platte River via the Loup River bypassed reach and the Loup Power Canal. Further downstream in the Platte River, this removal of sediment from the Loup River system corresponds to 31 percent of the sediment yield of the Platte River at North Bend and 14 percent of the sediment yield at Louisville. Table 5-1 also shows that the sediment yield of the Loup Power Canal to the Platte River is about 13 percent of the adjusted sediment yield of the Loup River upstream of the project's diversion weir.[1]"

"This reduction of the sediment yield of the Loup Power Canal is analogous to flow released from a dam where sediment is trapped in the reservoir. The clear water from the Loup Power Canal can adversely affect channel stability as the downstream erosive power is increased because the flows released from the project are no longer using energy to transport sediment removed from the system.[2]" Further, the USR provides sedimentation data based on narrow operating constraints, without considering how alternative operation regimes might improve sediment yield, and thus improve tern and plover nesting habitat formation in the Loup River Basin and Platte River downstream of the project.

District Response

The District respectfully maintains that the sediment removed from the Settling Basin and deposited within the Loup Power Canal and Lake Babcock does not represent 53 percent of the annual sediment supply to the Platte River as stated by the Commission. The District calculates the sediment removed from the system by Project operations to be 35 percent of the annual sediment supply from the Loup River system. An explanation of the calculation is provided below.

The total amount of sediment dredged, on an average annual basis is 2,004,800 tons / year (Table 5-1, Study 1.0 – Sedimentation, USR). The MRBC report estimated another 350,000 tons/year of sediment settles out in Lake Babcock and the canal. Also, sediment dredged to the South Sand Management Area (SMA) (560,000 tons/year) is eventually returned to the Loup River as detailed in the USR and the attached Appendix A. Therefore, the total annual amount of sediment removed from the system by Project operations is calculated as:

$$2{,}004{,}800 + 350{,}000 - 560{,}000 = 1{,}794{,}800\ tons/year$$

To calculate the percentage of removed sediment as compared to the total, the proper equation should be:

1 The sediment yield of the Loup River upstream of the diversion weir is adjusted based on the Loup Power Canal conveying 67 percent of the annual flow.

2 Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. Trends in Channel Gradation in Nebraska Streams, 1913-95. USGS Water-Resources Investigations Report 99-4103. Lincoln, Nebraska.

Value	**Amount of Sediment (tons/year)**
Total Amount removed by District Operations	1,794,800
Total Amount removed by District Operations + Total Amount of Sediment available to the Platte River at Columbus from the Loup River after dredging	1,794,800 + 3,373,500 = 5,168,300
Percent of total amount of sediment not available to the Platte River from the Loup River	1,794,800 / 5,168,300 = 35%

Shown another way:

$$\frac{1{,}794{,}800}{1{,}794{,}800 + 3{,}373{,}500} = 35\%$$

Continuing downstream, the removal of sediment from the Loup River system corresponds to 24 percent of the sediment supply of the Platte River at North Bend and 12 percent of the sediment supply at Louisville. Equations are shown below.

$$\frac{1{,}794{,}800}{1{,}794{,}800 + 5{,}770{,}000} = 24\%$$

$$\frac{1{,}794{,}800}{1{,}794{,}800 + 12{,}780{,}000} = 12\%$$

The Commission stated that "Table 5-1 also shows that the sediment yield of the Loup Power Canal to the Platte River is about 13 percent of the adjusted sediment yield of the Loup River upstream of the project's diversion weir." The District is unclear how the Commission arrived at this value. In addition, the District is unclear about the intent of the Commission's footnote 1 which states "The sediment yield of the Loup River upstream of the diversion weir is adjusted based on the Loup Power Canal conveying 67 percent of the annual flow." The sediment yield in Table 5-1 was adjusted based on the reduction in dredging amount pre- and post 1975, which was a ratio of 0.534.

With respect to the Commission's description of District sediment removal being analogous to flow released from a dam where sediment is trapped in the reservoir, the District respectfully disagrees with this comparison. Dams trap essentially all the sediment but discharge all the water, resulting in a downstream transport capacity in excess of yield. The District's calculations show that this never occurs with Project operations. In the Loup River bypass reach downstream of the diversion weir, the District diverts both water and sediment. The water that travels down the Loup River bypass reach is still flowing at its full carrying capacity. This is evidenced from calculations presented in the USR and studies by others (Chen et al., 1999). The Diversion Weir in the Loup River, therefore, does not act like a dam in regards to creating a sediment transport imbalance in the Loup River bypass reach.

In the Platte River downstream of the Project Tailrace, the Tailrace Canal return flow is not carrying sediment at capacity, which could be analogous to flow from a dam except for several other important points. The most important is that there is no evidence of a sediment supply deficit at Site 4 (immediately downstream of the Tailrace return) or at North Bend. The results of the studies presented in the USR corroborate this conclusion.

The District respectfully disagrees with the assertion that the “clear water” can adversely affect channel stability, and offers the following pieces of physical evidence indicating that channel instability in the form of degradation, or any coarsening, are not occurring downstream of the Tailrace Return.

A review of aerial photos between 2003 and 2010 shows there has been no change in the vegetated in-channel features immediately downstream of the Tailrace Return (see attached Platte River Series 2003 to 2010 figures 1 through 7). If either coarsening or degradation were occurring, those vegetated in-channel features would not persist year after year. In addition, the same braided pattern of the sandbars persists year after year, in addition to the bedforms. This demonstrates the dynamic nature and the natural translation of sandbars in the downstream direction typical of a braided system. If coarsening were occurring, this braiding and permanent features would not exist.

Additionally, cross sections for each ungaged site were surveyed once during the late spring and once during the late summer of 2010, as detailed in Study 2.0 – Hydrocycling, USR. The change in channel cross-section area between surveys was determined. In general, the average in channel cross-section area decreased, suggesting that the reaches aggraded between surveys. There was a 6 percent decrease in cross sectional area between surveys at Site 3, and a 4% and 3% decrease in cross sectional area for Sites 4 and 5 respectively. The change in cross sections at Site 4, consistent with the change in cross sections at Site 3, would indicate a general increase (or aggradation) of the channel between surveys. Recall that Site 3 is upstream of the Tailrace Return and is not affected by hydrocycling. The cross sections both upstream and downstream of the Tailrace Return exhibited similar cross-section changes. Any measured or calculated adjustment in geometry cannot be readily attributed to any other cause than the natural dynamics of a braided river.

Further, the cross section data taken at two or more points in time show that the cross-section at all study sites dramatically changes over short periods of time. Coarsening is a phenomenon that begins with slight degradation which mobilizes and lifts the fines across the bed surface. Formation of a coarse layer requires that the entire cross-section remain stable while the fines are piped up and transported. If the entire section is not coarsened, parts of the bed are more subject to down-cutting than others, resulting in continuous mixing of the sediments. As shown by the cross-section analysis in Study 2.0 - Hydrocycling, this mixing occurs in feet versus inches. Complete mixing of several feet of the bed sediments occurs even over short periods of time, preventing formation of a coarse layer that would be required under the Service's hypothesis. Further, the dramatic and continuous mixing of several feet of the bed material renders any distinguishable change in gradation imperceptible. In fact, narrow or unbraided rivers that form a layer of coarsened sediments are less subject to degradation by virtue of the reduction in transport due to the coarse sediments. But transport still occurs at capacity because the equations adjust for any changes in gradation.

Finally, the USGS obtained bed, bank, and sandbar sediment samples in 2010 (Schaepe and Alexander, 2011). The District has plotted the bed and sandbar D15, D50, and D85 were plotted spatially (Figures 1 through 6). As shown in the Figures, the gradation at River Mile (RM) 98.5, just downstream of the Tailrace Return, is finer than the measured gradation at RM 108 (near Duncan) and is consistent with the gradations measured downstream near North Bend, Ashland and Louisville. In addition, a Kendall Tau test was performed for each, revealing no trend between the measured data.

Review of this analysis shows there is nothing in the measured data that would suggest the river is degrading and subsequently coarsening downstream of the Tailrace Return. The fact that this is not occurring is additional support of the District's conclusion that there is not a sediment deficit downstream of the Tailrace Return.

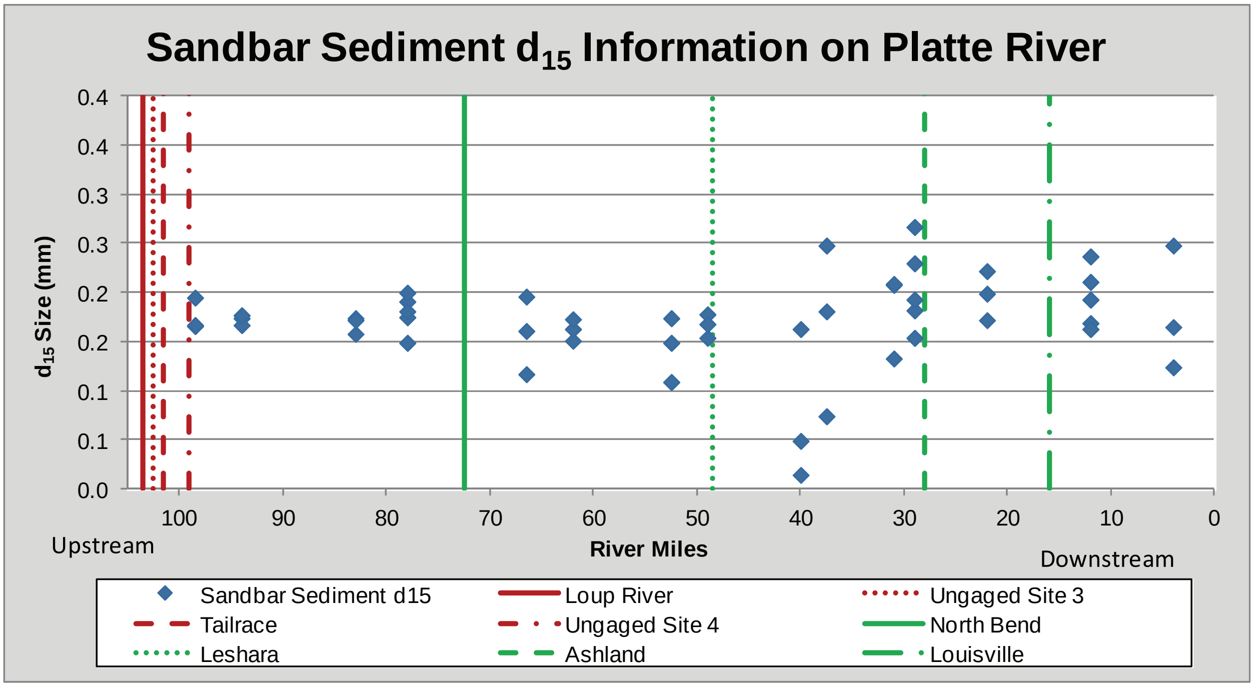

Figure 1 – d15 values from Sandbar samples

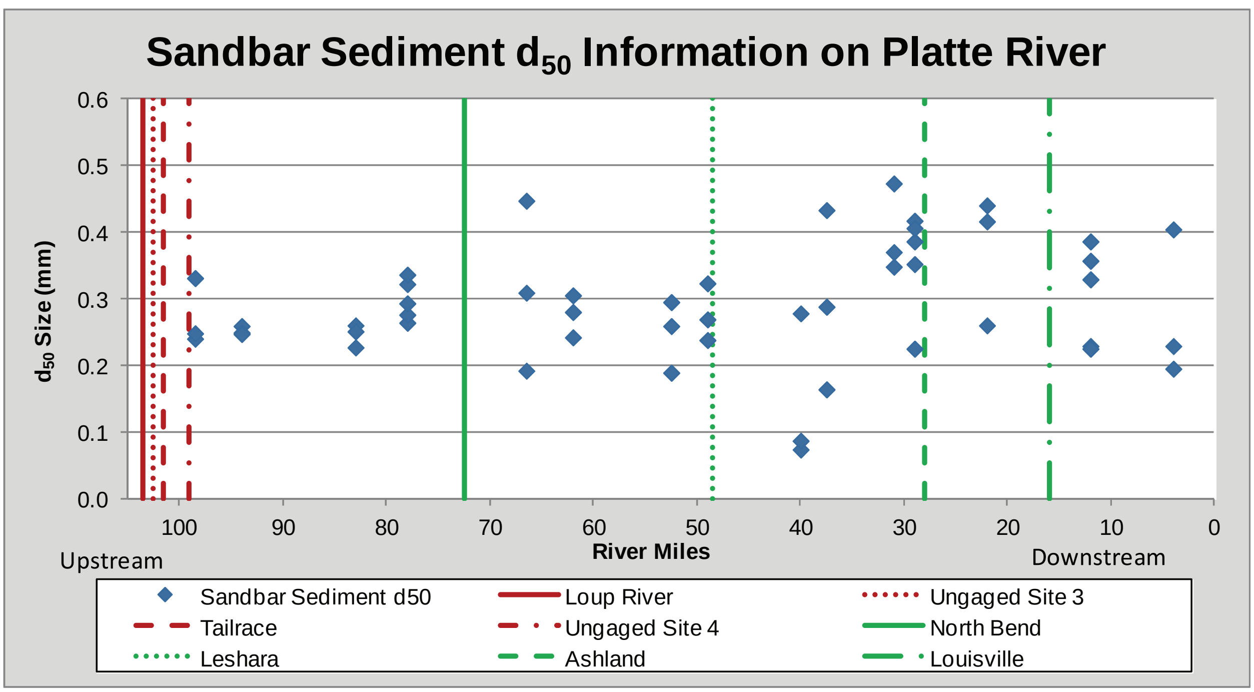

Figure 2 – d50 values from Sandbar samples

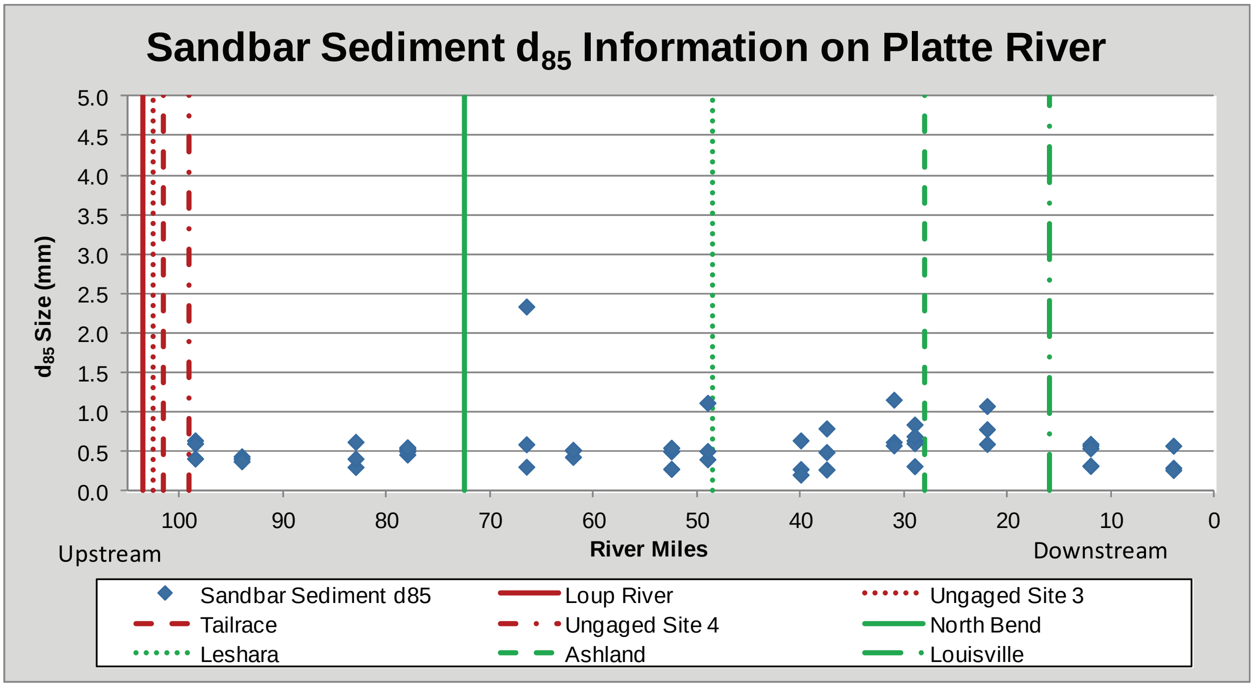

Figure 3 – d85 values from Sandbar samples

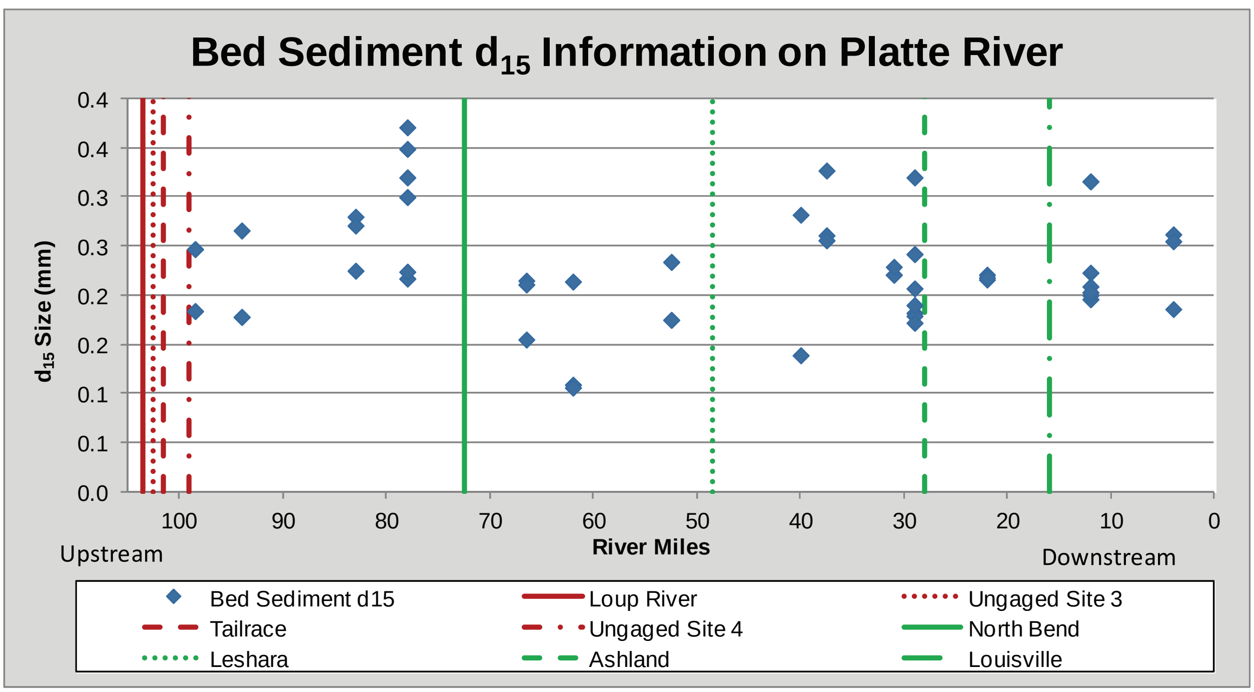

Figure 4 – d15 values from bed samples

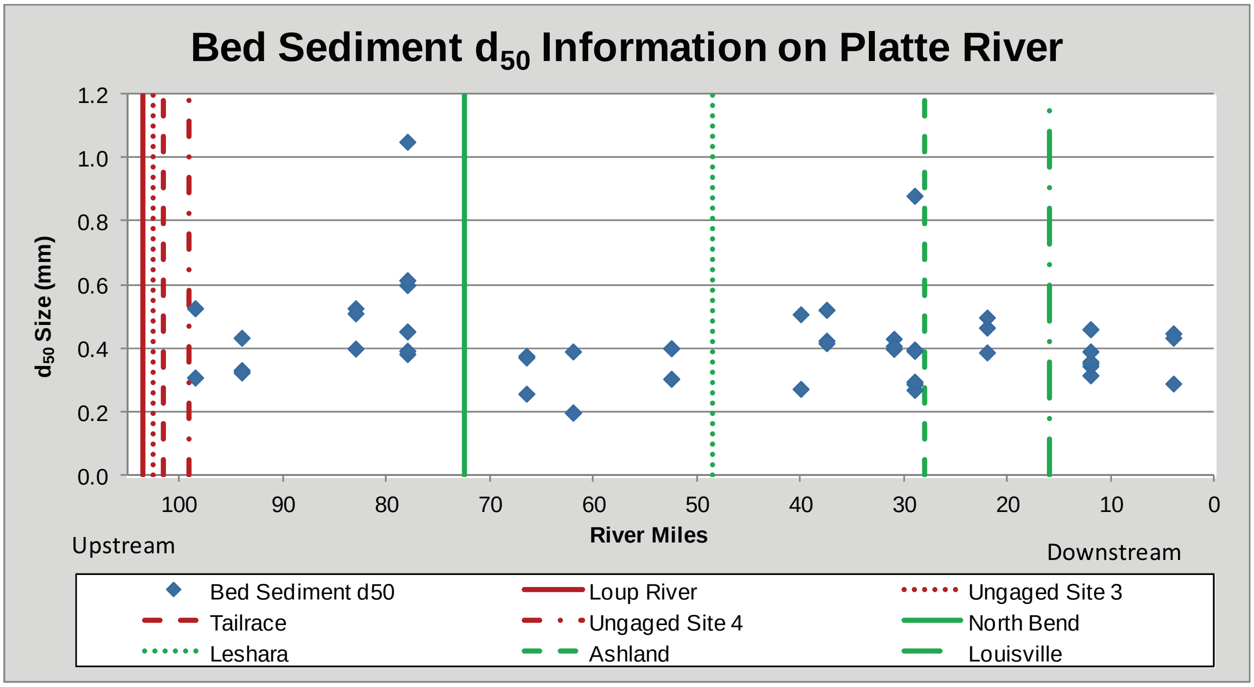

Figure 5 – d50 values from bed samples

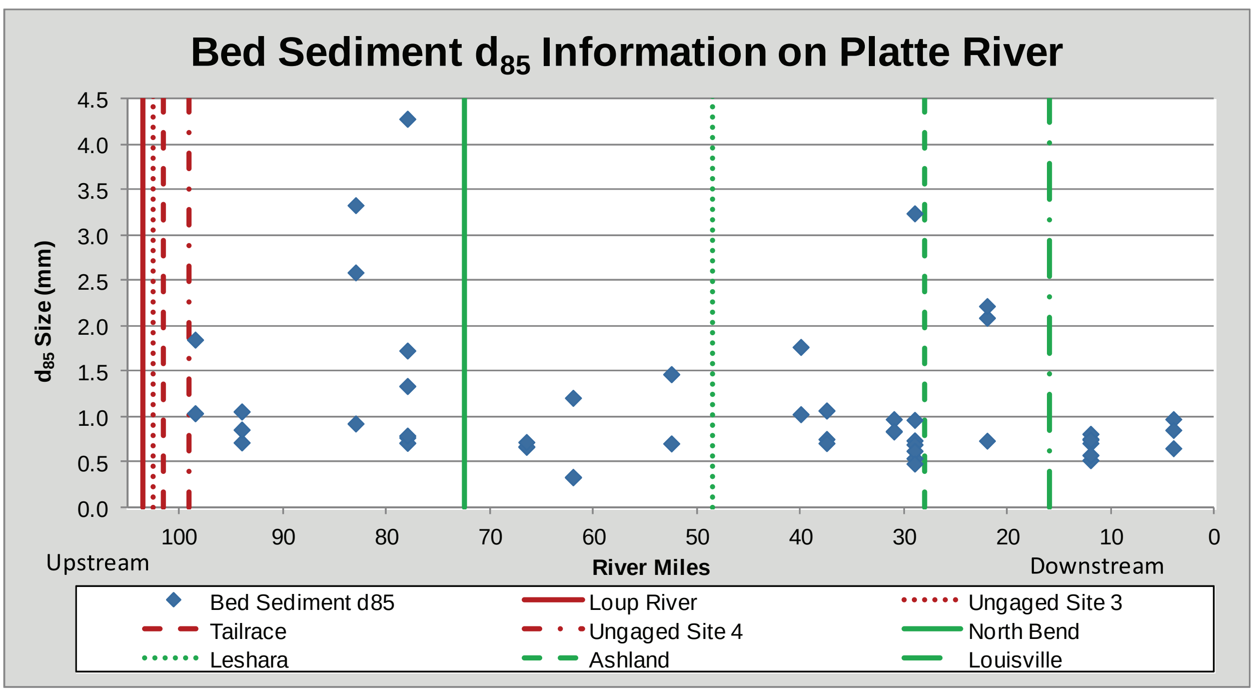

Figure 6 – d85 values from bed samples

In addition, the Chen et al. (1999) report shows that both the Loup River at Genoa and the Platte River at North Bend are both stable and show no signs of an aggradational or degradational trend. The Chen report does not support the assertion that the downstream erosive power is increased because the flows released from the project are no longer using energy to transport sediment removed from the system. In fact, in the summary section of the Chen, et al. report lists stations that are downstream from dams, and the Loup River at Genoa and the Platte River at North Bend are not in this list, as the USGS does not consider these sites as downstream from a dam, nor that they are analogous to a dam.

The District's specific gage analysis, which uses a similar data set to the one used in the Chen report, also shows no overall aggradational or degradational trend at North Bend.

The HEC-RAS sediment transport modeling effort, which was requested by the Commission, also shows that Site 4 is not experiencing overall degradation nor is it experiencing anything that is analogous to what occurs downstream of a dam. The results of the HEC-RAS sediment transport modeling show that there is no overall aggradational or degradational trend in mean channel invert, as shown in Study 2.0 – Hydrocycling, USR Figure 5-31; and as shown in Figure 5-35, the amount of sediment transported matches the sediment capacity of the site with no evidence that the Tailrace Canal return is adversely affecting channel stability. As stated in the USR, the modeled trends experienced at Site 4 (see Figures 5-31 and 5-32 of Study 2.0 – Hydrocycling, USR), that trended between aggradational and degradational, and ultimately showed a stable trend, suggest that the Tailrace Return flows do not have a negative effect on the sediment transport or the channel being in dynamic equilibrium. It suggests that the increased flows in the channel downstream of the Tailrace Return have been balanced by the inflowing sediment from Site 3 (and further upstream) as well as the change in channel hydraulic characteristics between Sites 3 and 4.

Review of the literature and the District's analysis shows there is nothing in the measured data that would suggest that coarsening is occurring or that the river is degrading downstream of the Tailrace Return. The fact that this is not occurring is more proof that there is not a sediment deficit downstream of the Tailrace Return. Because of this, the District did not evaluate modifying dredge operations.

4. Commission Suggested Operational Alternatives Study - Proposed Methodology

§5.8(b)(6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

"Our proposed study methodology is for you to apply the dominant and effective discharge methodology used in Study 2.0., *Hydrocycling*, to analyze the effects of the following alternative operations in the Loup River bypassed reach and the lower Platte River. You would document all input parameters, assumptions, and computations."

"**Alternative 1**. Release all dredged material to the Platte River at its confluence with the Loup Power Canal. This alternative would include construction and operation of a pipeline to convey dredged material from the Settling Basin to the confluence of the Loup Power Canal with the Platte River. Neither the existing North or South Sand Management Areas would be used."

"**Alternative 2.** Release all dredged material to the South Sand Management Area. Under this alternative, all dredged material from the Settling Basin would be directed to the South Sand Management Area. The North Sand Management Area would not be used."

"**Alternative 3.** Release all dredged material to the South Sand Management Area and modify project operation to allow additional flow in the Loup River bypassed reach during high flow events. This alternative would be identical to Alternative 2 except that project operations would be curtailed during the tern and plover nesting season to allow high-flow events to transport sediment to the Loup River bypassed reach."

"**Alternative 4.** Release all dredged material to the South Sand Management Area, modify project operations to allow additional flow in the Loup River bypassed reach during high flow events, and modify project operation to maintain a minimum water level in the Loup River bypassed reach. This alternative would be identical to Alternative 3 except that project operations would be modified during the tern and plover nesting season to provide a minimum flow in the Loup River bypassed reach to allow development and maintenance of tern and plover nesting habitat."

District Response
The District has come to the conclusion that it has not clearly articulated Project dredging operations and how the dredging process has evolved over more than 70 years of Project operation. Therefore, the District provides a description of how dredging operations have evolved since project inception in Appendix A, Summary of Loup River Hydroelectric Project Dredging Operation. The District believes a clear understanding of Project dredging operations is critical to discussing and evaluating alternatives, such as those proposed by the Commission,

With respect to Commission Alternative 1, the District notes that all analysis presented in the studies in the USR show that the Platte River is transporting sediment at capacity, therefore the District did not study further what would happen if an additional 2 millions tons of sediment per year were to be released to a Platte River that is already carrying abundant sediment supplies at capacity.

The dominant and effective discharge methodology used in Study 2.0 – Hydrocycling, USR, is based on the existing sediment discharge rating curve and a hydrograph. The existing sediment discharge rating curve is a function of the existing hydraulic condition in the river, namely, the width, depth, and velocity versus discharge relationships developed from measured or modeled values. In order to evaluate this alternative using the effective or dominant discharge methodology, assumptions would have to be made to alter the flow hydrograph, change the average size of the sediment particles, change the slope of the river, or alter the depth-discharge or width-discharge relationships.

Unless the hydrograph is altered, the effective and dominant discharges would be unchanged for this scenario. And from the definition of these indicators, the channel geometry would not change unless either or both were changed. The method is able to determine impacts on geometry of prescribed changes in effective or dominant discharge, or changes in either indicator from prescribed changes in channel geometry, but cannot perform both at the same time.

As an excellent qualitative indicator, Lane's relationship[3], as shown below states that the product of sediment discharge and median grain size is directly proportional to the product of discharge and bed slope.

$$Q_s d \ \alpha \ QS$$

[3] Lane, E.W. 1957. A Study of the Shape of Channels Formed by Natural Streams Flowing in Erodible Material. Missouri River Division Sediment Series No. 9, U.S. Army Corps of Engineers, Missouri River Division, Omaha, NE.

Where Q_s is the sediment discharge, d is the median sediment size, Q is the discharge, and S is the bed slope. Under Alternative 1, the median grain size (d) and the available flow (Q) would remain constant. Adding sediment would require Q_s to increase, meaning that the channel slope, S, would also have to increase.

According to the regime equations presented in Study 1.0 – Sedimentation, Study 2.0 – Hydrocycling, and Study 5.0 – Flow Depletion and Flow Diversion in the USR, a braided river is distinct from a meandering river by the relationship between bankfull (or dominant or effective) discharge, slope, and (depending upon the author), the sediment size. By putting more sediment into the Loup River bypass reach, without a commensurate increase in flow, according to all three regime equations and Lane's "law," one consequence of adding the sediment would be that the slope would likely increase.

Adding the 2 million tons of sediment per year to the Platte River which is already flowing at capacity could cause stability issues. Approximately 5,000 tons per day of sediment would be added. At Site 4, according to Yang's Unit Stream Power sediment discharge rating curve, an average of an additional 3,500 cfs of water per day would be needed to transport this additional sediment load.

The sediment yield in the Loup River bypass reach includes the sediment available from dredging to the South SMA. If all sediment from the dredging process were to be transported to the Platte River, it might negatively affect sediment transport in the Loup River bypass reach. Table5-1 in Sedimentation in the URS illustrate that the sediment from the SMA is an integral part of ensuring the Loup River bypass reach is transporting sediment at capacity. If this sand were to instead be transported directly to the Platte River, the Loup River bypass reach might start exhibiting signs of sediment deficit.

Additionally, if the South SMA were no longer used, there would be a loss of recreational area as the large expanse of sand at the Headworks OHV (Off-Highway Vehicle) Park would be slowly vegetated and perhaps be less suitable to recreational use by OHVs.

Also, if the District were to stop using the North SMA, it would adversely affect the interior least tern and piping plover habitat that exists at the North SMA. Consistently, the North SMA has been one of the largest colonies of nesting interior least terns along the Loup River. The North SMA provides a large sandy area with adjacent wetted areas that are consistently used for nesting, breeding, and foraging. The dredging operations provide an important source of water and food to the North SMA for a variety of species, including interior least terns and piping plovers. If the District were to cease discharging sediment to the North

SMA, it would no longer be actively managed and would become vegetated and unsuitable for nesting.

As stated in Appendix A, a concrete flume was originally constructed on the south side of the settling basin to discharge dredged sediment to the Loup River bypass reach. The final engineering report developed by Harza Engineering in 1938, investigated the potential to construct a flume all the way to the tailrace, based on the contract price for constructing the concrete flume along the south side of the Settling Basin and assuming a nominal amount for right of way acquisition, the report estimated it would cost $1,000,000, in 1938 dollars, to extend the flume 30 miles to the Tailrace. Holding everything else constant (i.e. design standards, etc.) and escalating the 1938 construction cost estimate to current 2011 dollars using the consumer price index, results in a cost of approximately $16 million[4]. This does not take into consideration the amount or source of additional water necessary to convey the sediment, current design standards, the environmental permitting issues associated with such a construction, the logistics of discharging the sediment into the river, and the uncertainty associated with conveying approximately 5,500 tons of sediment per day over 30 miles in a concrete flume. Taking all of these into consideration, the District believes the cost of Commission Alternative 4 would exceed hundreds of millions of dollars; therefore, the District believes this alternative is not practicable.

With respect to Commission Alternative 2, the District provides the following discussion. As stated above, the dominant and effective discharge methodology used in Study 2.0 Hydrocycling in the USR, is not suited to study adding all dredged sediment back into the Loup River via the South SMA. Unless the hydrograph changes, or the depth-discharge or width-discharge relationships change (which can only occur if the effective or dominant discharges change), there will be no change to the effective or dominant discharges. The Loup River bypass reach is already flowing at capacity.

To add more sediment, approximately 2 million tons per year, to the South SMA would reinstate the issues that caused the District to develop the North SMA, as detailed in Appendix A. If all of the dredged material were to once again be placed on the South SMA, it is likely that the same issues would arise.

Also, as discussed above, if the District were to stop using the North SMA altogether, it would adversely affect the interior least tern and piping plover habitat that exists at the North SMA.

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4 U.S. Department of Labor: Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items. http://research.stlouisfed.org/fred2/data/CPIAUCNS.txt

With respect to Commission Alternative 3, the District notes that the maximum flow in the Power Canal is 3,500 cfs, per the hydraulic capacity of the canal as well as the District's water appropriation from the Nebraska Department of Natural Resources. During high flow events on the Loup River all flows above 3,500 cfs already flow down the bypass reach regardless of when they occur. Additionally, during high flow events, if there is debris in the Loup River upstream of the Diversion, the District will stop diverting water altogether in order to protect the canal, thus allowing more water down the bypass reach during high flow events. Also, currently, the Power Canal does not always flow at maximum capacity, the table below shows the average flow in the canal, by month, for the period of record. The table shows that with the exception of April, the average flow in the canal is less than 2,000 cfs.

Loup River Power Canal near Genoa 10/1/1937 to 9/30/2010			
Month	**Minimum**	**Mean**	**Maximum**
Jan	4.5	1,160	2,790
Feb	9.3	1,520	2,990
Mar	12	1,840	3,160
Apr	93	2,140	3,410
May	12	1,990	3,430
Jun	94	1,950	3,290
Jul	56	1,390	3,340
Aug	0	1,280	3,140
Sep	0	1,580	3,320
Oct	4.2	1,950	3,220
Nov	3	1,870	3,560
Dec	1	980	3,050

As stated above in the analysis of Alternatives 1 and 2, an additional 2,000,000 tons per year of sediment reintroduced into the bypass reach would translate to approximately 5,500 tons of additional sediment per day. In order for the bypass reach to transport that additional sediment, an additional flow of 1,500 cfs would have to be allowed down the bypass reach, based on the current and most accurate sediment discharge rating curve of the Loup River at Genoa. This flow is greater than the average flow in the canal in January, July, August, and December, and approximately equivalent to the average flow in the canal during February and September. Therefore, on average, to transport the dredged sediment, the canal would have to completely shut down about half the year. In the other half of the year, the flow remaining in the canal after the required 1,500 cfs were allowed down the bypass reach, would likely be less than is needed to operate the canal. Simply put, the amount of sediment entering the settling basin is commensurate to the amount of flow entering the settling basin. In order to transport the entire sediment load entering the settling basin, the entire flow entering the settling basin would have to be allowed into the bypass reach, in effect, eliminating the project.

Also, as discussed above, if the District were cease diversion, and thus cease dredging and using the North SMA, it would adversely affect the interior least tern and piping plover habitat that exists at the North SMA. Additionally, if the District were to cease diversion of flow into the Power Canal, especially in the summer months, it could lead to fish kills in the canal and other impacts due to the degradation of water quality in the canal.

With respect to Commission Alternative 4, as stated above, in order to convey all sediment entering the settling basin, essentially all flows entering the settling basin would also be needed in the Loup River bypass reach. Invoking an additional minimum flow in the bypassed reach would only exacerbate the impacts described under Alternative 3.

Because of the flow-related reasons above, this alternative would cause the District to no longer operate the project, therefore, this scenario would be equivalent to the no diversion scenario, which has already been fully modeled and documented. The sedimentation-related results of the no diversion scenario have been presented in Study 5.0 – Flow Depletion and Flow Diversion. Under this scenario, the Loup River bypass reach would, over time, look exactly like the Loup River upstream of the Power Canal Diversion. Therefore, there is no reason to study this scenario a second time.

Also, as discussed above, if the District were cease diversion, and thus cease dredging and using the North SMA, it would adversely affect the interior least tern and piping plover habitat that exists at the North SMA. Additionally, if the District were to cease diversion of flow into the Power Canal, especially in the summer months, it could lead to fish kills in the canal and other impacts due to the degradation of water quality in the canal.

5. Commission Suggested Operational Alternatives Study - Level of Effort and Cost

§5.9(b)(7) – Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

"The estimated cost of this work is approximately $25,000. This desktop analysis may be completed for incorporation into the applicant's preliminary licensing proposal, if possible, or if time does not permit, the results should be included in the license application filed with the Commission."

District Response
The District believes it has provided sufficient evidence that additional study of sedimentation as requested by the Commission is not needed; therefore, the Commission's estimate of $25,000 for additional study is not relevant.

Appendix A

Summary of Loup River Hydroelectric Project Dredging Operation

Water diverted from the Loup River enters the Settling Basin. The Settling Basin is designed for very slow flow velocity to allow heavier sediment materials to settle out of the water before it enters the much narrower, faster flowing Upper Power Canal. Design flow velocity through the Settling Basin is less than 1 foot per second. The Settling Basin is approximately 2 miles long and has a bottom width of 200 feet and a nominal depth of 16 feet. Hydraulic capacity of the basin varies depending on the accumulation of sand, silt, and sediment within the basin. Maximum hydraulic capacity, when the basin is largely free of sediment, is 3,500 cfs.

