Meeting Notes

Project:	Loup River Hydroelectric Project FERC Project No. 1256
Subject:	Loup Power District Study Plan Data Gathering
Meeting Date:	January 5, 2010 9:00 AM – 12:00 PM
Meeting Location:	HDR Lincoln Office, 301 South 13th St., Cornhusker Plaza Suite 601 - Lincoln, NE
Notes by:	HDR

Attendees:

Frank Albrecht, NGPC
Richard Holland, NGPC
Joel Jorgensen, NGPC
Michelle Koch, NGPC
Dave Tunink, NGPC
Ron Ziola, LPD
Pat Engelbert, HDR
George Hunt, HDR
Melissa Marinovich, HDR
Matt Pillard, HDR
George Waldow, HDR
Robert Harms, USFWS
Jeff Runge, USFWS
Nick Jayjack, FERC
Kim Nguyen, FERC
Dave Turner, FERC
Paul ??, FERC

A meeting was held between Loup Power District, the Federal Energy Regulatory Commission, HDR Engineering, the Nebraska Game and Parks Commission, and the U.S. Fish and Wildlife Service to discuss data collection for the upcoming Relicensing Studies.

Meeting Agenda:

1. Review of Study Plan Determination Letter
   - Study 1 - Sedimentation
   - Study 2 - Hydrocycling
   - Study 5 – Flow Depletion and Flow Diversion
2. Information to be determined from Study 2
3. Information to be determined from Study 5
4. Study 5 – Flow Depletion and Flow Diversion – Aerial Imagery Review
   - River Miles for Study – 5 miles above and below, randomly generated
   - Years for photo interpretation
   - Characteristics to be identified

Discussion:

Matt Pillard began the meeting with introductions and by providing a summary of the Study Plan Determination Letter and the planned studies (1-Sedimentation, 2-Hydrocycling, and 5-Flow Depletion/Flow Diversion). Provided that while Study 1 – Sedimentation, did not require coordiantion with agencies per the Study Plan Determination, it was inlcuded to show the data needs and overlap with other studies. The purpose of the meeting is to discuss when, what, how, and where data collection for these studies. Discussion of issues is summarized by agenda topic below.

1. Review of Study Plan Determination Letter

HDR provided a brief summary of each study plan's projected "where and when" with information from the Study Plan Determination Letter.

Study 1 – Sedimentation

Locations were determined for additional cross-sections to those originally stated in the Revised Study Plan (USGS gages).

Data Gathering Summary: A flow record will be synthesized and one survey cross-section will be taken at: 1) Platte River between the Loup River confluence and the tailrace return confluence, 2) Platte River within 5 miles downstream of the tailrace return. Cross-sections shall be surveyed in the late spring to early summer period (mid-May to mid-June) to coincide with the beginning of interior least tern and piping plover nesting period and the presumed pallid sturgeon spawning period. The above data will be used for spatial analysis determining a relationship between sediment transport and tern and plover nest counts and fledge success.

Study 2 – Hydrocycling

Per the Study Plan Determination letter, when selecting representative sites for analysis, an area where there has been historic tern and plover nesting is preferred. A 1D steady state HEC-RAS model based on this May and August data will be developed.

Data Gathering Summary: Reaches for the representative study sites for the HEC-RAS model are: 1) Platte River between the Loup River confluence and the tailrace return confluence, 2) Platte River within 5 miles downstream of the tailrace return, 3) Near the USGS North Bend gage station. These study sites should include (to the extent possible) areas where terns and plovers have historically nested. This data would be collected prior to the first week in May and near the first week in August (beginning and end of nesting season for terns and plovers).

Study 5 – Flow Depletion and Flow Diversion

Data Gathering Summary: Reaches for the representative study sites for the HEC-RAS model are: 1) Loup River upstream of the diversion weir, 2) Loup River downstream of the diversion weir, 3) Platte River between the Loup River confluence and the tailrace return confluence. This data would be collected prior to the first week in May and near the first week in August (beginning and end of nesting season for terns and plovers).

