Independent Science Advisory Committee (ISAC)

Responses to Questions Posed by the Platte River Recovery Implementation Program (PRRIP) in July 2015

Sand deposited below the Kearney Canal Diversion; July 14, 2015.

Submitted to
PRRIP Governance Committee

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August 21, 2015

The Platte River Recovery Implementation Program (PRRIP or Program) requested written input from the ISAC on five questions. These questions were the focus of discussions during the ISAC meeting in Kearney, NE, held on July 13-15, 2015. To enable the Program to easily extract ISAC recommendations from our overall discussion of the questions posed to us, we have put our recommendations in **blue** text. These recommendations are contained within the context of the overall discussion of each question so that our rationale is clear.

2014 State of the Platte Report

1) Is the "two thumbs up" assessment for Big Question #9 in the 2014 State of the Platte Report logical based on your understanding of Program data and consistent with what you have learned during your involvement with the Program?

Reference Documents – 2014 State of the Platte Report

Big Question #9 (BQ 9) asks: "Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?" The relevant Program flow management actions which could potentially affect flows in lower Platte River include diversions of Platte River water for the J2 reservoir or for groundwater recharge (a much smaller volume than J2 diversions). The Program associated habitat reach for pallid is from the Elkhorn River to the Missouri confluence (pg. 30, AM Plan 2006). The area examined in the stage change study was the reach between the Nebraska Highway 50 Bridge and the reclaimed Chicago Rock Island and Pacific Railroad (pedestrian) Bridge (pg. 1-2, HDR et al. 2009).

The ISAC provided inputs on BQ 9 in our October 2013 report (pg. 10, lines 413-431):

> "The current conclusion is one thumb up, which is reasonable. The peer-reviewed stage change study confirms that answer to BQ 9 is at least one thumb up. If there are minimal predicted effects on water physical and chemical conditions below the Elkhorn River from Program flow management actions (as determined in the peer-reviewed stage change study), then it is unlikely that sturgeon below the Elkhorn River are exposed to any effects from Program flow management actions, either positively or negatively. If evidence were provided which redefined the area of concern to include areas above Elkhorn River (i.e., from ongoing studies by USGS and the Nebraska Game and Parks Commission), then it would be necessary to repeat the stage change study for areas further upstream. The ISAC recommends publishing the results of the stage-change study in a journal, and using the tool developed in the stage-change study to examine the effects of the proposed operations of the J2 re-regulating reservoir.
>
> While a one thumb up conclusion is justified, we do not support a conclusion of two-thumbs up at this time. The water part of the peer-reviewed stage change study is robust. However, the connection to sturgeon habitat is less certain because we don't know if the area modeled for sturgeon habitat suitability was sufficient given the true distribution of sturgeon, as discussed above. We recommend that the Program uses the stage-change tool to adjust Program water operations to further minimize downstream effects during low-water conditions, and then re-evaluate the evidence for BQ 9."

What has been learned since the 2013 ISAC report? Hamel et al. (2014; their Figure 3) reported one pallid sturgeon at multiple locations in the 107 km of the Lower Platte River between the Elkhorn and Loup Rivers (rkm 52-159). Additionally, Delonay et al. (in press) and Delonay (personal communication, 14 August 2015; Appendix A) stated it is highly suggestive pallid sturgeon spawned in the Lower Platte River, Nebraska from 2011 through 2014 under widely differing flow conditions. They also tracked a spawning ready female above the Elkhorn River. Specific locations and habitats where pallids have spawned in the Lower Platte River and whether larvae were produced remain unknown.

The stage change study was restricted to a representative reach of the segment below the Elkhorn to mouth (rkm 52-0). Thus there is pallid sturgeon use of the river above the Program's associated habitat reach in the Lower Platte River area, upstream from the additional flow contributed by the Elkhorn River. **To address the new**

information on pallid sturgeon we recommend that the Program repeat its "Alternative Analysis of Program Activities" (Appendix G in HDR et al. 2009) to determine if Program flow management actions also yield minimal predicted effects on water physical and chemical conditions in the Elkhorn to Loup segment of the Lower Platte River.

The 2014 State of the Platte Report (pg. 28) mentions the idea of an operational rule:

> "Impacts can be avoided through development of operational rules that prohibit Program diversions when lower Platte River discharges fall below 4,000 cfs"

The ISAC recommends that the Program formulate an operational rule that would be applied to the operation of the J2 reservoir. Provided that such a rule is put in place by the Program to protect the habitat of pallid sturgeon, then the ISAC supports the conclusion of two thumbs up on Big Question #9.