A floating Hydraulic Dredge is employed to remove accumulated sediment from the Settling Basin (see Photos 1 and 2). Without frequent dredging, the Settling Basin would quickly become choked with sand and cause the Project to shut down. Each year, the Hydraulic Dredge removes approximately 1 million to 1.5 million cubic yards of sediment from the Settling Basin. Sediment (in the form of silt, sand, and gravel) pumped by the dredge is carried through an articulated steel pipeline to a series of fixed steel discharge pipes spaced along both sides of the Settling Basin. These pipes lead to the North and South Sand Management Areas (SMAs), (see Photos 3 and 4). located on either side of the Settling Basin (See Figure A-1). The North SMA is approximately 320 acres in size and is located north of the Settling Basin. The South SMA is approximately 400 acres in size and is located south of the Settling Basin, adjacent to the Loup River. Although designed for the same purpose—to receive and decant dredged material—the two areas have evolved quite differently.

As part of the original Project development, a concrete flume was constructed adjacent to the south bank of the Settling Basin (see Figure A-2). Its purpose was to convey the dredged material to a point downstream of the Skimming Weir, where it discharged material back into the Loup River bypass reach. However, the flume did not have sufficient capacity to convey the dredged material, and as a result, silted in within the first year of operation. Subsequently, all dredged material was pumped to the South SMA from 1937 to 1960. The quantity dredged during that period averaged approximately 2,600,000 cubic yards annually. In the mid to late 1950's, riparian property owners on the south side of the Loup River expressed concern that as the South SMA increased in size, the Loup River Bypass Reach was migrating south. To remediate this situation, the District began dredging material in 1961 to the North SMA as well as the South SMA. From Project inception, most of the sediment dredged was pumped to the South SMA. However, once the North SMA developed, the majority of sediment has been dredged to the North SMA. Prior to 1973, approximately 75 percent of the sediment dredged was pumped to the South SMA. Since then, only about 28 percent of dredged sediment has been pumped to the South SMA.

Figure A-3 shows the amount of material dredged since Project inception. The graph reveals a reduction in dredged material after approximately 1974. Prior to 1974, the amount of dredged material was approximately 2.34 million cubic yards per year (3.75 million tons per year). Since 1975, that amount has been reduced to approximately 1.24 million cubic yards per year (2 million tons per year). The reason for this disparity is not clear, but it may be related to development of upstream reservoirs or other changes in the upper Loup River Basin.

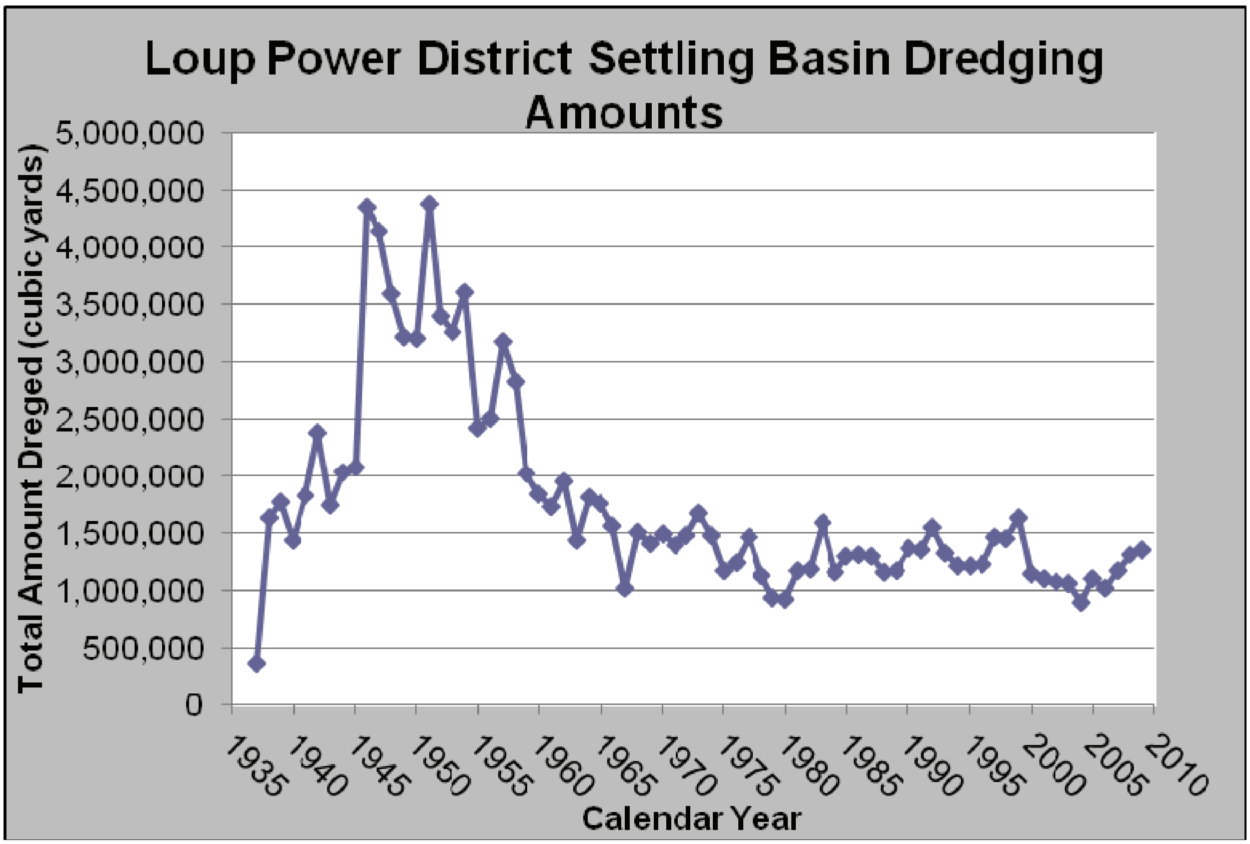

Figure A-3. Loup Power District Settling Basin Dredging History

As previously stated, the material is dredged in the Settling Basin and is distributed to the North and South SMAs through fixed 28 inch diameter discharge pipes on either side of the Settling Basin. There are 13 discharge pipes for the South SMA evenly spaced from the most northeast corner to the approximate center of the South SMA. The North SMA has 15 discharge pipes evenly spaced along its entire length. The discharge pipe locations are shown in Figure A-1.

Coarser sediment materials settle out in the upstream portion of the Settling Basin, while the finer sediment deposits settle out nearer the downstream end. Sediment accumulates in the greatest quantity at the upstream end of the Settling Basin, and the accumulation quantity decreases in the downstream direction.

The annual dredging operation is initiated in the spring after the winter ice cap melts in early March. Dredging begins at pipe #1 of the South SMA (see Figure A-1) because the downstream end of the Settling Basin has the lowest quantity of accumulated sediment, and thus the greatest depth of water to float the dredge. Prior to the mid 1980's the dredging operation would progress from downstream to upstream from March through November. However, since 1988 the dredging operation is suspended from early June to mid August to accommodate the interior least tern and piping plover nesting season.

Currently, dredged material is pumped to the South SMA from pipe #1 to pipe #13, and to the North SMA from pipe #1 up to approximately pipe #8 between March and June 1 (see Figure A-1). In mid-August, dredging begins again at the downstream end of the Settling Basin, and progresses upstream toward the head gates. Typically, dredging is suspended in mid to late November when ice begins to form on the Settling Basin. Prior to 1988, when the dredging schedule was modified to accommodate nesting, the entire Settling Basin was dredged at least once annually. However, since 1998, it is rare that the entire basin gets dredged annually. Maintenance on the dredge is typically conducted in the winter between late November and early March, and is conducted as necessary during the nesting season shutdown between June 1 and mid August.

After dredge material is deposited at the South SMA, the sand and water are conveyed adjacent to the Settling Basin in a northeasterly direction; a majority of the sand and water eventually flows back into the Loup River, as evidenced by establishment of large trees and only small changes in the elevation of the South SMA. However, since the material dredged to the North SMA stays on site, the North SMA eventually covered approximately 320 acres and extended over 80 feet above natural grade.

In 2006, the District entered into an agreement with a materials processing company that wanted to purchase and remove sand from the North SMA. The District subsequently entered into an agreement with Preferred Sands[5] to remove sand from the North SMA and process it at Preferred Sands' facility located north of and outside of, the Project Boundary. As a condition of sand removal, the District required that Preferred Sands coordinate with USFWS and NGPC to ensure that sand removal operations would not adversely affect interior least terns

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5 The District's original agreement in 2006 was with Harwest. Through transfers and acquisitions, Preferred Rocks of Genoa and then Preferred Sands took over this operation. Each of these companies has accepted and abided by the conditions of the original agreement.

and piping plovers. As a result, a Memorandum of Understanding (MOU) was developed by Preferred Sands, USFWS, and NGPC that includes an adaptive management plan to protect the threatened and endangered birds.

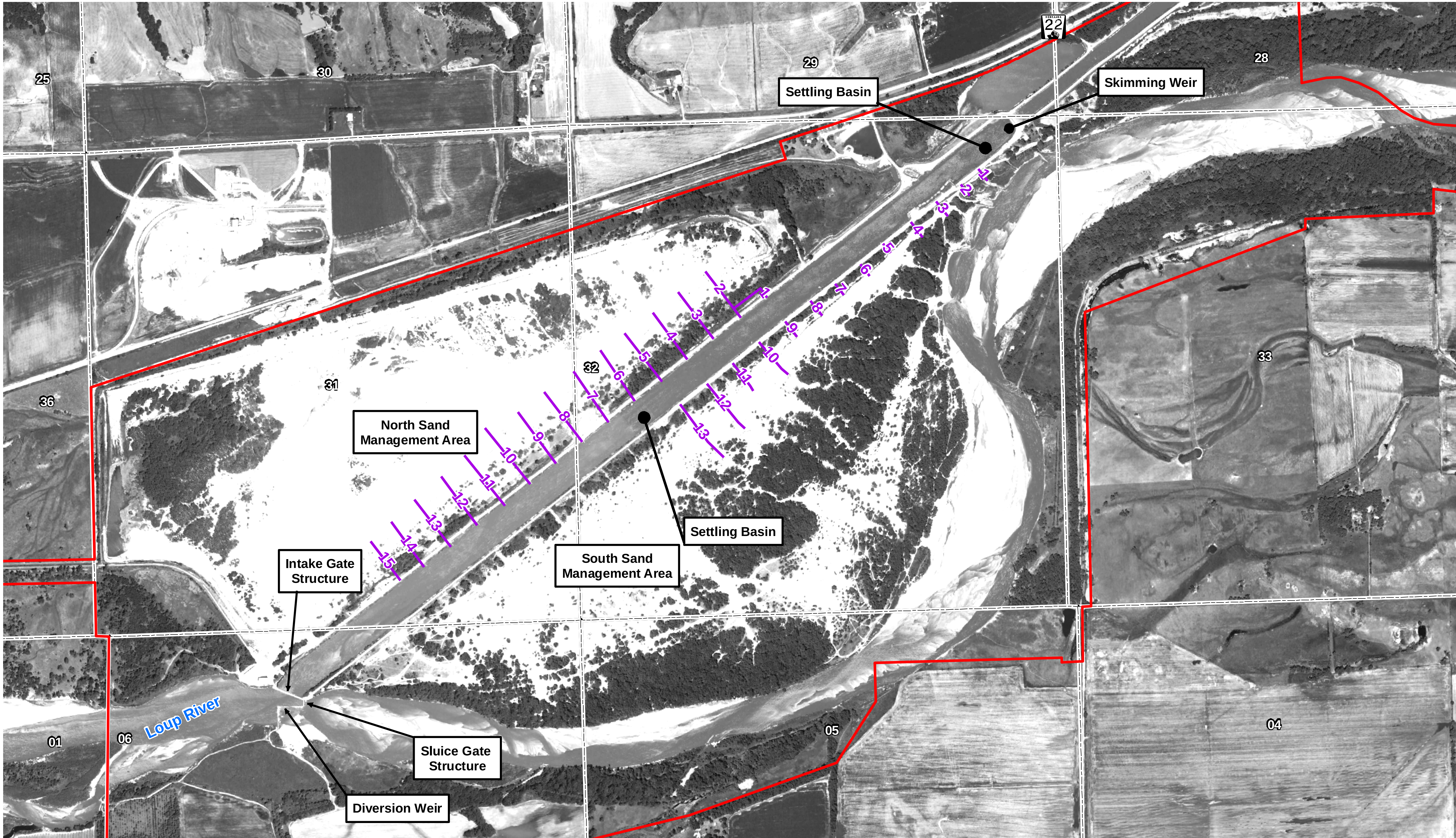
The District anticipates that Preferred Sands will continue to remove and process sand from the North SMA for a substantial period of time; however, the length of this operation, and whether it will continue for the entire period of a new license, cannot be estimated because Preferred Sands' operation is dependent on the demand for sand in the marketplace. However, if sand removal operations were to cease, the District could continue to use the North SMA for sand disposal with the acquisition of additional acreage as needed.

Photo 1. The 1937 Hydraulic Dredge, "PAWNEE," in dry dock for maintenance.

Photo 2. View of part of the floating dredge.

Photo 3. A typical dredge connection point along the Settling Basin.

Photo 4. Typical discharge piping and shoreline stabilization at the South Sand Management Area.



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Feet

Aerial Imagery: 2010 National Agricultural Inventory Project, Nance and Platte Counties Mosaic

Legend

- Project Boundary
- Section Line

Loup Power District Hydro Project

Settling Basin Dredge Discharge Locations

Loup River Hydroelectric Project
FERC Project No. 1256
Draft License Application

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DATE
November 2011

FIGURE
A-1

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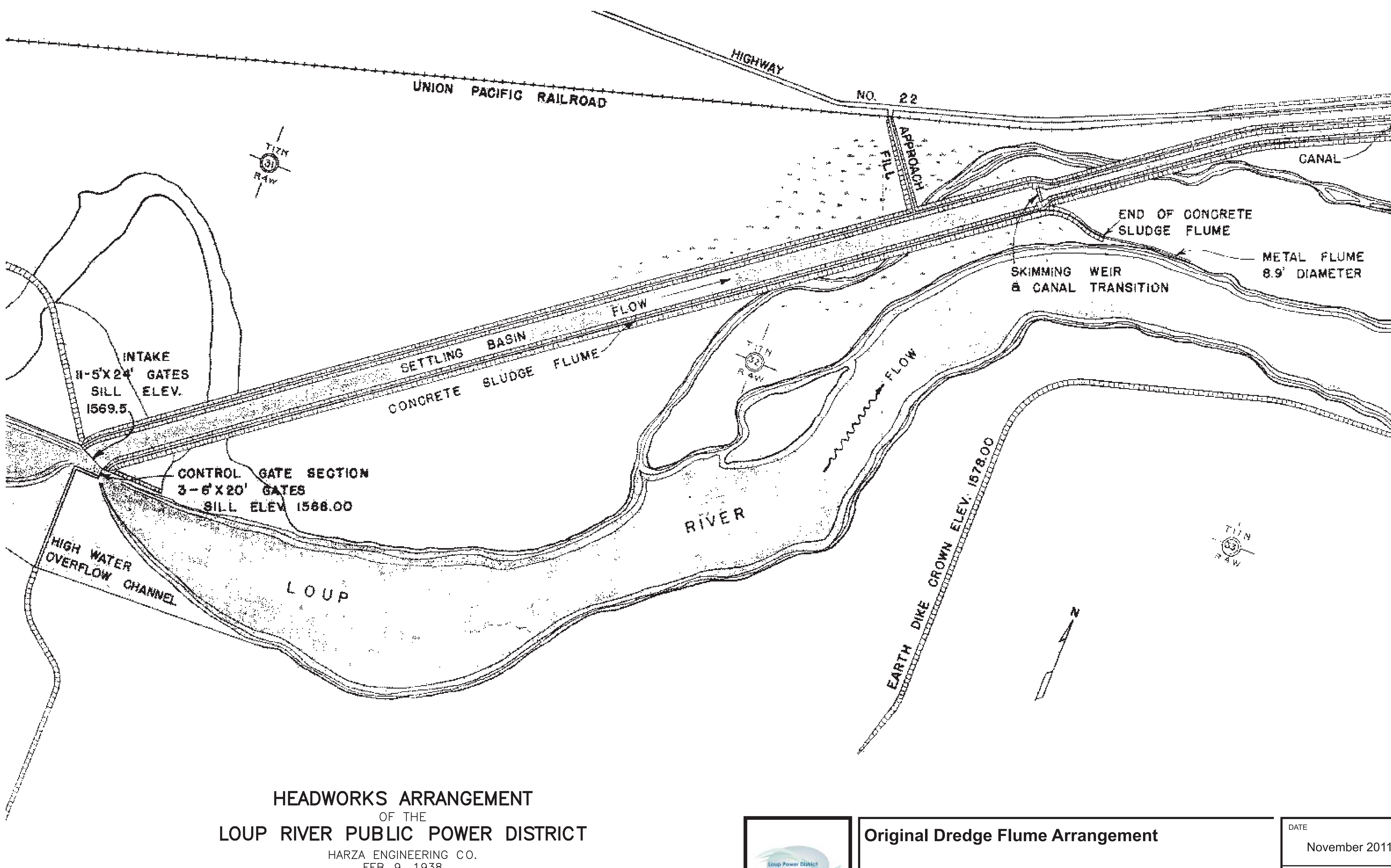

Original Dredge Flume Arrangement

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FIGURE
A-2

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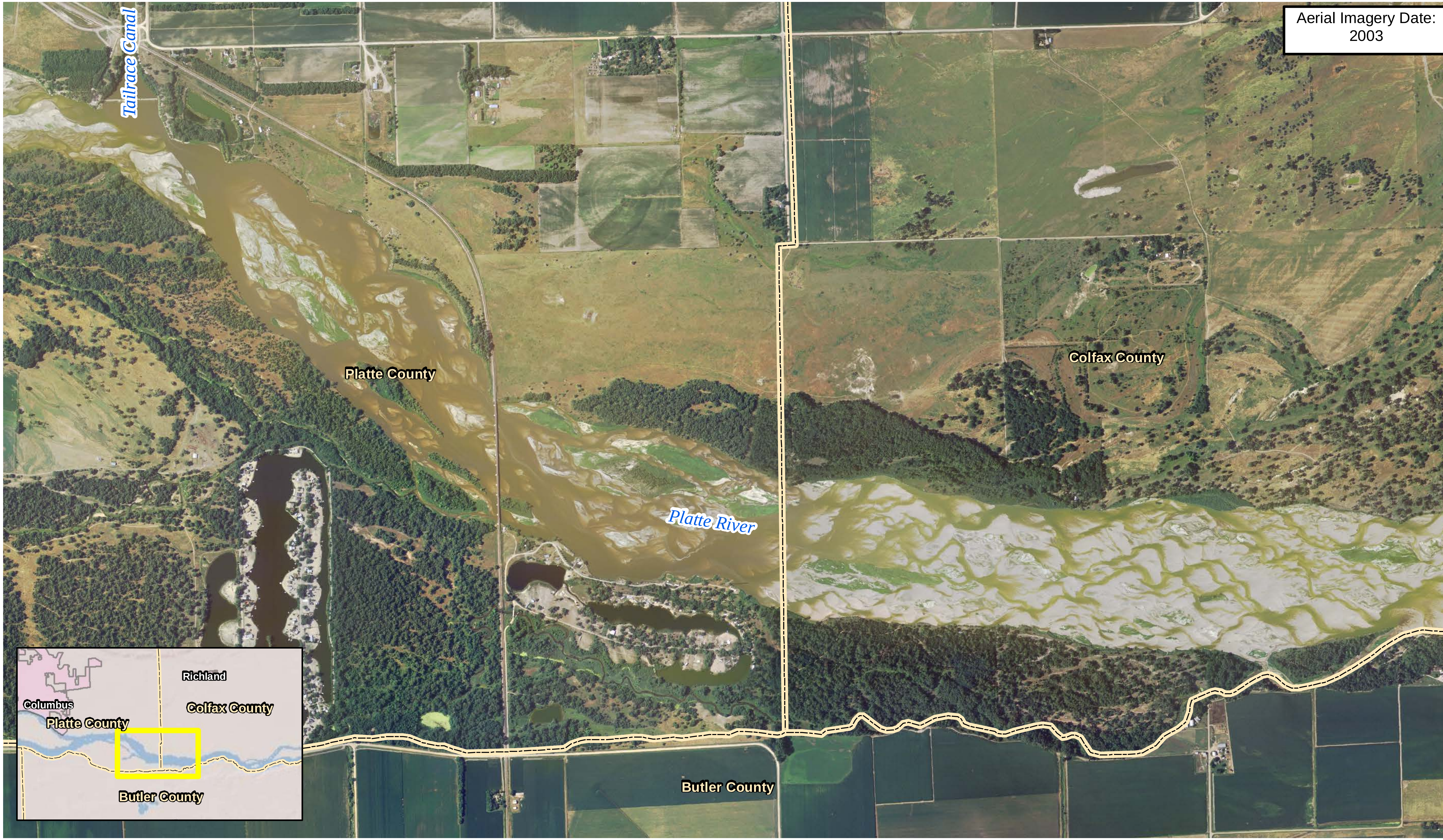

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2004 Platte County, USDA NAIP Imagery
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2007 Platte County, USDA NAIP Imagery
2009 Colfax County, USDA NAIP Imagery
2010 Colfax County, USDA NAIP Imagery

Loup Power District Hydro Project

Platte River Series 2003 to 2010

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DATE
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FIGURE
1

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Source: 2003 Platte County, USDA NAIP Imagery
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2005 Platte County, USDA NAIP Imagery
2006 Platte County, USDA NAIP Imagery
2007 Platte County, USDA NAIP Imagery
2009 Colfax County, USDA NAIP Imagery
2010 Colfax County, USDA NAIP Imagery

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FIGURE
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2005 Platte County, USDA NAIP Imagery
2006 Platte County, USDA NAIP Imagery
2007 Platte County, USDA NAIP Imagery
2009 Colfax County, USDA NAIP Imagery
2010 Colfax County, USDA NAIP Imagery

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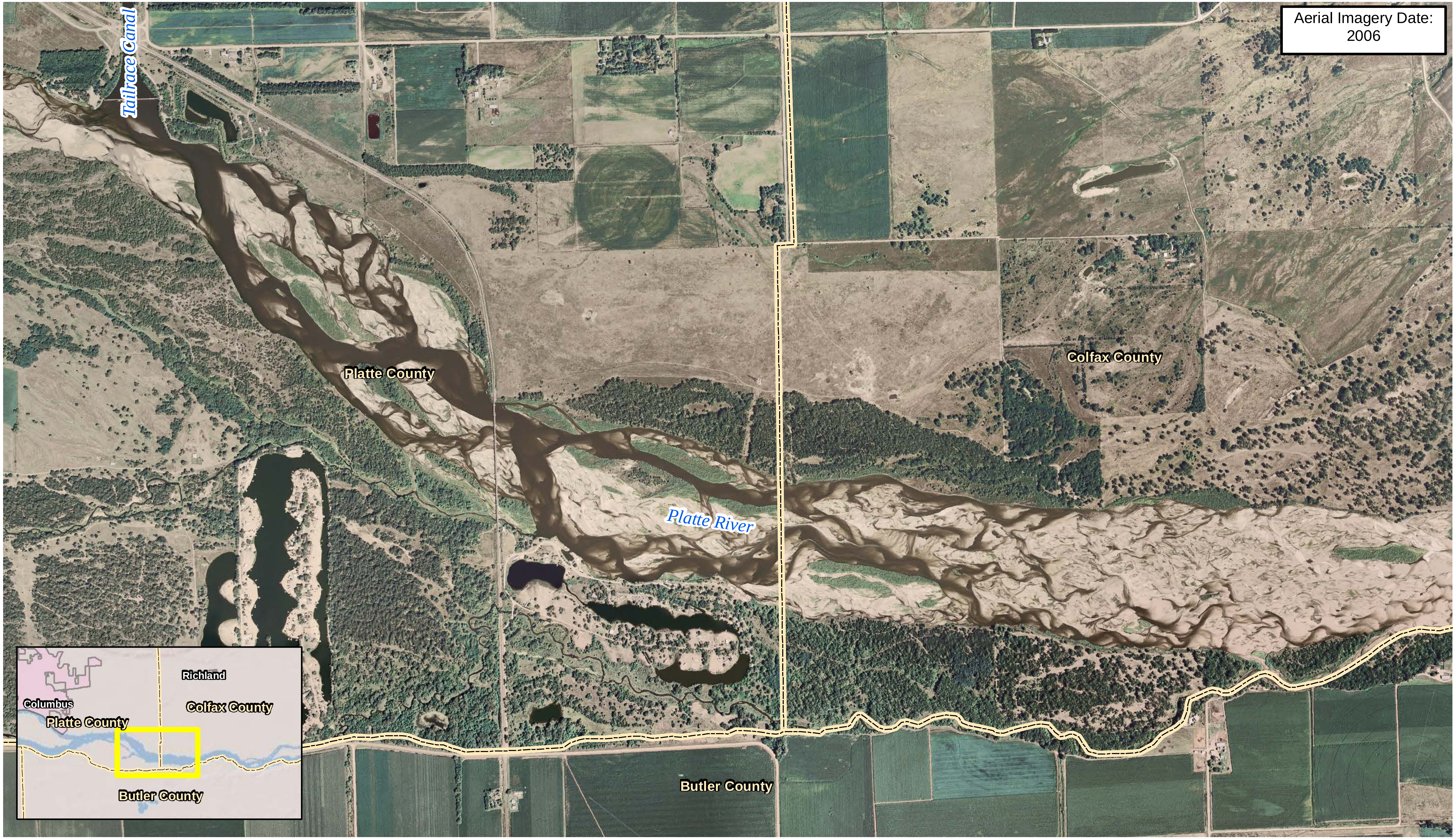
FIGURE
3



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2010 Colfax County, USDA NAIP Imagery

Loup Power District Hydro Project

Platte River Series 2003 to 2010

Loup River Hydroelectric Project
FERC Project No. 1256

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DATE
November 2011

FIGURE
4

Z:\Projects\Loup_Power_District\37104_LPD_FERC_Relicensing\map_docs\mxd\map_11x17_PlatteRiver_Aerials.mxd, 11/23/2011

Source: 2003 Platte County, USDA NAIP Imagery
2004 Platte County, USDA NAIP Imagery
2005 Platte County, USDA NAIP Imagery
2006 Platte County, USDA NAIP Imagery
2007 Platte County, USDA NAIP Imagery
2009 Colfax County, USDA NAIP Imagery
2010 Colfax County, USDA NAIP Imagery

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FIGURE
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FIGURE
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DATE
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FIGURE
7

November 23, 2011

Attachment B

District response to U.S. Fish and Wildlife Service (USFWS) comments on the Updated Study Report dated October 20, 2011.

1. Comments on Sediment Transport Analysis

USFWS Comment 1

"Because of the inter-annual variability in flow and sediment transport, detection of trends in degradation or aggradation may require decades of observation as evidenced by Chen et al. (1999). Detection of aggradation/degradation is especially difficult for braided channels because large changes in sediment imbalance equates to relatively small changes in elevation compared to narrower channels."

District Response

The District recognizes that the very dynamic nature of a braided system makes it difficult to detect changes over a relatively short period of time. For this reason, the District referenced the article by Chen, Rus, and Stanton (1999) in the Updated Study Report (USR) which evaluated decades of measurements taken by the USGS. The Chen study best addresses the question of aggradation or degradation by evaluating measurements, not models, of trends in channel gradation (slopes) in Nebraska streams, including both the lower Platte River and the Loup River at and downstream of the Diversion Weir. By evaluating extensive sets of longitudinal, cross section, and water surface elevation data collected at 145 gaging stations between 1913 and1995, Chen et al. reported the following conclusions:

- Channel degradation was found at stations downstream of dams.
- No such degradation was found downstream of the Project Diversion Weir.
- A slight aggrading trend was noted at the Loup River at Columbus, but Chen, Rus, and Stanton pointed out that it did not have the same data set as the other gages. Gaging at the site was discontinued in 1978 and not resumed until 2008.
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- A slight degrading trend was noted at Louisville, which was attributed to site-specific circumstances and not considered to be generic.

As previously stated, the analysis by Chen et al. covered decades of measurements through 1995. Additionally, in conjunction with the Updated Study Report, the District performed a specific gage and associated Kendall Tau analysis extending the gage records through 2010. The specific gage analysis revealed results consistent with of Chen in that the gages were stable over the period evaluated. In addition, the Kendall Tau analysis identified no consistent aggradational or degradational trends at any of the analyzed gages. Therefore, it is concluded that at all gages analyzed, there was no overall aggradational or degradational trend found by the long term observation that has been documented, making any other analysis unnecessary, especially using models versus measurements.

USFWS Comment 2

"The Service has found that the 17-year assessment period for the sediment transport analysis is inadequate in assessing Project effects throughout the 30-year license period. The Service recommends that the sediment transport model simulate operations for a 30-year license period as opposed to the modeled 17 years of post-warm-up operation."

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First, the District notes that a specific license period has not yet been identified, nor requested, by the District. The length of license the District will request will be identified in the License Application to be submitted in April 2012.

The District would like to clarify that a 3-year warm up period was used at a constant discharge (in this case the dominant discharge) to "warm up" the model, then a 16-year period of daily data was used to validate model performance, after which time one (1) year of real time data was used to evaluate project operations for the year added. All model results for years preceding the added year were for calibration, not evaluation of project impacts, although they added value to that assessment. Thus, the total model simulation was 20 years including a 3-year warmup, a 16-yr validation and calibration sequence, and one year of evaluation of alternative conditions under non-sequentially-historic conditions.

The model that included Site 5 was used for calibration because it was the only site for which long term topographic, suspended sediment, and bed material measurements were available (North Bend gage). A 16-year daily flow record was used to calibrate the model which included Site 5. In addition, the 16-year daily flow record was used to qualitatively validate the model's performance at Sites 3 and 4 relative to noted trends at the upstream boundary conditions of the model, the trend noted between survey measurements, and comparison of the resulting gradation to the measured gradation at Site 4.

The analysis revealed that the selected 16-year period between 1990 and 2006 provided a good distribution between wet, dry and normal hydrologic years. Project operations (sub-daily data) were not taken into account for this period. Therefore, it would not be accurate to consider this period as an "assessment" period. This was used to allow the model to solve for more-accurate bed gradations and relative bed elevations prior to assessing a single calendar year of operation under wet, normal and dry, non-sequentially-historic, conditions.

Sub-daily flow fluctuations, replicating hydrocycling, require flow data at finer time intervals to assist with model stability. Computing decades of a mobile-bed HEC-RAS sediment transport model at the sub-daily timestep necessary to accurately represent the hydrocycling hydrograph is computationally infeasible. Time step and other discretization limits of HEC-RAS prohibit this. This was the primary reason that only one year of sub-daily flows were used to assess project impacts. Additionally, as reported during the USR meeting and in the meeting summary, this use of just one year of sub-daily flows “taxed” the model.

The calibration and validation results detailed in Study 2.0 – Hydrocycling, USR, show that the models performed reasonably well, and certainly within the model’s capability and industry standards. The model captured long term dynamics of the river, including transporting sediment at capacity. Based on the model performance, the resulting trends (or in this case absence of any trends) were adopted as an accurate depiction of the current trend, and determined to be representative of typical wet, dry, and normal years, for both the long term trend, and for evaluating current and alternative operating scenarios for the Project.

USFWS Comment 3
“As discussed previously, braided channels are relative [*sic*] insensitive to changes in sediment imbalance because of their wide channel widths. Additionally, scientific literature has documented the coarsening of bed sediments from reductions in sediment supply (Eaton et al. 2010; Dietrich et al. 1989). The coarsening of bed sediments would lead to reduced sediment transport rates and reduced rates of change in mean bed elevations due to armoring of the channel (Murphy et al. 2006; Dietrich et al. 1989).”

District Response
The Service continues to hypothesize that there is bed coarsening and/or armoring downstream of the tailrace return, yet they have not presented any physical evidence to corroborate such an assertion.

The District notes several pieces of physical evidence to support the District’s conclusion that neither degradation, nor any coarsening, are occurring downstream of the Tailrace return as the Service suggests.

A review of aerial photos between 2003 and 2010 shows there has been no change in the vegetated in-channel features immediately downstream of the Tailrace Return (see Platte River Series 2003 to 2010 figures 1 through 7 of Attachment A). If either coarsening or degradation were occurring, those vegetated in-channel features would not persist year after year. In addition, the same braided pattern of the sandbars persists year after year, in addition to the bedforms. This demonstrates the dynamic nature and the natural translation of sandbars in the downstream direction typical of a braided system. If coarsening were occurring, this braiding and permanent features would not exist.

Additionally, cross sections for each ungaged site were surveyed once during the late spring and once during the late summer of 2010, as detailed in Study 2.0 – Hydrocycling, USR. The change in channel cross-section area between surveys was determined. In general, the average in channel cross-section area decreased, suggesting that the reaches aggraded between surveys. There was a 6 percent decrease in cross sectional area between surveys at Site 3, and a 4% and 3% decrease in cross sectional area for Sites 4 and 5 respectively. The change in cross sections at Site 4, consistent with the change in cross sections at Site 3, would indicate a general increase (or aggradation) of the channel between surveys. Recall that Site 3 is upstream of the Tailrace Return and is not affected by hydrocycling. The cross sections both upstream and downstream of the Tailrace Return exhibited similar cross-section changes. Any measured or calculated adjustment in geometry cannot be readily attributed to any other cause than the natural dynamics of a braided river.

Further, the cross section data taken at two or more points in time show that the cross-section at all study sites dramatically changes over short periods of time. Coarsening is a phenomenon that begins with slight degradation which mobilizes and lifts the fines across the bed surface. Formation of a coarse layer requires that the entire cross-section remain stable while the fines are piped up and transported. If the entire section is not coarsened, parts of the bed are more subject to down-cutting than others, resulting in continuous mixing of the sediments. As show by the cross-section analysis in Study 2.0 - Hydrocycling, this mixing occurs in feet versus inches. Complete mixing of several feet of the bed sediments occurs even over short periods of time, preventing formation of a coarse layer that would be required under the Service's hypothesis. Further, the dramatic and continuous mixing of several feet of the bed material renders any distinguishable change in gradation imperceptible. In fact, narrow or unbraided rivers that form a layer of coarsened sediments are less subject to degradation by virtue of the reduction in transport due to the coarse sediments. But transport still occurs at capacity because the equations adjust for any changes in gradation.

Finally, the USGS obtained bed, bank, and sandbar sediment samples in 2010 (Schaepe and Alexander, 2011). The District has plotted the bed and sandbar D15, D50, and D85 spatially (Figures 1 through 6). As shown in the figures, the gradation at River Mile (RM) 98.5, just downstream of the Tailrace Return, is finer than the measured gradation at RM 108 (near Duncan) and is consistent with the gradations measured downstream near North Bend, Ashland and Louisville. In addition, a Kendall Tau test was performed for each, revealing no trend between the measured data.

Review of this analysis shows there is nothing in the measured data that would suggest that coarsening is occurring or that the river is degrading downstream of the Tailrace Return. The fact that this is not occurring is additional support of the District's conclusion that there is not a sediment deficit downstream of the Tailrace Return due to coarsening or any other physical process.