HDR presented a Field Collection Summary Matrix – displaying when data collection should occur for each of the studies by river reach based on the Study Plan Determination Letter. The flow depletion/flow diversion data should be collected at times of low flow and some higher flow, which corresponded with timeframes for the other studies, May (typically high flow) and August (typically low flow).

The NGPC asked if HDR would be monitoring sediment transported during all months of the year. HDR responded that the sediment transport information will be based on the amount of dredged material from the settling basin. NGPC also asked if there was headcutting below the diversion. HDR stated that the gage at Genoa had not shown any signs of degradation, nor has there been any sign of the diversion wall being undermined. . The sedimentation study will look at seasonal and annual sediment transport, assuming transport capacity. HDR noted that for the sedimentation study, the cross sections would be taken from the survey data obtained for the hydrocycling and flow depletion and flow diversion studies.

The NGPC questioned the validity of only cutting one cross-section when gathering the data at each of the dates. HDR noted that the study plan determination letter required only one cross-section at each time. HDR will also be looking at data that the USGS collects (monthly). From this data a collective sediment discharge rating curve will be developed for comparison to the USGS gage information.

HDR stated that one of the goals of this meeting is to identify what information the USFWS and NGPC would use from the HEC-RAS models results to evaluate the effects on tern, plover, and whooping crane habitat.

USFWS asked if HDR would be applying Parker's regime equations to the Effective Discharge results at the ungaged sites (single cross section locations), as well as the gaged sites (USGS sites). HDR stated that a relationship between

width and depth would be based on the effective discharge and surveyed data, as suggested by Leopold. But HDR would look into applying Parker's regime equations.

The window of opportunity to get the data in the spring is narrow, as river levels must be monitored. HDR is hoping to look for breaks in high water and weather for the early-mid May and early-mid August data collection efforts, as well as coordinating with the USGS to collect field data. NGPC noted that HDR will need to be cognizant of the terns and plovers and that they may be on the river at the time of data collection. HDR will plan on coordinating with NGPC to make sure they are aware of bird locations.

NGPC questioned the lack of details regarding the studies at this juncture. Where is the line between HDR making decisions and assumptions about the data and how studies should be conducted and getting input from agencies? HDR noted that ultimately, LPD needs to satisfy FERC. FERC asked the resource agencies for their input on the information to be studied. The study plans were discussed in a series of meetings, where goals and objectives were discussed on how they should be accomplished. A comment period was opened and comments received. FERC released a decision on the study plan (the study plan determination letter), requesting information needed for their environmental assessment. HDR also noted that this information would be reviewed in the development of the biological assessment and making sure that the USFWS would have all they need for the biological opinion. All told – it is FERC's decision for acceptance or denial of the information found in the studies.

The NGPC asked if there would be more detailed descriptions of the studies as to why something was done and what assumptions were made. HDR needs to check on this, but is under the impression that this information could be included in quarterly progress reports. USFWS pointed out that a lot of the information and assumptions are in the revised study plan already. NGPC noted that a higher level of detail is needed to validate the information in the studies as to why certain data was used and why certain assumptions are being made. NGPC asked who would be submitting the progress reports and noted that the first report, submitted by LPD, was very general and did not include a lot of detail. HDR noted that there is no required format for these quarterly progress reports; however, they are designed to convey the most current information at the time. The first few reports will purely validate that the data collection process is working and later reports will share results and conclusions. Some reports may just have raw data.

The USFWS asked when the agencies would be able to review these progress reports. The timeline is vague. The progress reports are submitted to FERC and FERC will post them. There is no set submittal and posting time, although there is a general guideline set forth – at this point, the next submittals are scheduled for February and May. HDR's understanding of the periodic reporting to FERC is to assure FERC that progress is being made. This way, if the study is not addressing the issue, mid-course corrections may be implemented. There is nothing built into the proposed schedule that allows for a comment-response exchange with the agencies on the quarterly reports. HDR noted, if there is something that the agencies wish to see in the reports, they need to let HDR know and HDR will try to get the information to them. It is important to keep monitoring the studies to make sure they are showing reasonable data.