The operational rule might be of the following form:

> *If flows are < X in Lower Platte at gage Y, and if extraction of flows from the Platter River (for any purpose) in the Central Platte River could cause detectable, adverse changes in river stage in the area used by pallid stugeon , then do not extract water to J2 for Short Duration High Flows (SDHF). This rule is based on the HDR et al. 2009 stage change study and supplementary analyses for the Elkhorn to Loup reach.*

The draft 2014 State of the Platte report (pg. 29, lines 881-885) has the following statement:

> "The U.S. Fish and Wildlife Service maintains the GC needs to address, at the policy level, perceived disagreement between the AMP management objective of "avoid adverse impacts from Program actions on pallid sturgeon populations" and the stated Program goal of "testing the assumption that managing flow in the central Platte River also improves the pallid sturgeon's lower Platte River habitat."

The ISAC agrees that the GC needs to address this perceived disagreement.

2) In June 2015 the GC accepted the "two thumbs down" assessment for Big Question #1 in the 2014 State of the Platte Report. The GC asked the EDO to work with the ISAC and the TAC to provide guidance on how to adjust management in response to Program learning. Do you concur with the EDO recommendation to utilize a Structured Decision Making process to assist the GC with the adjust step of adaptive management and if so what guidance do you have to help make the process successful?

Reference Documents – 2014 State of the Platte Report; SDM White Paper; Tern and Plover Habitat Synthesis Chapters (final peer review package)

The ISAC accepts the evidence against Big Question #1, as described in the 2014 State of the Platte Report and referenced materials. The ISAC is also satisfied with the peer reviews of the Tern and Plover Habitat Synthesis chapters, and the responses of Program scientists to recommendations made by the peer reviewers. **We recommend that the Program add a requirement for documentation of responses to peer reviews in the policy related to the PRRIP peer review process.**

The ISAC has previously recommended that the Program apply modelling and Structured Decision Making– see ISAC 2014a (points 10 and 11 on pages 4-5) and ISAC 2014b (point 8 on page 15; also found on page 49 of the 2014 State of the Platte Report). Natural resource management decisions involve synthesizing both science and human values. Examples of Platte River decisions which involve this kind of synthesis include the kinds of habitats that are required to achieve plover and tern objectives (e.g., off-channel only vs. off-channel and in-channel) and the optimal allocation of water and funding resources across whooping cranes, plovers and terns. Now that the Program has collected ample ecological evidence to address some basic questions, it is time to move forward with an analysis of future management options, bringing together ecological evidence, economics, and human values. This analysis must be conducted in such a manner that all stakeholders clearly understand the process for formulating and evaluating alternative management actions to be applied in the future, including adaptive management alternatives. A common understanding of the process will facilitate the selection of alternative(s) for implementation, and the documentation of the rationale for that selection. Structured Decision Making provides a formal method for rigorously combining scientific evidence and modelling tools with stakeholder values to converge on management alternatives which best meet ecological, economic and other objectives (Hammond et al. 1999, Gregory et al. 2012). We recommend that this process be applied on a trial basis on a single question concerning the Platte River as a means to evaluate its future utility for the larger program.

We concur with the EDO recommendation to use Structured Decision Making to assist the GC with the adjust step of the AM cycle for Big Question #1. A key benefit of this process is that it will provide a structured integration of the learning that has occurred during the last 8 years into a form which provides insights on the implications of decisions for various objectives, and the implications of differing weights on objectives for choices. It's prudent to do a test application of this approach on part of the Program (i.e., Big Question #1) rather than tackling all issues related to an extension of the First Increment or Second Increment. In the test application to Big Question #1 for terns and plovers proposed by the EDO, it's important to ensure that the objectives and performance measures PMs include potential impacts to whooping cranes and pallid sturgeon (i.e., that tradeoffs in the use of water are fully considered).