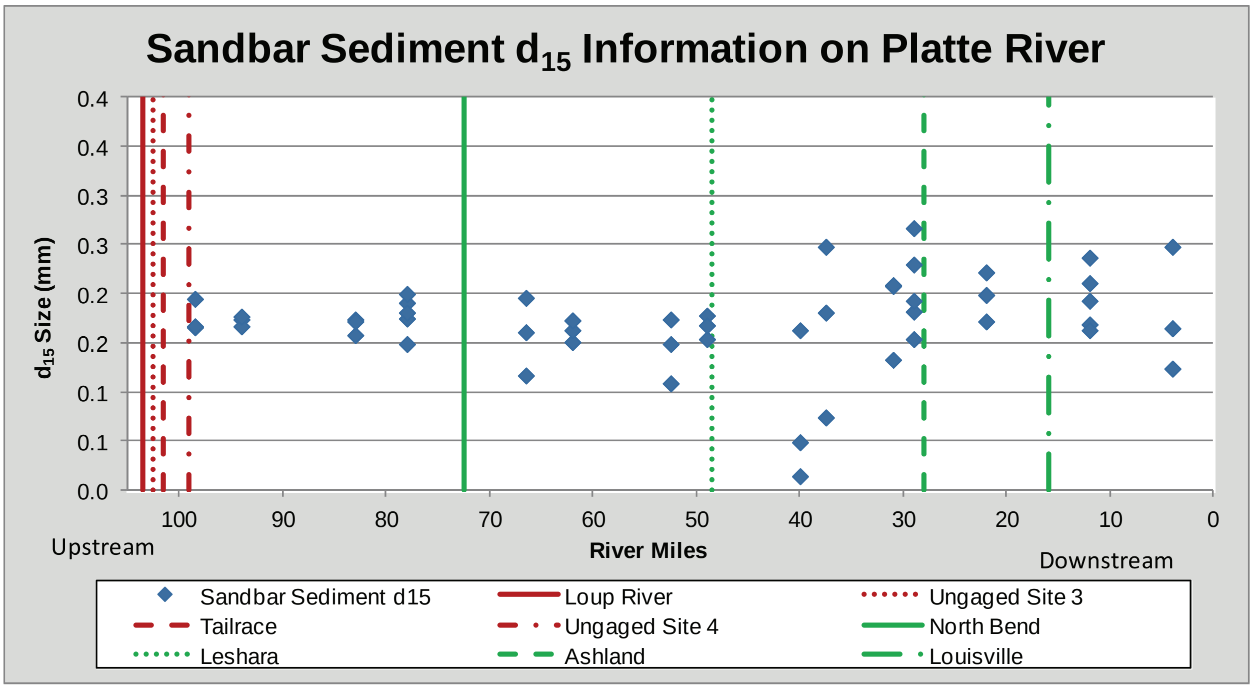

Figure 1 – d15 values from Sandbar samples

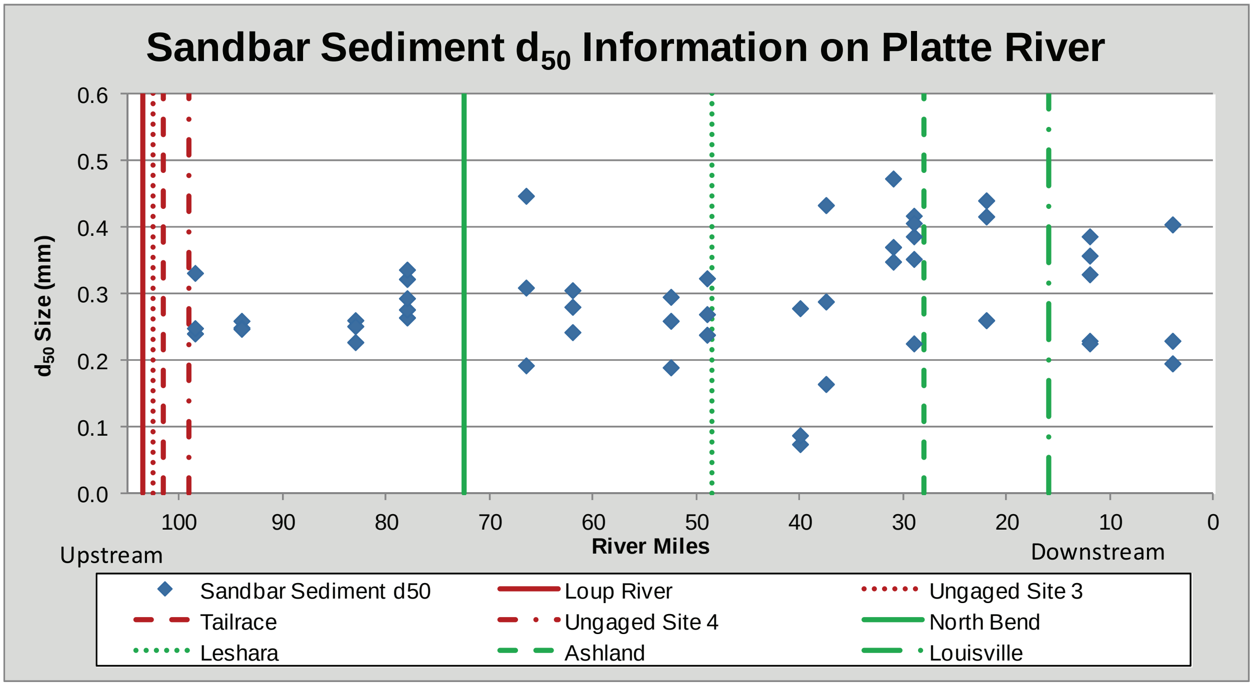

Figure 2 – d50 values from Sandbar samples

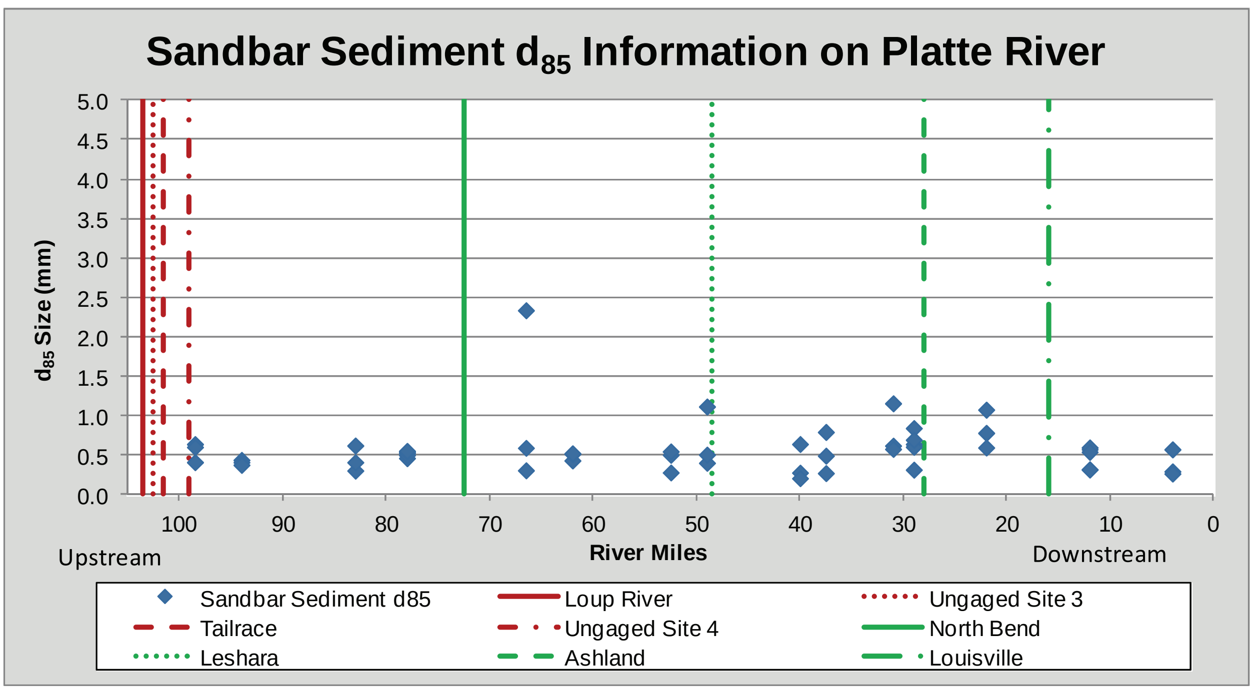

Figure 3 – d85 values from Sandbar samples

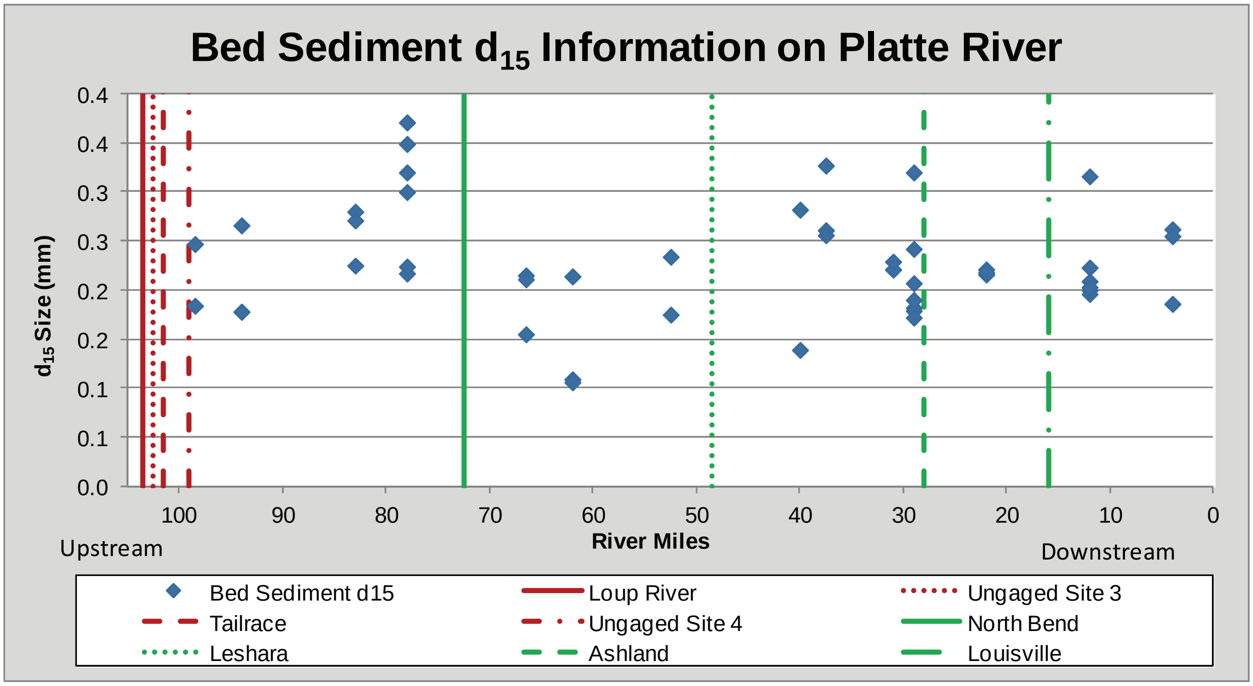

Figure 4 – d15 values from bed samples

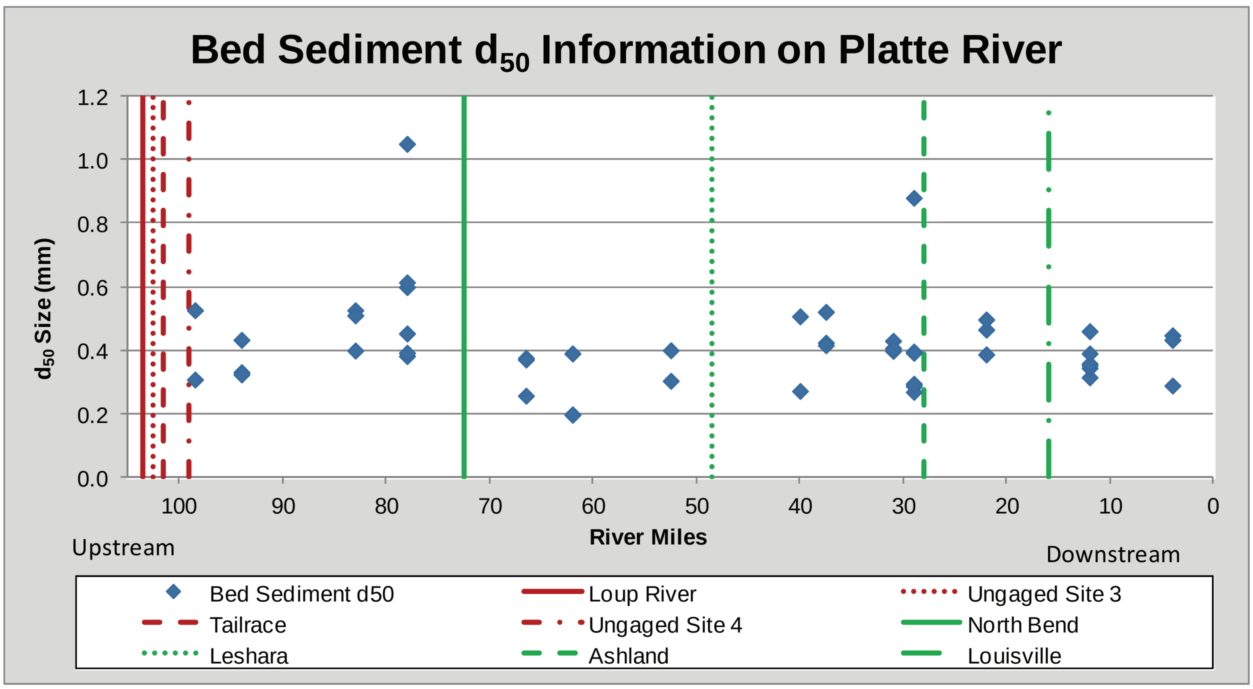

Figure 5 – d50 values from bed samples

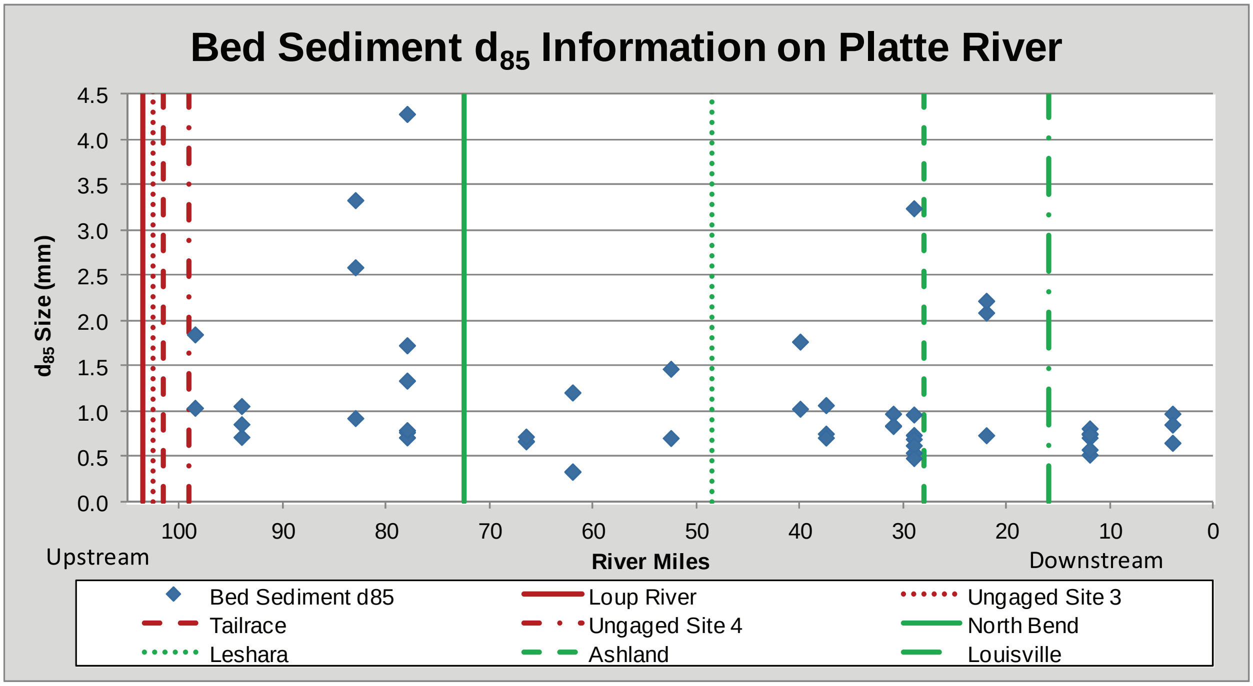

Figure 6 – d85 values from bed samples

USFWS Comment 4

"Therefore, the main indice [*sic*] used in the sediment transport analysis (i.e., mean invert elevation) is insensitive to detecting changes in sediment transport, and the analysis does not consider possible bed sediment gradations. Because the sediment transport analysis does not report changes in sediment transport and bed gradations over time, it is difficult to determine the Project's sediment transport effects on lower Platte River channel morphology. For reference, the USR only reports averaged sediment gradations for the last year of the model run (pages 104-106 of the USR meeting transcript)."

District Response

The mean bed invert elevation is the most appropriate indicator of the long term trend of the river. This was clearly implied by Chen et al. (1999). This parameter provides a relative measure of how the parameters that define the channel respond to dynamic flow conditions. The model calculates the transport rate and capacity based on the bed gradation available and the hydraulics at each cross section, and adjusts the cross section accordingly. In this way, bed gradations were not explicitly considered but implicitly considered. For example, if the mean channel invert elevation is showing a degrading trend, then it is likely that the channel is picking up the finer materials, resulting in bed coarsening. However, the results of the model indicate a stable trend, with sufficient supply of sediment.

USFWS Comment 5

"To address the above limitations in the USR, the Service recommends that the sediment transport analysis summarize changes in: a) sediment transport, b) mass balance, and c) bed gradation for Study Sites 3, 4, and 5. The Service recommends a mass balance assessment for Study Sites 3, 4, and 5 for each year of post-warm-up operation. The Service requests the following information: a) annual sediment transported at the transect representing the upstream boundary of the study site, and b) annual sediment transported at the transect representing the downstream boundary of the study site. The difference in sediment transport between the two transects would represent a change in mass balance within the study site whose differences could be summarized on an annual basis throughout the 30-year simulated license period. The Service also recommends an evaluation of the bed sediment gradation for Year 1 and Year 30 using data from Study Sites 3, 4, and 5. The Service suggests that a bed sediment gradation evaluation would represent the median and 90-percent confidence interval values obtained by summarizing sediment gradation data for transects in each respective study site."

District Response

Regarding sediment transport and mass balance, the USR shows plots of the sediment transport rate versus sediment transport capacity at all modeled locations (Sites 3, 4, 5, and the North Bend gage). Over the course of the simulation, there are time steps where the transport rate is greater than the sediment capacity (aggradation) and time steps where the transport rate is less than the transport capacity (degradation). However, over the long term simulation, at each location, the sediment transport rate and the sediment transport capacity cluster together revealing that the river is transporting sediment at capacity (see Figures 5-19, 5-30, 5-35, and 5-43 in Study 2.0 – Hydrocycling, USR). Therefore, over the long term mass in is approximately equal to mass out.

Finally, the District has plotted the bed gradations at Sites 3 and 4 for every five years of simulation, as shown in Figures 7 and 8. Contrary to the Service's assertion, there is very little difference in the temporal sediment gradation simulated.

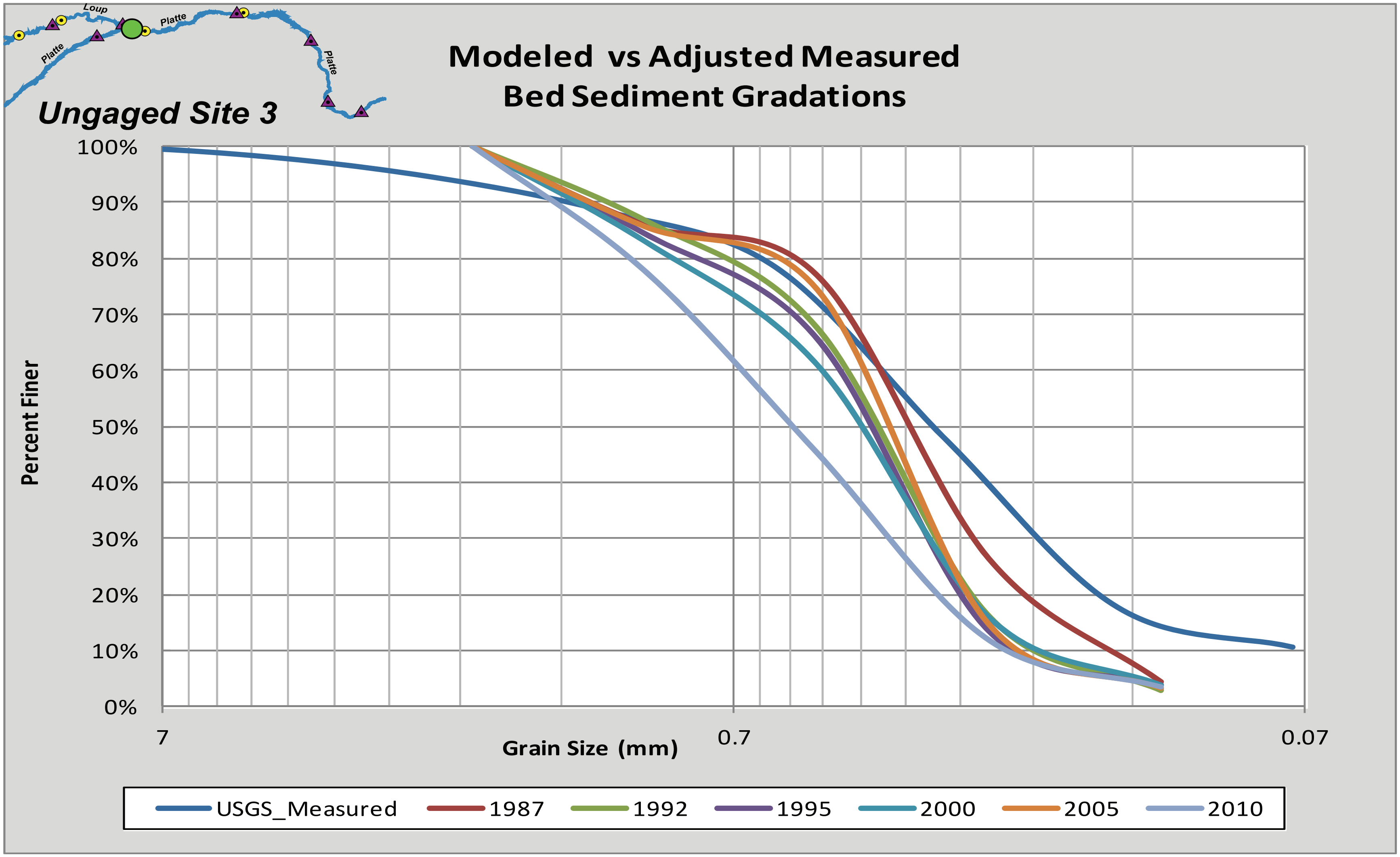

Figure 7 – Sediment Gradations at Site 3

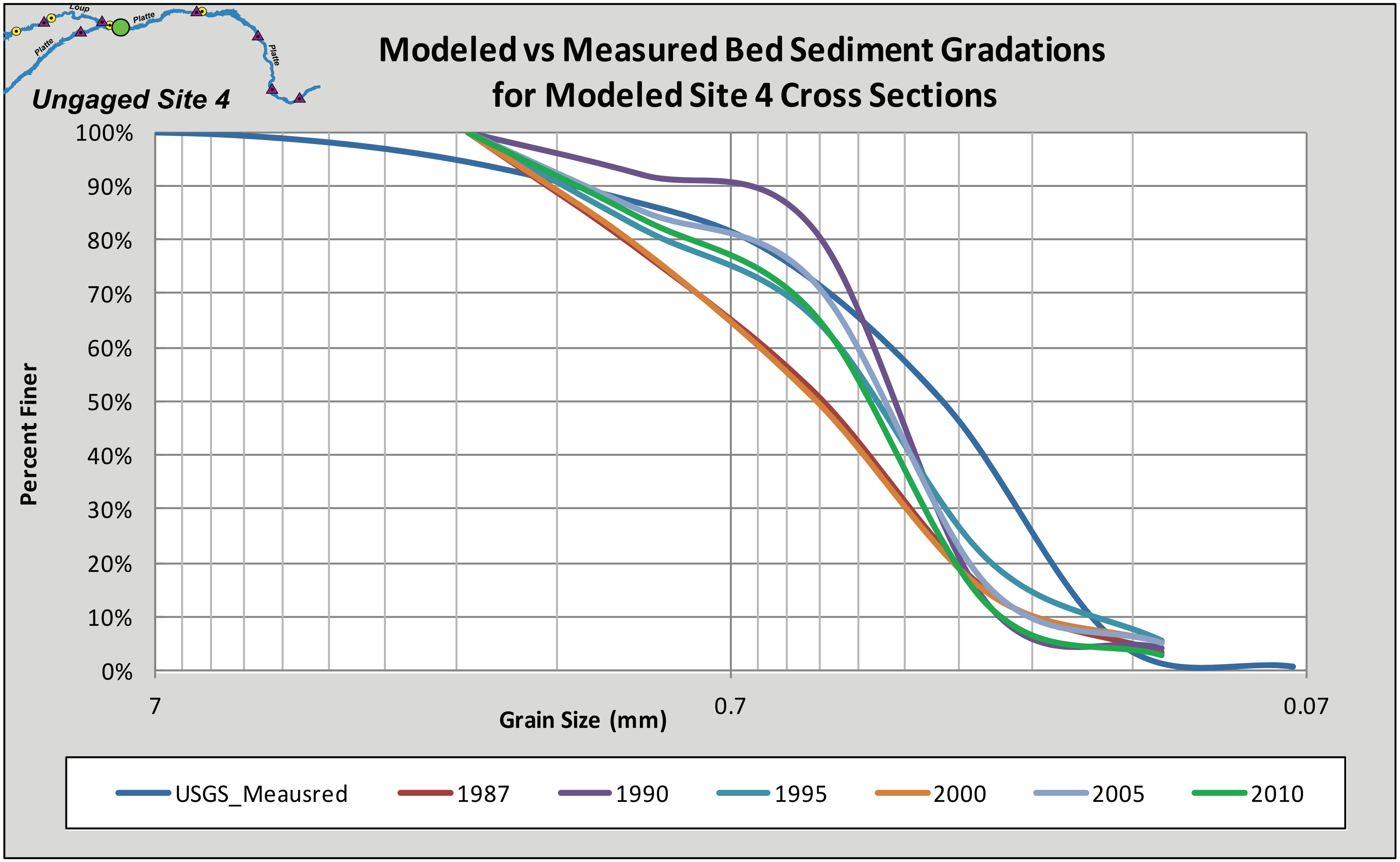

Figure 8 – Sediment Gradations at Site 4

USFWS Comment 6

"In accordance with directives provided by FERC, the Service provides the following rationale to meet the five study criteria required when proposing a revised study:

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service has determined that modeled 17 years of post-warm-up operation and use of the indice, mean invert elevation, is inadequate in fully assessing effects of the Project tailrace return.
3) The proposed change in methods was is necessary to detect changes in sediment transport via the coarsening of bed sediments.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA."

District Response

As shown above, sufficient numbers of scientific studies have been performed regarding the question of aggradation/degradation and cross-sectional changes in the study reaches to thoroughly document that there is no evidence of either process. The District also emphasizes that long-term observations (e.g. Chen et al. 1999) and long-term modeling are not the same, so citing Chen et al. as support of the requested modeling is not reasonable. The number and quality of Chen's and other studies preclude the need for any new analyses for the purpose of this sedimentation analysis for Study 2.0 - Hydrocycling. The analyses described in the USR are considered to be sufficient for concluding that the reaches are "in regime" and that the system is in a state of dynamic equilibrium (that is, not aggrading or degrading).

References

Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. "Trends in Channel Gradation in Nebraska Streams, 1913-95." USGS Water-Resources Investigations Report 99-4103. Lincoln, Nebraska.

Schaepe, N.J., and Alexander, J.S., 2011, Sediment Samples and Channel-Geometry Data, Lower Platte River Watershed, Nebraska, 2010: US Geologic Survey Data Series 572, 22p.

November 23, 2011

Attachment B

District response to U.S. Fish and Wildlife Service (USFWS) comments on the Updated Study Report dated October 20, 2011.

1. Comments on Sediment Transport Analysis

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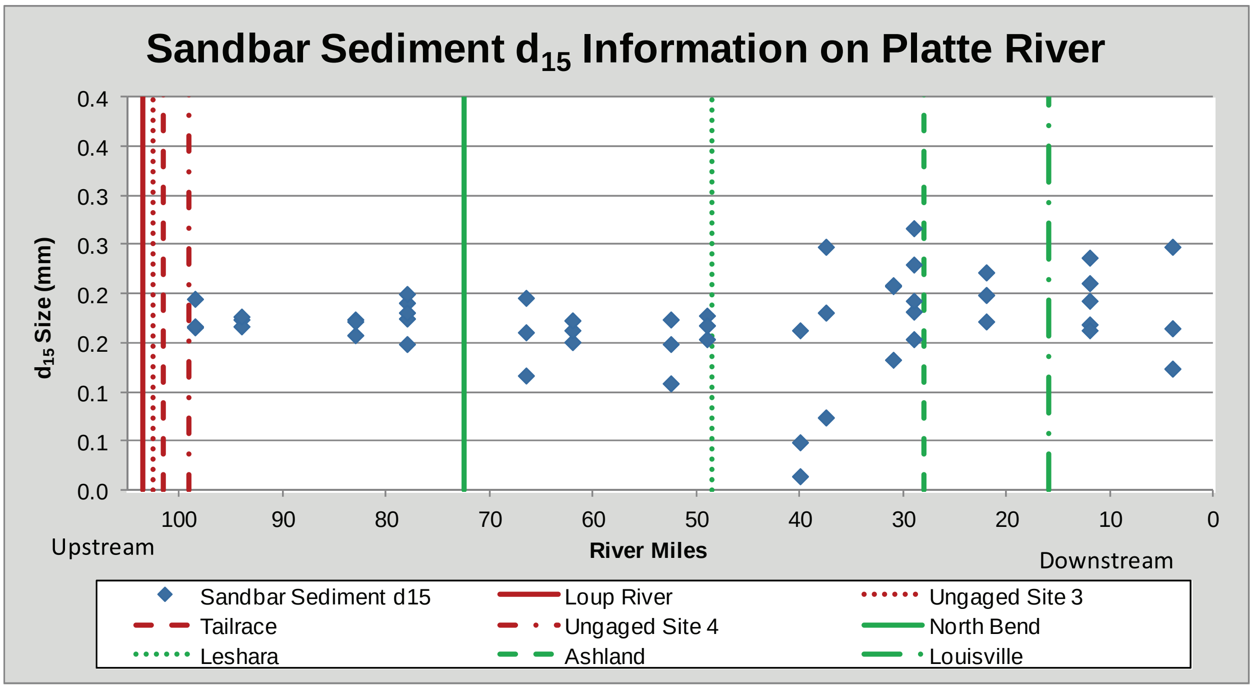

Figure 1 – d15 values from Sandbar samples

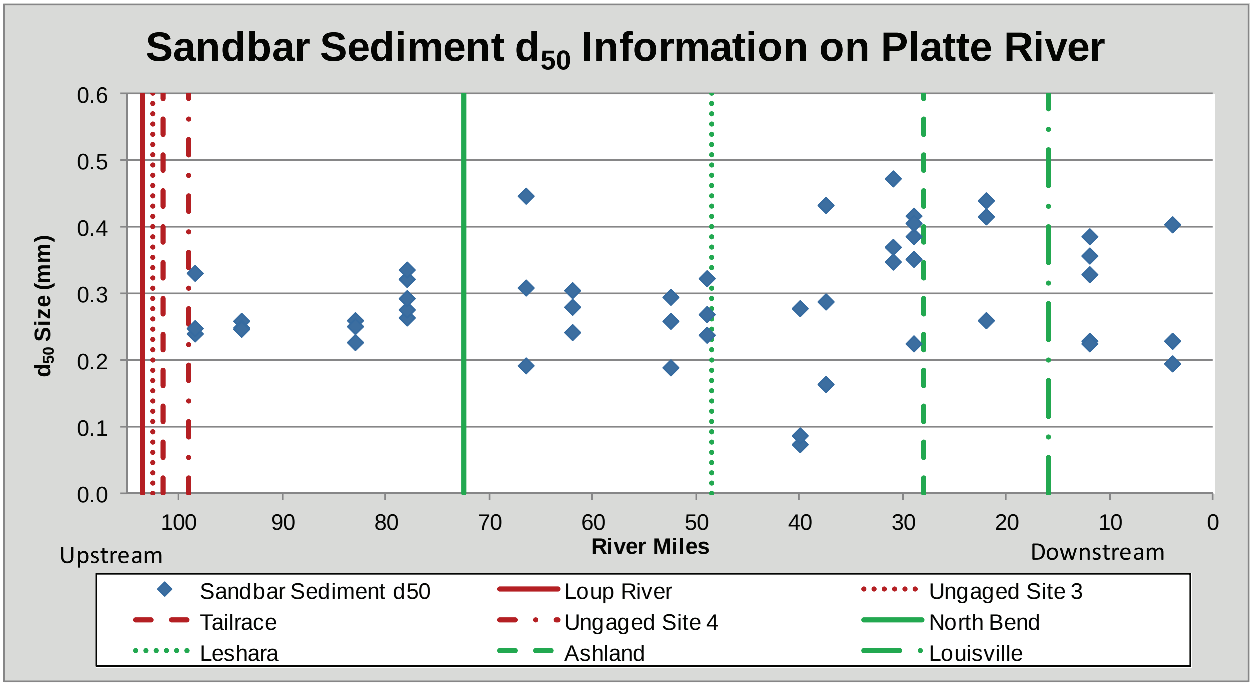

Figure 2 – d50 values from Sandbar samples

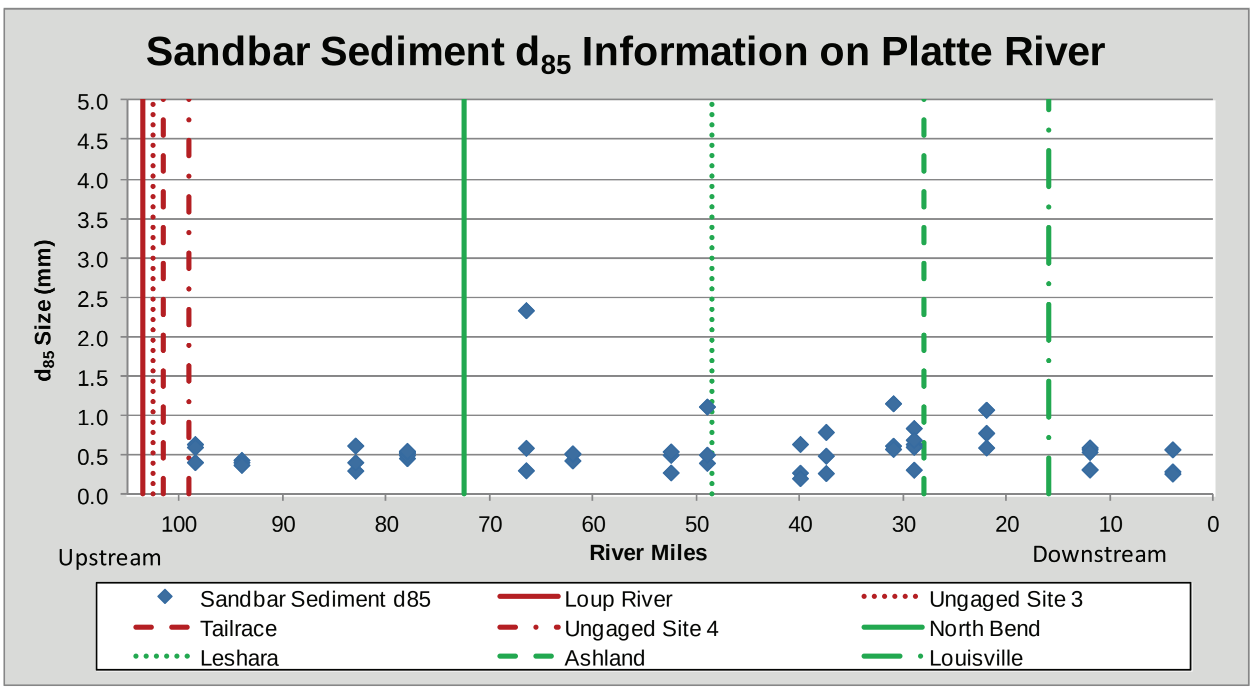

Figure 3 – d85 values from Sandbar samples

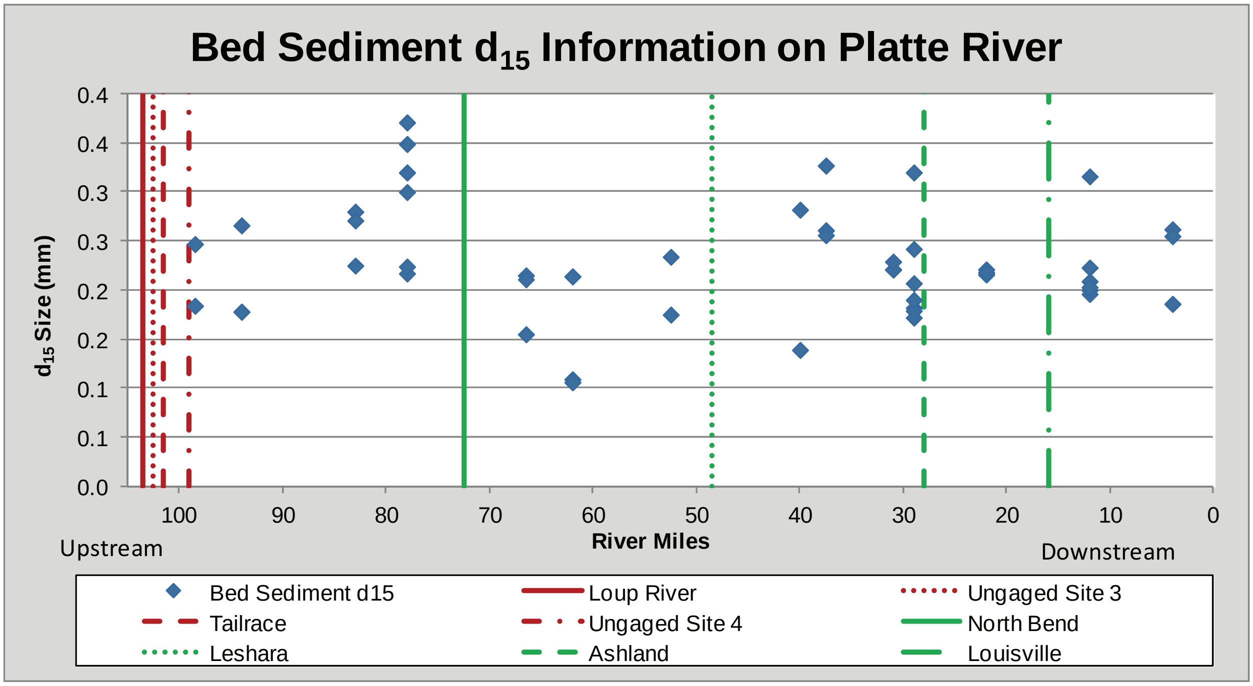

Figure 4 – d15 values from bed samples

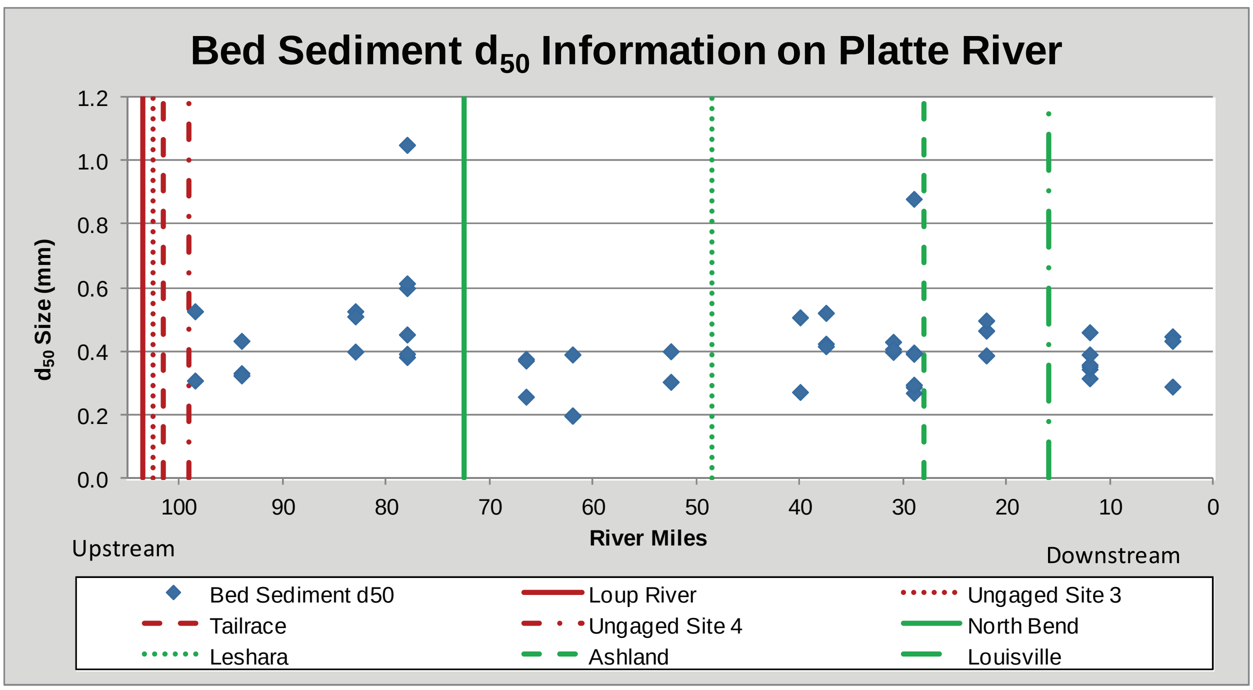

Figure 5 – d50 values from bed samples

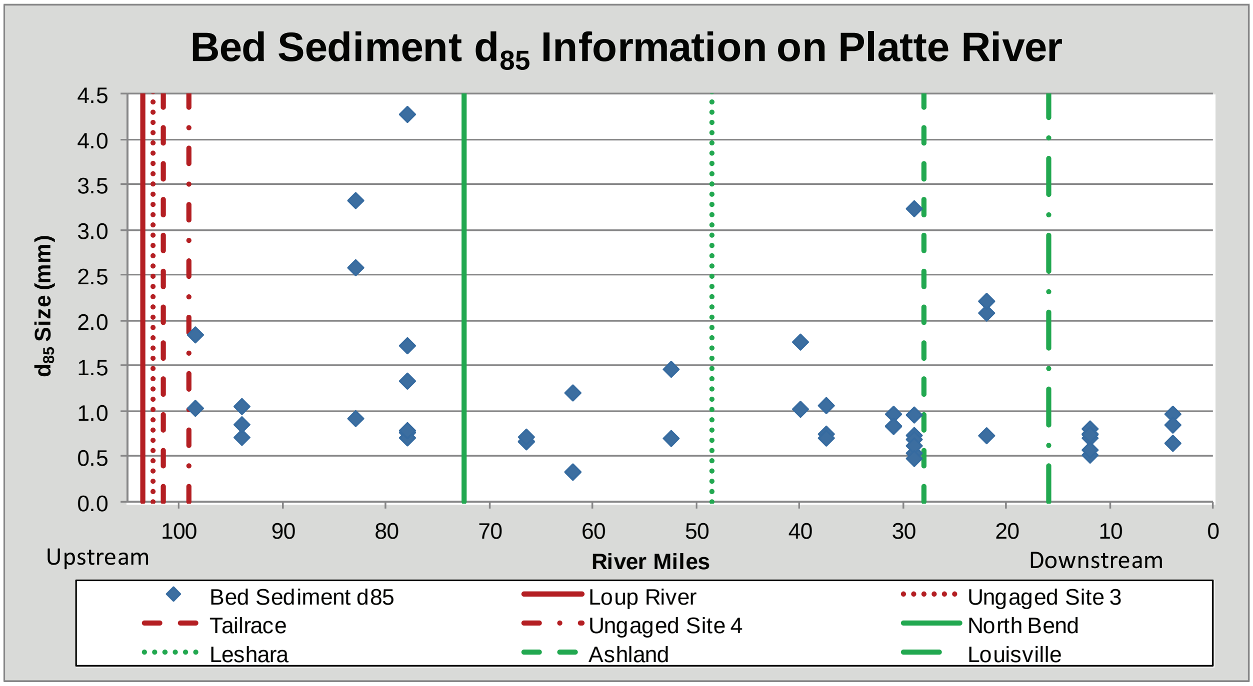

Figure 6 – d85 values from bed samples

USFWS Comment 4
"Therefore, the main indice [*sic*] used in the sediment transport analysis (i.e., mean invert elevation) is insensitive to detecting changes in sediment transport, and the analysis does not consider possible bed sediment gradations. Because the sediment transport analysis does not report changes in sediment transport and bed gradations over time, it is difficult to determine the Project's sediment transport effects on lower Platte River channel morphology. For reference, the USR only reports averaged sediment gradations for the last year of the model run (pages 104-106 of the USR meeting transcript)."