2. Information to be determined from Study 2

Cross sections or topo data will be used to develop a 1D steady state HEC-RAS model within the reaches described above. . From the model results, HDR asked what information the USFWS and NGPC would need from the model results to determine effects on tern and plover habitat. NGPC would like to see whether or not fluctuations in elevation of water level impacts exposed habitat. What happens if the fluctuations in water surface elevation go above the elevation of the sandbars? USFWS noted that change in elevation and changes in size of habitat, cohesiveness of sand particles as it relates to erosion could be important. Looking at the flooding aspect and sandbar erosion is important.

HDR explained that there were two parts to this study. Peak flow would be evaluated during nest initiation period and then again later in the season. HDR noted that the 1D model would be based on a series of cross-sections or topo taken in May and August (as previously discussed). They will compare how the cross-sections change and look at discharge and how stage has changed. Width of exposed mid-channel features and height of these features will be looked at with regards to how these variables change with a change in discharge for a typical wet, dry, and normal year.

USFWS noted there is published literature regarding sandbar measurements. Mary Bomberger-Brown and Joel Jorgensen have done a lot of research on this concept. USFWS asked what will be a representation of what is habitat. Would need to look at a continuous variable, such as wetted area, and look at the changes.

HDR noted that the 1D model will not tell you whether the habitat is suitable or not. NGPC commented that the sandbar area is challenging to quantify and may be important in some years and not in others. In addition, that tern and plover habitat is variable and that what is considered "suitable" varies depending on what is available. NGPC made the following points:

1. It is difficult to define habitat because it is not constant for these species
2. Conditions vary and birds respond to what is available
3. Trying to say that the birds nest in the same place every year is a false assumption
4. If hydrocycling increases the stage of the river during a pulse flow, there will be an affect at some point
5. It is challenging to quantify how important "sandbar area" is to the birds
6. Elevation appears to be more important
7. Although there may be sand above the surface water level, hydrocycling may not be allowing the sand to dry to a sufficient level to become habitat for the birds

NGPC asked how wet/dry/normal water years are defined. . HDR noted that a volume duration analysis will be used to determine a typical wet, dry and normal year.

NGPC asked if it would still be the practice to use the highest flow in a year would be the highest sandbar point. HDR explained that highest flow would be used compare flows. How often are these high flows exceeded? Flow is used as a surrogate for habitat. It is not assumed that the nesting occurs at this high flow, but simply a means to isolate how flows are affected by hydrocycling as way to relate to potential effects to birds. USFWS added that all of this will be part of FERC's EA. It will all be relative and used for comparison. This method will not give an absolute species response, it will only be a relative evaluation across alternatives. This type of study will not provide an analysis of good versus bad habitat. NGPC requested additional detail on the assumptions that HDR is making regarding this study.

The output question was revisited: what HEC-RAS output do the agencies need to look at impacts on tern and plover habitat?

- USFWS said they would need to go back to the office and look at additional information and discuss with NGPC further. They will return correspondence to HDR within 2-3 weeks (approximately by January 29).

3. Information to be determined from Study 5 – Flow Depletion/Flow Diversion

HDR summarized that this study would develop a 1D HEC-RAS steady state model to study the effects of diverted flows on least tern and piping plover nesting habitat and also whooping crane roosting habitat. USFWS noted that there have been reports published on 1D model for whooping crane habitat. The Platte-Habitat simulation, which has a lot of indices, would likely apply to the Loup diversion area.

