

Agenda Item: 8.

Memo to: Programs, Projects & Operations Subcommittee

Subject: Lower Platte River Corridor Alliance - USGS Sandbar Survey

Date: April 9, 2012

By: Gerry Bowen

In 2011, the United States Geological Survey (USGS) in cooperation with the Nebraska Game and Parks Commission, and the Tern and Plover Partnership, contemplated a study of the shape and height of sandbars in the Lower Platte River (Columbus to the mouth). The intent was a three year study. USGS also contemplated applying for an NET grant in 2011 for the project. One of the goals of the study was to survey sandbar location, shape and height that resulted from the 2010 and 2011 high water events on the Lower Platte. This study would have been funded by USGS and the NET grant, with no financial contribution from the NRDs.

As an interim measure, USGS and the Lower Platte South NRD (LPS) entered into a cost share agreement for a pilot study of the location, shape and height of sandbars in the Lower Platte from the confluence with Salt Creek to the mouth. The pilot study used laser rangefinders, laser levels, and handheld GPS units to rapidly map the area and heights of sandbars in this reach. The methods used were able to map shape and height of sandbars in a 22 mile stretch of the Lower Platte over five days of field operations and was repeated during three different seasons. This study was the first comprehensive survey of sandbar shape and height ever completed in the Lower Platte. The District was asked to participate in this study, but the Board denied this request. The Lower Platte North NRD also declined to participate.

The results of the study are outlined in a memo from Meghan Sittler, as well as a listing of benefits to the District of continuing the survey for another year not only on the Salt Creek to the mouth reach, but also including the reach above the Elkhorn. The main benefits to the District are:

1. Permitting of future infrastructure projects (levees, bridges, etc) should be less complicated since the size and location of sandbars can be predicted, lessening the chances of impacts on least tern and piping plover nesting areas.
2. It will add needed data for the sediment budget portion of the ongoing Platte River Cumulative Impacts Study.

Based on her recommendation, there are two scenarios for the District to consider, both would involve cooperating with the LPS.

1. The first scenario would be a sandbar survey during 2012 on the Lower Platte from Salt Creek to the mouth. The total estimated cost of the survey would be \$81,700. USGS would contribute \$24,500 of this amount with the NRDs being responsible for the remaining \$57,200, or \$28,600 from each NRD. As noted above, the LPS surveyed this reach in 2011 on its own, and may do so again in 2012.

2. A second option would be a similar sandbar survey during 2012 of the Lower Platte from Fremont to the mouth. This would include the area from Salt Creek to the mouth, but add in the reach above the mouth of the Elkhorn River, or an additional 25 river miles. Due to an economy of scale, the total estimated cost of the survey would be \$121,100. USGS would contribute \$34,400 of this amount with the NRDs being responsible for the remaining \$86,700, or \$43,350 for each NRD. It is believed that the LPS would cooperate on this survey if the Papio also agreed to the project. This will be more beneficial since sandbar formation appears to react differently in the reach above the Elkhorn River.

While Management supports the survey of sandbars in the Lower Platte River, funding priorities and other budgetary challenges, it is recommended that the District not participate in the survey at this time.



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Memorandum

Date: April 4, 2012
To: Program, Projects and Operations Committee, Papio-Missouri River Natural Resources District
From: Meghan Sittler, Coordinator, Lower Platte River Corridor Alliance
Subject: USGS Sandbar Dynamics Survey

In 2011, the Lower Platte South NRD and the United States Geologic Survey (USGS) entered into an agreement to conduct a pilot study of sandbar dynamics (e.g. size, shape, height, and location) in the lower Platte River from the confluence of Salt Creek to the mouth. The goals of the pilot study were to capture baseline data on sandbar dynamics in the lower Platte River following the high flows of 2010 and throughout 2011. The pilot study was the first step in what had been designed as a longer term study done in partnership with the LPRCA, Nebraska Game & Parks Commission and the Tern & Plover Partnership to better understand how, where and why sandbars form in the lower Platte River and how that relates to tern & plover habitat.