We have the following other responses and recommendations on this topic (not bolded for ease of reading)**:**

- The ISAC endorses the EDO's proposed process, use of outside experts and schedule;
- It's a good idea to have a test application of this structured process on Big Question #1, to figure out the process of adjustment in the AM cycle, and inform the GC on how this process works, recognizing that decisions on allocation of water and other resources for one big question could affect decisions on other big questions
- It's critical that the GC be involved in reviewing existing Program objectives and performance measures, adding other metrics as required related to human values, and that the GC be involved in proposing management alternatives, as well as in evaluating those alternatives (see recommended roles Figure 1).
- In developing the tools that help the GC to evaluate alternatives, it's important that:
  - the models used in the process be kept as simple as possible (but not too simple) recognizing that the key filter for deciding whether or not to include a hypothesis or process in a particular model is whether or not it would help distinguish among alternatives (determined by sensitivity analysis);
  - the models should recognize uncertainty with respect to various functional relationships that are still being explored, such as alternative hypotheses related to the effects of flow on erosion of islands (for examples of decision analyses incorporating alternative hypotheses see Peters et al. 2001 and Alexander et al. 2006);

- the models' assumptions be well documented, and reviewed by both the TAC and ISAC;
- the EDO should work with a subset of TAC members who have the time to 'dig deep', and become thoroughly familiar with the models used in this process; and
- the EDO, TAC and outside experts develop simple ways to summarize for the GC the relationships in the models, and the consequences of the alternatives.

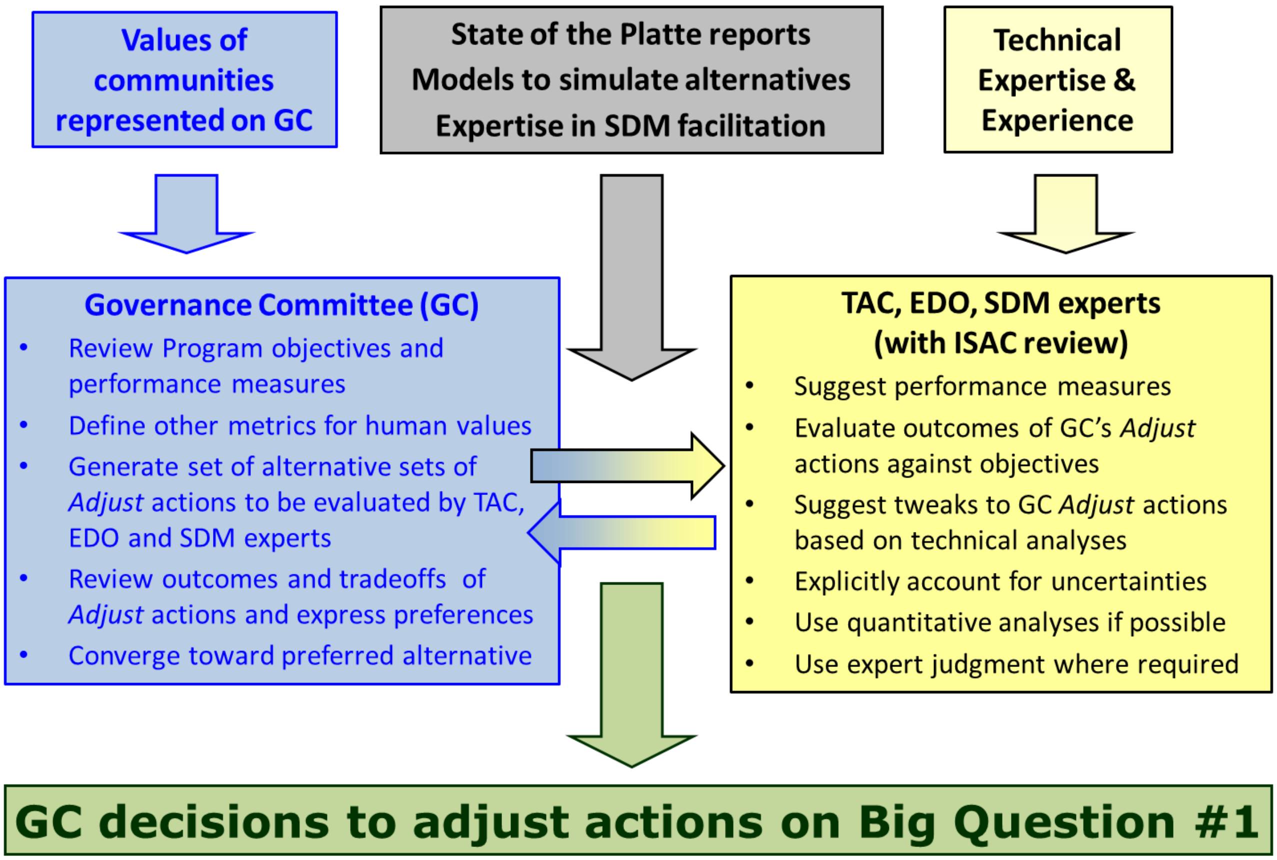

Figure 1. ISAC view of how Structured Decision Making can be applied to the adjust phase for Big Question #1 and the respective roles of the GC, TAC, EDO and outside experts.