- USFWS referenced a USGS publication – "Evaluation of Models and Data for Assessing Whooping Crane Habitat in the Central Platte River, Nebraska" – 2005 Farmer et al.
- USFWS will send a copy to David Turner at FERC.
- Because this reference is a bit dated, USFWS would like to think about this habitat assessment and coordinate with NGPC before discussing with HDR what information they will need to determine affects to whooping crane roosting habitat.
- Parkers Regime Equation can be found in the 1983 USGS report (as referenced in the Revised Study Plan – pg. 24)

4. Data Collection Locations

HDR began this discussion by displaying aerials with tern and plover nesting sites overlaid on a number of years of aerial imagery. Discussion centered on where the cross-sections should be taken for the flow depletion/flow diversion study

(some of which would be used for other studies too). All parties agreed that the extent of the data gathering (topo) and subsequent model extents would be 1-2 times the channel width. One additional cross section would be taken upstream of the study site and downstream of the study site to assist with modeling boundary conditions. Only topo information would be gathered. The 1D model would be calibrated based on water surface profile information obtained during the survey and flows obtained from nearby gages. Therefore, velocity measurements would not be obtained.

USFWS noted that when looking at changes in sediment transport, this can be impacted because of bank stabilization. USFWS also noted that it might be difficult to see a change upstream and downstream of the diversion because changes in the transport may actually be affected by jetties and bank revetment, rather than from the diversion. However, it was discussed that this is the condition of the river today, and effects of bank stabilization can not be ignored. HDR will take a closer look at aerial photographs and try to set a study site outside of bank stabilization areas.

- USFWS will deliver bank stabilization information from a survey of the lower Platte River to HDR; however, no such survey was done for the Loup River. USFWS noted that the lower Platte River survey was completed in 2006, so there may be additional bank stabilization that was not noted in this survey. HDR should coordinate with USACE to get additional permitted activity to supplement the 2006 data.

HDR reiterated that if they can understand what the agencies need to evaluate effects; that will assist in developing the model and how to get the required information. There was some discussion as to whether cross sections will be cut, or a topo survey will be performed, from which cross sections for the model can be obtained. Due to relatively higher spring flows, the cross-sections or topo information in May will likely be from a boat. The data collected in August can likely be done on foot to a large degree, with the assistance of an amphibious vehicle, as the channel can often be walked across in August due to lower flows. HDR is planning to collect topo or cross-section data. Velocity measures are not necessary for the 1D model.

The criteria discussed when choosing the representative sites were:

- Locations where the birds historically nested;
- Access locations for survey equipment;
- Representative of the general reach;
- Avoid revetment locations, if possible

HDR proposed the locations for obtaining topo data or taking cross-sections in the following areas and requested feedback from the agencies:

<u>Loup River/Platte River confluence to the tailrace return/Platte River confluence</u>

HDR is planning to obtain data where birds had historically nested between Platte RM's 102 and 103. The data collection effort would consist of obtaining topographic information and would be limited to 1-2 times the channel width. USFWS asked about the extent of the revetment in this stretch, because by looking at the aerials, there may be some at the location of the proposed cross-section

- NGPC noted that the effect will be realized and the revetments should not make a difference
- USFWS noted that if the revetment was not there, the effects would be different
- NGPC pointed out that the revetments are there and they are not going away, so it's not realistic or representative to try and take a cross-section in an area without revetment.
- HDR noted that this stretch is only approximately 1.5 miles, so the most logical choice of where to obtain the data would be in the one area where birds had historically nested, between RM's 102 and 103.
- USFWS reiterated that if there were a sediment deficit, the river would erode banks, bed, and bars
- NGPC reiterated that the majority of the lower Platte River is stabilized, so unless the USFWS is proposing a river restoration project, which they are not, the stabilization sites shouldn't dictate where a cross-section is cut. Stabilization is there and should be irrelevant for the purposes of this study. Need to focus on effects to the birds.
- LPD noted that there is revetment along most of this stretch for the adjacent county road and for the powerline near the railroad bridge

- USFWS asked HDR how representative this proposed location was of the longitudinal segment. HDR responded that it seems fairly representative and likely the best location from a bird nesting standpoint, as well as from an access standpoint.