District Response
The mean bed invert elevation is the most appropriate indicator of the long term trend of the river. This was clearly implied by Chen et al. (1999). This parameter provides a relative measure of how the parameters that define the channel respond to dynamic flow conditions. The model calculates the transport rate and capacity based on the bed gradation available and the hydraulics at each cross section, and adjusts the cross section accordingly. In this way, bed gradations were not explicitly considered but implicitly considered. For example, if the mean channel invert elevation is showing a degrading trend, then it is likely that the channel is picking up the finer materials, resulting in bed coarsening. However, the results of the model indicate a stable trend, with sufficient supply of sediment.

USFWS Comment 5

"To address the above limitations in the USR, the Service recommends that the sediment transport analysis summarize changes in: a) sediment transport, b) mass balance, and c) bed gradation for Study Sites 3, 4, and 5. The Service recommends a mass balance assessment for Study Sites 3, 4, and 5 for each year of post-warm-up operation. The Service requests the following information: a) annual sediment transported at the transect representing the upstream boundary of the study site, and b) annual sediment transported at the transect representing the downstream boundary of the study site. The difference in sediment transport between the two transects would represent a change in mass balance within the study site whose differences could be summarized on an annual basis throughout the 30-year simulated license period. The Service also recommends an evaluation of the bed sediment gradation for Year 1 and Year 30 using data from Study Sites 3, 4, and 5. The Service suggests that a bed sediment gradation evaluation would represent the median and 90-percent confidence interval values obtained by summarizing sediment gradation data for transects in each respective study site."

District Response

Regarding sediment transport and mass balance, the USR shows plots of the sediment transport rate versus sediment transport capacity at all modeled locations (Sites 3, 4, 5, and the North Bend gage). Over the course of the simulation, there are time steps where the transport rate is greater than the sediment capacity (aggradation) and time steps where the transport rate is less than the transport capacity (degradation). However, over the long term simulation, at each location, the sediment transport rate and the sediment transport capacity cluster together revealing that the river is transporting sediment at capacity (see Figures 5-19, 5-30, 5-35, and 5-43 in Study 2.0 – Hydrocycling, USR). Therefore, over the long term mass in is approximately equal to mass out.

Finally, the District has plotted the bed gradations at Sites 3 and 4 for every five years of simulation, as shown in Figures 7 and 8. Contrary to the Service's assertion, there is very little difference in the temporal sediment gradation simulated.

November 23, 2011

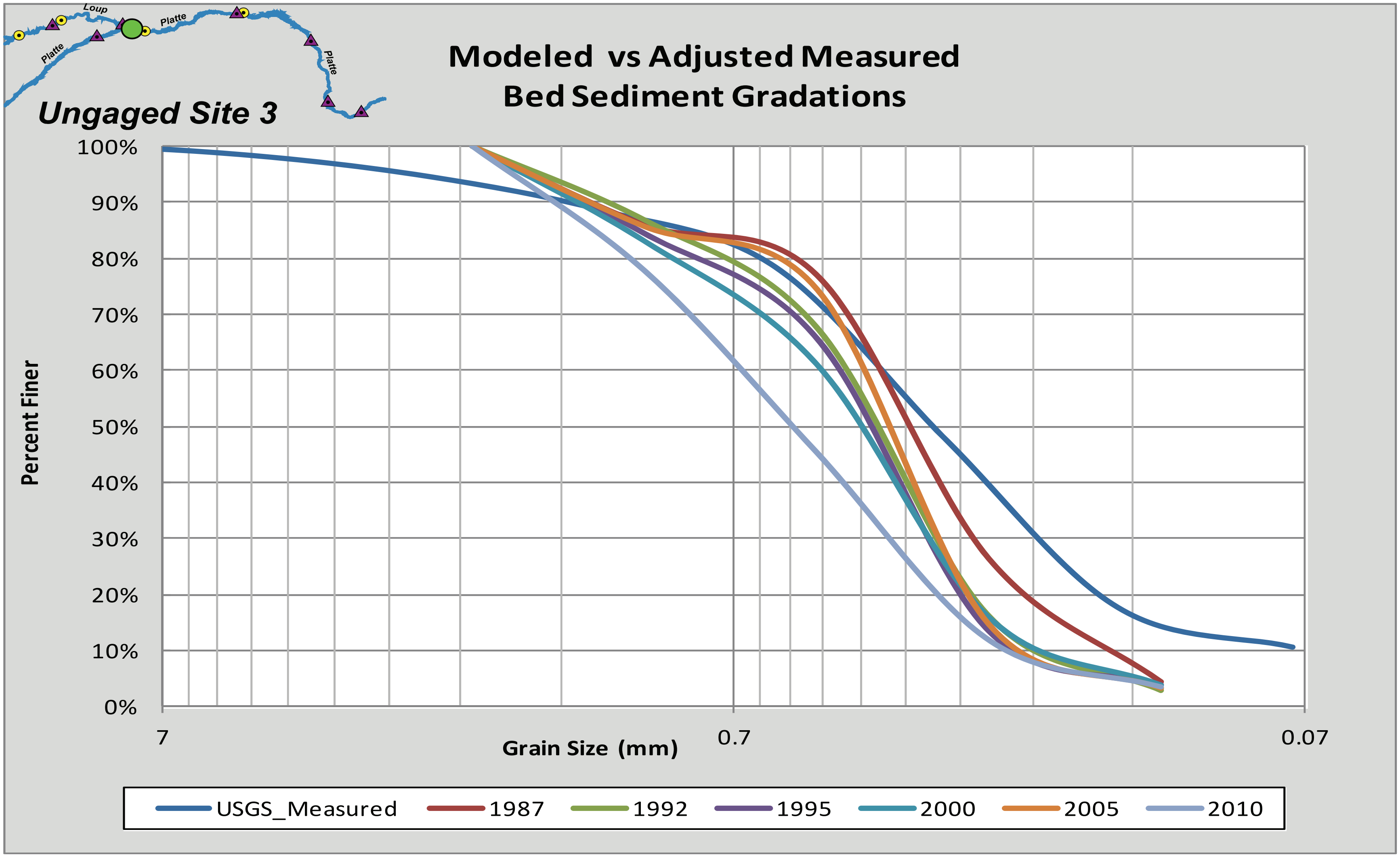

Figure 7 – Sediment Gradations at Site 3

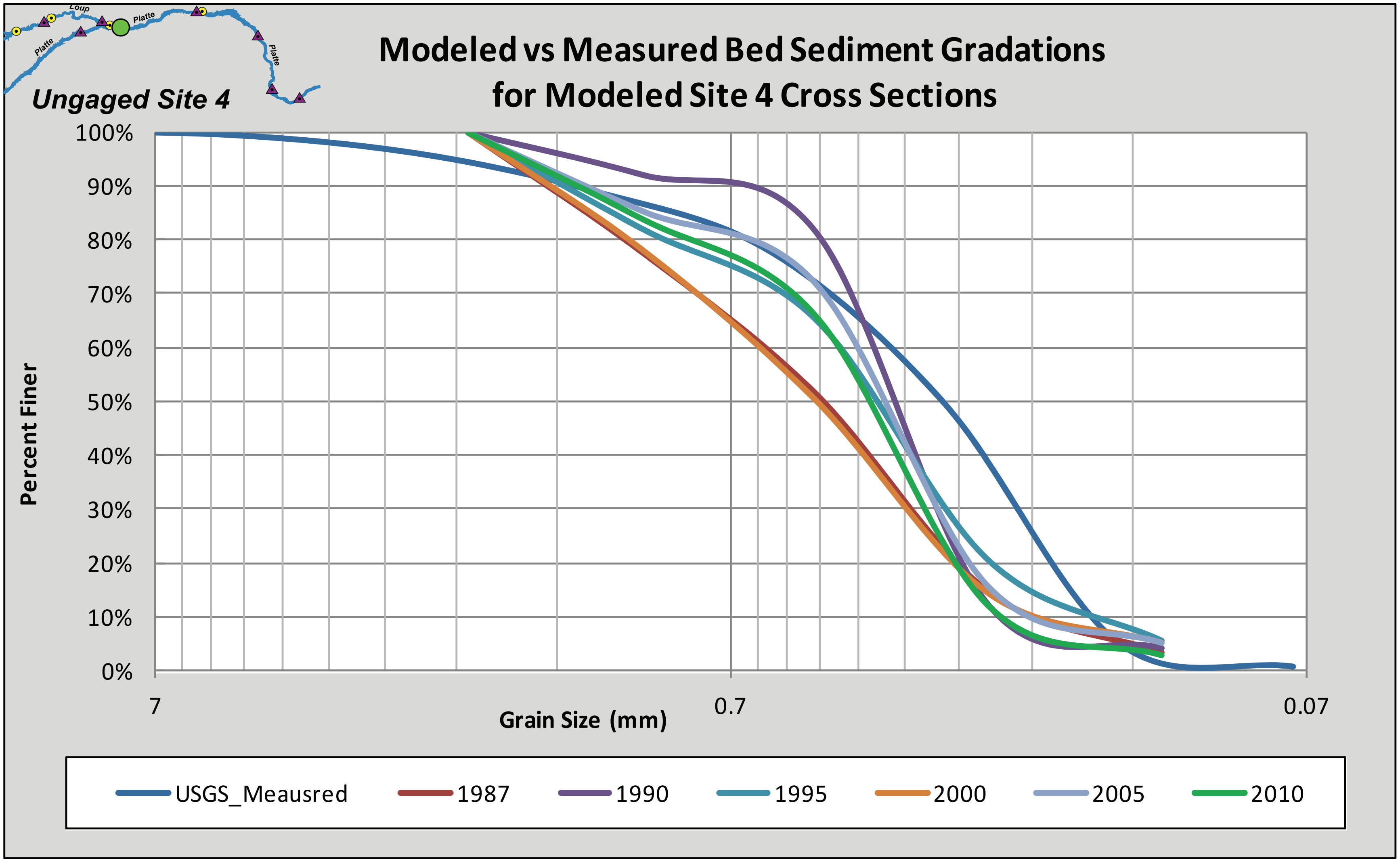

Figure 8 – Sediment Gradations at Site 4

USFWS Comment 6
"In accordance with directives provided by FERC, the Service provides the following rationale to meet the five study criteria required when proposing a revised study:

1) Proposed changes in methods were not a result of material changes in the law or regulations.
2) Approval of Service revised methods would be needed to fully address goals and objectives of the study plan. The Service has determined that modeled 17 years of post-warm-up operation and use of the indice, mean invert elevation, is inadequate in fully assessing effects of the Project tailrace return.
3) The proposed change in methods was is necessary to detect changes in sediment transport via the coarsening of bed sediments.
4) Service proposed modification was not a result of significant changes in the project proposal or was not a result of the availability of significant new information material to the study objectives.
5) In absence of the proposed study modification, it is unknown if the existing study satisfies study criteria in § 5.9(b) of the Integrated License Application Process. Service proposed modification to the study would better enable FERC and the Service to conduct section 7 requirements under ESA."

District Response
As shown above, sufficient numbers of scientific studies have been performed regarding the question of aggradation/degradation and cross-sectional changes in the study reaches to thoroughly document that there is no evidence of either process. The District also emphasizes that long-term observations (e.g. Chen et al. 1999) and long-term modeling are not the same, so citing Chen et al. as support of the requested modeling is not reasonable. The number and quality of Chen's and other studies preclude the need for any new analyses for the purpose of this sedimentation analysis for Study 2.0 - Hydrocycling. The analyses described in the USR are considered to be sufficient for concluding that the reaches are "in regime" and that the system is in a state of dynamic equilibrium (that is, not aggrading or degrading).

References
Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. "Trends in Channel Gradation in Nebraska Streams, 1913-95." USGS Water-Resources Investigations Report 99-4103. Lincoln, Nebraska.

Schaepe, N.J., and Alexander, J.S., 2011, Sediment Samples and Channel-Geometry Data, Lower Platte River Watershed, Nebraska, 2010: US Geologic Survey Data Series 572, 22p.

LOUP POWER DISTRICT
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Via Electronic Filing

December 15, 2011

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

Subject: Loup River Hydroelectric Project
Updated Study Report Comments
FERC Project No. 1256
Docket P-1256-029

Dear Secretary Bose,

Loup River Public Power District (Loup Power District or District) is submitting hydraulic model files associated with relicensing the Loup River Hydroelectric Project, FERC Project No. 1256 (Project) per request from Commission staff. The District is the owner, operator, and original licensee of the Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

The District is submitting the HEC-RAS sediment transport model developed for relicensing Study 2.0 – Hydrocycling per request from Commission staff. The HEC-RAS files are contained on a flash drive that is being sent directly to Mr. Paul Makowski due to the large file sizes. These files are considered Critical Energy Infrastructure Information (CEII) and should not be released publicly.

If you have any questions regarding this submittal, or any information provided by the District, please contact me at (402) 564-3171 ext. 268.

Respectfully Submitted,

Neal D. Suess
President/CEO
Loup Power District

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FEDERAL ENERGY REGULATORY COMMISSION
Washington, DC 20426
December 21, 2011

OFFICE OF ENERGY PROJECTS

Project No. 1256-029-Nebraska
Loup River Hydroelectric Project
Loup Power District

Mr. Neal Suess, President/CEO
Loup Power District
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Reference: Study Determination on Requests for Modifications to the Loup River Hydroelectric Project Study Plan

Dear Mr. Suess:

Pursuant to 18 C.F.R. § 5.15 of the Commission's regulations, this letter contains the determination on requests for modifications to the Loup Power District's approved Loup River Hydroelectric Project (Loup River Project or project) Study Plan. The determination is based on: the study criteria set forth in section 5.15(e) of the Commission's regulations; applicable law; Commission policy and practice; and the record of information.

Background

Loup Power District filed an updated study report (updated report) for the existing Loup River Project on August 29, 2011, filed an updated study report revision on September 7, 2011, held an updated study report meeting on September 8, 2011, and filed a summary of the updated study report meeting on September 23, 2011.

Comments on the updated study report and meeting summary were filed by the U.S. Fish and Wildlife Service (FWS) on October 20, 2011 and the Federal Energy Regulatory Commission staff (Commission staff) on October 21, 2011. Both the FWS and Commission staff recommended that new sediment transport studies be conducted pursuant to section 5.15(e) of the Commission's regulations. Loup Power District subsequently filed reply comments on the requested new studies on November 23, 2011.

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Study Plan Determination

Pursuant to section 5.15(e), new study requests must show good cause and include, as appropriate to the facts of the case, a statement explaining: (1) any material changes in the law or regulations applicable to the information request; (2) why the goals and objectives of any approved study could not be met with the approved study methodology; (3) why the request was not made earlier; (4) significant changes in the project proposal or that significant new information material to the study objectives has become available; and (5) why the new study request satisfies the study criteria set forth in section 5.9(b).

As indicated in Appendix A, Commission staff's requested Alternative Project Operations and Sediment Management Study is granted with modification. FWS' requested Sediment Transport Study is not required. The bases for requiring staff's requested study and not requiring FWS' requested study are explained in Appendix B.

Finally, nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies.

If you have any questions, please contact Lee Emery at (202) 502-8379 or lee.emery@ferc.gov.

Sincerely,

Jeff C. Wright
Director
Office of Energy Projects

cc: Mailing List
Public Files

Enclosures: Appendix A—Summary of determinations on requested new studies
Appendix B—Staff's recommendations on requested new studies

APPENDIX A
SUMMARY OF DETERMINATIONS ON REQUESTED NEW STUDIES

Study	Requesting Entity	Approved	Approved with Modifications	Not Required
Alternative Project Operations and Sediment Management	Commission staff		X	
Sediment Transport	FWS			X

APPENDIX B

Staff's Recommendations on Requested New Studies

Below is staff's analyses and recommendations on the new studies that were requested by the U.S. Fish and Wildlife Service (FWS) and Commission staff on October 20 and 21, 2011, respectively.[1]

Alternative Project Operations and Sediment Management Study

Commission staff requested that Loup Power District (District) analyze potential changes in sediment transport based on four alternative project operations designed to mitigate project-related sediment depletion in the lower Platte River and enhance nesting habitat for interior least terns (*Sterna antillarum*) and piping plovers (*Charadrius melodus*). The four alternatives are:

Alternative 1. Release all material dredged from the settling basin to the Platte River at its confluence with the Loup Power Canal. This alternative would include construction and operation of a conveyance to transport dredged material from the settling basin (located at the head of the Loup Power Canal) to the confluence of the Loup Power Canal with the Platte River. Neither the existing North nor South Sand Management Areas (SMAs) would continue to be used for sediment disposal under this alternative.

Alternative 2. Release all material dredged from the settling basin to the South SMA. Under this alternative, all dredged material from the settling basin would be directed to the South SMA. Flow diversion into the Loup Power Canal would not change from existing project operation. The North SMA would no longer be used for sediment disposal under this alternative.

Alternative 3. Release all material dredged from the settling basin to the South SMA and modify project operation to allow sufficient flow to pass downstream into the Loup River bypassed reach during high-flow events to enhance sediment transport. The North SMA would no longer be used for sediment disposal under this alternative.

Alternative 4. Release all material dredged from the settling basin to the South SMA, modify project operations to allow sufficient flows to pass into the Loup River bypassed reach during high flow events to enhance sediment transport, and modify project operation to maintain a minimum flow in the Loup River bypassed reach during the tern and plover nesting

[1] The Study Plan was approved on August 26, 2009, and subsequently modified on December 20, 2010, and June 10, 2011.

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season. This alternative would be identical to Alternative 3, except that project operations would be modified during the tern and plover nesting season to provide a minimum flow in the Loup River bypassed reach to provide for the development and maintenance of tern and plover nesting habitat.

Staff noted that, although the District stated in its study report that the Platte River is in dynamic equilibrium,[2] staff concluded that project operations result in a large reduction in sediment yield in the Loup River system from removal of sediment by flow diversions into the Loup Power Canal; the sediment is dredged from the settling basin and disposed in the SMAs. Furthermore, staff concluded that this sediment reduction would likely impact sediment transport further downstream in the Platte River, where it may affect channel dimensions and the formation of sandbar habitat for interior least tern and piping plover nesting in the Platte River downstream of the Loup Power Canal tailrace.

In its October 21, 2011 filing, staff justified the new study request based on the filing of significant new information in the District's updated study report filed on August 29, 2011, as supplemented on September 7, 2011. Specifically, staff noted that although the updated study report illustrates that the Platte River is in dynamic equilibrium, the report also shows that project operations result in a large reduction in sediment yield in the Loup River system. Staff noted that this reduction will likely impact sediment transport further downstream in the Platte River, which may affect channel dimensions and sandbar habitat for tern and plover nesting. Therefore, staff requested the additional study pursuant to section 5.15(e)(4) of the Commission's regulations.

Comments on the Requested Study

The District stated that it has demonstrated in its study report that the lower Platte River downstream of the Loup Power Canal tailrace is in dynamic equilibrium, is well-seated within a braided stream regime, and is flow-limited rather than supply-limited. The District stated that its removal of sediment from the settling basin and its transport of sediment to the North SMA does not cause a sediment deficiency at any of the sites studied in the updated study report. The District also disagrees with staff's conclusion that project operations would likely impact sediment transport or stream morphology on the lower Platte River

[2] A stream in dynamic equilibrium has no significant erosion (degradation) or deposition (aggradation) of sediment occurring within the stream cross section and is considered stable. The stability of a stream in dynamic equilibrium is maintained by self-correcting mechanisms that persist within a range of conditions.

downstream of the project's tailrace. In addition, the District stated that its analyses have shown that the Platte River downstream of the tailrace:

- is transporting sediment at capacity,
- is showing no signs of trending toward aggradation or degradation,
- has a channel geometry that is consistent with the rest of the Platte River, and
- is well within a braided stream regime.

The District stated that it calculated the amount of sediment dredged from the settling basin to be 35 percent of the annual sediment supply from the Loup River system.[3] The District stated that it also estimates that the sediment removed from the system corresponds to 24 percent of the sediment supply of the Platte River as calculated downstream of the project tailrace at North Bend and 12 percent of the sediment supply of the Platte River as calculated further downstream at Louisville.

The District also stated that it disagrees with staff's description of sediment removal from dredging operations in its October 21, 2011 letter as being analogous to flow released from a dam where sediment is trapped behind the dam in the reservoir. To refute staff's assertion, the District cited a study by Chen et al. (1999)[4] that found the Loup River at Genoa (near the project's diversion dam) and the Platte River at North Bend to be stable. The District stated that because the Chen study did not include the Platte River stream gaging station at North Bend in its list of stations located downstream of dams, the Chen study does not consider the Platte River at North Bend as downstream from a dam nor is it analogous to a dam.

The District also disagreed with staff's assertion in its October 21, 2011 letter that "clear water" can adversely affect channel stability. The District stated that its analyses suggest that increased flows downstream of the Loup Power Canal tailrace have been balanced by the inflowing sediment from the Platte River upstream of the tailrace (designated as site 3 in the approved study plan) as well as

[3] In its October 21, 2011 letter, staff calculated the percentage of the sediment yield of the Loup River system delivered to the lower Platte River to be 53 percent, which is calculated as [2,004,800 – 560,000 + 350,000] / [3,370,800] = 53%. Downstream calculations are similarly calculated.

[4] Chen, Abraham H., David L. Rus, and C.P. Stanton. 1999. Trends in Channel Gradation in Nebraska Streams, 1913-95. USGS Water-Resources Investigations Report 99-4103. Lincoln, NE.

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from the change in channel hydraulic characteristics in the Platte River downstream of the tailrace.

The District stated that to evaluate staff's Alternative 1 using the effective or dominant discharge methodology of the study plan, it would need to make certain assumptions to alter the flow hydrograph, change the sediment particle size, change the slope of the river, or alter the depth-discharge or width-discharge relationships. Furthermore, the District stated that at site 4 (Platte River downstream of the project tailrace), Yang's Unit Stream Power[5] sediment discharge rating curve demonstrates that an average of 3,500 cubic feet per second (cfs) of water per day would be needed to transport the additional sediment load required by Alternative 1. In addition, the District stated that if the North SMA was no longer used and all sediments were released downstream under Alternative 1, there would be adverse effects on interior least tern and piping plover habitat within the North SMA. Similarly, the District also stated that if the South SMA was no longer used for sediment disposal under Alternative 1, there would be adverse affects to a recreational area at the Headworks Off-Highway Vehicle Park located within the South SMA. The District stated that it finds Alternative 1 to be impractical because of its high construction and operation costs.

The District stated that to evaluate Alternative 2 using the effective or dominant discharge methodology of the study plan, the flow hydrograph would need to be altered. The District also stated that the effects on terns, plovers, and recreation would be similar to that which would occur under Alternative 1.

With respect to Alternative 3, the District stated that during high-flow events on the Loup River, all flows greater than 3,500 cfs (the maximum hydraulic capacity of the Loup Power Canal) already flow in the Loup River bypassed reach, suggesting that evaluation of Alternative 3 would provide little useful additional information.

With respect to Alternative 4, the District stated that to implement this alternative, all sediment and flows entering the settling basin would, in essence, have to be returned to the Loup River bypassed reach. The District stated that this alternative has already been presented in Study 5.0 (Flow Depletion and Flow Diversion).

The District concluded by finding that the staff's requested new study is not needed.

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[5] Yang, Chih Ted. 1972. "Unit Stream Power and Sediment Transport." Journal of the Hydraulics Division, ASCE 98(10):1805-1826.

Discussion

Staff agrees with the District that the Platte River appears to be in dynamic equilibrium based on information presented in the updated study report. However, in this instance, being in a state of dynamic equilibrium only means that the channel is stable under ongoing project operations;[6] it does not mean that there are no ongoing adverse effects of project operations on sediment transport as discussed below.

With respect to the District's stated disagreement with our characterization that project operation is analogous to a reservoir, we note that the District's study report shows that the settling basin and project reservoirs remove 87 percent of the sediment entering the Loup Power Canal. This is a substantial amount of sediment considering that the canal conveys 67 percent[7] of the annual flow in the Loup River at the point of the diversion dam. We understand that the Loup Power Canal does not function like a dam on the Platte River. However, the result is that a substantial amount of Loup River flow enters the Platte River deficient of sediment similar to the outflow from a reservoir where incoming sediment to the reservoir has settled to the reservoir bottom.

Based on the mean daily discharges presented in table 4-1 of Study 5.0, the flow in the Loup Power Canal is about 49 percent of the combined flow of the Platte River and Loup River bypassed reach, which indicates that the "clear water" (i.e., sediment-depleted water) from the Loup Power Canal likely affects sediment transport in the Platte River downstream of the Loup Power Canal tailrace. The effects of the clear water releases according to Vanoni (1977) are to "pick up materials from the stream bed and banks until a full sediment load compatible with the material available and the transporting capacity is attained. [This action] is commonly referred to as degradation."[8] The Chen study, cited by the District, states that "river dams affect channel stability on the downstream reach; streambed degradation downstream from dams is a well-known phenomenon on alluvial streams," which illustrates that dams and reservoirs do have an effect on sediment transport.

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[6] Project operation began in 1937 and the use of the North SMA began in 1961.

[7] Table 4-4, Study 1.0 – Sedimentation provides a flow split between the Loup Power Canal and the Loup River bypass reach as 67 percent.

[8] Vanoni, V.A., Editor. 1977. Sedimentation Engineering. American Society of Civil Engineers, Manuals and Reports on Engineering Practice – No. 54. New York, NY.

To support its claim that the Loup Power Canal does not act as a reservoir that traps sediments, the District cites the summary section of the Chen study, which does not include the Platte River gaging station at North Bend in the list of the Chen study's U.S. Geological Survey (USGS) stream gaging stations located downstream of dams. The District stated that this exclusion is evidence that the Chen study does not consider the Loup Power Canal system to function as a reservoir in terms of trapping sediments. We cannot speak to the reason that the North Bend gaging station was not included in the list of USGS stream gaging stations located downstream of dams. It is in the realm of possibilities that the USGS was unaware of the project dredging activities that have evolved during the 70 years of project operation. Therefore, we do not view the exclusion of the North Bend gaging station as evidence that the Chen study did not consider the Loup Power Canal to be analogous to a reservoir.

The District stated that there is no evidence of a sediment supply deficit downstream of the Loup Power Canal tailrace. In support of this statement, the District supplied aerial photographs of the area dating from 2003 through 2010. The District stated that, during this period, there have been no changes in the features downstream of the Loup Power Canal tailrace. We concur that Platte River appears to be in dynamic equilibrium under ongoing operations, including the project's use of the North SMA during the last 40 to 50 years. Any differences seen in the aerial photographs are likely attributed to the annual variability in the runoff. However, the aerial photographs supplied by the District show an apparent spatial variability in the distribution of open water and sediment features downstream of the Loup Power Canal tailrace. From the Loup Power Canal tailrace to at least 1-2 miles downstream, the Platte River appears to have open water confined to a single main channel as compared to the braided pattern characteristic of the Platte River further downstream. These noted spatial differences of sediment features in the Platte River are most apparent at lower flows.

The District stated that the sediment dredged from the settling basin represents 35 percent of the annual sediment supply from the Loup River system, 24 percent of the sediment supply of the Platte River at North Bend, and 12 percent of the sediment supply of the Platte River at Louisville. Although the Loup and Platte River systems have an abundance of sediment available as indicated in Table 5-6 of Study 1.0, removal of 24 percent of the sediment supply of the Platte River at North Bend would likely adversely affect sediment transport characteristics in the impacted reach as the system seeks to achieve an equilibrium sediment transport condition.

With respect to the District's statement that to evaluate Alternative 1 using the effective or dominant discharge methodology, certain assumptions would need

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to be made that would render the evaluation ineffective, we agree and modify our recommendation as follows. In Study 2.0 (Hydrocycling), one of the HEC-RAS sediment transport model reaches encompassed the Loup Power Canal tailrace. This particular model was developed with the Loup Power Canal tailrace flows transporting no sediment load. The approach used to model the no sediment approach in Study 2.0 can be used to evaluate Alternative 1 in place of using the effective or dominant discharge methodology.

With respect to the District's response that to evaluate Alternative 2 using the effective or dominant discharge methodology, certain assumptions would have to be made to alter the flow hydrograph, change the average size of the sediment particles, change the slope of the river, or alter the depth-discharge or width-discharge relationships, we agree with the District. Instead, we recommend that the District not alter the flow hydrograph, average size of sediment particles, change in slope, or depth-discharge and width-discharge relationships, but keep these parameters constant. In this way, the District will be modeling existing conditions that would be used as the base condition for comparisons with the results of alternatives 3 and 4.

With respect to the District's response that during high-flow events on the Loup River, all flows greater than 3,500 cfs already pass into the Loup River bypassed reach, suggesting that evaluation of Alternative 3 would provide very little useful additional information, we find that based on the study results, there is still insufficient flow in the Loup River bypassed reach to transport all the sediment dredged from the Loup Power Canal and deposited in the South SMA. Therefore, the analysis described in this alternative is needed. Alternative 3 was designed to evaluate the effect of additional flow in the Loup River bypassed reach on stream geometry. The additional flow would be provided during the high flow events that would transport the most sediment. Current project operations result in 67 percent of the flow in the Loup River flowing into the Loup Power Canal and 33 percent flowing into the Loup River bypassed reach. This alternative alters the flow split between the Loup Power Canal and the Loup River bypassed reach to assess the changes or effects in stream geometry in the Loup River bypassed reach and the Platte River. The increased flows in the Loup River bypassed reach would be provided during the higher flow events in the Loup River.

With respect to the District's response with regard to Alternative 4 that to implement this alternative, all sediment and flows entering the settling basin would, in essence, have to be returned to the Loup River bypassed reach due to insufficient flow in the Loup River bypassed reach, we note that Alternative 4 is identical to Alternative 3 except that project operations would be modified during the tern and plover nesting season (mid-April through mid-August) to provide a minimum flow in the Loup River bypassed reach to allow development and maintenance of tern and plover nesting habitat. We understand that there will be insufficient flow in the Loup River bypassed reach to transport all the sediment dredged from the Loup Power Canal. However, this alternative was precisely designed to evaluate the effect of additional flow in the Loup River bypassed reach on stream geometry and additional potential habitat provided to the terns and plovers.

Staff Recommendation

Pursuant to section 5.15(e)(4), we recommend that the District implement our requested Alternative Project Operations and Sediment Management Study. As noted above, the District's updated study report includes significant new information demonstrating that project operations result in a large reduction in sediment yield in the Loup River system. This reduction will likely impact sediment transport further downstream in the Platte River, which may affect channel dimensions and sandbar habitat for tern and plover nesting. The recommended study would determine the benefits of alternative project operations and sediment management activities at protecting tern and plover nesting habitat.

For the reasons discussed above, Alternative 1, as requested by staff on October 21, 2011, should be modified so that the HEC-RAS sediment transport model would be used to assess Alternative 1 in place of using the effective or dominant discharge methodology. In addition, the base condition for Study 2.0, which is hydrocycling, should be used as the base condition for Alternative 1.

We recommend that alternatives 3 and 4 be completed as we requested on October 21, 2011. Alternative 2 should be developed and considered the base condition for comparison to Alternatives 3 and 4. We recommend that the District provide all relevant output data so we have sufficient information necessary to assess any differences in sediment transport related to alternative project operation. This information should include, but not be limited to width, depth, area, flow, velocity, and stream bed material gradation.

Sediment Transport Study

FWS requested that the District conduct a new sediment transport study. The study would provide for sediment transport modeling for a period of 30 years. FWS stated that additional modeling is needed to allow assessment of project operation for the anticipated term of any new license issued for the project.

In addition, FWS stated that the existing analysis in Study 2.0 did not consider possible bed material gradations. FWS stated that the coarsening of bed

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material over time would lead to reduced sediment transport rates and reduced rates of change in mean bed elevations. FWS also stated that the model output data presented in the updated report for Study 2.0, which are limited to mean invert elevations, do not allow for an adequate evaluation of changes in sediment transport and bed material gradation. Therefore, FWS requested that the new study include a summary of model output data for sites 3, 4, and 5 that would include mass balance of sediment loads and bed material gradation for these sites. FWS stated that the requested study is necessary to assess the effects of project operation on sediment transport.

Comments on the Requested Study

The District submitted the Study 2.0 report as part of the updated study report. The District considers the updated study report sufficient to address the requirements described in the approved study plan. The District stated that it simulated 20 years of flow and sediment transport that consisted of a 3-year warm up period, a 16-year validation and calibration period and 1 year of alternative project operations corresponding to one of three non-sequential alternative hydrologic conditions. These non-sequential alternative hydrologic conditions included a typical wet, dry, and normal year. The District stated that project operations could only be modeled for a 1-year period because of the large quantity of sub-daily input data needed to represent hydrocycling in the model. The District also stated that simulating durations greater than 1 year is beyond the capability of the model. The District stated that the model calculates the transport rate and capacity based on bed material gradation and the hydraulics at each cross section and adjusts the cross section accordingly. Furthermore, the District also stated that mean bed elevation is the most appropriate indicator of the long-term trend of the river.

Discussion

The District has already conducted a sediment transport analysis using the HEC-RAS model. The sediment potential in HEC-RAS was computed by grain size fraction that allows sorting and armoring. The HEC-RAS algorithms allowed the simulation of the coarsening of bed material over time that would lead to reduced sediment transport rates and reduced rates of change in mean bed elevations. The model simulated long-term trends of scour and deposition that result from modifying the frequency and duration of water discharge and stage. After warm up, validation, and calibration, one year of project operations corresponding to hydrocycling and run-of-river operations were modeled for normal, dry, and wet stream flows.

The FWS did not show good cause for a new study pursuant to section 5.15(e), because it did not describe to what degree the results of the additional modeling would be better than that already provided by the approved study.

Staff Recommendation

As discussed above, the District has already conducted a sediment transport study that sufficiently analyzes the effects of project operations (run-of-river and hydrocycling) on sediment transport in the Platte River. Therefore, we do not recommend the FWS' requested Sediment Transport Study.

Document Content(s)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

January 12, 2012

FWS NE 2012-091

Mr. Matt Pillard
HDR Engineering
8404 Indian Hills Drive
Omaha, NE 68114

RE: Request for Updated Species List, Loup River Hydroelectric Project, FERC Project Number 1256

Dear Mr. Pillard:

This is to confirm the species list previously provided as part of our section 7 consultation for relicensing of the Loup River Hydroelectric Project by the Federal Energy Regulatory Commission, Project Number 1256. The U.S. Fish and Wildlife Service previously provided a species list and determined that the proposed relicensing action may affect the federally endangered pallid sturgeon *(Scaphirhynchus albus)*, least tern *(Sternulla antillarum athalassos)*,and whooping crane *(Grus americana)* and federally threatened piping plover *(Charadrius melodus)* and western prairie fringed orchid *(Platanthera praeclara)*.

Should you have questions, please contact Mr. Robert Harms within our office at Robert_Harms@fws.gov, (308)382-6468, extension 17.

Sincerely,

Martha Tacha (for)

Michael D. George
Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Frank Albrecht)

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup River Hydroelectric Relicensing - Data Request
Date:	Tuesday, January 17, 2012 3:39:59 PM
Attachments:	USFWS.120116.Harms_2011_T&P_Data_request.pdf

For the DB – already on PW

From: Richardson, Lisa (Omaha)
Sent: Tuesday, January 17, 2012 3:40 PM
To: 'Robert_Harms@fws.gov'
Cc: Pillard, Matt; 'Neal Suess'
Subject: Loup River Hydroelectric Relicensing - Data Request

Bob,

USFWS has previously provided tern and plover data to us for the Loup Power District Relicensing. Attached please find a request for 2011 data (a hardcopy will follow in the mail). We are requesting this information so that it can be incorporated into the District's License Application due to FERC in April. If you have any questions regarding this request, please feel free to give me or Matt Pillard (402-399-1186) a call.

Thanks,

Lisa

LISA M. RICHARDSON P.E.
HDR Engineering, Inc
Associate Vice President

8404 Indian Hills Drive| Omaha, NE 68114
o: 402.926.7026 | c: 402.618.9865
f: 402.399.1111
lisa.richardson@hdrinc.com | hdrinc.com

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup River Hydroelectric Relicensing - Data Request
Date:	Tuesday, January 17, 2012 3:40:09 PM
Attachments:	LNGPC.120116.JJorgenson_2011_T&P_Data_request.pdf

For the DB – already on PW

From: Richardson, Lisa (Omaha)
Sent: Tuesday, January 17, 2012 3:40 PM
To: 'Jorgensen, Joel'
Cc: Pillard, Matt; 'Neal Suess'
Subject: Loup River Hydroelectric Relicensing - Data Request

Joel,

NGPC has previously provided tern and plover data to us for the Loup Power District Relicensing. Attached please find a request for 2011 data (a hardcopy will follow in the mail). We are requesting this information so that it can be incorporated into the District's License Application due to FERC in April. If you have any questions regarding this request, please feel free to give me or Matt Pillard (402-399-1186) a call.