Sediment Augmentation

3) What guidance can the ISAC provide regarding future sediment augmentation management actions on the central Platte River?

Reference Documents – Sediment Augmentation & Sediment Deficit Memo

The November 2014 ISAC report provided several recommendations on sediment augmentation, which can be found in the 2014 State of Platte Report on pages 37 (response to Big Question 3), and page 50 (ISAC other suggestions). The key points made by the ISAC in November 2014 were to focus sediment augmentation on a smaller spatial scale, and to perform more intensive monitoring to detect the effects of this action. At the July 2015 meeting, the ISAC added the following observations:

- Within the uncertainty of existing information, most of the Central Platte River appears to be in balance. Except for the area upstream of Overton, there does not appear to be a sediment deficit.
- A reach scale sediment deficit will most likely lead to both river channel degradation and narrowing, which will then decrease the number and area of exposed, unvegetated sand bars. Channel incision would also reduce the Program's ability to use Flow-Sediment-Mechanical approaches to affect floodplain vegetation and channel width.
- The Program needs to address two questions: "Is sediment balance necessary to achieve suitable habitat?", and "Is sediment augmentation necessary to achieve sediment balance?". As we indicated in the ISAC's November 2014 report, it's best to first address these two questions in one intensively monitored area with greater experimental control. The large amount of spatial and temporal variability in sediment transport and deposition demands both greater experimental control, and also using performance measures that can be monitored very thoroughly and reliably. A third related question is: "How close to balance do you need to be to maintain channel width?"
- Sediment balance or aggradation is likely *necessary* but not *sufficient* for creating and maintaining suitable habitat by Flow-Sediment-Mechanical or Mechanical Creation and Maintenance. Sediment balance is not sufficient because it's also necessary to remove *Phragmites* and other vegetation.
- **The ISAC recommends focusing all appropriate actions for creating habitat (i.e., vegetation removal, sediment augmentation, flow management) in the south channel upstream of Overton and intensively monitoring responses to these actions, in particular determining if sediment augmentation maintains or increases channel width.** If the intensive monitoring does not demonstrate benefits of these actions in the south channel below the J2 return, then it's unlikely that benefits will be observed anywhere else.
- **We recommend that the Program base sediment augmentation decisions on thoroughly measured, multiple lines of evidence that have first been proven in an intensively monitored area (i.e., south channel below the J2 return; see Q4). We recommend using the following highest priority lines of evidence:**
  - **apply geomorphic change detection techniques (GCD) to green LIDAR, using methods developed by Dr. Joseph Wheaton of the USGS and colleagues[1];**
  - **analyze trends in transects, cross-sections, and other geomorphic metrics of interest derived from planform maps;**
  - **assess the magnitude of change in the longitudinal profile; and**
  - **specific gage analysis, reporting confidence intervals for changes in slope.**
- **For each of these lines of evidence, we recommend that the Program:**

[1] https://sites.google.com/a/joewheaton.org/www/Home/research/projects-1/morphological-sediment-budgeting

- **review statistical power analyses conducted in other rivers to assess the risks of type 1 and type 2 error (e.g., falsely detecting a sediment deficit that does not exist, and not detecting a sediment deficit that does exist); and then**
- **conduct statistical power analyses with data collected from the Platte (so as to best characterize spatial and temporal variability with local data)**

- The ISAC considered two additional lines of evidence, but assigned them a lower priority at this time:
  - analyzing trends in sediment transport from high frequency sampling - assigned a lower priority due to major challenges in measuring bed load in the Platte River; and
  - HEC-6T modelling, which is useful for integrating the various lines of evidence, but is ultimately dependent on high quality data for model calibration and validation (the high priority types of data mentioned above)

Geomorphology/In-Channel Vegetation Monitoring

4) Can the Program collect the necessary geomorphology and vegetation monitoring data to assist with evaluation of the Big Questions and related hypotheses through acquisition of imagery (e.g., LiDAR, aerial photos)? If so, what considerations are important before the Program moves to this monitoring effort?

