



# Study Plan Meeting Outcomes

Project:	Loup River Hydroelectric Project FERC Project No. 1256		
Subject:	Consensus on Study Plan Goals & Objectives		
Meeting Date:	April 21, 2009, 8:30 am – 4:30 pm	Meeting Location:	Holiday Inn Express, Columbus, NE
Revisions Noted by:	HDR		

The Study Plan Meeting held on April 21, 2009 included discussion of the specific goals and objectives for Studies 1-5 and 7 from the District's Proposed Study Plan. During those discussions, the agencies and organizations in attendance discussed whether or not the goals and objectives, as stated in the Proposed Study Plan, met the needs for data collection related to each study resource, including information needed for evaluation of impacts to species (both aquatic species and threatened and endangered species).

Through discussion and revision, consensus was reached on the Goals and Objectives listed below for Studies 1-5 & 7; items not fully accepted by all parties are not included in this memo and will be discussed at the meeting on May 27/28. As each goal and objective was reviewed, some objectives from the Proposed Study Plan were identified as being more appropriately listed as tasks or activities. The final goals and objectives for Studies 1-5 & 7 are stated below; objectives which have been changed to tasks are also noted. These revised goals and objectives will be incorporated into the Revised Study Plan.

Details of the discussion can be found in the Study Plan Meeting transcript which will be posted to the Project website at: <http://www.loup.com/relicense/html/agencymeetingsresources.html>.

Detailed discussion of the tasks and activities for each study will occur at future meetings.

## Study Plan 1: Sedimentation

### Goal(s):

The goal of the sedimentation study is to determine the effect, if any, that Project operations have on stream morphology and sediment transport in the Loup River bypass reach and in the lower Platte River. In addition, the goal is to compare the availability of sandbar nesting habitat for interior least terns (*Sterna antillarum*) and piping plovers (*Charadrius melodus*) to their respective populations and to compare the general habitat characteristics of the pallid sturgeon (*Scaphirhynchus albus*) in multiple locations.

### Objectives:

1. To characterize sediment transport in the Loup River bypass reach and in the lower Platte River through effective discharge calculations (Former Objective 2).
2. To characterize stream morphology in the Loup River bypass reach and in the lower Platte River by reviewing existing literature on channel aggradation/degradation and cross sectional changes over time (former Objective 3).
3. To determine if a relationship can be detected between sediment transport parameters and interior least tern and piping plover nest counts (as provided by the Nebraska Game and Parks Commission's Natural Heritage Database) (revision to former Objective 4).

4. To evaluate whether sandbar availability is limiting interior least tern and piping plover numbers on the lower Platte River (revision to former Objective 5).
5. To determine if sediment transport is a limiting factor for pallid sturgeon habitat in the lower Platte River below the Elkhorn River (former Objective 6). [Note: There was not full consensus on this objective – to be discussed at the May 27/28 meeting.]
6. To investigate the relationship between sedimentation and ice jam flooding (former Objective 7).

#### Objectives Converted to Tasks:

- Develop a sediment budget from existing data sources (former Objective 1).
- Compare the availability of sandbar nesting habitat to interior least tern and piping plover nest counts on the lower Platte River and to compare these results to the relationship of interior least tern and piping plover nest counts and the availability of sandbar habitat in the Missouri River downstream of Gavins Point Dam (former Objective 5).

#### Study Plan 2: Hydrocycling

##### Goal(s):

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

##### Objectives:

1. To compare the sub-daily Project hydrocycling operation values (maximum and minimum flow and stage) to daily values (mean flow and stage). In addition to same-day comparisons, periods of weeks, months, and specific seasons of interest to protected species will be evaluated to characterize the relative degrees of variance between hydrocycling (actual) and alternative conditions in the study area (former Objective 2).
2. To determine the potential for nest inundation due to both hydrocycling and alternative conditions (revision to former Objective 3).
3. To assess effects, if any, of hydrocycling on sediment transport parameters (see Study 1.0, Sedimentation) (former Objective 4).
4. To identify material differences in potential effects on nesting habitat of the interior least tern, piping plover, and pallid sturgeon (revision to former Objective 5).