Thanks,

Lisa

LISA M. RICHARDSON P.E.

HDR Engineering, Inc
Associate Vice President

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Nebraska Game and Parks Commission
2200 N. 33rd St. / P.O. Box 30370 / Lincoln, NE 68503-0370
Phone: 402-471-0641/ Fax: 402-471-5528 / www.OutdoorNebraska.org

February 14, 2012

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

Dear Ms. Bose,

Nebraska Game & Parks Commission staff members have reviewed the Draft License Application for the **Loup River Hydroelectric Project, Nebraska, FERC Project No. 1256.** The Nebraska Game & Parks Commission (NGPC) has been involved with this re-licensing effort from the beginning of the process. We have attended all of the meetings and provided letters which outlined a number of concerns and questions to include potential impacts to state-listed species. Please reference these letters for a detailed description of our earlier comments.

We appreciate the willingness of Loup Power District (LPD) and FERC to seek input, undertake studies and provide reports and updates. The Draft License Application states that LPD is proposing no new project facilities and no changes to existing project operations. Specific comments on the application are provided below.

Water Temperature and Flows in the Loup River Bypass Reach

Water temperature in the bypass reach of the Loup River was identified as a potential issue due to the repeated occurrence of fish kills in this reach. The Nebraska Department of Environmental Quality (NDEQ) identified low flows and thermal stress as suspected causes of mortality in these fish kills. NDEQ has established temperature standards to support aquatic life in a warm water stream with a maximum limit of 90 degrees Fahrenheit (^{O}F).

The NGPC provided LPD with a requested flow bypass of 75 cfs in 2003. However, after a more thorough analysis, we recommend higher flows to help address the thermal stress issue and avoid future fish kills. We concur with the FWS letter that outlines the use of the Montana Method to address the flows (see paragraph from the FWS letter below). The lower number of the identified flow ranges below would satisfy our concerns.

- ***Minimum Flow:*** *The Service recommends the development of a flow bypass that is greater than the 50 to 75 cfs proposed in the PLP. The certification process for low impact hydropower facilities considers the maintenance of a "good" condition under the Montana Method as one criterion for certification (Low Impact Hydropower Institute 2011). A "good" condition for the Loup Bypass area represents a bypass within 297 to 364 cfs from April through September and 149 to 215 cfs from October through March. An increase in the minimum bypass from 50-75 cfs to 364 cfs would reduce the* *probability of exceeding the NDEQ temperature standard from 90-percent range to the mid-20 to 30 percent range (USR Figure 5-16). The Service requests that FERC consider magnitudes and durations of a minimum flow bypass that contributes toward improving whooping crane habitat suitability for both spring and fall migration periods. The Service also requests that FERC consider magnitudes and durations of a minimum flow bypass that contributes toward the improvement effective/dominant discharges in the Loup and Platte River bypass areas in addition offsetting Project-related reductions in sediment supply at the tailrace return.*

Sediment Management

The NGPC supports a further investigation of the sediment management portion of LPD's operations. We support FERC's request for further analysis stated in their December 21, 2011 letter. Specifically, we believe Alternative #4 should be addressed (see language below from FERC's letter).

- ***Alternative Project Operations and Sediment Management Study***

  Commission staff requested that Loup Power District (District) analyze potential changes in sediment transport based on four alternative project operations designed to mitigate project-related sediment depletion in the lower Platte River and enhance nesting habitat for interior least terns (Sterna [sic] antillarum)and piping plovers (Charadrius melodus).

  Alternative 4. *Release all material dredged from the settling basin to the South SMA, modify project operations to allow sufficient flows to pass into the Loup River bypassed reach during high flow events to enhance sediment transport, and modify project operation to maintain a minimum flow in the Loup River bypassed reach during the tern and plover nesting season. This alternative would be identical to Alternative 3, except that project operations would be modified during the tern and plover nesting season to provide a minimum flow in the Loup River bypassed reach to provide for the development and maintenance of tern and plover nesting habitat.*

Hydrocycling

The FWS and NGPC identified impacts from Project hydrocycling to the least tern, piping plover, pallid sturgeon, and the lower Platte River ecological community and provided several potential alternatives at earlier meetings.

We continue to support any activity/study that would reduce the magnitude and duration of discharge peaks from the Project tailrace to benefit the downstream biotic community. We would also advocate evaluating the feasibility and efficacy of the full array of possible alternatives, including those that have been provided and those that have not, that would minimize the impacts of hydrocycling on species and communities while optimizing the efficiencies of LPD power operations.

Monitoring

The NGPC recognizes that monitoring is critically important in evaluating the positive or negative consequences of any action. However, we further acknowledge that creation of effective and efficient monitoring programs are fraught with logistical and methodological challenges. Therefore, NGPC is also willing to offer technical assistance on any monitoring plans that are developed during the remaining steps of the re-licensing process.

Conclusion

Thank you for considering these comments as part of the FERC relicensing of the Loup River Hydroelectric Project. If you have any questions or need additional information, feel free to contact me at 402-471-5422.

Sincerely,

Frank J. Albrecht

Frank Albrecht
Assistant Division Administrator
Environmental Services Division

Cc Jim Douglas, NGPC
Joel Jorgensen, NGPC
Richard Holland, NGPC
Jeff Schuckman NGPC
Dave Tunink, NGPC
Michelle Koch, NGPC
Jeff Runge, USFWS
Bob Harms, USFWS
Neal Suess, LPD

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

February 16, 2012

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, DC 20426

RE: Comments on Draft License Application; Loup River Hydroelectric Project; Federal Energy Regulatory Commission Project Number 1256; Nance and Platte Counties, Nebraska

Secretary Bose:

Please make reference to the Preliminary License Proposal (PLP) for the Loup River Hydroelectric Project (Project); Federal Energy Regulatory Commission Project Number 1256; Nance and Platte Counties, Nebraska that was submitted to the Federal Energy Regulatory Commission (FERC) on November 18, 2011. The PLP provided FERC with a draft Biological Assessment pursuant to section 7 consultation under the Endangered Species Act (ESA) and a draft environmental analysis to assist with preparing required documents under the National Environmental Policy Act (NEPA). Additional information provided included protection, mitigation, and enhancement measures (PM& E) that have applicability to ESA, NEPA, and section 10j of the Federal Power Act (FPA). The following U.S. Fish and Wildlife Service (Service) comments are provided in accordance with regulations implementing the FPA (18 CFR § 5.9) and our authorities pursuant to the ESA, Fish and Wildlife Coordination Act, NEPA, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and other executive orders and policies.

Background

Representatives of the Service, Nebraska Game and Parks Commission (Commission), Loup Power District (LPD), and its consultant met prior to submittal of the PLP on October 3 and November 2, 2011, to discuss, the section 7 process including the baseline for this consultation and the section 10j process. Further discussion included species affects and potential PM&Es, which if implemented as part of the relicensing process, could meet requirements of section 7 of the ESA and section 10j of the FPA. The PM&Es discussed, which should be viewed as an effort to achieve a settlement agreement to meet ESA and FPA requirements, addressed impacts to federal and state fish and wildlife trust resources by category of project affect. The PM&Es were largely based on the results of studies conducted by LPD during the course of the Integrated Licensing Process (ILP) which identified affect to these species; and professional, peer-reviewed literature, survey information, knowledge of LPD operations, and extensive knowledge of the riverine habitats and life requisites of the affected species. Detailed discussion and justification for each of the PM&Es previously discussed with LPD and its consultant is included in this letter. We note that few of the PM&Es previously discussed at our October 3 and November 2, meetings were included in the PLP that was submitted to FERC by LPD. Please note that the Service and Commission remain willing to discuss the aforementioned PM&Es with LPD and FERC including other alternatives that may also have the potential to meet section 7 of ESA and section 10j of the FPA.

I. COMMENTS ON THE PLP EFFECT DETERMINATIONS TO FEDERALLY LISTED SPECIES

The following Service comments should be considered a summary of our review of the PLP for the Project as it relates to the federally endangered whooping crane, pallid sturgeon, and least tern and federally threatened piping plover and western prairie fringed orchid. In all instances we recommend revision of the Draft Biological Assessment (DBA) to take into consideration Project affects and potential PM&Es available to offset such affects and that studies completed by LPD during the ILP process be considered. The Service comments on DBA are based on the: a) current surveyed number and distribution of the aforementioned species in the Loup and Platte rivers; b) the potential Project impacts to habitat suitability in the bypass area of the Loup River and the lower Platte River for these species as applicable; and c) the importance of the Loup and Platte rivers in the conservation and recovery of these species when considering their range-wide distribution, which includes multiple river systems and watersheds in several states. Further, our comments were also based on the lack of PM&Es discussed at the October 3 and November 2 meetings in the DBA which could offset Project impacts. Further discussion and detail are provided in this letter, including the appendices.

Whooping Crane

The Service cannot concur with the conclusion that adverse effects resulting from Project operations to the whooping crane (*Grus americana*) are discountable because species usage estimates can be determined, the Project is located within the migratory corridor, and habitat affects are measureable.

Section 7 of ESA defines discountable effects as those extremely unlikely to occur and further states that based on best judgment a person would not: a) be able to meaningfully measure, detect, or evaluate insignificant effects; or b) expect discountable effects to occur. The Project is located within the whooping crane migratory corridor in Nebraska and it is during those migration times that the species is most at risk to mortality and injury if suitable roosting and foraging habitats are unavailable. Studies completed during the ILP process by LPD confirm that Project diversions reduce the suitability of several habitat indices in the Loup River bypass area including: channel width, wetted width, and proportion of suitable depths for roosting, all important habitat indices for that which comprised suitable roosting habitat for whooping cranes.

Based on current population levels, approximately seven individual whooping cranes are likely to fly over the bypass area on an annual basis for both the spring and fall migrations. This represents roughly 2.5 percent of the total migratory population for the species that would be impacted by continued operation of the Project over the next 30 years. The Service has applied the discountable standard to other species in Nebraska. For instance, we consider a less than one percent chance of encountering (and impacting) the federally endangered American burying beetle as discountable. Admittedly, a far different species, but it is one whose population in the Nebraska sandhills is estimated to be in the thousands whereas the population of migratory whooping cranes is 279 individuals. As the Aransas Wood Buffalo population increases to meet recovery objectives, the number of individuals that could use the Loup River bypass area would also be expected to increase.

Least Tern and Piping Plover

The Service cannot concur with the determination that the Project may affect, but is not likely to adversely affect the piping plover (*Charadrius melodus*) and least tern (*Sternula antillarum*). Project water diversions reduce the suitability of several habitat indices in the Loup River bypass including: channel width, wetted width, and/or sandbar position. Project effects to stream temperature and instream habitat were identified in a study completed by LPD during the ILP process for the Loup River bypass. These impacts may affect food resources for the least tern and piping plover. Especially noteworthy and an outcome of the studies undertaken by LPD and its consultant during the ILP process is the Project's removal of 24 percent of the sediment supply at the diversion resulting in an impediment to sandbar habitat formation. Alterations to sandbar habitat through impediment to its formation affect the least tern and piping plover.

Hydrocycling is known through extensive scientific research to have an effect on primary production. Effects on primary production likewise have a negative effect on the availability of food resources for the least tern and piping plover. Discussions during the ILP process on the hydrocycling study completed by LPD showed that hydrocycling contributes toward the inundation of piping plover and least tern nests in the lower Platte River.

Pallid Sturgeon

The Service cannot concur with the determination that Project operations may affect, but are not likely to adversely affect the pallid sturgeon (*Scaphirhynchus albus*). The Service has determined that the Project is likely to impact the species by affecting the quantity and quality of habitat and riverine connectivity of multiple aquatic habitats starting from the tailrace on the Platte River to its confluence with the Missouri River. Project operations may also inhibit the spawning migration of the species. Recent research further corroborates that the species spawns on the Platte River. Project hydrocycling operations as determined by studies conducted by LPD during the ILP process may also affect pallid sturgeon prey items as described in the subsequent aquatic community discussion.

Western Prairie Fringed Orchid

The Service concurs that Project operations are not likely to adversely affect the western prairie fringed orchid (*Platanthera praeclara*). The western prairie fringed orchid can be impacted by depletions to the Platte River system. A study conducted by LPD confirmed that depletions were less under current Project operations than under a no-Project operation scenario. The DBA should be revised to reflect this conclusion.

II. COMMENTS ON THE PLP EFFECT DETERMINATIONS TO RESOURCES OF CONCERN UNDER SECTION 10J OF THE FPA

There have been numerous studies on the effects of hydrocycling on other river systems that showed effects on the diversity and abundance of the aquatic community. The Service's February 9, 2009, comment letter to the Pre Application and Scoping Document identified concerns about hydrocycling affecting primary production, and stated that impacts to primary production may also affect the forage base for the pallid sturgeon, least tern, and piping plover. The Service's June 24, 2009, comments on the Proposed Study Plan identified concerns about Project hydrocycling on habitats of the fish community. The conclusion that Project hydrocycling for this relicensing action, however, has no effect on federal and state trust species seems to be unique and somewhat inconsistent with what other researchers have found on the Platte River and other river systems.

The Service has determined that the Project hydrocycling operations may impact the aquatic community in the lower Platte River. As reported in recent studies, the Project hydrocycling operations are likely to be a contributor in the reduction of benthic invertebrate production resulting the reduction in the growth rates of species that feed on benthic invertebrates including channel catfish, shovelnose sturgeon, and pallid sturgeon. Project impacts similarly affect the fish community by reducing the quantity of habitat available, quality of habitat available, and connectivity of these habitats. Given the conclusions that other researchers have found, and results from the studies conducted by the LPD during the ILP process, the Service's concerns regarding the Project's hydrocycling effects to the lower Platte River aquatic communities remain and in fact have been long standing.

The PLP proposes a minimum Loup River bypass discharge of 50 to 75 cubic feet per second (cfs) will maintain a "severe degradation" condition under the Montana Method. A study conducted by LPD under the ILP process showed that Project diversions severely impact fish habitat in the Loup River bypass area from April through October with the most severe degradation of such habitat from July through October. Furthermore, the minimum bypass has a high probability of exceeding the temperature standard set by the Nebraska Department of Environmental Quality (approximately 90-percent daily exceedence according to the Second Initial Study Report (SISR) results). The Service expects similar impacts to the Platte River bypass area although impacts based on results from the SISR and the Updated Study report (USR) as completed by LPD are difficult to discern because of the influence of central Platte River streamflow.

III. PROPOSED PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES TO AVOID AND MINIMIZE PROJECT EFFECTS FOR RESOURCES OF CONCERN UNDER ESA, NEPA, AND SECTION 10J OF FPA

The Service supports the investigations of the four alternatives described in FERC's June 10, 2011, request for study plan modifications (as amended December 21, 2011). Such a study could provide additional information that could result in the development of more focused PM&E measures to avoid and minimize impacts to federal and state trust species resulting from Project operations. The following are PM&E measures that were discussed by the Service and Commission at the October 3 and November 2, meetings with representatives of LPD and its consultant based on the most current information available. We look forward to the results of the FERC-requested evaluation of the operational alternatives and how the results of that study could be used to modify the current PM&E measures. The following PM&E measures are organized by Project affect.

Hydrocycling

The Service and Commission identified impacts from Project hydrocycling to the least tern, piping plover, pallid sturgeon, and the lower Platte River aquatic community and recommended several potential PM&E alternatives at our October 3 and November 2, meetings with representatives of LPD and its consultant as follows:

- **Timing:** PM&E measures should be put into place to avoid or minimize impacts to federal and state trust fish and wildlife resources within the March through October time frame. Hydrocycling affects are most pronounced from March through October.

- **Magnitude and Duration:** Consider implementation of some or all of these alternative PM&E measures including: a) no hydrocycling; b) limit the number of operational turbines; and/or c) develop re-regulation facilities. In regard to option b, the Columbus powerhouse has three turbines whose efficiency is optimized at 1,600 cfs, below that discharge, cavitation causes turbine instability and potential damage. Therefore, limits on the number of operational turbines to two or less during critical time periods would reduce the amplitude of the hydrocycle. A re-regulation reservoir stores hydrocycled peak flows within the Tailrace Return and allows for water to slowly return within the trough portion of the hydrocycle, which attenuates the hydrocycle and degree of Project affect. Capacity for storage may be available through modifications within the Tailrace Return or through off-Project storage reservoirs. Barada (2009) suggested a reduction in the magnitude and duration of discharge peaks from the Project tailrace as a management strategy to benefit the downstream biotic community.

Flow Diversion

The Service and Commission identified impacts from flow diversion and sediment dredging to the least tern, piping plover, pallid sturgeon, whooping crane and the lower Platte River aquatic community and recommended several potential PM&E measures at our October 3 and November 2, meetings with representatives of LPD and its consultant as follows:

- **Minimum Flow:** The Service recommends the development of an instream flow bypass that is greater than the 50 to 75 cfs proposed in the PLP. The certification process for low impact hydropower facilities considers the maintenance of a "good" condition under the Montana Method as one criterion for certification (Low Impact Hydropower Institute 2011). A "good" condition for the Loup Bypass area represents a bypass within 297 to 364 cfs from April through September and 149 to 215 cfs from October through March. An increase in the minimum bypass from 50-75 cfs to 364 cfs would reduce the probability of exceeding the NDEQ temperature standard from 90-percent range to the mid-20 to 30 percent range (USR Figure 5-16). The Service requests that FERC consider magnitudes and durations of a minimum flow bypass that contributes toward improving whooping crane habitat suitability for both spring and fall migration periods. The Service also requests that FERC consider magnitudes and durations of a minimum flow bypass that contributes toward the improvement effective/dominant discharges in the Loup and Platte River bypass areas in addition offsetting Project-related reductions in sediment supply at the tailrace return.

- **Effective/Dominant Discharge:** Implement an effective/dominant discharge level flow from May-June on the Loup River bypass reach to enhance sediment transport. A May through June time frame approximates what might be expected under a natural hydrograph scenario. It also coincides with periods of high annual peak flows at Genoa (Figure C-6 of Appendix C).

- **Sandbar Shaping and Vegetation Removal:** We recognize that modifications to an effective/dominant flow regime may not necessarily translate to immediate changes in channel form because of the presence of riparian vegetation (Eaton et al. 2010; Tal et al. 2003). Therefore, the Service recommends mechanical modifications on two to four sandbar point bars within the Loup River bypass area. Mechanical modification would include removal of vegetation and shaping of sand on a point bar to an elevation that would be inundated by the expected effective/dominant discharge. Proposed mechanical modifications allow for the channel to quickly adjust to the modified flow regime. The proposed mechanical modifications are similar to the mechanical actions in the Flow-Sediment-Mechanical approach adopted by the Platte River Recovery Implementation Program (USFWS 2006). Number of sites were based on a comparison of the number of nesting colonies upstream versus downstream of the Project diversion on the Loup River (see Appendix C).

- **Monitoring:** A multi-year monitoring program is recommended for the Loup River bypass and lower Platte River to: a) ascertain response of the least tern, piping plover, pallid sturgeon, whooping crane, and other riverine fish and wildlife species to the recommended PM&E measures; and b) ascertain habitat response of the above species to the recommended PM&E measures. Development of the monitoring program will be done in coordination and concurrence with the Service and Commission to ensure goals and objectives are met with regard to assessing species' response to PM&E measures.

IV. SERVICE RECOMMENDATIONS FOR NEPA PROCESS

The Loup River Hydroelectric Project represents a 53.4-megawatt (MW) project that has a total land area of approximately 5,200 acres of land of which approximately 1,100 acres is water. The geographic scope of the effects of the Project represents approximately 103-miles of Platte River and 30-miles of Loup River. Four federally listed threatened and endangered species are negatively affected by Project operations, not to mention the effects to other federal and state fish and wildlife trust resources.

The Project is similar in scope to other FERC relicensing projects where an Environmental Impact Statement (EIS) was prepared. For example, the Swan Falls Hydroelectric Project in Idaho (FERC Project No. 503-048) resulted in the preparation of an EIS, where a Final EIS (FEIS) was issued in August, 2010. The 25 MW hydroelectric project has a project boundary of 2,192 acres, of which 937 acres are water. The EIS stated only three resources considered in the Scope of Cumulative Effects: a) water quality (nutrients), b) white sturgeon (*Acipenser transmontanus*), and c) riparian vegetation. The geographic scope of effects to the white sturgeon represents the Snake River main stem between Brownlee dam and C.J. Strike dam (approximately 209 miles).

A FEIS was issued on November 2008, for the Holtwood Hydroelectric Project, (FERC Project No. 1881-050). The 107.2 MW project has a total land area within the project boundary of approximately 6,320 acres which includes 2,400 acres of lakebed under Lake Aldred. Water quality and fisheries were identified as the resources that have the potential to be cumulatively affected by the project. The geographic scope of effects to fish passage extends from the Susquehanna River Basin from the Chesapeake Bay to the basin to the York Haven Project (approximately 55 miles) and upstream.

In summary, the Loup River Hydroelectric Project represents a project that is similar in scope to the Swan Falls Hydroelectric Project and the Holtwood Hydroelectric Project. However, Loup River Hydroelectric Project has a much greater number of affected resources when compared to the aforementioned projects. The Service will defer to

FERC to determine the level of documentation needed to satisfy NEPA requirements for the Loup River Hydroelectric Project. However, the Service has serious concerns about the inadequacy of PM&E measures currently proposed in the PLP given the number of important resources involved. It may be difficult for FERC to support preparation of a Finding of No Significant Impact with only the current level of PM&E measures.

The Service appreciates the opportunity to provide comments on the PLP. Should you have any questions regarding these comments, please contact Mr. Jeff Runge within our office at (308) 382-6468, extension 22.

Sincerely,

Michael D. George
Nebraska Field Supervisor

Enclosures

cc: LPD; Columbus, NE (Attn: Neil Suess)
FERC; Washington DC (Attn: Lee Emery)
EPA; Kansas City, KS (Attn: Larry Shepard)
NGPC; Lincoln, NE (Attn: Frank Albrecht)
FWS; Denver, CO (Attn: Dave Carlson)
FWS; Denver, CO (Attn: Tom Econopouly)

Appendix A.

SERVICE COMMENTS ON PROJECT EFFECTS TO THE PHYSICAL ENVIRONMENT

I. Service Comments on Sedimentation

A recognized shortcoming of the Missouri River Basin study is that the sediment yield analysis only evaluates sediment sources, but does not assess sediment sinks. The assumed absence of sediment sinks leads to the incorrect assumption that the total quantity of source sediment is transported to the next downstream sub basin. This limitation was keenly noted by FERC in the April 8, 2011, SISR comments on the sediment budget. The Missouri River Basin study identified sources of sediment, but study methods did not identify areas of sediment deposition which includes hillslope deposition, valley deposition, and floodplain deposition (i.e., sediment sinks). This line of reasoning has also been applied in the Preliminary License Proposal (PLP) with the North and South Sand Management Areas (SMA) but nowhere else. Walling (2010) stressed the importance of understanding the entire sediment budget which includes sediment sources, sediment sinks, and sediment discharged to the downstream basin. Furthermore, Garg and Jothiprakash (2011) reported that physics-based and regression models, including the Universal Soil Loss equation and modified USLE, are primarily used for small watersheds, and these approaches have not shown significant results in estimating sediment yield from medium to large sized watersheds which is likely to represent the Loup and Platte River basins. A study often cited in the PLP elected to apply methods that are different from the Missouri River Basin study to estimate sediment yield (USACE 1990).

The Service is concerned about the Project's removal 24 percent of the sediment supply from the Platte River at North Bend and its effect on channel morphology leading to impacts to species habitats. The Service encourages FERC to consider the cumulative effects to lower Platte River sediment supply and how these effects may change into the future. For example, the US Army Corps of Engineers (Corps) had determined that bank erosion accounts for approximately five percent of the sediment supplied to the lower Platte River (USACE 1990). The Service has documented an increase in the stabilization of high banks from 25 percent in 1987 and 1988 to 38.8-percent from 2004 through 2006. A segment of the Platte River from the Loup River confluence to the Schuyler Bridge, which includes the tailrace return, has bank stabilization on 44.3 percent of the banks. Since 2006, the Service has received multiple requests for lower Platte River bank stabilization from the Corps and has reported multiple unpermitted bank stabilization projects (Jeff Runge and Robert Harms, USFWS, pers. comm. 2012). This increasing trend in bank stabilization projects reduces the availability of sediment that could be supplied through bank erosion and is cumulative to the removal of sediment supply to the Project tailrace.

The central Platte River is currently experiencing similar problems in the loss of sediment supply (Murphy et al. 2006). This erosion of sediment supply has migrated downstream as evidenced through the progressive coarsening of sediment in the central Platte River (Kinzel and Runge 2011). It is assumed that sediment transport impacts in the central Platte River will be realized in the lower Platte River. The Platte River Recovery Implementation Program intends to offset the sediment imbalance in the central Platte River through sediment augmentation, but the long-term feasibility of sediment augmentation remains under investigation. When considering the central and lower Platte River cumulative effects, the Corps (1990) conclusion that the sediment supply of the lower Platte River is virtually unlimited does not appear to be valid.

The Service suggests the following publications that would help to characterize Project impacts sandbar development and maintenance. Schmidt (2007) noted that higher concentrations of suspended sand would create larger eddy sandbars for the same hydrologic event. Low concentrations of suspended sand result in the formation of small sandbars (Schmidt 2007). The author showed that deposition rates during the 1996 controlled flood were larger downstream from the Little Colorado River, where suspended-sand concentrations were greater. It is similarly documented that dams along the Missouri River have greatly reduced sediment inflow into the system, reducing the amount of sand available for sandbar creation (USFWS 2009; National Research Council 2002).

Similarly, sediment-free water from the Tailrace Return is likely to facilitate sandbar erosion. In other river systems, Schmidt (2007) documented that low concentrations of suspended sand in the Little Colorado River may result in net sandbar erosion. Information from Elliot et al. (2009) identified a higher composition of the category "deep water" immediately downstream of the Project tailrace (Figure A-1). Deep water was characterized by the authors as water where the channel bottom was not visible. The presence of deep water was highest below the Project tailrace and diminishes further downstream. Downstream areas of deep water represent the Cedar Bluffs area and the Lower Platte River Gorge (Joeckel and Henebry (2008) that are formed through valley confinement, but the deep water at the Project tailrace return cannot be explained outside of the erosion of sediment supply. This deep water feature was also recognized by your staff as described in FERC's December 21, 2011, study plan determination.

When reviewing the body of current literature for the lower Platte River, there is not clear support that the lower Platte River is in stable geomorphic condition as stated in the PLP. Joeckel and Henebry (2008) concluded that channel surface for the study site encompassing the Project tailrace return (study site RG) decreased consistently during the period from 1938 to 1999. The consistent decrease in channel surface was detected despite an increasing trend in Mean Annual Flow and 7-day Low Flow for the North Bend streamgage (Graph E-12 of the PLP). A higher proportion of deeper water documented by Elliot et al. (2009) combined with a consistent decrease in channel area (Joeckel and Henebry 2008) indicates the possibility of channelization resulting from the Project's sediment deficit at the tailrace return. Joeckel and Henebry (2008) also noted that "Sparse anecdotal data exist for some level of channel downcutting at some sites on the lower river". Furthermore, Horn et al. (2012) has identified that:

> The lower Platte River has not undergone channel narrowing as intensely as the central Platte River from the influence of tributaries, but it has still undergone a change in bar-forming processes related to a decrease in sediment and water discharge.

Unfortunately, the document referenced in the Horn et al. (2012) is currently "in review". When available, the Service will forward the document to FERC for consideration in the ILP process. In conclusion, information from published, scientific literature creates uncertainty around the PLP conclusion that the lower Platte River is in a state of dynamic equilibrium.

II. Service Comments on Hydrocycling

The Service believes that hydrocycling operations have resulted in the erosion of sandbars in the lower Platte River. Dexter and Cluer (1999) document the greatest number of rapid failures in sandbars is correlated to sudden or prolonged periods of discharge reduction. In studies of interior least tern nesting on the Arkansas River, the observed deterioration of sandbars by undercutting banks from diurnally fluctuated releases for hydropower (Lott and Wiley, In Press; Leslie et al. 2000). Budhu and Gobin (1995) explain the physics behind sandbar erosion by hydrocycling on the Colorado River. Also, the Biological Opinion on the Missouri River (USFWS 2000) reported that the bouncing of releases (2 days of low flow followed by 1 day of higher flows) at Gavins Point Dam resulted in the taking of "some" least tern and piping plover habitat. Hydrocycling has also been documented to facilitate vegetation encroachment on sand bars because of the daily downstream wetting of sand bars which would not be as prominent under a run-of-river regime (Lott and Wiley, In Press).

III. Service Comments on Temperature

The Serviced believes that Project operations have increased the probability of high water temperatures in the Loup River bypass. Water temperature is affected by atmospheric conditions, topography, streambed, and stream discharge (Olden and Naiman, 2010; Cassie, 2006). Surface water diversions have been documented to decrease the thermal capacity of the river and thus increase the likelihood of high temperature events and resulting in impacts to federal trust resources. Streamflow diversion would lead to small volumes of water that are more responsive to ambient conditions (Ward 1985), and low discharge leads to more pronounced diel temperature fluctuations. Meier (2003) through the use of heat balance models have linked water diversions to higher summer stream temperatures for low sloped, unshaded river systems. Recent synthesis papers discussing the thermal regime of rivers cite the Sinokrot and Gulliver (2000) paper as the most current paper that documents the linkage between water diversions on stream temperature (Olden and Naiman, 2010; Cassie, 2006).

The comparison of the probability of temperature exceedence to streamflow is one product of the relicense studies whose methods were derived from Sinokrot and Gulliver (2000). LPD replication of methods developed by Sinokrot and Gulliver (2000) demonstrate that, at lower discharges, diel temperature fluctuations are more pronounced as evidenced in the probability of temperature exceedences graph in the USR (Figure 5-16). The current minimum flow bypass of 50 to 75 cfs has a high probability exceeding the Nebrāska Department of Environmental Quality standard (approximately 90-percent daily exceedence).

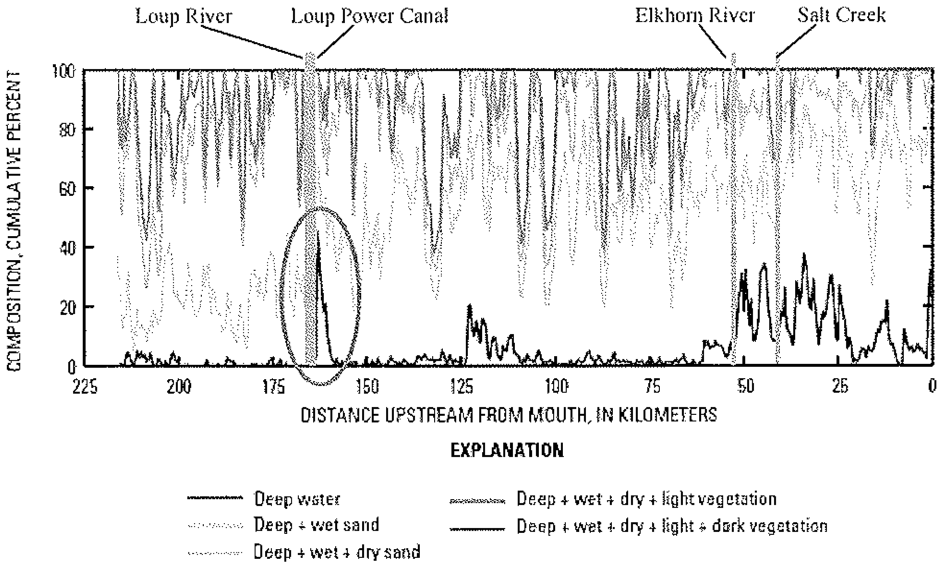

Figure A-1. Longitudinal comparison of percent channel composition from Elliot et al. (2009). The blue oval identifies the rapid increase in percent deep water downstream of the Project tailrace return. Deep water was classified as water where the channel bottom was not visible. Deep water areas downstream of the Project tailrace represent conditions of valley eonfinement (i.e., Cedar Bluffs and Lower Platte River Gorge).

Appendix B.

SERVICE COMMENTS ON EFFECTS TO SECTION 10J RESOURCES

I. Effects of Flow Bypass on the Loup River Fish Community

The Service has determined that Project operations impact the Loup River fish community by: a) increasing the probability of exceeding the water quality standard for warm water aquatic life, and b) reducing suitability of instream habitat.

In the previous section, the Service documented how Project effects stream temperature in the Loup bypass area. This relationship between stream temperature and flow has been documented in other river systems. Sinokrot and Gulliver (2000) and Meier et al. (2003) have documented that a reduction in stream discharge resulting from water diversions can directly affect water temperatures by decreasing thermal capacity and increasing the likelihood of high temperature events, and thus it is logical that lower flows in the Loup River bypass area have a higher probability of exceeding the water quality standard of 90^0 Fahrenheit.

Reducing the anthropogenic effect to a river's temperature regime is important for the ecological integrity of the biotic systems linked to river temperature. For example, the life cycles for freshwater insects and fish respond to the cumulative effects of thermal units (i.e. the accumulation of daily temperatures above some threshold) and absolute temperatures (Olden and Naiman, 2010). Fish species also have both chronic and acute temperature thresholds for survival, growth, and reproduction (Olden and Naiman, 2010). The Service has determined that the above ecological and physiological processes in the Loup River bypass area are affected by the frequent temperature exceedences of the water quality standard of 90^0 Fahrenheit associated with a minimum flow bypass of 50 to 75 cfs.

Service April 7, 2011, comments on the SISR also documents the impacts to the fish community in the bypass area of the Loup River and the bypass area of the Platte River as recognized using the Montana Method. The Service noted large differences in the proportion of Fair, Poor, or Degraded conditions for each of the respective months when comparing Site 1 upstream of the Project diversion to Genoa. The percentage of years categorized as Fair, Poor, or Degraded for the months from April through June ranged from 0 to 1.8 percent for Site 1 while percentages at Genoa ranged from 37.5 to 48.2 percent. From July through September, the percentage of years categorized as Fair, Poor, or Degraded ranged from 1.8 to 19.6 percent for Site 1 while percentages at Genoa ranged from 71.4 to 82.1 percent. In summary, approximately half of the years, over a year time frame, at Genoa were categorized as degraded for the months of July through September.

Service SISR comments also summarized the percent of total categorized as Fair, Poor, or Degraded from October through March for the 56-year period of record. There is an obvious difference in October when the Site 1 has zero years in a degraded condition while Genoa has 46.4 percent of the years categorized as degraded. The percentage of years categorized as Fair, Poor, or Degraded for the months from November through March ranged from 0 to 1.8 percent for Site 1 while percentages at Genoa ranged from 0 to 16.1 percent.

II. Effects of Hydrocycling on the Lower Platte River Aquatic Community

The conclusion that Project hydrocycling for this relicensing action, however, has no effect on federal and state trust species seems to be unique and somewhat inconsistent with what other researchers have found on the Platte River and other river systems. Published scientific literature had identified the effects of hydrocycling on the aquatic community. Impacts from hydrocycling include reduced benthic invertebrate abundances (Gisalson 1985), stranding of burrowing invertebrates (Braaten and Guy 1995), and decreased feeding and growth of fish (Weisberg and Burton 1993). Hydrocycling effects to primary production and fish growth have been demonstrated in research specific to the lower Platte River. Barada (2009) noted slower growth rates for channel catfish collected in the Platte River compared to growth rates in published literature, and that channel catfish collected from sites directly below the Loup River Power Canal exhibited the slowest growth rates compared to sites further upstream and downstream. Holland and Peters (1992) observed similar slow growth of channel catfish in the lower Platte River suggesting stressful environmental conditions as a possible source. When comparing conclusions in published scientific literature to study results, Barada (2009) concluded that canal hydropeaking reduces availability of channel catfish prey which reduces consumption of prey items. The author also suggested that the reduced growth of channel catfish is influenced by individual adjustments to rapidly changing habitats due to hydrocycling.

In a separate study, Anderson (2010) stated that shovelnose sturgeon are aquatic benthivores, and it is likely that benthic invertebrates are being directly influenced by diel fluctuations from the Loup River Power Canal. Anderson (2010) concluded that Project hydrocycling effects on channel catfish, as documented by Barada (2009), would similarly affect shovelnose sturgeon because of similar diets and habitat uses. Anderson (2010) documented relatively high mortality rates for sturgeon on the lower Platte River compared to other shovelnose sturgeon populations. Anderson (2010) hypothesized that environmental stressors such as hydropeaking create an extreme environmental condition that results in direct mortality of individuals or forced emigration from the lower Platte River.

Recent publications have documented the potential effect of hydrocycling on fish diversity and abundance. Anderson (2010) reported lower fish diversity in the study site nearest the Project's tailrace return when compared to the downstream study site. A difference in fish abundance was also reported by Peters and Parham (2008a). The author attributed hydropeaking as a possible cause for the reduced abundance due to its rapid alterations to flow regime.

The importance of the Platte River to the Missouri River basin fish communities has been well documented (Winders and Delonay 2011; Pierce et al. 2003; Newcomb 1989). Pierce et al (2003) stated that tributaries are critical to maintaining healthy fish populations in the Missouri River because they provide refugia for fish populations residing in the degraded main channel of the Missouri River. The authors also concluded that continued degradation of tributaries such as the Yellowstone, Platte, and Kansas rivers could further jeopardize fish populations in the Missouri River ecosystem.

Appendix C.

SERVICE COMMENTS ON DRAFT BIOLOGICAL ASSESSMENT

I. Whooping Crane

Importance of the Loup River
An understanding of whooping crane recovery is necessary prior to assessing how Project operations would affect the survival and recovery of the species. The whooping crane recovery plan lists two recovery objectives that would allow for a downlisting in status from federally Endangered to Threatened (CWS and USFWS 2005).

Objective 1 – Establish and maintain self-sustaining populations of whooping cranes in the wild that are genetically stable and resilient to stochastic environmental events.
Objective 2 – Maintain a genetically stable captive population to ensure against extinction of the species.

Within these objectives, there are measurable criteria specific to the Aransas Wood Buffalo Population (AWBP). Criteria for the AWBP are variable and based on the sustainability of other populations such as the Florida non-migratory population and the eastern migratory population. The following table lists the AWBP recovery criteria based on the number of sustainable non-AWBP populations.

Number of Sustainable Non-AWBP Populations	AWBP Criteria
2	40 productive pairs for at least 10 years
1	400 individuals (i.e. 100 productive pairs)
0	1,000 individuals (i.e. 250 productive pairs)

The Loup River bypass has a role in whooping recovery in the future if habitat could be improved compared to present conditions. Approximately 60 to 80-percent of the AWBP mortalities occur within the migration time periods totaling just nine weeks out of the year (CWS and USFWS 2005; Lewis et al. 1992). The Service recognizes the importance of improving the secure migration habitat range-wide which includes the Loup River bypass. Given the above downlisting criteria, none of the non-AWBP populations are currently considered sustainable, so the recovery criterion for the AWBP is 1,000 individuals of which there would need to be 250 productive breeding pairs. With the flock size estimated at 279 individuals, this would imply the need for secure habitat for a population that is approximately four times the current size. The Loup River bypass area has the potential to provide a greater contribution in stopover habitats for delisting to occur.