Reference Documents – Channel Width Analysis Manuscript

The ISAC's previous recommendations on geomorphic and vegetation monitoring (ISAC 2014b) are worthy of review, and can be found on pages 50-51 of the 2014 State of the Platte report. Table 1 summarizes the ISAC's recommendations on geomorphic and vegetation monitoring from the July 2015 meeting, which are generally consistent with our previous recommendations, but more specific.

Our recommendations are based on the following considerations and observations:

- the need for coarse measures of geomorphic and vegetation condition on a system wide scale;
- the need for detailed measures of geomorphic and vegetation condition on an intensive scale to assess the effects of sediment augmentation;
- current geomorphic and vegetation monitoring is spread too thin over space and time to detect what is a relatively small signal from sediment augmentation (relative to the annual sediment load);
- the need to focus on a smaller area and test out methods first before applying them on a system wide scale;
- the time of year at which it is most critical for whooping cranes to have sufficient *unobstructed vegetation width* (March/April and October/November);
- the implications of whooping crane habitat requirements for the *timing* of geomorphology and vegetation monitoring (monitor in Oct/Nov and use the information for the following spring);
- the finding that fall LIDAR imagery provides estimates of channel widths that are very similar to transect measurements (Channel Width Analysis);
- the types of vegetation data of interest for assessing whooping crane habitat (*unobstructed vegetation width*);
- the quantitative description of vegetation required as inputs to geomorphological analyses (*unvegetated channel width*), focusing on plants which have geomorphic influence (e.g., annual weed species (cockleburs, red top), cheat grass, cottonwoods, willows, reed-canary grass, *Phragmites*); and

- the observation that the strongest correlation with the green line is the average flow during the germination season, which apparently keeps annual plants from establishing.

Table 1. ISAC recommendations on geomorphic and vegetation monitoring.

Spatial Scale and Type of Monitoring	What should be measured?	Why do these measurements?
Coarse Monitoring at system wide scale (Lexington to Chapman) including all habitat complexes	• highest priority: current 0.5' CIR aerial imagery across entire system during fall period, ideally at a consistent flow (may not always be possible)	• provide system- wide estimate of changes in unvegetated channel width, which is more useful than measurements just at transects
	• if green LIDAR can provide the desired information (see 'Why' column), then use a subset of current transects to ground truth green LIDAR and continue these through time to provide long term trend • if green LIDAR doesn't work, then the program needs to carefully rethink the current set of transects based on intensive studies, ensuring that there is some continuity of the trend anchor points, while making the reaches longer	• maintain existing time series to detect large scale, long term geomorphic change (more likely due to natural events than PRRIP actions)
Intensive Monitoring (S. Platte River below J2 return and above Overton)	• *assuming that the Program continues to remove vegetation and adds appreciable volumes of sediment at Dyer Property above Overton (pushing sediment in from banks) then it's worth:* • applying green LIDAR between Lexington and Overton in fall, and compare to transects that were done in July / Aug, accounting for flow differences • doing more detailed transect spatial density above Overton, which can then be subsampled to help inform decisions on system scale sampling (e.g., 1 transect every channel width for a reach of about 10 channel widths) – provides backup if green LIDAR doesn't work and also provides ground truthing of green LIDAR	• test out whether intensive vegetation removal and sediment augmentation can produce detectable changes in sediment balance and unvegetated channel widths above Overton using higher priority lines of evidence described under Big Question3 • test out whether green LIDAR provides reliable channel topography with which to evaluate, channel aggradation / degradation • use green LIDAR to filter out effects of flow on estimates of unvegetated (or perhaps unobstructed) channel width • if green LIDAR does not work, then consider more temporally intensive sediment transport measurements at Overton • use traditional aerial photography to estimate: a) green line; b) unobstructed channel width; and c) unvegetated channel width

With respect to field monitoring at transects, the ISAC further recommends:

- **Carefully examining (with ISAC assistance if desired) the ~30 or so vegetation and geomorphic metrics that are now being measured at each transect and decide what's really needed for whooping crane and geomorphic analyses (i.e., considering the fidelity of metrics as surrogates for processes that affect changes over time in the channel, possible redundancies in metrics, cost, value of along the causal chain within the conceptual ecological model, ease of measurement).**
- **Re-evaluating the benefit of the rotating panel sites. At present, 50% of the sites are done every year at trend sites, and one quarter of the remaining sites are sampled every year as rotating panel sites. The original intent of the rotating panel sites was to get a better estimate of system-wide status, but the magnitude of spatial and temporal variability appears to be such that the density of transects (including both fixed and rotating panel sites) is insufficient to detect changes on a system wide scale.**

The ISAC has the following recommendations on presentation and statistical issues in the Channel Width Analysis manuscript, as well as other statistical and geomorphic recommendations which have been communicated directly to scientists at the EDO.