##### Objectives Converted to Tasks:

- Conduct a gage analysis using existing U.S. Geological Survey (USGS) and NDNR flow and stage data to accurately determine the timing, frequency, rate of change, travel time, and magnitude of sub-daily flow and stage changes attributable to Project hydrocycling at established gage locations in the Tailrace Canal and the lower Platte River (former Objective 1).
- Determine the flow characteristics (magnitude and occurrence) during the interior least tern and piping plover nesting season compared to a maximum (benchmark) flow event occurring just prior to, or during, initiation of the nesting season (portion of former Objective 3).
- Compare river stage variations of Project hydrocycling with flow and stage variations of the every-third-day cycling program on the Missouri River below Gavins Point Dam (or another relevant example) (portion of former Objective 5).

### Study Plan 3: Water Temperature in the Platte River

Study Plan 3 was determined to be unnecessary for Project relicensing and will not be included in the Revised Study Plan.

### Study Plan 4: Water Temperature in the Loup River Bypass Reach

#### Goal(s):

The goal of the study of water temperature in the Loup River bypass reach is to determine if project operations (flow diversion) materially affect water temperature in the Loup River bypass reach with particular emphasis between the diversion weir and the confluence of Beaver Creek with the Loup River (revised).

#### Objectives:

1. To estimate the relationship between flow in the Loup River bypass reach, ambient air temperature, water temperature, relative humidity, and cloud cover (revision to former Objective 5).
2. To describe and quantify the relationship, if any, between diversion of water into the Loup Power Canal and water temperature in the Study Reach of the Loup River bypass reach (former Objective 6).

#### Objectives Converted to Tasks:

- Coordinate with the U.S. Geological Survey (USGS) to install temperature sensors in the Loup River at the Diversion Weir and in the Loup River bypass reach at USGS Gage 06793000, Loup River near Genoa, NE (former Objective 1).
- Collect and review ambient air temperature data at the National Weather Service (NWS) atmospheric station located at Genoa (former Objective 2).
- Collect and review flow data at USGS Gage 06793000, Loup River near Genoa, NE, and USGS Gage 06792500, Loup River Power Canal near Genoa, NE (former Objective 3).
- Analyze the collected ambient air and water temperature and flow data (former Objective 4).

### Study Plan 5: Flow Depletion and Flow Diversion

#### Goal(s):

The goals of the flow depletion and flow diversion study are to determine if Project operations result in a flow depletion on the lower Platte River and to what extent the magnitude, frequency, duration, and timing of flows affect the Loup River bypass reach. The results will be used to determine if the Project operations relative to flow depletion and flow diversion adversely affect the habitat used by interior least tern and piping plover populations, the fisheries, and the riverine habitat in the Loup River bypass reach and the lower Platte River.

#### Objectives:

1. To determine the net consumptive losses associated with Project operations compared to alternative conditions (former Objective 2).
2. To use current and historic USGS gage rating curves to evaluate change in stage in the Loup River bypass reach during Project operations and compare against alternative hydrographs (former Objective 4).
3. To evaluate historic flow trends on the Loup and Platte rivers since Project inception (former Objective 5). [Note: There was not full consensus on this objective – to be discussed at the May 27/28 meeting.]

4. To determine the extent of interior least tern and piping plover nesting on the Loup River above and below the Diversion Weir (former Objective 6).
5. To determine Project effects, if any, of consumptive use on fisheries and habitat on the lower Platte River downstream of the tailrace canal (new objective).
6. To determine the relative significance of the Loup River bypass reach to the overall Loup River fishery (former Objective 7).