The Draft Biological Assessment (DBA) is correct in that the whooping crane was not included in the Service's July 21, 2008, letter. However, the Service justified the inclusion of the whooping crane in their February 9, 2009, comment letter to the Pre Application and Scoping Document. Improved mapping capabilities were developed that resulted in improved delineations of the whooping crane migration corridor for the

AWBP (Tacha et al. 2011). The improved mapping capabilities show that Loup River bypass is nearly contained within the eastern 95-percent boundary whooping crane migration corridor in Nebraska (Figure C-1). This would imply that 5-percent of the population migrates within the 95-pecent boundary, and the Service assumes the eastern corridor represents 2.5-percent or one half of the total 5-percent. The current AWBP population estimate is 279 individuals of which 2.5-percent represents approximately seven individual whooping cranes that are likely to fly over the bypass area for both the spring and fall migrations. Based on the downlisting criteria for the AWBP is 1,000 individuals, approximately 25 individual whooping cranes are expected to fly over bypass area, for both spring and fall migration seasons, on an annual basis with the expectation of roosting along the migration route.

Effects of Project Diversion

Assessments of habitat use in the DBA do not consider information from recently published documents. The DBA does not consider channel width, wetted width, and depth information published by Farmer et al. (2004) or Howlin et al. (2008) which represent important habitat criteria for the whooping crane. It is important to recognize that, although whooping crane may use a range of unobstructed and wetted widths, the species selects for the widest unobstructed and wetted widths available. The DBA description of habitat use in Table 4 does not capture the complexities of how the species selects habitats based on habitat availability using resource selection applications (Johnson et al. 2006, Rosenfeld 2003, Johnson 1980).

Farmer et al. (2004) concluded for the central Platte River that wide channel width was a necessary condition for a large number of whooping crane roosts to occur. Narrow channel widths precluded large numbers of use by cranes. Figure C-2 demonstrates that channel widths downstream of the Project diversion fall within the range of unobstructed channel widths that would preclude high number of whooping cranes. Unobstructed channel widths upstream of the diversion provide conditions that would allow for a much higher probability of use by the species. The Service has also applied channel width data to a suitability curve developed by Howlin et al. (2008) demonstrating that the channel width upstream of the diversion has a higher suitability compared to channel widths downstream of the diversion (Figure C-3).

Published literature also recognizes a suitability indice of "wetted width" (Farmer et al. 2005, Howlin et al. 2008). HEC-RAS modeling results from USR Table 5-10 compares wetted channel for Site 1 to Site 2-No Diversion (Table C-1). Narrower channel widths associated with Site 2 result in narrower wetted widths, and average wetted widths for the Site 1 dry, normal, and wet time period are greater than the average channel width for Site 2. Differences in channel width are consistent when comparing study sites upstream and downstream of the Project diversion. Figure 5-11 in the USR Flow Depletion/Flow Diversion also show that the No Diversion condition for study sites in the Loup Bypass area have the same streamflow as Study Site 1 but do not have the ability to achieve comparable wetted widths thus does not provide habitat for the species.

The distribution of depths across a channel represents another important habitat suitability indice for the whooping crane. Farmer et al. (2005) used the indice "wetted widths of channel >0.7 feet in depth" in their analysis, and Howlin et al. (2008) used the indice "depth of suitable sand less than 8 inches deep". Furthermore, Farmer et al. (2005) recognized a minimum depth to characterize roost habitat. The DBA indice "shallow water/wet sand" is not comparable to the above indices because the depth of water could not be determined through aerial interpretation (SISR, Page 42, footnote 6). To address the shortcoming of the aerial interpretation, the Service used data developed through HEC-RAS modeling to assess riverine habitat suitability because: a) the HEC-RAS models apply transect data collected with survey grade Global Positioning Units, and b) the indice "Percentage of Channel Width with Water Depths of 0.8 Foot or Less" used in HEC-RAS modeling better represents habitat suitability indices described by Farmer et al. (2005) and Howlin et al. (2008).

Table C-2 summarizes the indice "Percentage of Channel Width with Water Depths of 0.8 Foot or Less" from Table 5-19 of the USR and "Percentage of Exposed Channel Width" from Table 5-10 from the USR. The sum of both variables represents the indice "proportion of depth suitable or sand" described by Howlin et al. (2008). Figure C-4 compares the habitat suitability using the variables "proportion of depth suitable or sand" from Table C-2, and wetted width from Table C-1. When comparing suitability above and below the Project diversion, it is evident that Project operations have a considerable effect to whooping crane habitat suitability.

The DBA also does not discuss roost sites occur mid-channel away from visual obstructions such as tall vegetation and/or high banks (Farmer et al. 2004; Austin and Richert 2001; Faanes et al. 1992). While the DBA correctly states that the Loup River bypass has greater areas of shallow water/wet sand, the Service does not consider shallow water/wet sand as roost habitat unless it is located away from visual obstructions. Study sites upstream of the Project diversion have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars. The DBA does not describe the position of the shallow water/wet sand, but the Service would infer that the shallow water/wet sand is likely to be located adjacent to point bars next to the river bank where visual obstructions make the area unsuitable. Submerged mid-channel sand bars located upstream of the project diversion are likely to be higher in suitability because sandbars would be located away from visual obstructions.

II. Least Tern

The recovery team for the interior least tern has determined that the Platte and Loup rivers are essential for the recovery of the species. In 1990, the Service published the *Interior Population of the Least Tern Recovery Plan* (USFWS 1990). That plan includes recovery goals for the least tern along major river systems throughout the species range. Major recovery steps outlined in the plan include: a) determine population trend and habitat requirement; b) protect, enhance, and increase populations during breeding; c) manage reservoir and river water levels to the benefit of the species; d) develop public awareness and implement educational programs about the least tern, and; e) implement law enforcement actions at nesting areas where there are conflicts with high public use.

The recovery plan further recommends the removal of the least tern from the list of threatened and endangered species if essential habitat throughout its range is properly protected and managed, and species distribution and population goals are reached and maintained for a period of ten years. Specifically, the recovery plan recommends that the following distribution and numbers of adult birds be maintained for ten years:

Missouri River system - 2,100
Lower Mississippi system - 2,200-2,500
Arkansas River system - 1,600
Red River system - 300
Rio Grande River system - 500

The recovery plan also specifies a geographic distribution of these totals within each river system. Within the Missouri River system, the plan calls for 1,120 of the 2,100 adult terns to be distributed in Nebraska, as follows:

Missouri River - 400 (shared with South Dakota on the Missouri River)
Niobrara River - 200
Loup River - 170
Platte River – 750

The Service does not support the DBA conclusion that interior least tern use of the Loup River in relation to use of other Nebraska rivers is minimal. The species recovery plan has identified the Loup River as important for species conservation and recovery, and species recovery cannot occur unless Loup River recovery objectives are achieved. Peripheral populations can be disproportionately important to the conservation of widely distributed species such as the least tern because individuals contribute to metapopulation longevity (Perkins et al. 2003; Howe and Davis 1991). The absence of spatially diverse habitats can result in crowded breeding habitat; thus, intra- or interspecific competition that can reduce local reproduction (Guo et al. 2005). Maintenance of peripheral populations also spreads risk so that variable habitat conditions in one or a few river systems do not threaten the entire species (Murphy et al. 1990). Species production in the Loup River in 2011 was especially important for the larger population because production on the Platte and Missouri Rivers were reduced due to flooding.

The DBA does not include important adult and nest survey information that was provided by the Commission. Table C-3 summarizes survey data from 1985 to 2008 (excluding 2005 International Census data reported in DBA). Total number of birds and nests were determined by using the highest number recorded on a single day for a segment of river. If two days were required to survey a segment, then data from those two days were combined as long as the survey dates were within two to three days of each other. Table C-4 also includes individual and nest information collected by the Tern and Plover Conservation Partnership for the North Sand Management Area.

Recent adult and nest surveys from 2009-2011 had the objective of counting peak bird and nest numbers on the Loup River, so data from these surveys provides an improved baseline for number of individuals and number of nests compared to the 2005 census that was based on different objectives. Tables C-5 and C-6 separates least tern data for the 2009-2011 surveys by location upstream and downstream of the diversion, respectively. The 2009 survey was conducted by the Nebraska Public Power District, the 2010 survey was conducted by the Service, and the 2011 survey was conducted by both agencies. The maximum number of individuals surveyed (i.e., Peak #) represents the peak number of individuals for one longitudinal survey. Multiple surveys were conducted for 2010 and 2011, and by using the maximum number of individuals for one survey eliminates the possibility of double-counting of individuals across multiple surveys. Total number of nests (i.e., Nests) represents the total number of unique nests documented for all surveys. Unique nests were determined by interpretation of Global Positioning Unit data or by comparison of observation dates. The Service has also modified the maximum number of individuals and total number of nests to reflect the number of birds and nests per river mile (i.e., per RM). The Loup River downstream of the Project diversion represents approximately 34.2 river miles. The Loup River from the Middle Loup/South Loup confluence to the project diversion represents approximately 21.8 river miles.

The Service has also summarized the total number of nesting colonies observed in the 2009 – 2011 surveys (Table C-7). A nesting colony is defined as a site having at least one active nest containing one or more eggs or chicks. Because least tern and piping plovers often nest together in a colony, Table C-7 does not separate colonies by species. As with the previous tables, data was modified to reflect the number of colonies per river mile. It is clear in Tables C-5, C-6, and C-7 that the Loup River upstream of the diversion has a higher number of: a) maximum number of individuals surveyed per mile, b) total number of least tern nests per river mile, and c) total number of nesting colonies per river mile for all three years of survey.

Species Use in the Loup River

The PLP stated that the calculation of channel width and depth using the no diversion effective and dominant discharges reveals that the values of both parameters would be larger under a no diversion condition than under current operations. Tables C-8, C-9, and C-10 provide a projection of: a) maximum number of individuals surveyed, b) total number of least tern nests, and c) total number of nesting colonies for the bypass area if habitat conditions in the bypass area were similar to conditions upstream of the bypass. The variable *Max # Bypass* represents the maximum number of individuals surveyed within the bypass area (i.e., Table C-8, Column 1). The number of river miles in the Loup River bypass (i.e., 34.2 river miles) is then multiplied by the maximum number of individuals surveyed per mile observed upstream of the Project diversion (i.e., Table C-8, Column 3) to develop the variable *Max # Potential.* The variable *Max # Potential* represents an indice of the maximum number of individuals that are expected to be observed in the Loup Bypass area if habitat conditions downstream of the Project diversion were similar to conditions upstream of the diversion and rates of use are similar. The difference between the variables *Max # Potential* and *Max # Bypass* represents the number of individuals that could be present if the rate of use downstream of the Project diversion was similar to the rate of use upstream. Methods were similarly developed for: a) total number of least tern nests, and b) total number of nesting colonies for the bypass area as represented by Tables C-9 and C-10, respectively.

The LPD May 11, 2011, response to SISR comments stated that under the no diversion condition, the Loup River bypass reach would over time develop characteristics similar to the upstream location. If the Loup River downstream of the Project diversion was geomorphically similar to the river upstream of the diversion, then species use would be similar. If the rate of species use for the Loup River bypass area was similar to use documented for the Loup River upstream of the diversion, then we would expect the: a) maximum number of individuals to increase by 20 to 33 individuals; b) total number of nests to increase by 4 to 26 nests; and c) number of nesting colonies to increase by 2 to 4 colonies.

The upstream to downstream differences in species use is especially dramatic when considering that a single nesting colony as well as the majority of least tern nests occurred in a location in the Loup River bypass area where the channel migrated laterally into the Central Sand and Gravel sandpit. As noted in Figure C-5, channel widths of approximately 1,700 feet are much wider than widths documented in the flow depletion/flow diversion study. When removing nest totals from the Central Sand and Gravel sandpit, the total number of unique nests observed in the Loup Bypass area is reduced from 25 to 8. Additionally by removing the Central Sand and Gravel sandpit colony from the totals, 2011 represents the only year out of the 3-year survey that nesting colonies were observed in the Loup River bypass area. The Service would like to note that habitat suitability and species use at the site would likely diminish once the channel at the Central Sand and Gravel sandpit adjusts to the dimensions associated with the effective/dominant discharge and vegetation establishes in the area.

As discussed previously in the whooping crane section, channel width in the bypass segment of the Loup River is narrower than channels upstream of the diversion. For the central and lower Platte River, Ziewitz (et al. 1992) documented that least terns and piping plovers nested in river segments whose channel width was wider than what was typically available. Nest sites in the central Platte River averaged 969 feet (standard deviation 267 feet) while random sites averaged 659 feet (standard deviation 252 feet). Nest sites in the lower Platte River averaged 1,703 feet (standard deviation 316 feet) while random sites averaged 1,410 feet (standard deviation 335 feet). Results from the HEC-RAC analysis show channel widths upstream of the diversion averaging 825 feet while channels downstream of the diversion average 640 feet. As discussed previously, 17 of the 25 least tern nests in Loup Bypass area were located at the Central Sand and Gravel sandpit, a site considered by the Service to be an anomaly, but whose channel width is approximately 1,700 feet. The Service believes that the lower rates of use and nesting in the Loup River bypass are linked to lower channel width suitability.

Furthermore, the DBA did not consider the position of the sandbars in relation to habitat suitability. While the DBA correctly states that the Loup River bypass has greater areas of bare sand, the Service does not consider bare sand as suitable habitat unless the sand represents a mid-channel sandbar isolated by streamflow. Study sites upstream of the Project diversion have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars. Mid-channel sandbars located upstream of the project diversion are likely to be higher in suitability because sandbars would be located away from visual obstructions.

As stated in Appendix B, Project operations may affect least tern forage because of Project diversions affecting water temperature in the Loup River bypass and instream habitat in the Loup and Platte River bypass areas. Least terns are opportunistic feeders. However, adults and chicks have different sizes requirements for food items, so a diverse and healthy fish community is necessary to support different least tern life stages.

The DBA also discusses Off-Highway Vehicle (OHV) use in the OHV park could influence interior least tern and piping plover nest site selection and productivity. While surveying for least tern and piping plovers, the Service has observed OVH use throughout the Loup River bypass area. The Service supports the DBA assessment that OHV could represent a disturbance-related effect to the species, and broad use of OHV in the bypass may be facilitated by low bypass flows.

<u>Species Use in the Platte River</u>

Figure 5 of the DBA identifies the number of adult least terns observed during June surveys although it does not separate river and sandpit observations. This separation of habitat types is important because the Project affect habitats differently. The DBA also discusses statistical studies conducted by the LPD which evaluated nest count data on the lower Platte River for all river miles downstream of the confluence with the Loup River. The DBA concluded that factors such as suitable habitat, mid-summer flooding, recreational disturbance, predation, nesting success in other locations, and threats in the wintering locations create variability in nesting numbers. The Service has determined that the DBA analyses cannot singularly assess Project effects to least tern nesting. The Project may/may not affect the species, but current methods can not verify this effect (of lack of) because methods cannot account for the aforementioned confounding factors that creates variability in the results.

According to the LPD USR response, approximately 1,794,800 tons of sediment are removed on an average annual basis through Project operations. Assuming a bulk density of sand at 1.9 tons per cubic yard (Kinzel 2009), approximately 944,632 cubic yards of sediment near the Project tailrace return would be needed to maintain sediment balance on an annual basis. The sediment removed from the available sediment supply would come from Platte River streambed, banks, and sandbars. Project removal of sediment at the Project diversion may affect Platte River sandbar formation and sediment free water from the Tailrace Return may facilitate sandbar erosion as observed in Figure A-1. As identified in Appendix A, this relationship between suspended sediments and sandbar development has been documented in other river basins.

The PLP referenced results from the aggradation/degradation analysis which used methods from Chen et al. (1999) stating that channel degradation was not detected at the North Bend streamgage and sites further downstream. However, the aggradation/degradation analysis is limited in that stream gage. The North Bend gage is approximately 30 miles downstream from the Project tailrace, and methods could not be used to detect change to the sub-aerial component of the channel (i.e., sandbars) (Alexander 2009).

As discussed in Appendix B, Project hydrocycling operations also affect primary productivity in the Platte River below the tailrace return which may affect least tern forage base. Project hydrocycling affect the least tern through sandbar erosion, and the continuous wetting of sandbars may also impact sandbar suitability by facilitating vegetation establishment (Appendix A).

Project hydrocycling also affects least tern nest inundation. The Service does not support the DBA conclusion that the relative elevation above the wetted sand of a sand bar would be the same for current operations and a run-of-river scenario. Brown and Jorgensen (2009) documented that sandbars do not form at the elevation of the peak flow. Rather, sandbars form at different elevations below the peak flow. Effects of hydrocycling on the descending slope of a peak flow thus, have the potential to inundate nests which is depicted in Figure C-7. Under run-of-river operations, a nest initiated in mid-April whose elevation is equivalent to 3,700 cfs would not be inundated by subsequent flows. Conversely, a nest could not initiate at comparable elevations under hydrocycling operations because peak of the hydrocycle would inundate any nesting attempt. Figure C-7 represents 2006 conditions and the magnitude hydrocycling effects vary across years and across different elevations. Service SISR comments, dated April 7, 2011, included commentary from the Commission which elaborates on the potential effects on nest inundation. It is reasonable to conclude under certain flow conditions that hydrocycling either: a) has the potential for nest inundation, or b) has the potential to inundate nesting habitat that would preclude nesting opportunities.

General Comments

1. The genus for the least tern has recently changed from *Sterna* to *Sternula*.

2. The DBA is correct in that the breeding range has not changed, but the number of breeding sites range-wide has diminished.

3. DBA statement that least terns are associated with piping plovers at nesting sites is incomplete. The species have been known to nest at colonies independent of the other species. Furthermore, species ranges are different further documenting why species are not always associated.

4. The Service would like to caution the use of 2005 census data as the sole source of data used to determine the significance of the Loup River to the species. The low number of bird counted in 2005 was a consequence of the time of survey.

The objective of the 2005 international least tern census was to implement a standardized method to survey the presence of the species across numerous river basins, and surveyors had a narrow time frame for to conduct surveys. Loup River surveys for the 2005 occurred immediately after a series of rainstorm events which inundated all available nesting habitats and may have moved individuals into other river systems (Jeff Runge, pers. comm. 2012).

5. The North SMA has 425.5 acres of sand, but only 100 to 150 acres is considered habitat for terns and plovers.

6. The Service does not view the MOU as a mitigation or enhancement offset for Loup or Platte River habitat impacts. The North SMA memorandum of understanding reduces the take of least tern and piping plover nests resulting from sand mining operations only and does not reduce effects of Project operations on Loup River nesting habitat.

III. Piping Plover

The Service finalized a recovery plan for the Great Lakes and Northern Great Plains Piping Plover in (USFWS 1988). The 1988 plan established a recovery goal for the northern Great Plains piping plover population of 1,300 pairs. The recovery plan identifies the geographic and temporal elements of the recovery goals that need to be met. The recovery plan states that the population must remain stable for a period of at least 15 years. The geographic goals in the recovery plan 1,300 pairs are to be distributed in the following locations.

Montana - 60 pairs
North Dakota - 650 pairs
    Missouri River - 100 pairs
    Missouri Coteau - 550 pairs
South Dakota -350 pairs (including 250 pairs shared with Nebraska on the Missouri River)
    Missouri River below Gavin's Point - 250 pairs (shared with Nebraska)
    Other Missouri River sites - 75 pairs
    Other sites - 25 pairs
Nebraska - 465 pairs (including 250 pairs shared with South Dakota on the Missouri River)
    Platte River - 140 pairs
    Niobrara River - 50 pairs
    Missouri River - 250 pairs
    Loup River system - 25 pairs
Minnesota - 25 pairs at Lake of the Woods

The Service does not support the DBA conclusion that piping plover use of the Loup River in relation to use of other Nebraska rivers is minimal. The species recovery plan has identified the Loup River as important for species conservation and recovery, and species recovery cannot occur unless Loup River recovery objectives are achieved. As discussed in the least tern section, peripheral populations can be disproportionately important to the conservation of the species by contributing to metapopulation longevity, the reduction intra- or interspecific aggressiveness within colonies and, to spread risk across multiple river systems (Perkins et al. 2003; Howe and Davis 1991). Species production in the Loup River in 2011 was especially important for the larger population because production on the Platte and Missouri Rivers were reduced due to flooding.

The DBA does not include important adult and nest survey information. Table C-11 summarizes survey data from 1985 to 2008 (excluding 2005 International Census data reported in DBA). Total number of birds and nests were determined by using the highest number recorded on a single day for a segment of river. If two days were required to survey a segment, then data from those two days were combined as long as the survey dates were within two to three days of each other. Table C-12 also includes individual and nest information collected by the Tern and Plover Conservation Partnership for the North Sand Management Area.

The Service has developed Tables C-13 and C-14 which separates the 2009-2011 piping plover survey data by location either upstream or downstream of the diversion. Tables C-13 and C-14 applied piping plover data using the same methods described in the least tern section.

Similar to findings in the least tern section, the Loup River upstream of the diversion has a higher number of: a) piping plover individuals per mile, b) piping plover nests per river mile, and c) nesting colonies per river mile for all three years of survey. This change is especially dramatic when considering that a single nesting colony as well as all of the documented piping nests in the Loup River bypass area occurred at the Central Sand and Gravel sandpit. As noted in Figure C-5, channel widths of approximately 1,700 feet are much wider than widths documented in the flow depletion/flow diversion study in the bypass area. When removing nest totals from the Central Sand and Gravel sandpit, there would be zero nests in the Loup Bypass area. The Service would like to note that once the channel at the Central Sand and Gravel sandpit adjusts to the dimensions associated with the effective/dominant discharge, it is likely the habitat suitability and species use at the site would diminish as well once vegetation establishes.

Species Use in the Loup River

The PLP stated that the calculation of channel width and depth using the no diversion effective and dominant discharges reveals that the values of both parameters would be larger under a no diversion condition than under current operations. Tables C-15, C-16, and C-10 provide a projection of: a) maximum number of individuals surveyed, b) total number of piping plover nests, and c) total number of nesting colonies for the bypass area if habitat conditions in the bypass area were similar to conditions upstream of the bypass. The Service developed Tables C-15 and C-16 by applying methods that were similar to those applied in Tables C-8 and C9.

If the rate of species use for the Loup River bypass area was similar to use documented for the Loup River upstream of the diversion, then we would expect the: a) maximum number of individuals would increase by 3 to 13 individuals; b) total number of nests would increase by 2 to 5 nests; and c) number of nesting colonies would increase by 2 to 4 colonies.

The upstream to downstream differences in species use is especially dramatic when considering that all documented piping plover nests occurred in the Loup River bypass area where the channel migrated laterally into the Central Sand and Gravel sandpit. As noted in Figure C-5, channel widths of approximately 1,700 feet are much wider than widths documented in the flow depletion/flow diversion study. When removing nest totals from the Central Sand and Gravel sandpit, the total number of nests observed in the Loup Bypass area is reduced from two to zero. Habitat suitability and species use at the site would likely diminish once the channel at the Central Sand and Gravel sandpit adjusts to the dimensions associated with the effective/dominant discharge and vegetation establishes in the area.

Channel width in the bypass segment of the Loup River is narrower than channels upstream of the diversion. Results from the HEC-RAC analysis show channel widths upstream of the diversion averaging 825 feet while channels downstream of the diversion average 640 feet. As discussed previously, all of the piping plover nests in Loup Bypass area were located at the Central Sand and Gravel sandpit whose channel width is approximately 1,700 feet. The Service believes that the lower rates of use and nesting in the Loup River bypass are linked to lower channel width suitability. While the DBA correctly states that the Loup River bypass has greater areas of bare sand, the Service does not consider bare sand as nesting habitat unless the sand represents a mid-channel sandbar isolated by streamflow. Study sites upstream of the Project diversion have a larger percentage of mid-channel bars in comparison to downstream sites which have a higher proportion of point bars. Mid-channel sandbars located upstream of the project diversion are likely to be higher in suitability because sandbars would be located away from visual obstructions.

The DBA also discusses Off-Highway Vehicle (OHV) use in the OHV park could influence interior least tern and piping plover nest site selection and productivity. While surveying for least tern and piping plovers, the Service has observed OVH use throughout the Loup River bypass area. The Service supports the DBA assessment that OHV could represent a disturbance-related effect to the species, and broad use of OHV in the bypass may be facilitated by low bypass flows.

<u>Species Use in the Platte River</u>

Figure 6 of the DBA identifies the number of adult least terns observed during June surveys although it does not separate river and sandpit observations. This separation of habitat types is important because the Project affect habitats differently. The DBA also discusses statistical studies conducted by the LPD which evaluated nest count data on the lower Platte River for all river miles downstream of the confluence with the Loup River. As discussed in the least tern section, the Project may/may not affect the species, but current methods cannot verify this effect (of lack of) because methods cannot account for the confounding factors that creates variability in the results.

Project removal of sediment at the Project diversion may affect Platte River sandbar formation and sediment free water from the Tailrace Return may facilitate sandbar erosion. As identified in Appendix A, this relationship between suspended sediments and sandbar development has been documented in other river basins. The aggradation/degradation analysis Chen et al. (1999) is limited in that stream gage at North Bend is approximately 30 miles downstream from the Project tailrace, and methods could not be used to detect change to the sub-aerial component of the channel (i.e., sandbars) (Alexander 2009).

Project hydrocycling operations affects primary productivity in the Platte River below the tailrace return which may affect piping plover forage base. LeFer (2008) concluded that on the Missouri River, hydrocycling in combination with the decrease in physical habitat diversity has likely led to the decline in forage base for the piping plover. Similar effects would be anticipated for the lower Platte River. Project hydrocycling may affect the piping plover through sandbar erosion, and the continuous wetting of sandbars may also impact sandbar suitability by facilitating vegetation establishment (Appendix A). It is also reasonable to conclude under certain flow conditions that hydrocycling either: a) has the potential for nest inundation, or b) has the potential to inundate nesting habitat that would preclude nesting opportunities.

General Comments

1. The Service cautions the use of international piping plover census data as the sole source of data to determine the significance of the Loup River to the species. The goal of the international piping plover census is to describe long-term changes in population numbers and the species breeding distribution. To address this goal, the recovery team. To address this goal, the recovery team implemented a standardized method to survey the presence of the species across numerous river basins, and surveyors had a narrow time frame to conduct surveys. The time frame for surveys generally occurs in early to mid-June. This represents a time period when peak flows are frequent in the Loup River basin (Figure C-6) and species presence may be limited. Conversely, Service and NPPD nest surveys from 2009 through 2011 were generally conducted from mid-June through July with the objective of counting maximum number of individuals and nests.

2. The International Piping Plover Census is conducted every five years, not four as cited in the DBA.

3. Table 3 of the DBA should compare the Loup River metapopulation to the total number of piping plover adults when comparisons should be developed at the subspecies, population, or Distinct Population Segment level because of the biological significance of these units to species conservation (USFWS 2009).

4. Banded piping plover data accessible to the LPD demonstrates regular and routine dispersal between breeding sites and areas at various scales. This exchange of individuals demonstrates the Loup River contributes to the overall population and shows the interconnectedness of breeding areas and sites. Loss or increases of breeding sites and habitat on the Loup River, or elsewhere for that matter, has population-level consequences.

5. The Service does not view the MOU as a mitigation or enhancement offset for Loup or Platte River habitat impacts. The North SMA memorandum of understanding reduces the take of least tern and piping plover nests resulting from commercial sand mining operations only and does not reduce effects of Project operations on Loup River nesting habitat.

6. The DBA did not identify the pertinence of beach width, wetlands, and deep water habitats of the Great Lakes to Project effects.

IV. Pallid Sturgeon

As stated in the DBA, critical habitat has not been designated for the pallid sturgeon, but six Recovery Priority Management Areas (RPMAs) have been identified in the species recovery plan (USFWS 1993). These RPMAs were selected based upon recent pallid sturgeon records and the probability that these areas still provide suitable physical habitat for restoration and recovery of the species. These areas are in relatively good condition and in some reaches still exhibit a channel configuration of sandbars, side channels, and varied depths. The RPMAs also have one or more major tributaries affecting their hydrology, physical, and chemical characteristics.

The confluence areas of major tributaries to the lower Missouri and Mississippi rivers are highlighted in the recovery plan for the pallid sturgeon because of their importance as feeding and nursery areas for large river fish (USFWS 1993). RPMA number four, as described in the recovery plan, is the Missouri River below Gavins Point Dam to its confluence with the Mississippi River; most importantly, within 20 miles upstream and downstream of major tributary mouths, including, but not limited to the Platte, Kansas, and Osage rivers (USFWS 1993). It is important to note that natural recruitment of pallid sturgeon is sporadic or limited in RPMA 4 (USFWS 2007), and data indicate that the pallid sturgeon could face local extirpation.

Although no Platte River specific recovery objectives or criterion has been identified, the pallid sturgeon recovery plan states that species recovery is unlikely to be successful without restoring the critical portions of morphology, hydrology, temperature regimes, and sediment/organic matter transport of the rivers that provide the life requisites for the species (USFWS 1993). Several documents have been published subsequent to the recovery plan that identifies the importance of the Platte River to the pallid sturgeon.

Several pallid sturgeon life stages have been documented in the Platte River. Peters and Parham (2008a) noted that adult and juvenile pallid sturgeon have been captured in the lower Platte River which is a significant indicator that the habitats found in the lower Platte River are suitable for pallid sturgeon. Larval sturgeon (species not confirmed) has been documented in the lower Platte River (Hofpar 1997, Reade 2000). DeLonay (2012) described the radio tagging of two gravid female pallid sturgeon in the Missouri River. Based on temperature data collected from an inserted data storage tag, it was determined that one of the pallid sturgeon likely migrated into the Platte River to spawn.

The pallid sturgeon 5-year review (USFWS 2007) identifies the lower Platte River as a major Missouri River tributary in RPMA 4 and documents why the lower Platte River is/was important habitat for pallid sturgeon:

> The lower Platte River is a major Missouri River tributary in RPMA 4 and likely is/was important habitat for pallid sturgeon. The lower Platte River is defined in Snook et al. (2002) as the Platte River from the confluence with the Missouri River upstream to the Loup River. Snook (2001) documented that hatchery-reared pallid sturgeon (1992 year class produced at Blind Pony State Fish Hatchery, Missouri) released (1994) in the lower Platte River tended to remain in this reach, and speculate that habitat features like sand bars were important features for the species. In 2003, Swingle (2003) collected two presumed wild pallid sturgeon in the lower Platte River and subsequently followed their movement via telemetry. One of these was a gravid female collected early May 2001 that subsequently moved into the Missouri River on June 9, 2001, suggesting the lower Platte River may be an important tributary for spawning.

Furthermore, the Middle Basin Pallid Sturgeon Workgroup is currently investigating the possibility of stocking the pallid sturgeon in the lower Platte River. Winders and Delonay (2011) stated the following:

> Sturgeon-specific monitoring efforts, telemetry studies on the Missouri and Platte rivers, along with intensive broodstock collection efforts below the mouth of the Platte have highlighted the potential importance of the Platte River to pallid sturgeon recovery efforts.

Potential Effects to Pallid Sturgeon

Potential impacts to the pallid sturgeon can be divided into the following categories: a) flow and sediment-related effects to sustainability of habitats, b) flow and sediment-related effects to habitat quantity and quality, c) flow-related effects to habitat connectivity, d) flow-related effects to spawning behavior (spawning cues), and e) flow-related effects to prey items.

Flow and Sediment-Related Effects to Sustainability of Habitats – As diseussed previously in Appendix A, Joeckel and Henebry (2008) concluded that channel surface for the study site encompassing the Project tailrace return (study site RG) decreased consistently during the period from 1938 to 1999. As identified in FERC's December 21, 2011, study plan determination, there was a higher proportion of deep water below the Project tailrace. The Project's removal of 24 percent of the sediment supply at the Project tailrace may result in future channel degradation which would affect species habitats. In summary, Project operations are likely to reduce habitat capacity for the pallid sturgeon.

Pallid sturgeon may also be affected by Project bypass operations. Study Site 3, located within the Platte River bypass area, has narrower channels compared to study sites downstream of the Project's tailrace return which is a result of Project diversions lowering effective discharge. This reduction in channel area would assume to have some proportionate reduction in pallid sturgeon habitat.

Project reductions in active channel area may affect pallid sturgeon habitats in two ways. Reduction in active channel area may affect the longitudinal distribution of habitats which in turn affect the presence or absence of species at large spatial scales (Rosenfeld 2003). Reductions in channel area may also reduce the lower Platte River's habitat capacity for a species which in turn affect species abundance (Rosenfeld 2003). These reductions in channel area may result in river segments that are unsuitable to pallid sturgeon, or suitability is so reduced that the river segment serves only as a migration corridor.

Flow and Sediment-Related Effects to Habitat Quantity and Quality - Several studies have characterized pallid sturgeon habitat in the lower Platte River as deeper channels along the downstream margins of sandbars and channel macroforms (Peters and Parham 2008b). Studies on the Yellowstone River, another braided river tributary to the Missouri River, identified similar use of deep water along the margins of sandbars and channel macroforms (Bramblett and White 2001). The Project's removal of 24 percent of the sediment supply at the Project tailrace return could affect the development of channel sandbars and macroforms. Furthermore, the Project's release of clear water at the tailrace return would increase water clarity in the lower Platte River. The clear water returns would affect the pallid sturgeon which select for dark to very dark conditions, avoid areas of low turbidity, and have specialized physiological adaptations to turbid environments (Peters and Parham 2008b). The increase in water clarity would decrease habitat suitability and may increase predation pressure on individuals near the tailrace return (Peters and Parham 2008b).

Project hydrocycling may also affect pallid sturgeon habitats. Depths of captured pallid sturgeon in the lower Platte River averaged 1.27 meters; depths at capture sites were deeper than those generally available (Peters and Parham 2008a). The authors also concluded that pallid sturgeon were avoiding water less than 0.8 meters deep. Pallid sturgeon use of relatively deeper, swifter water has been documented in other systems (Jordan et al. 2006) and in the laboratory assessments (Allen et al. 2007). Elliot (2011) noted that deep water geomorphic classification (i.e., percent of deep water) was sensitive to discharge changes resulting from hydrocycling; therefore, it is reasonable to assume that hydrocycling similarly affects pallid sturgeon habitat.

Flow-Related Effects to Habitat Connectivity – Service April 7, 2011, comments on the SISR identified Project hydrocycling effects to the connectivity to pallid sturgeon habitats. Parham (2007) identified that the lower Platte River is generally unconnected at discharge rates below 4,400 cfs and rapidly becomes connected as discharges reaches 6,300 cfs. The river can be considered fully connected at a discharge of 8,100 cfs. Conclusions from the Lower Platte River Stage Change Study also validate conclusions from Parham (2007). The Lower Platte River Stage Change Study identified Run and Plunge habitats (i.e., pallid sturgeon microhabitat) are mostly connected across the width of the river at 6,000 cfs (HDR et al., 2009). Discharges less than 6,000 cfs may lower water elevations enough to limit access for pallid sturgeon since they will not or cannot move through Flat or Slackwater habitat.

The Service noted in the SISR comments that Project effects to pallid sturgeon habitat connectivity are infrequent during the winter months of December and January, and Project effects to pallid sturgeon habitat connectivity during the low flow months of July through October are primarily limited to the Ashland and Louisville study sites. The most prominent Project effects to connectivity occur from February through June and in November. For certain months, Project effects to connectivity occur upstream to Study Site 4. These losses of connectivity at Study Site 3 could imply Project diversions potentially affecting pallid sturgeon habitat in the Platte River Bypass area. Project effects to habitat connectivity may reduce the capacity of the Platte River to support pallid sturgeon individuals. Reductions in habitat connectivity may also affect the spawning migration of pallid sturgeon in the Platte River between April and July when reproductive shovelnose and pallid sturgeon generally move upstream to spawn DeLonay et al. (2009).

Flow-Related Effects to Spawning Behavior - It is likely that Project operations would not affect spawning behavior of the pallid sturgeon. DeLonay et al. (2009) identified potential long-term and short term cues for reproductive maturation and readiness to spawn. Day length is the likely long-term cue that is initiated months before a predictable spawning date. Of three potential short-term spawning cues (i.e., water temperature, discharge, day of year) water temperature is the most likely to affect the sensitivity of pallid sturgeon hormones, embryo development, and embryo survival. Since Project operations are not known to affect stream temperature in the Platte River, it is reasonable to conclude that Project operations would not affect spawning behavior. Although Project effects to spawning behavior may not be evident, Project impacts to spawning migration corridors were previously discussed.

Flow and Sediment-Related Effects to Prey Items – The Project may similarly affect pallid sturgeon prey items by: a) flow and sediment-related effects to sustainability of habitats, b) flow and sediment-related effects to habitat quantity and quality, c) flow-related effects to habitat connectivity, and d) flow-related effects on primary production. Although pallid sturgeon forage studies have not been conducted for the lower Platte River, Peters and Parham (2008b) has identified a range wide preference for benthic minnows especially those of the *Macrhybopsis* species which includes sturgeon chub (*Macrhybopsis gelida*), shoal chub (*Macrhybopsis hyostoma*), silver chub (*Macrhybopsis storeriana*), and flathead chub (*Platygobio gracilis*). Similar to discussions in previous sections, Project reductions in channel area, reductions in suspended sediment, removal of sediment supply near the tailrace return may affect habitat quality and quantity of pallid sturgeon prey items. Project hydrocycling operations may affect habitat quality and connectivity of habitat for pallid sturgeon prey items.

Most notable is the Project hydrocycling effects to primary production has been well documented as noted in Appendix B, Section II. This effect would be realized for benthic invertebrates commonly consumed by juvenile pallid sturgeon as well as affecting small fishes commonly consumed by adults. In addition, Peters and Parham (2008b) stated that increased water clarity would probably reduce the ability of pallid sturgeon to compete with other piscivorous species for the small fish in the lower Platte River.

General Comments

1. University of Nebraska at Lincoln researchers have captured both stocked and wild pallid sturgeon upstream of the Elkhorn River confluence for all three sampling years and all three sampling time periods (i.e., spring, summer, and fall). Thus, implying that the Platte River provides habitat for the pallid sturgeon year round as opposed to providing seasonal habitat described in the DBA.

2. The Service cautions the use of angler-reported pallid sturgeon to determine the range of the species. The initial range of the pallid sturgeon for the Platte River (i.e., downstream of the Elkhorn River confluence) was developed in absence of directed research upstream of the Elkhorn River confluence. The University of Nebraska at Lincoln studies provided the first effort in searching for the species upstream of the confluence.

Table C-1. Average channel width and wetted channel width in feet for channels upstream of Project diversion and downstream .