Platte River: 5-miles downstream of the tailrace return confluence

- HDR displayed the proposed area for data collection to be just east of the Bellwood Lakes area, near Platte RM 99, due to the amount of birds historically nesting in this location. The data collection effort would consist of obtaining topographic information and would be limited to 1-2 times the channel width. NGPC asked how HDR was proposing to control other variables that could affect the data being measured. HDR proposes to look at how the width and depth can change based on relationships developed in the sedimentation study, not estimating how the channel section will change (i.e. erosion or aggradation of a sandbar feature). The 1D steady-state model utilizes a fixed cross section, and does not have mobile bed component.
- USFWS noted that there is not an integrated model that looks at all variables. Only models exist that look at different pieces in different parts.
- NGPC noted that the proposed site was probably optimal relative to nesting birds; however, it may not be representative of the reach.
- USFWS noted that in this reach, above the railroad bridge (which splits this river reach) the river is deep and swift, while below the bridge is wide and slower, making it difficult to choose one location that could represent the entire reach.
- NGPC again agreed that RM 99 would be the best area for nesting birds because a large sandbar existed there; however, it would likely not represent the entire reach, although a cross-section should not be cut where no habitat could potentially exist.
- USFWS will consider this location and get back to HDR with comments within 2-3 weeks (approx. January 29).
- HDR can place the aerials with the proposed locations on an FTP site for USFWS and NGPC to access. USFWS would let HDR know if this is needed.

Platte River near the North Bend USGS Gage

HDR displayed the proposed cross-section location in this reach near RM 71. HDR noted that USFWS, in their comment letter on the Study Plan, would prefer the cross-section be taken downstream of the Hwy. 79 Bridge. The data collection effort would consist of obtaining topographic information and would be limited to 1-2 times the channel width.

- NGPC noted that this reach would also be difficult to find a representative site for the entire reach, so it would be sensible to take the data where the birds have nested historically. NGPC also noted that there may still be an operable boat ramp at "Legge's Lake" near RM 69 for access. NGPC pointed out that there was also a bar with nesting at RM 69 in 2009.
- HDR reiterated that this cross-section needs to be "near the North Bend USGS gage." HDR is trying to pick a location that stays closer to the gage (at RM 72.5) and RM 69 may be a little farther than anticipated.
- USFWS said that if NGPC is okay with the site at RM 71 that HDR chose, then USFWS is okay with it.
- NGPC agreed that the site at RM 71 would work.

Loup River Upstream of the Diversion

HDR displayed the proposed the data be collected downstream of the confluence of Cedar River and the Loup River at approximately Loup RM 39. There was has also been historic tern nesting here.

- USFWS noted that targeting the area downstream of the Cedar River is good, so as not to confuse any effects the Cedar River could have on the data.
- All parties agreed that the proposed upstream of the diversion and downstream of the Cedar River location was appropriate.

Loup River Downstream of the Diversion

HDR proposed taking the cross-section between Loup RM's 30 and 31. USFWS had proposed a site nearer to Loup RM 4, by Columbus. HDR asked if USFWS had a preference of the cross-section being cut closer to or farther from the diversion. The data collection effort would consist of obtaining topographic information and would be limited to 1-2 times the channel width.

- USFWS noted that they had selected the farther downstream site because they thought there were nesting records for that area.
- HDR noted that they did not currently have nesting records for this area.
- USFWS does not have a preference about being closer or farther away from the diversion, but would like to go back to their office and review their records before agreeing to this cross-section location. They will get back to HDR in the 2-3 week timeframe.
- NGPC noted that if HDR is looking for an area to take data that would detect greater impacts of the operation, wouldn't it be better to be closer to the diversion?
- LPD noted that there is a powerline running through the trees near Loup RM 31, which would provide good access.
- USFWS reiterated that they would prefer to review their data. It has been noted that HDR's preference is near Loup RM 31.
- NGPC noted that there may be a lot of people impacts directly downstream of the diversion.
    - LPD noted that ATV usage typically remains upstream of Loup RM 32.