**Objectives Converted to Tasks:**

- Quantify flow depletion in the Loup Power Canal, regulating reservoirs, and Loup River bypass reach by calculating consumptive use and making a comparison to alternative conditions (former Objective 1).
- Use existing gage data to develop flood frequency and flow duration curves in the Loup River bypass reach for current Project operations and for alternative operations (former Objective 3).

**Study Plan 7: Fish Passage**

**Goal(s):**

The goal of the fish passage study is to determine if a useable pathway exists for fish movement upstream and downstream of the diversion weir (revised).

**Objectives:**

1. To evaluate the hydraulic flow, velocity, and stage parameters at the Diversion Weir and Sluice Gate Structure.
2. To determine whether fish pathways exist over the Diversion Weir, through the Sluice Gate Structure, or by other means (former Objective 7).

**Objectives Converted to Tasks:**

- Review stage and discharge data available at nearby U.S. Geological Survey (USGS) gage stations (USGS Gage 06793000, Loup River near Genoa, NE, and USGS Gage 06792500, Loup River Power Canal near Genoa, NE) (former Objective 2).
- Collect hydraulic information, including surveying river cross sections at the upstream and downstream face of the Headworks and recording headwater and tailwater elevations at the Diversion Weir (former Objective 3).
- Review literature to determine velocity and depth criteria for upstream fish passage at the Diversion Weir (former Objective 4).
- Review flow duration curves at the Diversion Weir (former Objective 5).
- Develop a hydraulic model to determine the flow split between the Diversion Weir and sluice gates for a range of flows (former Objective 6).



# Attendance by Meeting

Hydroelectric Relicensing  
FERC Project No. 1256

Meeting Type: Agency  
Meeting Name: Study Plan Meeting  
Date: 4 /21/2009  
Time: 8 :30 AM  
Location: Holiday Inn Express

Name	Organization	Contact Type
Frank Albrecht	Nebraska Game and Parks Commission	Agency - State
John Bender	Nebraska Department of Environmental Quality	Agency - State
Mary Bomberger Brown	Tern and Plover Conservation Partnership	NGOs & Stakeholders
Robert Clausen	Loup Power District	LPD Board Member
Quinn Damgaard	HDR	HDR
John Engel	HDR Engineering, Inc.	HDR
Pat Engelbert	HDR Engineering, Inc.	HDR
Jim Frear	Loup Power District	LPD Project Team
Gayle Goering	Cornhusker Public Power District	NGOs & Stakeholders
Charles Gonka	Loup Power District	LPD Board Member
Michael Gutzmer	New Century Environmental	Public
Richard Holland	Nebraska Game and Parks Commission	Agency - State
Mark Ivy	FERC	FERC
Nick Jayjack	FERC	FERC
Thomas Kumpf	Loup Power District	LPD Board Member
Gary Lewis	HDR	HDR
Joseph Mangiamelli	City of Columbus	Agency - Local

Name	Organization	Contact Type
Robert Mohler	Lower Loup Natural Resources District	Agency - Local
Zach Nelson	US Senate	Elected Official
Kim Nguyen	FERC	FERC
Dan Nitzel	Nebraska Off Highway Vehicle Association	NGOs & Stakeholders
Theresa Petr	Loup Power District	LPD Project Team
Matt Pillard	HDR Engineering, Inc.	HDR
Lisa Richardson	HDR Engineering, Inc.	HDR
Jeff Runge	US Fish and Wildlife Service	Agency - Federal
Julia Sage	Ponca Tribe of Nebraska	Tribal
John Shadle	Nebraska Public Power District	Agency - Local
Scott Stuewe	HDR	HDR
Neal Suess	Loup Power District	LPD Project Team
Randy Thoreson	National Park Service	Agency - Federal
David Turner	FERC	FERC
George Waldow	HDR Engineering, Inc.	HDR
Stephanie White	HDR Engineering, Inc.	HDR
Ron Ziola	Loup Power District	LPD Project Team