		Downstream	
	Upstream	Current Hydrology	No Diversion
Channel Width	825	640	640
Wetted Width (Dry)	660	237	550
Wetted Width (Normal)	726	346	576
Wetted Width (Wet)	743	378	576

Table C-2. Percent of exposed channel width (i.e., exposed channel) and percentage of channel width with water depths of 0.8 foot or less (i.e., width ≤0.8) for channels upstream and downstream of the Project diversion.

	Upstream of Diversion			Downstream of Diversion		
	Exposed Channel	Width ≤0.8	Sum	Exposed Channel	Width ≤0.8	Sum
Dry	20	38	58	63	24	87
Normal	12	38	50	46	30	76
Wet	10	34	44	41	30	71

Table C-3. Least tern adult and nesting information from annual surveys (Nebraska Game and Parks Commission Nongame Bird Database).

	Downstream of Diversion		Upstream of Diversion	
	Birds	Nests	Birds	Nests
1985	41	0	7	0
1986	10	0	0	0
1987	28	2	50	3
1988	14	2	58	18
1990	26	0	66	0
1992	83	23	70	23
1993	18	1	34	15
1995	46	13	82	27
1998	23	2	41	0

Table C-4. Least tern adult and nesting information for the North Sand Management Area. Cells classified as NA was used for years when data was insufficient in quantifying a use type.

Year	Adults	Fledglings	Chicks	Nests
1987	32	5	NA	30
1988	26	3	NA	16
1989	11	0	NA	4
1990	15	5	NA	12
1991	21	NA	NA	NA
1992	12	0	NA	NA
2008	19	3	2	17
2009	19	1	3	14
2010	22	3	4	22
2011	17	0	7	13

Table C-5. Peak number of least tern adults (Peak #), total number of least tern nests (Nests) observed on the Loup River upstream of the Projeet diversion for the 2009 through 2011 surveys. Peak number of least tern adults per river mile (Peak # per RM) and total number of least tern nests per river mile (Nests per RM) were calculated using the stream length of 21 miles.

Upstream of Diversion

	Peak #	Nests	Peak # per RM	Nests per RM
2011	33	27	1.51	1.24
2010	39	10	1.79	0.46
2009	37	4	1.70	0.18

Table C-6. Peak number of least tern adults (Peak #), total number of least tern nests (Nests) observed on the Loup River downstream of the Project diversion for the 2009 through 2011 surveys. Peak number of least tern adults per river mile (Peak # per RM) and total number of least tern nests per river mile (Nests per RM) were calculated using the stream length of 34.2 miles.

Downstream of Diversion

	Peak #	Nests	Peak # per RM	Nests per RM
2011	25	16	0.73	0.47
2010	28	7	0.82	0.20
2009	38	2	1.11	0.06

Table C-7. Number of nesting colonies observed on the Loup River upstream and downstream of the project diversion for the 2009 through 2011 surveys (Upstream and Downstream, respectively). Number of nesting colonies per river mile were calculated using the stream length of 21 miles and 34.2 miles for river segments upstream and downstream of the Project diversion, respectively.

	Number of Colonies		Colonies per RM	
	Upstream	Downstream	Upstream	Downstream
2011	4	4	0.19	0.13
2010	3	1	0.14	0.03
2009	2	1	0.10	0.03

Table C-8. Lists the peak number of least tern adults observed downstream of the Project diversion (Max # Bypass), and peak number of least tern adults per river mile observed upstream of the Project diversion (Peak # per RM). The potential maximum number of birds for the Loup River bypass area was calculated by multiplying (Peak # per RM) by 34.2 river miles. The difference in the maximum number of birds in the Loup River bypass area (Max # Difference) was calculated by subtracting (Max # Bypass) from (Max # Potential).

	Max # Bypass	Peak # per RM	Max # Potential	Max # Difference
2011	25	1.51	52	27
2010	28	1.79	61	33
2009	38	1.70	58	20

Table C-9. Lists the number of least tern nests observed downstream of the Project diversion (Nests Bypass), and number of least tern nests per river mile observed upstream of the Project diversion (Nests per RM). The potential number of nests for the Loup River bypass area was calculated by multiplying (Nests per RM) by 34.2 river miles. The difference in the number of nests in the Loup River bypass area (Max # Difference) was calculated by subtracting (Nests Bypass) from (Nests Potential).

	Nests Bypass	Nests per RM	Nests Potential	Nest Difference
2011	16	1.24	42	26
2010	7	0.46	16	9
2009	2	0.18	6	4

Table C-10. Lists the number of nesting colonies observed downstream of the Project diversion (Colony Bypass), and number of least tern nests per river mile observed upstream of the Project diversion (Upstream Colonies # per RM). The potential number of nests for the Loup River bypass area was calculated by multiplying (Upstream Colonies # per RM) by 34.2 river miles. The difference in the number of nests in the Loup River bypass area (Colony Difference) was calculated by subtracting (Colony Bypass) from (Colony Potential).

	Colony Bypass	Upstream Colonies per RM	Colony Potential	Colony Difference
2011	4	0.19	6	2
2010	1	0.14	5	4
2009	1	0.10	3	2

Table C-11. Piping plover adult and nesting information from annual surveys (Nebraska Game and Parks Commission Nongame Bird Database).

	Downstream of Diversion		Upstream of Diversion	
	Birds	Nests	Birds	Nests
1985	0	0	0	0
1986	0	0	0	0
1987	4	0	14	3
1988	4	0	25	4
1990	8	0	14	0
1992	15	8	17	6
1993	7	0	14	5
1995	15	1	40	15
1998	3	0	9	0

Table C-12. Piping plover adult and nesting information for the North Sand Management Area. Cells classified as NA was used for years when data was insufficient in quantifying a use type.

Year	Adults	Fledglings	Chicks	Nests
1987	25	1	NA	10
1988	2	3	NA	1
1989	7	0	NA	4
1990	6	2	NA	2
1991	0	0	NA	0
1992	4	0	NA	2
2008	12	0	12	8
2009	10	2	2	5
2010	12	3	5	7
2011	9	0	6	3

Table C-13. Peak number of piping plover adults (Peak #), total number of piping plover nests (Nests) observed on the Loup River upstream of the Project diversion for the 2009 through 2011 surveys. Peak number of piping plover adults per river mile (Peak # per RM) and total number of piping plover nests per river mile (Nests per RM) were calculated using the stream length of 21 miles.

	Peak #	Nests	Peak # per RM	Nests per RM
2011	11	4	0.50	0.18
2010	9	3	0.41	0.14
2009	4	2	0.18	0.09

Table C-14. Peak number of piping plover adults (Peak #), total number of piping plover nests (Nests) observed on the Loup River downstream of the Project diversion for the 2009 through 2011 surveys. Peak number of least piping plover per river mile (Peak # per RM) and total number of piping plover nests per river mile (Nests per RM) were calculated using the stream length of 34.2 miles.

	Peak #	Nests	Peak # per RM	Nests per RM
2011	6	1	0.18	0.03
2010	1	0	0.03	0.00
2009	3	1	0.09	0.03

Table C-15. Lists the peak number of piping plover adults observed downstream of the Project diversion (Max # Bypass), and peak number of piping plover adults per river mile observed upstream of the Project diversion (Peak # per RM). The potential maximum number of birds for the Loup River bypass area was calculated by multiplying (Peak # per RM) by 34.2 river miles. The difference in the maximum number of birds in the Loup River bypass area (Max # Difference) was calculated by subtracting (Max # Bypass) from (Max # Potential).

	Max # Bypass	Peak # per RM	Max # Potential	Max # Difference
2011	6	0.50	17	11
2010	1	0.41	14	13
2009	3	0.18	6	3

Table C-16. Lists the number of piping plover nests observed downstream of the Project diversion (Nests Bypass), and number of least piping plover per river mile observed upstream of the Project diversion (Nests per RM). The potential number of nests for the Loup River bypass area was calculated by multiplying (Nests per RM) by 34.2 river miles. The difference in the number of nests in the Loup River bypass area (Max # Difference) was calculated by subtracting (Nests Bypass) from (Nests Potential).

	Nests Bypass	Nests per RM	Nests Potential	Nest Difference
2011	1	0.18	6	5
2010	0	0.14	5	5
2009	1	0.09	3	2

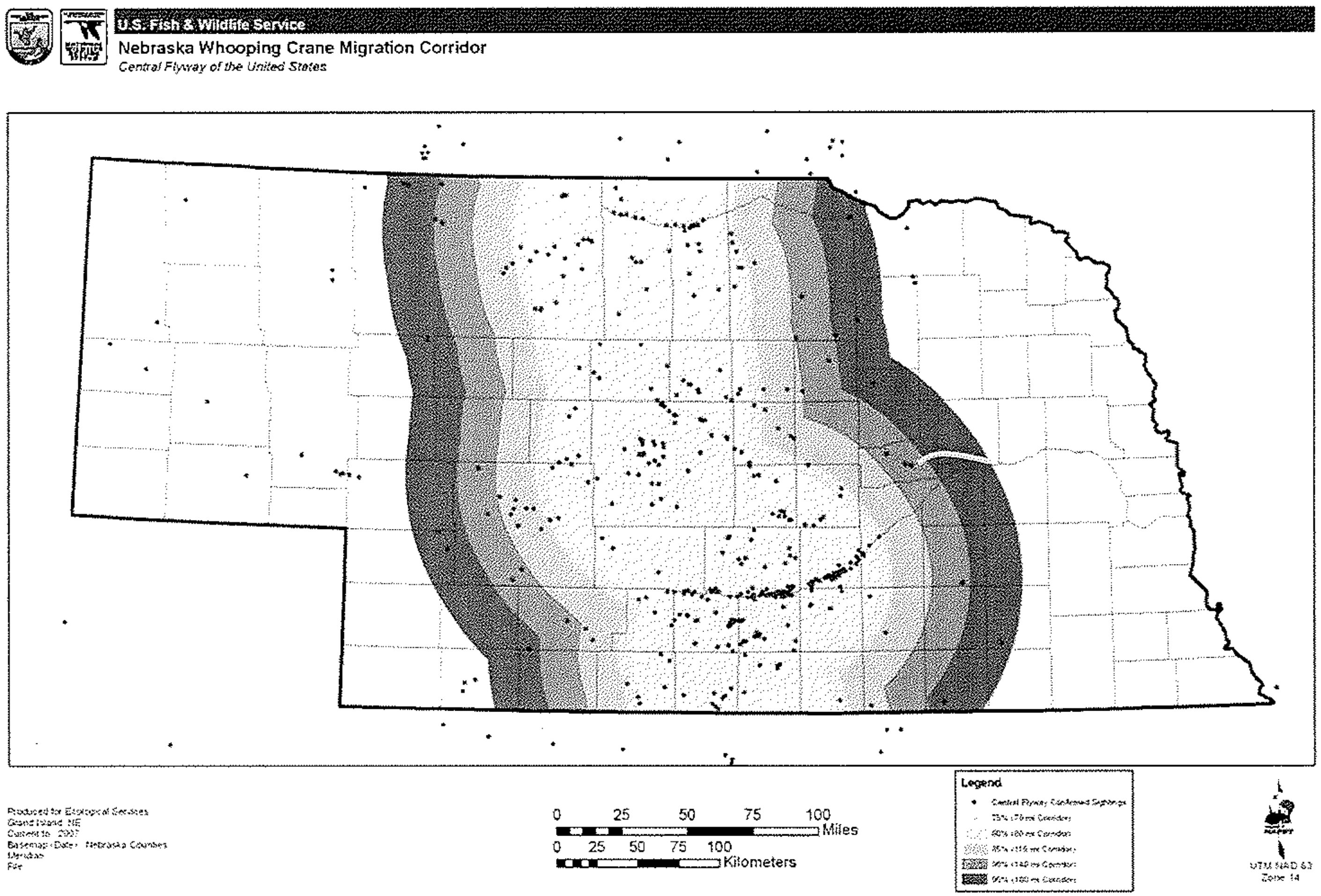

Figure C-1. Range map for the whooping crane in Nebraska. The yellow line represents the approximate location of the Loup River bypass within the 90-percent and 95-percent corridors.
http://www.fws.gov/nebraskaes/Library/Central_Flyway_State_Specific_NE.jpg

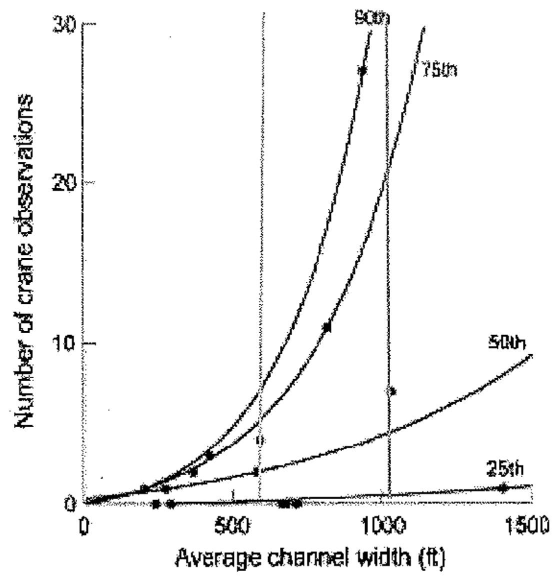

Figure C-2. A comparison of the number whooping crane observations versus the average channel widths of study segments in the central Platte River (Farmer et al. 2004). The unobstructed channel widths downstream (652 to 669 feet) and upstream of the diversion (1,050 to 1,077 feet) are represented by the green and blue lines, respectively.

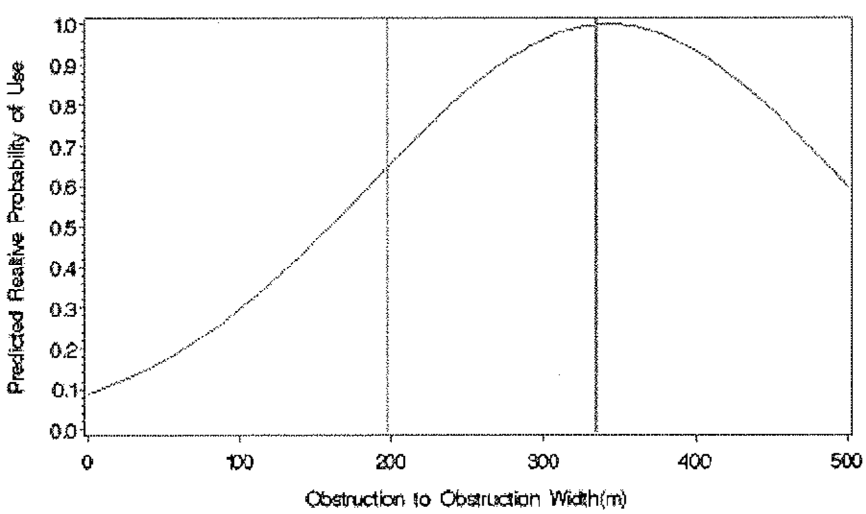

Figure C-3. Predicted quadratic relationship between relative probability of use and unobstructed width (Howlin et al. 2008). The unobstructed channel widths downstream (652 to 669 feet) and upstream of the diversion (1,050 to 1,077 feet) are represented by the green and blue lines, respectively.

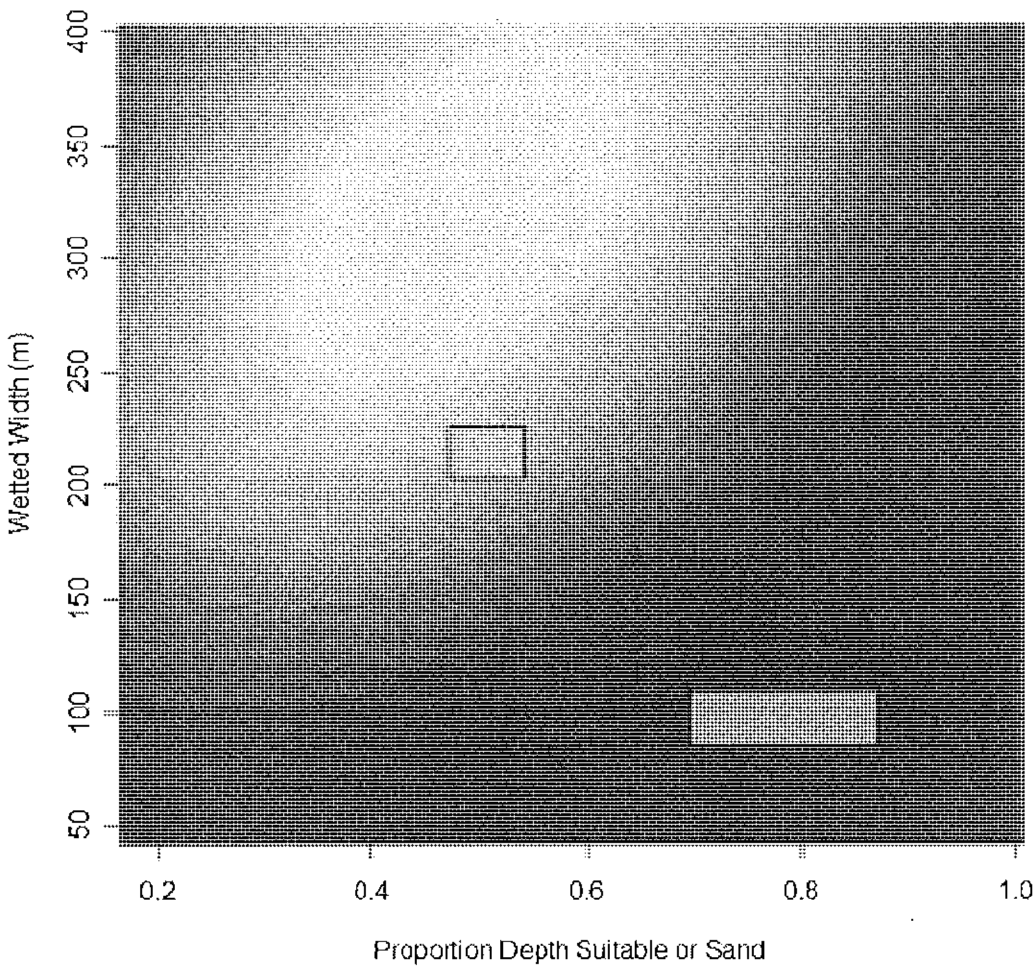

Figure C-4. Predicted probability of use comparing wetted width to proportion of depth suitable/sand from Howlin et al. (2008). Red and yellow portions of the graph represent areas of low and high suitability, respectively. The green and blue boxes represent range of wetted width and proportion of depth suitable/sand for Loup River study sites downstream and upstream of the Projeet diversion, respectively.

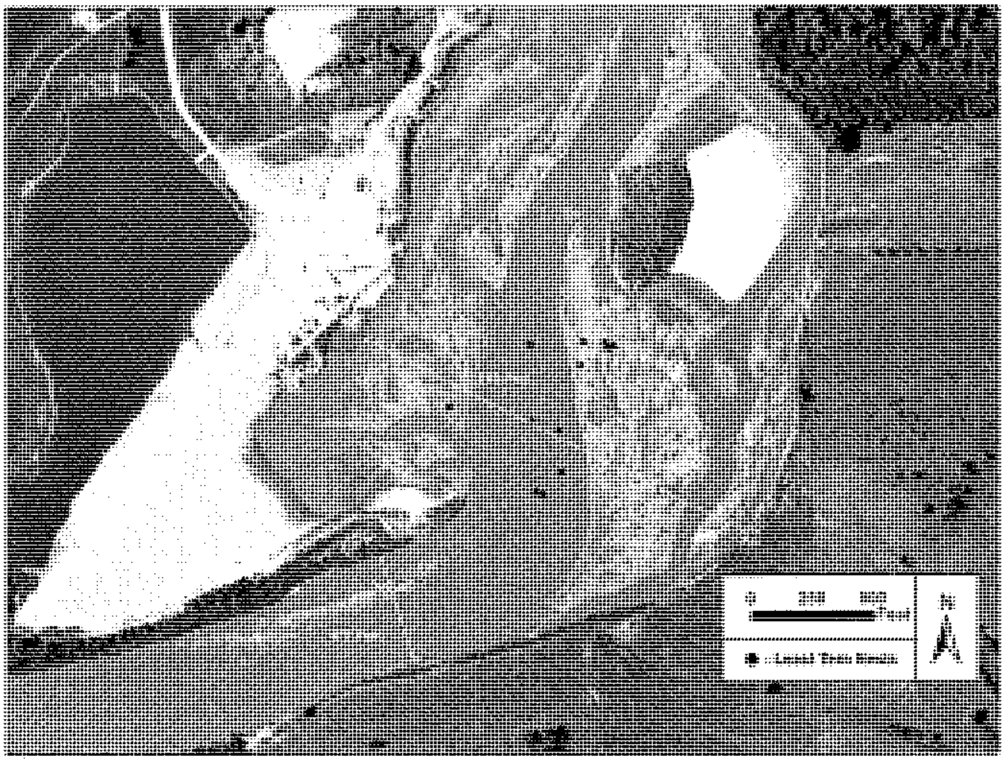

Figure C-5. A comparison of channel widths of the Loup River at the Central Sand and Gravel sandpit. Least tern nests represent locations collected by GPS from 2010 and 2011 surveys (2009 Photography from the Farm Service Agency, National Agricultural Imagery Program).

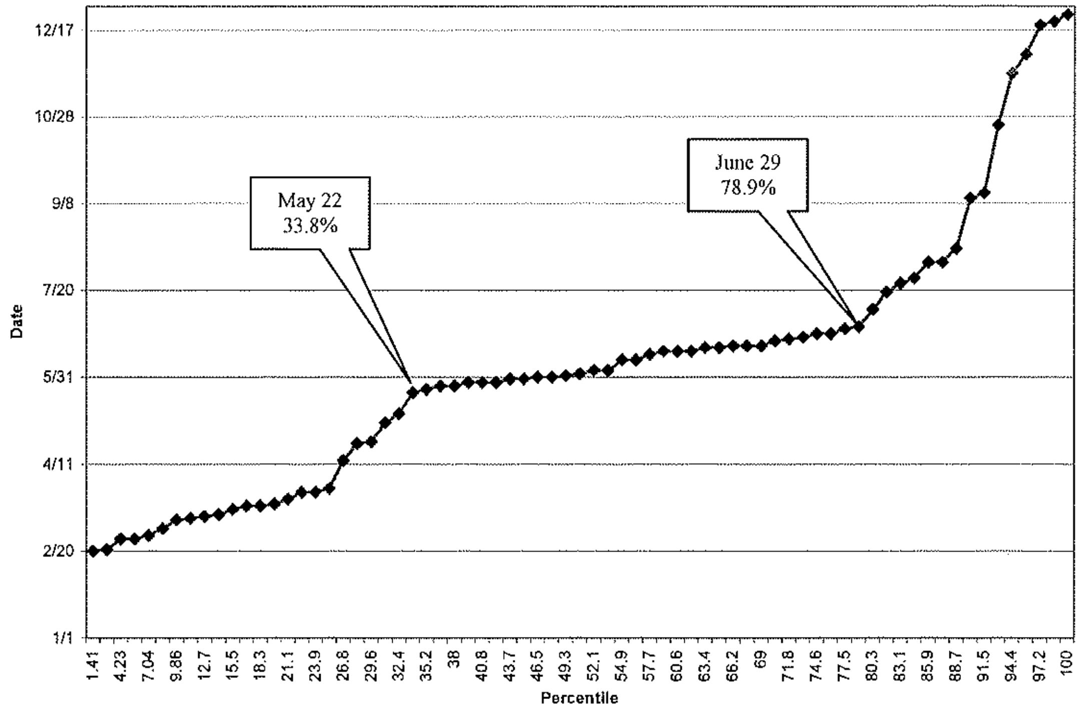

Figure C-6. Cumulative percentiles for peak flows at the Genoa streamgage from 1929 to 2010. May 22 and June 29 represents a time period when approximately 45-percent of peak flows have been documented.

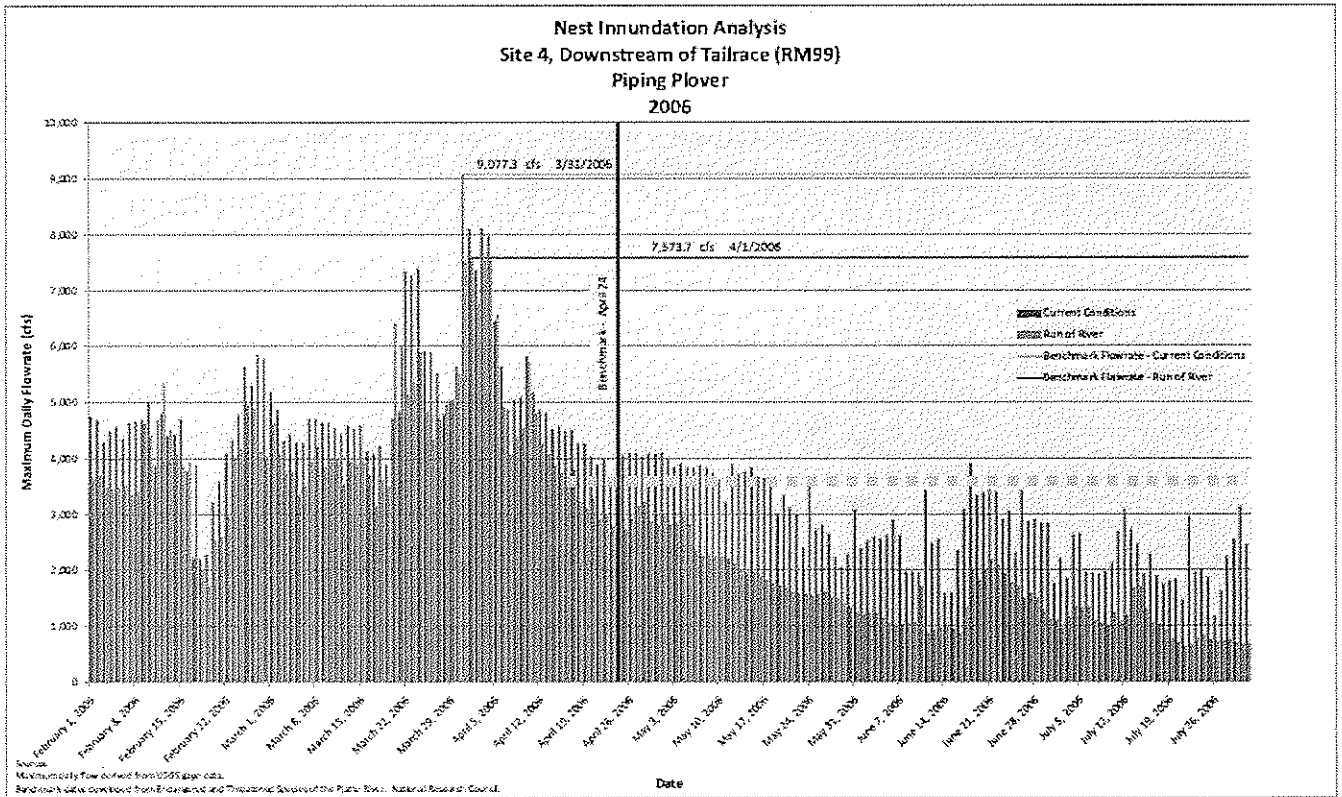

Figure C-7. Nest inundation analysis for the piping plover using 2006 hydrology (SISR Hydrocycling Attachment I). The green dashed line represents a hypothetical nest whose elevation is equivalent to 3,700 cfs.

Appendix D.

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FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426
February 16, 2012

OFFICE OF ENERGY PROJECTS

Project No. 1256-029--Nebraska
Loup River Hydroelectric Project
Loup River Public Power District

Neal D. Suess, President/CEO
Loup Power District
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Reference: Comments on Draft License Application

Dear Mr. Suess:

Pursuant to 18 CFR § 5.16(e), Appendix A of this letter contains Commission staff's comments on your Loup River Hydroelectric Project (Loup Project) draft license application filed on November 18, 2011. Please include the information outlined in Appendix A in your final license application.

If you have any questions, please contact Lee Emery at (202) 502-8379, or via email at lee.emery@ferc.gov.

Sincerely,

Nicholas Jayjack, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosure:
Appendix A--Comments on the Draft License Application

Appendix A
Comments on the Draft License Application
Loup River Hydroelectric Project No. 1256

Project Description

In Exhibit A, you state that there are no transmission lines at either the Monroe or Columbus powerhouses. However, in several places in the draft license application, you describe transmission facilities at both of these powerhouses. For example, in Section A.2.9 (page A-8), you state that at the Monroe powerhouse, there is a powerhouse bus that is directly connected to a substation by an underground bus cable. You state in Section A.2.16 (page A-14) that at the Columbus powerhouse, each of the three generator step-up transformers is connected directly to a substation bus.

A primary transmission line is a line that is used solely to transmit power from a licensed project to a load center. By this definition, without the line, there would be no way to transmit the project's power to the electrical grid. A line leading from a project ceases to be a primary line at the point it is no longer used solely to transmit power from the project to the interconnected grid. Based on the information you provided in Exhibit A, it appears that the underground bus cable at the Monroe powerhouse and the generators leads connecting to the step-up transformers may be primary transmission lines. Therefore, please tell us in the final license application (final application) where the Loup River Project transmission lines at the Monroe and Columbus powerhouses interconnect with the grid and cease to be primary lines used solely to transmit power from the project to the electrical grid. Exhibits A and G may need to be revised to note the type, length, and voltage of the transmission lines, and show where the project transmission lines interconnect with the regional grid.

In Section A.2.9 of Exhibit A (page A-8), you state that at the Monroe powerhouse, power is metered and purchased by the Nebraska Public Power District (Nebraska Power) prior to the power entering the substation. However, you also state that the substation is connected with the District's and Cornhusker Public Power District's sub-transmission and distribution systems. As stated in the draft license application, the implication is that the District operates a distribution system. Please clarify in the final application which "District" operates a distribution system as there are three "District's" discussed in the draft application (i.e., Loup Power District, which in some places in the application it is called simply District; the Nebraska Public Power District; and the Cornhusker Public Power District).

In Section A.2.12 of Exhibit A (pages A-10 and A-11), you provide storage characteristics for Lakes Babcock and North. You provide the effective storage for Lake

Babcock, the gross storage capacity for Lake North, and the gross storage capacity of both reservoirs. The dead storage and combined area-capacity relationship for Lakes Babcock and North are presented in Section B.2.4 of Exhibit B (page B-19). In the final application please clarify the relationship between effective and gross storage and provide the following information for each lake: (1) the elevation-storage relationship for the project's range of operation and (2) the elevation below which there is dead storage.

Project Operation

In Section B.1.2 of Exhibit B (page B-2), you state that the Monroe powerhouse units were sized to handle a design flow rate of 3,500 cubic feet per second (cfs). In Section A.2.9 of Exhibit A (page A-8), you state that the three units each have a maximum hydraulic capacity of 1,000 cfs for a total capacity of 3,000 cfs. Please eliminate this inconsistency between exhibits in the final application.

In Section B.2.4 of Exhibit B (page B-19), you state that Lake Babcock's effective storage is exhausted at 1,426 feet mean sea level (MSL) and Lake North provides storage down to its outlet sill at elevation 1,420 feet MSL. Exhibit F, sheet no. 20 of 26 (sectional view of the Columbus powerhouse intake) shows the minimum upstream elevation at the lakes is 1,499 feet MSL. Please eliminate this inconsistency between exhibits in the final license application. Please also describe in Exhibit B of the final application, the operation of Lakes Babcock and North as related to water surface elevations, effective storage, and entry to the Columbus powerhouse intake.

Sediment Transport

In Section E.6.1.2 of Exhibit E (page E-58), you state that no requests were made to study the direct project effects on geology and soils. However, in the sentence following that statement, you state that studies were requested to determine the effect of project dredging operations on sediment transport and channel morphology, and then you follow with a discussion on the effects of sediment transport and project dredging operations geology and soils. Therefore, it is unclear to us why you state that no requests were made to study project effects on geology and soils.

On a related matter, the final application should include the results of Study 1.0, *Sedimentation* and Study 2.0, *Hydrocycling* (HEC-RAS sediment transport modeling) in section E.6.1, geology and soils.

In our Study Determination on Requests for Modifications to the Loup River Project Study Plan, dated December 21, 2011, we directed you to complete the Alternative Project Operations and Sediment Management study. Please include the results of this study in the final application.

In Section E.6.2.2 of Exhibit E (page E-108), you state that the degrading trend at the Louisville gage was attributed to site-specific circumstances and not considered to be generic. In the final application, please elaborate on the site-specific circumstances for the degrading trend occurring at the Louisville gage.

In Section E.6.2.2 of Exhibit E (page E-110, table E-32), you provide identical drainage areas for sites 3 and 4 (Platte River upstream and downstream of the tailrace return, respectively). The drainage areas for sites 3 and 4 are larger than that provided for the North Bend gage, which is significantly downstream. Please describe in the final application how the drainage areas for sites 3 and 4 were developed and why the drainage areas for these sites are larger than that provided for the North Bend gage, which is significantly downstream. Also, the drainage area provided for the Ashland gage should be 83,600 square miles according to the U.S. Geological Survey's records. Please correct the Ashland gage drainage area in the final application.

In Section E.6.2.2 of Exhibit E (pages E-113 and E-114), you state that the project has no discernable impact on flow area because of tailrace return flows. You base this conclusion on the relationship of discharge and flow area presented on graph E-4. We agree that there is a strong relationship of the points in graph E-4 as indicated by the coefficient of linear regression. However, it is unclear how the calculation of the dominant and effective discharges for sites downstream of the tailrace return differs from those sites not impacted by project operation. In the final application, please include a discussion of the methodology used to calculate the dominant and effective discharges to assess the effects of project operation on channel geometry.

HEC-RAS was used to calculate flow characteristics (for example, water surface elevation, width, depth, area, and velocity) corresponding to a range of flow rates. The calculated relationships between flow rates and flow characteristics for the eight sites along the lower Platte River were used develop graphs E-3 and E-4. The cross sections used in the HEC-RAS model were field surveyed in the spring and fall of 2010. So that we understand the flows that shaped the cross section during the survey, in the final application, please include the date and flow characteristics of the cross sections in the HEC-RAS model used to develop graphs E-3 and E-4.

In Section E.6.2.2 of Exhibit E (page E-113), you state that dominant discharge generally increases in the downstream direction. This is true for all sites on both graphs E-3 and E-4 with the exception of site 5. In the final application, please discuss the apparent anomaly for the dominant discharge at site 5.

In Section E.6.2.2 of Exhibit E (pages E-116 through E-118), you present graphs E-5, E-6 and E-7. You state that the abscissa in these three graphs represents the channel-forming discharge. In the final application, please clarify whether effective or dominant discharges are plotted on the x-axis for these three graphs.

In Section E.6.2.2 of Exhibit E (pages E-116 through E-118), the data set used to develop the channel-forming discharge presented in graphs E-5, E-6, and E-7 is unclear. The only values of channel-forming discharges in the draft license application are presented in table E-33 (page E-112), which include the years 2003-2009. Three figures in Study 1.0, *Sedimentation* (dated August 26, 2011) were developed for the years 1985-2009 and appear to be identical to those presented in the draft license application. Therefore, in the final application, please clarify what data were used to develop the channel-forming discharge presented in graphs E-5, E-6 and E-7. Also, in the final application please revise the plotted data to provide positional accuracy.

In Section E.6.2.2 of Exhibit E (page E-115), you state that all plotted points on graph E-7 are positioned away from any threshold to a different morphology. However, all points plotted on graph E-7 are located within an area termed “intermediate streams” or very close to the threshold between intermediate and braided streams. The intermediate area appears to be a transitional zone between braided and meandering streams. In the final application, please include additional discussion to clarify your statement that all plotted points on graph E-7 are positioned away from any threshold to a different morphology.

Design Drawings

In Section E.4.12.1 of Exhibit E (page E-27), you state that the original maximum pool elevation in Lake Babcock was increased to 1,531 feet MSL from 1,529 feet MSL. However, this change in water surface is not reflected in Exhibit F, sheets 15 of 26, 20 of 26, and 21 of 26. In the final application, please revise Exhibit F to reflect the present normal water surface elevation in the project’s regulating reservoirs.

In Section E.4.18 of Exhibit E (page E-37), you state that in 1952, the crest of the outlet weir was lowered about 18 inches. However, this change is not reflected in Exhibit F, sheet 26 of 26. In the final application, please revise Exhibit F to reflect the present crest elevation of the outlet weir and upstream water surface.

Water Resources

On pages E-81 to E-105, you discuss water quality and state water quality standards. You also list state water quality standards in Appendix E-3. The title of table E-1 in Appendix E-3 should be modified to indicate “state water quality standards” rather than “standards.” Also, please include dissolved oxygen (DO) and temperature in table E-1.

On pages E-88 to E-105, you discuss in detail various water quality parameters and how the sampling and water quality data collected at the project and in nearby waters meet state water quality standards. It would be very helpful to have a short table in that section of the discussion that would indicate the state standards for several parameters, excluding all the metal and nutrients shown in Table E-1. In other words, the table would have the numeric state water quality standards for the following: DO, temperature (in Celsius and Fahrenheit), pH, E. coli, conductivity, ammonia, and chloride. Please also include in the revision to the final application the length of time, if available, where temperature exceeded the state standard of 90° F at each of the various collection sites.

Fish and Aquatic Resources

On page E-159, you state that you "believe" that the Loup Power system fishery that was characterized by Rupp (1981) as an excellent fishery and of regional importance to east-central Nebraska is still valid today, nearly 31 years after the report. Please explain the basis for your conclusion about the recreational fishery resources of the Loup River Project in your final application and include a copy of the 1981 paper by Rupp.

On page E-156, you mention that the Nebraska Game and Parks Commission (Nebraska Game) historically stocked walleye in Lake North but currently has no regular stocking program in Loup River Project waters. If available, it would be helpful to know why the walleye stocking program was discontinued, particularly, since in the very next sentence you state that the same agency stocked sauger in the Loup Power Canal in 2009. Please indicate in your final application whether Nebraska Game has any intention of continuing the stocking of sauger in the Loup Power Canal, and what, if any, management objectives have been established for that species in the canal.

On page E-168, you also discuss other fish stocking efforts by Nebraska Game and it is unclear what fish stocking occurred in the Loup Power Canal from among the 244,614 fish stocked in various locations since 2001. Please explain, in the final application, which species were stocked in the Loup Power Canal from among the 244,614 fish stocked and whether there is any intention by Nebraska Game to continue this stocking. Please also indicate if the stocking would be done on an annual basis or intermittently.

In your final application, please indicate if any exotic fish species, like Asian carp, northern snakehead, or other exotic fish species are present in project waters, and if so, the estimated relative abundance of these species compared to other native species found in the same waters.

On page E-256, you state that you have erected public awareness signs at Lake North in 2011 that alert the public to preventing the spread of potential aquatic invasive plants and animals. Please indicate in your final application whether any invasive aquatic plants or animals have been reported in project waters.