During 2011, surveys were conducted during spring, summer, and fall to capture various flow conditions. While sandbars less than 2 acres in size were inventoried and basic measurements were taken, particular attention was placed on sandbars that were 2 acres in size or larger. Sandbars that are 2 acres or larger in size tend to support tern & plover habitat nesting and survival. During each of the three surveys the size, shape, height, and location of the larger sandbars were taken. In addition to the study resulting in the development of a rapid and reliable method for surveying the shape and height of sandbars in the Platte River, the results of the three surveys show that:

- The larger sandbar stayed in the same location but changed shape and height
- The height of sandbars is generally lower than the height of the flood, which means that smaller floods can wash over sandbars left by a larger flood

Knowing that sandbars stayed in the same location means that we can predict their location. Also by knowing that smaller floods can wash over or inundate sandbars left by larger floods means that we are potentially able to predict the height and probability of inundation of the sandbars.

The implications of these results include:

- Benefits to infrastructure project permitting, construction and monitoring benefits by being able to predict sandbar location, size and height and therefore understanding where tern & plover habitat may exist or be impacted
- Benefits to the on-going sediment budget analysis being done as part of the Cumulative Impact Study to develop a predictive model of implications of human activities
- Benefits to the Weed Management efforts by being able to understand where sandbars may form to a height where invasive vegetation may be able to persist

Based upon the results from the pilot study and the potential implications listed above, continuing this survey will further our understanding and ability to predict sandbar stability and formation. Additionally, by expanding the survey to include the reach from Salt Creek to Fremont, we will increase our understanding of sandbar persistence and formation above the confluence with the Elkhorn River, where sandbars seem to behave differently than those below the confluence. Finally the additional surveys will be utilized to strengthen a proposal to the Nebraska Environmental Trust for a longer term survey of the entire lower Platte River.

USGS 2012 Proposed Costs for Sandbar Monitoring Study

Scenario 1 - Re-apply for NET grant (assumes no funding from NRDs this year for sandbar monitoring)
Assumptions

- Same as previous application but with NO hydraulic model building or surveying cross sections for hydraulic model. Surveying will be limited to sandbars using the 'rapid assessment' approach. The model is assumed to be up and running, and sediment inputs known.
- Duration is 2013 to 2015.
- Product is USGS-Scientific Investigations Report

Costs (at ~30% cost share)

- **Cooperator costs ~\$307,000** (unless NRD's are willing to provide some in-kind matching, this would all be covered by NET grant)
-USGS Costs ~\$124,200

Scenario 2 -NRD funding for 2012-2013 sandbar study from Loup R. confluence to mouth of LPR
Assumptions

- Same as first year of Scenario 1, but surveying ends with November pre-ice survey in 2012.
- Runs from April 2012 through end of Federal FY2013 (spanning two NRD fiscal years). Project would start in April, billing would occur first in July 2012.
- Product is journal paper
- These costs (minus publication and analysis costs) would be subtracted from NET grant application to increase its chances of successful funding.
- NET grant, if funded, would continue project from 2013 through the end of 2014.

Costs (at ~30% cost share)

-**Cooperator costs - ~\$108,500 (cost to NRD)**
-USGS Costs ~\$42,700

Scenario 3 -NRD funding for 2012-2013 sandbar study from Fremont to mouth of LPR.
Assumptions

- Same as first year of Scenario 1, but surveying ends with November pre-ice survey in 2012 and only spans from the HWY77 bridge in Fremont to the mouth of the LPR.
- Runs from April 2012 through end of Federal FY2013 (spanning two NRD fiscal years). Project would start in April, billing would occur first in July 2012.
- Product is journal paper
- These costs (minus publication and analysis costs) would be subtracted from NET grant application to increase its chances of successful funding.
- NET grant, if funded, would continue project from 2013 through the end of 2014.

Costs (at ~30% cost share)

-**Cooperator costs - ~\$86,700 (cost to NRD)**
-USGS Costs ~\$34,400

Scenario 4 -LPS-NRD funding for 2012-2013 sandbar study from Salt to mouth of LPR (same project span as in 2011).

Assumptions:

- Three surveys (ice-off, summer, and fall). Surveying ends with November pre-ice survey in 2012 and spans from the the mouth of Salt Creek to to the mouth of the LPR (actually 22 miles DS of Salt Creek).
- Project runs from April 2012 through end of Federal FY2013 (spanning two NRD fiscal years). Project would start in April, billing would occur first in July 2012.
- Product is journal paper
- NET grant, if funded, would continue project from 2013 through the end of 2015.

Costs (at ~30% cost share)

-Cooperator costs - ~\$57,200 (cost to NRD)

-USGS Costs ~\$24,500