5. Study 5 – Flow Depletion and Flow Diversion – Aerial Imagery Review

HDR will compare river conditions for five randomly generated 1-mile-stretches upstream of the diversion and five randomly generated 1-mile-stretches downstream of the diversion. Habitat specific items will be evaluated. As there are 34 miles of Loup River downstream from the diversion to the confluence with the Platte River, the limits for review upstream will also be 34 miles.

- USFWS noted that the "above the diversion" river would be the "control"
- HDR noted that FSA imagery would be used for this analysis and the method used by Kirsch (1996) would be followed.
- NGPC noted that Kirsch flew the river at specific times when nests were initiated for the aerial photos used in her analysis, which could make using FSA photos, typically taken in July, problematic. HDR stated this is the data that is available. NGPC also asked what factors HDR would quantify.
    - HDR is planning to use number of sandbars per mile, position of sandbars, vegetation composition on sandbars, etc.
    - NGPC noted that sandbars can be identified, but not all sandbars are habitat. NGPC would like HDR to clarify that all sandbars are not habitat.
    - USFWS noted that this study is not quantifying what is or is not habitat. This study is merely comparing river conditions with respect to sandbars.
    - HDR noted that originally the study was going to compare nesting numbers above and below, but after reviewing the data, it was found that there is not enough data to offer a powerful difference worth evaluating. HDR chose to move to the next step which was comparing river conditions.
    - NGPC noted that this is a fairly weak test for how operations could be affecting the river. A better test would be to go out and measure real life conditions for greater accuracy, but this is not feasible in the timeframe given. NGPC also noted that focusing solely on nesting locations could confound the analysis.
- NGPC asked if the FSA photos were all taken on the same day for the years to be analyzed. HDR responded that this is not likely the case, but will check. HDR will try to find photos with similar flows in different years, a representative 5 years of photos.

USFWS noted that in many areas of these studies, there is a lot of gray. Differences in the years and aerial photos will need to be stated and this study will not answer all questions.

- NGPC noted that this study still may not be able to isolate the impacts of the diversion. The study would likely show that there is not enough evidence to show there is an impact. This study would compare conditions above and below, but wouldn't be able to isolate Project effects.
- HDR will provide additional details on the methods to be used for this study and try to get something in writing that explains the method and assumptions.
- USFWS recommended a stream classification report by Jacobson and Elliot that was used on the Missouri River. HDR could potentially use some of the same methods. USFWS would try to send detailed reference information for this report.
- NGPC noted that this is not a stand-alone study.

FERC requested that HDR clarify if the 5 areas where cross-sections would be taken had been settled on. HDR noted that not all locations had been decided and USFWS would get additional comments on the 5-miles Downstream of the Tailrace confluence and Loup River Downstream of the Diversion locations back to HDR within 2-3 weeks.

Meeting Adjourned at 12:05 PM.

Action Items:

Who	Task	Date Assigned
HDR	Develop more detailed descriptions of the studies for subsequent Quarterly Progress Reports.	2/27/10
USFWS	Review USFWS information, meet with NGPC, and provide comment on what output the agencies would need from the 1D model to determine impacts on tern, plover, and whooping crane habitat.	1/29/10
USFWS	Deliver 2006 USFWS lower Platte River bank stabilization survey information to HDR. *[Subsequently delivered via email on 1/5/10]*	1/6/10
USFWS	Further consider the Platte River: 5-miles Downstream of the Tailrace Return Confluence stretch and provide comment on this proposed cross-section location.	1/29/10
USFWS	Further consider the Loup River Downstream of the Diversion stretch and provide comment on this proposed cross-section location.	1/29/10
USFWS	Provide detailed reference information of the Jacobson and Elliot stream classification report, referenced during the final discussion.	1/15/10