Recreation

In table D-1, *Preliminary Cost Estimate of Proposed Environmental Measures* of your draft license application, you provide the cost to install a sand volleyball court at the project's Headworks Park. However, you do not provide a proposed construction schedule for this volleyball facility in section C.2 *Proposed Construction Schedule.* Please provide a construction schedule for the sand volleyball court in your final application.

In table E-57 of your draft license application, you summarize the average daily and annual recreation use at the project's recreation facilities and the power canal; however, you do not define how you obtained the average daily and annual use for the recreational facilities and the power canal. Please state if the recreational use estimates are based on a recreation day, (i.e., a visit by a person for recreational purposes during any portion of a 24-hour period) or by other means and provide responses in your final application.

In section E.6.7.1 *Existing Environment* of your draft license application, you describe the parks and trails located within the project boundary; however, you do not describe any regional recreation facilities or parks. Please provide information about regional recreational facilities and parks in your final application.

In section E.6.7.1 *Existing Environment* of your draft license application and section 3.2 *Capacity of District Recreation Sites* of your draft Recreation Management Plan, you provide a brief qualitative summary of the project's capacities at various recreation facilities; however, more information is needed to determine if the project's recreational facilities are at or exceed their use capacities. Therefore, as requested in the Second Initial Study Report Meeting Summary filed March 11, 2011, please provide, quantitatively, the facility capacity for each recreation resource at your recreation facilities. To calculate facility capacity, compare the average total amount of weekend use with the total combined capacity of these resources to handle such use and enter a percentage that indicates their overall level of use. Please do not consider peak weekend use.[1] For example, if all available camping sites at the Headworks Park would be used to half its capacity during non-peak weekend days, the facility would be at 50 percent capacity.

In section E.6.7.1 *Existing Environment* of your draft license application, you state that you sponsor and maintain a public trail network within the project boundary. However, you do not state who owns these public trails. Please provide the ownership of the public trails you refer to in your final application.

---

[1] Peak weekends are defined as July 4th weekend and other holiday weekends.

In section E.6.7.1 *Existing Environment* of your draft license application, you state that you maintain Contemplation Point, kiosks, and other recreation enhancements built by the Boy Scouts and Girl Scouts. Please state who owns these recreational enhancements built by the scouts and the location of these enhancements in your final application.

In section E.6.7.3 *Proposed Environmental Measures* of your draft license application; you state that a new 2,000-foot trail segment would be constructed along the southeast side of Lake Babcock. Please state if the proposed trail would be included in the project boundary in your final application.

National Historic Preservation Act

In section E.3.5, *National Historic Preservation Act* of your draft license application, you state that as the non-federal representative for section 106 of the National Historic Preservation Act, you contacted six Indian tribes, and three of the tribes indicated that they have no interest in the project. Please identify in the final application the six tribes you contacted and the three tribes that stated that they are not interested in the project.

In section E.3.5, *National Historic Preservation Act* of your draft license application, you state that a draft Historic Properties Management Plan (HPMP) has been sent to the Nebraska State Historic Preservation Officer for comment and review. The restricted service list for the project, issued on July 1, 2009, identifies the Pawnee Tribal Business Council, Santee Sioux Nation, and the Omaha Tribe of Nebraska as tribes that we would consult with during the section 106 process. Please send the draft HPMP to these tribes for review, allowing at least 30 days for comment, and summarize their response, if any, in your final license application.

Miscellaneous Items

On page E-9, *Reasonably Foreseeable Future Actions,* you state that one of the parameters of concern would be the continued actions of the Platte River Recovery Implementation Program (Recovery Program) upstream in the central Platte River. On page E-154 you provide a brief description of the Recovery Program. Please include a footnote on page E-9 describing the Recovery Program.

In your discussion of the Recovery Program on page E-154, please identify the four federally-listed endangered species of concern and provide an example of one type of management measure for flow in the Platte River under the Recovery Program that could potentially affect these four federally-listed species. Also, please provide an example of how flows recommended under the Recovery Program could affect operation of the proposed Loup River Project in the future.

On page E-19, you mention that the project's skimming weir is fitted with screens to collect trash and debris. Please include in the final application the dimensions of the weir, including the clear bar spacing, and revise the drawing of the skimming weir to include profile and elevation views of the trashrack. Also include in your discussion about the skimming weir how debris is removed from the trashrack, and where it is disposed.

On pages E-80 and E-81, you use the term "raise dam" as a type of use related to water rights claims, applications, and appropriations. We are not familiar with this terminology. Please define the term "raise dam" in the final license application and explain how it relates to your proposed project.

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Cc:	Pillard, Matt; Madson, Michael J.
Subject:	FW: Loup Power District - Study Results Meeting
Date:	Friday, February 18, 2011 8:36:07 AM
Attachments:	image002.jpg image003.jpg

Wendy – please add to the DB & PW

I spoke to Jill this morning regarding next week's meeting and the Section 106 studies. I told her that we would not be presenting anything related to Section 106 next week as those studies have been completed and submitted to SHPO previously. I also noted that SHPO has concurred with the reports to date. Jill indicated that they are very pleased with how the coordination is going related to Section 106.

I mentioned to her that we are currently working on the Draft HPMP and that we will be submitting it to SHPO on the near future for their review and will set up a meeting to discuss the draft. She indicated that sounded good.

From: Pillard, Matt
Sent: Wednesday, January 19, 2011 2:52 PM
To: Richardson, Lisa (Omaha)
Subject: FW: Loup Power District - Study Results Meeting

See below.

From: Dolberg, Jill [mailto:jill.dolberg@nebraska.gov]
Sent: Wednesday, January 19, 2011 2:51 PM
To: Pillard, Matt
Subject: RE: Loup Power District - Study Results Meeting

Hi Matt!

When last I spoke with Lisa Richardson, she mentioned that you all were interested in talking about the Section 106 concerns separately. I am confident that you all are seeing the Cultural Resources portion of this relicensing through effectively, so I wonder how important it is that I attend these meetings? Let me know your thoughts!

Jill Dolberg

Jill E. Dolberg
Review and Compliance Coordinator
Nebraska State Historical Society
1500 R Street
PO Box 82554
Lincoln, NE 68501-2554

p: (402) 471-4773
f: (402) 471-3316
jill.dolberg@nebraska.gov

Your Nebraska source for the histories we share
www.nebraskahistory.org

From: Pillard, Matt [mailto:Matt.Pillard@hdrinc.com]
Sent: Wednesday, January 19, 2011 2:40 PM
To: Albrecht, Frank; Bender, John; 'jeff_runge@fws.gov'; 'robert_harms@fws.gov'; 'barbara.j.friskopp@usace.army.mil'; 'abaum@upperloupnrd.org'; 'randy_thoreson@nps.gov'; Puschendorf, Bob; 'mkuzila1@unl.edu'; Jundt, David; 'jmiyoshi@lpnnrd.org'; 'steve.chick@ne.usda.gov'; Platte County Clerk; 'cityadmin@cablene.com'; 'ncpza@hamilton.net'; 'rbishop@cpnrd.org'; 'jwinkler@papionrd.org'; 'lpsnrd@lpsnrd.org'; 'jmangi@columbusne.us'; 'cgenoa@cablene.com'; 'monroe@megavision.com'; 'calms@neb.rr.com'; 'danno@nohva.com'; 'mbrown9@unl.edu'; 'rtrudell@santeedakota.org'; 'jblackhawk@aol.com'; 'vwills@pawneenation.org'; Dunnigan, Brian; 'msittler@lpsnrd.org'; 'butchk@nctc.net'; 'robertm@llnrd.org'; 'jmsunne@nppd.com'; 'jalexand@usgs.gov'; 'jjshadl@nppd.com'; 'cothern.joe@epa.gov'; Lavene, Justin; Wickham, Bobbie; 'kennyj@headwaterscorp.com'; 'mferguson@gp.usbr.gov'; 'Willie_Taylor@ios.doi.gov'; 'Robert_F_Stewart@ios.doi.gov'; 'jeddins@achp.gov'; 'kenneth.sessa@dhs.gov'; 'peggy.harding@ferc.gov'; 'djjarecke@clarkswb.net'; Berndt, Al; Stuthman, Arnie; Sullivan, Kate; Langemeier, Chris; Dubas, Annette; 'chairmanrhodd@ponca.com'; 'asheridan@omahatribe.com'; 'don_simpson@blm.gov'; 'nicholas.jayjack@ferc.gov'; Dolberg, Jill; 'prescott.brownell@noaa.gov'; 'marvp@megavision.com'; 'lewrightjr@gmail.com'; 'thowe@ponca.com'; 'zach_nelson@bennelson.senate.gov'; 'julias@poncatribe-ne.org'; 'todd.crawford@mail.house.gov'; 'louis-pofahl@mail.house.gov'; 'emily_brummund@johanns.senate.gov'; 'deb.vanmatre@mail.house.gov'; 'tpetr@loup.com'; 'mike.black@bia.gov'; 'janet.hutzel@ferc.gov'; 'isis.johnson@ferc.gov'; 'lee.emery@ferc.gov'; 'paul.makowski@ferc.gov'
Cc: Angel Robak; Jim Frear; Neil Suess; Ron Ziola; Damgaard, Quinn V.; Engelbert, Pat; Frame, Gail; Grennan, Dennis E.; Hunt, George; Madson, Michael J.; Pillard, Matt; Richardson, Lisa (Omaha); Sigler, Bill; Thompson, Wendy; Waldow, George; White, Stephanie
Subject: Loup Power District - Study Results Meeting

Relicensing Participants:

This e-mail is to remind you of the Second Initial Study Results meeting scheduled for February 23rd and 24th at the New World Inn, 265 33rd Ave, Columbus, Nebraska. Please RSVP by February 21st to Angell Robak at arobak@loup.com or (402) 564-3171, ext. 275.

For those not able to attend in person, but wishing to do so via conference call, meeting materials will be posted to: http://www.loup.com/relicense/html/agencymeetingsresources.html in advance of the meeting (by end of day 2/22/10). Dial-in information is as follows:

1-866-994-6437
Passcode: 4023994909

On February 11th, the District will be submitting the Updated Initial Study Report to FERC, it will also be posted on the website at http://www.loup.com/relicense. The following studies will be presented in the updated report and at the meeting:

1 – Sedimentation (ungaged site analysis)

2 – Hydrocycling
4 – Water Temperature in the Loup River Bypass
5 – Flow Depletion and Flow Diversion
8 – Recreation Use
12 – Ice Jam Flooding on the Loup River

Please come ready to discuss; we have a lot of material to cover and will start promptly at 9:30 AM on the 23rd and at 8:00 AM on the 24th.

Please bring your own copy of the Updated Initial Study Report. It can be found online after 2/11/11.

We look forward to seeing you on February 23rd.

Matt Pillard, AICP
Senior Environmental Planner
Professional Associate
HDR | **One Company** | ***Many Solutions***
8404 Indian Hills Drive | Omaha, NE | 68114-4098
Phone: 402.399.1186 | Fax: 402.399.1111
Email: Matt.Pillard@hdrinc.com

Please consider the environment before printing.

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup River Hydroelectric Relicensing - Data Request
Date:	Friday, February 03, 2012 2:09:13 PM
Attachments:	2011_IPPC_Site_Summary.xlsx 2011_Lower_Platte_River_Chick_Metadata.pdf 2011_Lower_Platte_River_Nest_Metadata.pdf 2011_LPR_LETE_PIPL_Chick_Data.xlsx 2011_LPR_LETE_PIPL_Nest_Data.xlsx

For the DB and PW.

NOTE: I have removed the attachments from this e-mail because they are privileged information.

From: Jorgensen, Joel [mailto:Joel.Jorgensen@nebraska.gov]
Sent: Friday, February 03, 2012 1:11 PM
To: Richardson, Lisa (Omaha)
Cc: Pillard, Matt; Neal Suess; Brown, Mary
Subject: RE: Loup River Hydroelectric Relicensing - Data Request

Lisa:

The following files are attached to this email:

2011 IPPC Site Summary.xlsx – Raw data from Loup and Lower Platte River sites NGPC and the Tern and Plover Conservation Partnership (TPCP) surveyed as part of the 2011 International Piping Plover Census.
2011 LPR LETE PIPL Nest data.xlsx – Nest data for all sites NGPC and the TPCP surveyed on the Lower Platte and Loup River in 2011.
2011 LPR LETE PIPL Nest Metadata.pdf – Metadata for the above file. This document is required reading before using the data set.
2011 LPR LETE PIPL Chick data.xlsx – Chick data for all sites NGPC and the TPCP surveyed on the Lower Platte and Loup River in 2011.
2011 LPR LETE PIPL Chick Metadata.pdf – Metadata for the above file. This document is required reading before using the data set.

Additional information that is of interest is available publicly in our 2011 report. This can be found here:

http://ternandplover.unl.edu/download/annualreport/2011_TPCP_annual_report.pdf

I hope these files and resources satisfy your request. If you are in need of other information that has not been provided or if you need clarification on what has been provided, please do not hesitate contacting me.

- *Joel*

Joel Jorgensen | **Nongame Bird Program Manager**

Nebraska Game and Parks Commission
2200 N. 33rd St. | Lincoln, NE 68503
joel.jorgensen@nebraska.gov | 402.471.5440

From: Richardson, Lisa (Omaha) [mailto:Lisa.Richardson@hdrinc.com]
Sent: Tuesday, January 17, 2012 3:40 PM
To: Jorgensen, Joel
Cc: Pillard, Matt; Neal Suess
Subject: Loup River Hydroelectric Relicensing - Data Request

Joel,

NGPC has previously provided tern and plover data to us for the Loup Power District Relicensing. Attached please find a request for 2011 data (a hardcopy will follow in the mail). We are requesting this information so that it can be incorporated into the District's License Application due to FERC in April. If you have any questions regarding this request, please feel free to give me or Matt Pillard (402-399-1186) a call.

Thanks,

Lisa

LISA M. RICHARDSON P.E.

HDR Engineering, Inc
Associate Vice President

8404 Indian Hills Drive| Omaha, NE 68114
o: 402.926.7026 | c: 402.618.9865
f: 402.399.1111
lisa.richardson@hdrinc.com | hdrinc.com

LOUP POWER DISTRICT "SERVING YOU ELECTRICALLY"

GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

RECEIVED
FEB 29 2012
BY:

February 23, 2012

Mr. Robert Puschendorf
State Historic Preservation Office
1500 R Street
P.O. Box 82554
Lincoln, NE 68501-2554

Re: HP#0804-127-01
Loup River Hydroelectric Project Relicensing
Historic Properties Management Plan
FERC Project No. 1256; Docket No. 1256-029

Dear Mr. Puschendorf:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. The District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

Relicensing the Project is a Federal undertaking by FERC, and Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), requires Federal agencies to determine whether their undertakings have adverse effects on historic properties (any site, structure, or other property listed on or eligible for listing on the National Register of Historic Places [NRHP]) and allow interested parties the opportunity to comment on decisions and actions that may affect historic properties.

Pursuant to 18 CFR §5.11 and §5.13 the District prepared the Revised Study Plan (RSP) identifying studies needed for relicensing. The RSP included Study 11.0 – Section 106 Compliance. This plan was coordinated with your office and approved by FERC on August 26, 2009. Study 11.0 – Section 106 Compliance, includes the following six elements:

- Phase IA Archaeological Overview
- Phase I Archaeological Inventory and Evaluation
- Ethnographic Documentation
- Historic District Inventory and Evaluation
- Historic Properties Management Plan
- Executed Programmatic Agreement

HP# 0804-127-01
County ______
STR. X ARCH CO X
Resp. NOB Date 20120302

The Phase IA Archaeological Overview was submitted to your office in October 2009 and your office concurred with the findings. The Phase I/II Archaeological Inventory and Evaluation was submitted to your office in August 2010 and amended in December 2012. The Historic Buildings Inventory and Evaluation was submitted to your office in August 2010. Your office concurred with the findings of both of these reports.

The District has now completed the Draft Historic Properties Management Plan (HPMP). The HPMP provides guidance regarding the appropriate management of historic properties within the Project's APE. Because of the size of the APE, the number of reported cultural resources, and the duration of the new license, the HPMP provides both broad management practices and specific implementation procedures. In particular, the HPMP:

- Establishes the nature and significance of identified historic properties that may be affected by Project operations and maintenance, proposed improvements to Project facilities, and public use for recreational purposes.
- Identifies potential causes and types of Project effects.
- Defines goals for the preservation of historic properties.
- Provides a process for determining measures needed to avoid, minimize, or mitigate adverse Project effects on historic properties.
- Establishes guidelines for routine operations and maintenance activities as they relate to historic properties.
- Establishes a decision-making process for considering potential effects on historic properties.
- Establishes procedures for consulting with Nebraska SHPO and others with a potential interest in the effects of the Project on historic properties.

At this time we are seeking concurrence from your office regarding the management strategy and plan laid out in the HPMP and would like to further our dialogue towards achieving Section 106 compliance. Please provide your concurrence and/or comments by March 26, 2012.

Please do not hesitate to contact Lisa Richardson (HDR) at (402) 926-7026 or me at (402) 564-3171 if you have any questions about the management plan. We look forward to working with your office throughout the relicensing effort and beyond.

Sincerely,

Neal Suess
President/CEO
Loup Power District

CONCUR
DEPUTY STATE HISTORIC PRESERVATION OFFICER
DATE: 3/12/12

cc (without attachments):
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

LOUP POWER DISTRICT
"SERVING YOU ELECTRICALLY"
GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988
Phone:
402/564-3171
Fax:
402/564-0970

February 23, 2012

Larry Wright, Chairman
Ponca Tribe of Nebraska
P.O. Box 288
Niobrara, NE 68760

RE: Loup River Hydroelectric Project
Platte and Nance counties, Nebraska
FERC Project No. 1256
Docket No. P-1256-029

Dear Mr. Wright:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

Relicensing the Project is a Federal undertaking by FERC, and Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), requires Federal agencies to determine whether their undertakings have adverse effects on historic properties (any site, structure, or other property listed on or eligible for listing on the National Register of Historic Places [NRHP]) and allow interested parties the opportunity to comment on decisions and actions that may affect historic properties.

Pursuant to 18 CFR §5.11 and §5.13, the District prepared a study plan to gather the information needed to comply with Section 106 as part of Project Relicensing. On August 26, 2009, FERC approved the District's study (Study 11.0), as submitted in the Revised Study Plan on July 27, 2009. The District has completed the Phase I Archaeological Overview and Phase I/II Archaeological Inventory and Evaluation of the Project and previously submitted copies of those reports to your office.

The District has now completed the Draft Historic Properties Management Plan (HPMP). The HPMP provides guidance regarding the appropriate management of historic properties within the Project's APE. Because of the size of the APE, the number of reported cultural resources, and the duration of the new license, the HPMP provides both broad management practices and specific implementation procedures. In particular, the HPMP:

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At this time we are seeking concurrence from your office regarding the management strategy and plan laid out in the HPMP and would like to further our dialogue towards achieving Section 106 compliance. Please provide your concurrence and/or comments by March 26, 2012.

Please do not hesitate to contact Lisa Richardson (HDR) at (402) 926-7026 or me at (402) 564-3171 if you have any questions about the management plan. We look forward to working with your office throughout the relicensing effort and beyond.

Sincerely,

Neal Suess
President/CEO
Loup Power District

cc (without attachments):
Gary Robinette, Ponca Tribe of Nebraska
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

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2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

February 23, 2012

Douglas Rhodd, Chairman
Ponca Tribe of Oklahoma
20 White Eagle Drive
Ponca City, OK 74601

RE: Loup River Hydroelectric Project
Platte and Nance counties, Nebraska
FERC Project No. 1256
Docket No. P-1256-029

Dear Mr. Rhodd:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

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Pursuant to 18 CFR §5.11 and §5.13, the District prepared a study plan to gather the information needed to comply with Section 106 as part of Project Relicensing. On August 26, 2009, FERC approved the District's study (Study 11.0), as submitted in the Revised Study Plan on July 27, 2009. The District has completed the Phase I Archaeological Overview and Phase I/II Archaeological Inventory and Evaluation of the Project and previously submitted copies of those reports to your office.

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Sincerely,

Neal Suess
President/CEO
Loup Power District

cc (without attachments):
Trey Howe, Ponca Tribe of Oklahoma
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

LOUP POWER DISTRICT

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GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

February 23, 2012

George Howell, Chairman
Pawnee Nation of Oklahoma
P.O. Box 470
Pawnee, OK 74058

RE: Loup River Hydroelectric Project
Platte and Nance counties, Nebraska
FERC Project No. 1256
Docket No. P-1256-029

Dear Mr. Howell:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

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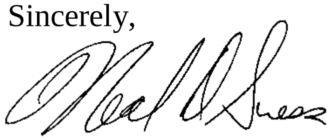
- Establishes procedures for consulting with Nebraska SHPO and others with a potential interest in the effects of the Project on historic properties.

At this time we are seeking concurrence from your office regarding the management strategy and plan laid out in the HPMP and would like to further our dialogue towards achieving Section 106 compliance. Please provide your concurrence and/or comments by March 26, 2012.

Please do not hesitate to contact Lisa Richardson (HDR) at (402) 926-7026 or me at (402) 564-3171 if you have any questions about the management plan. We look forward to working with your office throughout the relicensing effort and beyond.

Sincerely,



Neal Suess
President/CEO
Loup Power District

cc (without attachments):
Alice Alexander, Pawnee Nation of Oklahoma
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

LOUP POWER DISTRICT

"SERVING YOU ELECTRICALLY"

GENERAL OFFICE
2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

February 23, 2012

Roger Trudell, Chairman
Santee Sioux Tribe of Nebraska
108 Spirit Lake Ave W
Niobrara, NE 68760

RE: Loup River Hydroelectric Project
Platte and Nance counties, Nebraska
FERC Project No. 1256
Docket No. P-1256-029

Dear Mr. Trudell:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

Relicensing the Project is a Federal undertaking by FERC, and Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), requires Federal agencies to determine whether their undertakings have adverse effects on historic properties (any site, structure, or other property listed on or eligible for listing on the National Register of Historic Places [NRHP]) and allow interested parties the opportunity to comment on decisions and actions that may affect historic properties.

Pursuant to 18 CFR §5.11 and §5.13, the District prepared a study plan to gather the information needed to comply with Section 106 as part of Project Relicensing. On August 26, 2009, FERC approved the District's study (Study 11.0), as submitted in the Revised Study Plan on July 27, 2009. The District has completed the Phase I Archaeological Overview and Phase I/II Archaeological Inventory and Evaluation of the Project and previously submitted copies of those reports to your office.

The District has now completed the Draft Historic Properties Management Plan (HPMP). The HPMP provides guidance regarding the appropriate management of historic properties within the Project's APE. Because of the size of the APE, the number of reported cultural resources, and the duration of the new license, the HPMP provides both broad management practices and specific implementation procedures. In particular, the HPMP:

- Establishes the nature and significance of identified historic properties that may be affected by Project operations and maintenance, proposed improvements to Project facilities, and public use for recreational purposes.
- Identifies potential causes and types of Project effects.
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Sincerely,

Neal Suess
President/CEO
Loup Power District

cc (without attachments):
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

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Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

February 23, 2012

Amen Sheridan, Chairman
Omaha Tribe of Nebraska
P.O. Box 368
Macy, NE 68039

RE: Loup River Hydroelectric Project
Platte and Nance counties, Nebraska
FERC Project No. 1256
Docket No. P-1256-029

Dear Mr. Sheridan:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

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Sincerely,

Neal Suess
President/CEO
Loup Power District

cc (without attachments):
Antoine A. Provost, Omaha Tribe of Nebraska
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

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2404 15th Street
P.O. Box 988
Columbus, NE 68602-0988

Phone:
402/564-3171
Fax:
402/564-0970

February 23, 2012

Emily Smith
Winnebago Tribe of Nebraska
P.O. Box 687
Winnebago, NE 68701

RE: Loup River Hydroelectric Project
Platte and Nance counties, Nebraska
FERC Project No. 1256
Docket No. P-1256-029

Dear Ms. Smith:

Loup River Public Power District (the District) is applying to the Federal Energy Regulatory Commission (FERC) to relicense the Loup River Hydroelectric Project. The existing license was effective on December 1, 1982, for a term ending April 15, 2014. Loup Power District is utilizing the Integrated Licensing Process (ILP) for this relicensing effort.

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Sincerely,

Neal Suess
President/CEO
Loup Power District

cc (without attachments):
Lee Emery, Federal Energy Regulatory Commission
Janet Hutzel, Federal Energy Regulatory Commission
Ron Ziola, Loup Power District
Lisa Richardson, HDR

Attachments: Historic Properties Management Plan

From:	Richardson, Lisa (Omaha)
To:	Thompson, Wendy
Subject:	FW: Loup Power District FERC Relicensing - Section 7 Consultation
Date:	Friday, March 02, 2012 6:59:11 AM
Attachments:	Agenda.FWS_NGPC.120305.doc nUSFWS 111102 ESA.docx

For the DB and PW

From: Richardson, Lisa (Omaha)
Sent: Friday, March 02, 2012 6:59 AM
To: Pillard, Matt; joel.jorgensen@nebraska.gov; Michelle.Koch@nebraska.gov; jeff_runge@fws.gov; robert_harms@fws.gov; frank.albrecht@nebraska.gov; John_Cochnar@fws.gov; nsuess@loup.com; richard.holland@nebraska.gov
Subject: Loup Power District FERC Relicensing - Section 7 Consultation

Attached is an agenda for our meeting on Monday, March 5th to continue Section 7 Consultation discussions related to the Loup River Hydroelectric Project relicensing. If you have any additional topics you'd like to discuss, let me know or bring them to the meeting.

Also attached are the meeting notes from our meeting in November 2011.

Draft Meeting Notes

Project:	Loup River Hydroelectric Project FERC Project No. 1256
Subject:	Section 7 ESA and Section 10J FPA – Meeting #3
Meeting Date:	March 5, 2012 1:00 PM – 3:00 PM
Meeting Location:	Loup Public Power Headquarters – Columbus, NE
Notes by:	HDR

Attendees:

Robert Harms, USFWS
Jeff Runge, USFWS
Frank Albrecht, NGPC
Richard Holland, NGPC
Joel Jorgensen, NGPC
Michelle Koch (NGPC)
Neal Suess, LPD
Matt Pillard, HDR
Lisa Richardson, HDR

A meeting was held with the U.S. Fish and Wildlife Service and the Nebraska Game and Parks Commission to continue discussion of Section 7 of the Endangered Species Act, the consultation process, potential effects of the Project, Section 10J of the FPA, and possible protection, mitigation or enhancement (PM&E) measures.

Discussion at the meeting is documented according to the meeting agenda noted below.

Meeting Agenda:

1. Status of FERC Study Determination Alternatives Study
2. Review Process for North Sand Management Area MOU
3. Sandbar Shaping/Vegetation Removal
   a. Potential Locations
   b. Management and Access
   c. District Considerations/Feasibility
4. Hydrocycling
   a. Method of calculation of % reduction
   b. Results
   c. Discussion
5. Minimum Flows
6. Additional Discussion

1. Status of Evaluation of FERC Alternatives

HDR provided an update on the evaluation of the alternatives that FERC requested in their Study Plan Determination. The four FERC requested alternatives are being evaluated. HDR is in the process of stabilizing the sediment transport model for Alternative 1. Evaluations of the other alternatives will use sediment transport calculations. The results will be presented in what is being called Study 14 and will be included in the Final License Application.

2. North Sand Management Area MOU

- The District will prepare a draft MOU for circulation. HDR asked what the review process would be for the agencies. Bob Harms said he would be the point person on the MOU for USFWS and Frank Albrecht said he would be the point person for NGPC.
- USFWS asked if this MOU would tier off the existing MOU with Preferred. HDR stated that the intent of the MOU is to address the District's dredging practices and formalize the suspension of dredging activities for nesting season that is currently agreed to informally. It was determined that this MOU should be stand alone and not linked to the existing MOU.

- The NGPC asked what would happen if Preferred ceases operations? Or if a new lessee begins operations? NGPC noted that the concept of the MOU is to avoid "take." If activities were to change, how would those be addressed?
- The District noted that they cannot formalize in an agreement anything beyond what they currently do, that is, ceasing dredging activities for nesting season.
- NGPC asked what would happen if there were a new lessee other than Preferred? HDR noted that there is a transfer clause in the existing MOU and that the lease agreement between the District and Preferred requires any future operators to comply with necessary measures related to T&E species.

3. Sandbar Shaping

At the previous meeting USFWS suggested sandbar shaping as a potential mitigation or enhancement measure for interior least terns and piping plovers. USFWS stated that they reviewed the bypass reach aerials but did not identify any specific locations for shaping. However, they noted the following criteria to use to evaluate potential sites:

- What areas are the birds using now?
- What is the potential for disturbance?
- Presence of other disturbances, like bridge constrictions
- Distance from trees and the river banks (reducing risk of predation)

USFWS specifically noted the Central Sand and Gravel area – this is an area that the birds use repeatedly and it had a high number of nests in 2011, so there must be something right at that location. It was noted that protection of this area would be of great benefit to the birds. USFWS noted that there may be some ownership issues at this location that may make purchasing the property or an easement more difficult.

It was noted that early succession woody areas could be potential locations for clearing and potentially lowering to create a mid-channel bar.

HDR noted that areas of existing public ownership, such as WMAs, would be good areas for partnership and would reduce issues associated with land acquisition. NGPC stated that there are numerous other considerations for them in potentially using WMAs for T&E habitat. NGPC noted that the WMAs are mostly managed for upland and terrestrial wildlife; Tom Wellstead manages WMA's in this area. USFWS and NGPC noted that they would prefer that WMAs not be used for this purpose – WMAs are already managed/protected areas and part of the intent of this measure is to protect additional areas.

NGPC noted it would be beneficial to have the results from the FERC alternatives study, specifically, Alternative 4, to know how additional flows could work together and benefit sandbar clearing.

USFWS requested that the District identify two to four potential locations. They noted that identifying potential locations is the first of several steps. Once preliminary locations are identified, there are numerous steps that will take time to get to final locations. The site(s) will dictate the type of actions that would be needed to develop the area for use.

HDR asked for confirmation that the intent of this is not island building per se. USFWS confirmed that the intent of this action is bar shaping and clearing. USFWS noted that without a new flow regime, there is no reason to do the bar shaping because flows need to be altered to maintain the shaped conditions.
HDR asked if this would require continual maintenance/vegetation removal, etc. USFWS noted that the intent is not for continual treatment; they are thinking that a new flow regime would shape and maintain the shaped areas. Once areas are shaped, they would want to see how the river responds.

Does the initial shaping work speed up habitat improvements? Does the shaping combined with a change in effective discharge improve channel dimensions?

Although the shaping is be intended to be a one-time treatment, there would be many uncertainties with this type of work that would require monitoring by the applicant to relate corrections back to the impact. USFWS noted that if bar shaping and discharge don't work, there would need to be a reevaluation for other ways to offset impacts.

USFWS and NGPC reiterated that the results of the Alternative 4 analysis would be very useful in deciding how to proceed.

USFWS noted that there would be a lot of details to work out, but that in order to conclude consultation there would need to be agreement in principle and then the details would get worked out beyond that.

4. Hydrocycling

HDR presented hydrographs for May, June and July that were developed based on a 10% and 20% attenuation of hydrocycling as discussed at the last meeting. HDR noted that 50% attenuation is essentially run-of-river, which has already been evaluated in the studies. NGPC noted that the hydrographs provided good information but that the hydrographs needed to be tied to a proposed action.

The purpose of attenuation of hydrocycling is not just to reduce the peak, but to also fill the valley. NGPC noted that the more level the trough can be, the better productivity, biologically. They noted that trimming the peak by 10 or 20% isn't beneficial if there isn't more water in the trough. NGPC staff clarified that there are distinct concerns with both the peak and the trough. Specifically, the peak is a concern during nesting season (May, June, July, August).

NGPC asked what the minimum flow is through each of the turbines? The District noted that minimum is 1,000 cfs. NGPC asked what would it mean to maintain 1,000 cfs to eliminate the valley, or decrease the magnitude between the valley and the peak by focusing on raising the valley; the intent being to avoid zero flow to maintain the lower, wetter areas. NGPC asked what would the cost of this be? Would there be a way to offset the cost of filling the trough? Perhaps with higher peaks?

NGPC noted that the leveling of the trough for primary production, relative to time of the year the warmer months are more important. For secondary productivity, it would by year round. Additionally, NGPC noted that while August was not included in the original timeframes, the first two weeks in August are still important from a bird productivity perspective. USFWS and NGPC determined the following timeframes associated with peaks and valleys:

- Peaks are associated with birds - May to August 15
- Troughs are associated with aquatic life – May to October

So any additional analysis should analyze May to October. USFWS noted that the intent is to develop a plan that benefits the most years but they understand that in dry years there may not be much that can be done.

USFWS summarized three things to look at in any future analysis:

- Reducing the troughs
- Extending the peaks, but not increasing them
- Increasing the peaks

5. Minimum Flows

The District noted that they will propose a 75 cfs bypass flow when air temperature would dictate (based on the previous agreement). The District noted that a 300 to 400 cfs minimum flow is not feasible.

HDR noted that the USFWS letter to FERC on the DLA indicated different timeframes for minimum flows than July/August as was discussed at the last meeting of this group.

The USFWS offered that their letter was not necessarily recommendations, but they were reporting the effects – not the PM&E. The conditions they provided were based both on thermal indicators and the Montana Method. They indicated that they are not advocating for year round minimum flow. They are looking at July/August or July/August/September.

The USFWS asked if, while there is disagreement on minimum flow, are maintenance flows and the FERC alternatives open for negotiation? The District noted that they need to see what the results of the study are.

6. Additional Items

USFWS asked about the transmission lines comments from FERC on the DLA. USFWS asked if there are powerlines associated with the project.

The District clarified that FERC's definition of transmission lines is different – it is not necessarily an overhead line. The transmission lines that FERC is referring go from the generators to the substation. USFWS noted that the lines of concern to them are primarily transmission lines that cross rivers and may be prone to bird collisions.

USFWS asked what the next steps are?

- Final License Application will be submitted on April 16
- Anticipate FERC will ask questions
- FERC environmental analysis will begin this summer and take about a year.
- During FERC's environmental analysis, we can continue to work with agencies on a settlement agreement.

LOUP POWER DISTRICT
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Fax:
402/564-0970

March 29, 2012

Brian Dunnigan
Nebraska Department of Natural Resources
301 Centennial Mall South
P.O. Box 94676
Lincoln, NE 68509-4676

RE: Loup River Hydroelectric Project
Appropriation Nos. A-2287 and A-2573
Loup River Bypass Flows

Dear Mr. Thompson,

As you are aware, Loup Power District (the District) is currently seeking a new operating license with the Federal Energy Regulatory Commission (FERC) for its hydroelectric facilities located on the Loup River near Genoa and Columbus, Nebraska. Over the past several years the District has coordinated with resource agencies regarding operation of the Loup River Hydroelectric Project (Project) and potential impacts of continued operation under a new FERC license. Through this coordination, resource agencies have expressed concerns related to bypass flows in the Loup River downstream of the Project diversion (Loup River bypass reach).

My relicensing team and I met with you and your staff in January 2011 (see attached meeting notes) to discuss how bypassing flow might affect the District's water appropriation of 3,500 cfs for use in generating power. At our meeting, NDNR indicated that the District's water appropriation does not require continuous diversion at the maximum rate in order to protect the appropriation from adjudication, as long as water is diverted and being used for power generation. In addition, Water appropriations for power generation are not tied to diversion of a certain percent of water available.

I am writing to request written confirmation from your office that bypassing flow to meet a FERC license condition would not affect the District's appropriation. I am also requesting that your office provide guidance on how bypassing flow in the to meet a FERC license condition would affect administration of the District's appropriation, with respect to administration of interference payments from junior appropriators.

I appreciate your assistance in clarifying this matter. Please feel free to me at (402) 564-3171 x268 or Mr. Pat Engelbert of HDR at (402) 399-4917 if you have any questions or clarifications regarding this request. Thank you for your assistance.

Sincerely,

Neal D. Suess

Neal D. Suess
President/CEO
Loup Public Power District

cc: Mike Thompson, NDNR
Pat Engelbert, HDR
Lisa Richardson, HDR

From:	Richardson, Lisa (Omaha)
To:	robert_harms@fws.gov; jeff_runge@fws.gov; frank.albrecht@nebraska.gov; joel.jorgensen@nebraska.gov; Michelle.Koch@nebraska.gov; richard.holland@nebraska.gov
Cc:	Neal Suess; Pillard, Matt
Subject:	Loup River Hydroelectric Project
Date:	Monday, April 02, 2012 3:53:50 PM
Attachments:	Dredging_MOU.120402_To_FWS&NGPC&TPCP.docx

Bob, Frank & company,

Attached is a draft of the MOU related to dredging operations at the Loup Power District headworks for your review and comment. The intent of this draft MOU is to provide a little more formality and structure to the District's long standing practice of ceasing dredging operations during the interior least tern and piping plover nesting seasons.

Please review this document and provide your comments to me by May 1st.

Regards,

Lisa

LISA M. RICHARDSON P.E.

HDR Engineering, Inc
Associate Vice President

8404 Indian Hills Drive| Omaha, NE 68114
o: 402.926.7026 | c: 402.618.9865
f: 402.399.1111
lisa.richardson@hdrinc.com | hdrinc.com

Nebraska Public Power District
"Always there when you need us"

Patrick L. Pope
President & CEO
(402) 563-5029 / 5145 fax
Email: plpope@nppd.com

April 2, 2012

Mr. Neal Suess, P.E.
President & CEO
Loup Power District
2404 15th Street
Columbus NE 68602-0988

RE: **Loup River Hydroelectric Relicensing**
FERC Project No. 1256

Dear Neal:

The relationship between Loup River Public Power District (Loup) and Nebraska Public Power District (NPPD) goes back practically to the inception of the Loup River Hydroelectric Project. Over the years, our Districts have built a strong relationship that benefits not only our individual public power districts, but all electric ratepayers across Nebraska. This relationship has included the benefits of the Loup River Hydroelectric Project.

The Columbus Powerhouse units operate in a mode that enables use during peak periods of demand for electricity. Being able to help meet load changes is a valuable attribute of the Project for NPPD. The units offer us a tool during the peak demand hours, and also provide a very quick and responsive source of energy.

The Loup River Hydroelectric Project also provides benefits to the reliability of the transmission system. The Columbus Powerhouse units also provide ancillary services that are valuable in the operation of our transmission system, providing spinning and non-spinning reserves and a source of voltage control for NPPD.

When you look at what's going on in the world today, with concern for greenhouse gases and where energy supplies will come from in the future, hydroelectric projects like the Loup River Hydroelectric Project, are going to be more important in years to come. Hydroelectric projects do not emit greenhouse gases, they are a renewable energy source, and we need to make sure that we're capturing the value that they provide and can continue to provide for many years to come.

The Loup River Hydroelectric Project is a key component to the NPPD system, and helps us provide clean, reliable, and economical energy to the ratepayers of Nebraska. We wholeheartedly support the relicensing of the Loup project, and we urge the Federal Regulatory Commission to issue a new license in a timely manner and that maintains the operational flexibility for the Project.

Thank you.

Sincerely,

Patrick L. Pope
President & CEO