- Add an abstract to the manuscript.
- Redo the boxplots in Figures 3 to 5 to remove the extraneous diagonal lines.
- Digitize polygons (areas) and dividing them by length to get a quick but more accurate estimate of reach- averaged width.
- Evaluate whether considering only the middle transect will provide most or perhaps all, of the information obtained by the more complicated approach used in the current draft of the manuscript. The simpler analysis is preferred if the results are similar.
- Most importantly, remove the ANOVAs (which were computed using the *lm* command in the statistical program R to fit a linear model- without the intercept) and replace them with individual t-tests so that the standard errors are computed correctly. If you only have one set for each year (3 tests total), then you won't need to worry about a multiple-comparison problem.
- It is not accurate to call the differences in June 'errors'. One would expect that the exposed width is smaller when water levels are higher. Remove the 'error' language (e.g., line 178 in Channel Width Analysis). Similarly, for Figure 4 in the Channel Width Analysis, call these "differences" instead of "errors".

5) **Are the assumptions, methods, results, and conclusions in the SDHF and Lateral Erosion manuscripts reasonable?**

Reference Document – SDHF and Lateral Erosion manuscripts

The conclusions of the ISAC's review of these two manuscripts were that: a) their assumptions, methods, results, and conclusions are reasonable; and b) that these manuscripts make a very important contribution to the Program.

The response to Big Question #2 in the 2014 State of the Platte Report could be improved. The response to Big Question #2 currently focuses too much on the *why* before giving the reader the *what*:

- *What:* Repeated high flow events equal to or exceeding SDHF under a balanced sediment budget (i.e. below Overton) have not produced or maintained suitable WC roosting habitat on an annual or near-annual basis
- *Why?* Statements in present draft (e.g., *Phragamites* / reed canary grass). Other factors?

The Program should place a high priority on completing the analyses that will help to better define 'suitable habitat' for whooping cranes.

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ISAC 2014a. Responses to Questions Posed by the Platte River Recovery Implementation Program (PRRIP) in April 2014. 10 pp.

ISAC 2014b. Responses to Questions Posed by the Platte River Recovery Implementation Program (PRRIP) in October 2014. 18 pp.

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APPENDIX A

Summary of Evidence Suggestive of Pallid Sturgeon Spawning in the Platte River

Email from Aaron Delonay to David Galat, Fri 8/14/2015 4:15 PM (with minor formatting improvements)

David,

I have prepared a summary of what we have learned about pallid sturgeon spawning in the Platte River to date based upon USGS studies. I believe that Dr. Peters also had a reproductive female that was tagged in the Platte River in early studies that may have also spawned in the Platte River, but it moved rapidly downstream after tagging and was not recaptured to verify that it did spawn.

For some rapid background information on the use of tributaries by these species---we have observed shovelnose sturgeon in reproductive condition migrate upstream and explore the Big Sioux River for a short time (days) before exiting and subsequently spawning in the mainstem Missouri River. But we also have shovelnose sturgeon that did stay and spawn in the Big Sioux. We believe we had a similar instance of short-term tributary use (days) by a reproductive pallid sturgeon in the James River in 2011, which then most likely exited and spawned in the Missouri River. By contrast, the pallid sturgeon documented below migrated into the Platte River and stayed in the Platte for several weeks to more than a month during the spawning period. Some were recaptured nearly immediately as they exited the Platte River (NGPC boats searched the Missouri near the confluence almost daily), while other were recaptured weeks later, and one several months later. Successfully spawned females can be evaluate months after the event to determine if the eggs were shed successfully or reabsorbed. Recently initiated laboratory studies indicate that females that do ovulate cannot shed their eggs without going through spawning behavior.

2011 -- First indication of spawning in Platte River. Three probable wild pallid sturgeon females (PLS11-015, PLS11-016, and PLS11-020) known to be in spawning condition were tagged and released. They were not located during the spawning period using telemetry. They were recaptured later and determined to have spawned in the spring of 2011. Spawning location was inferred from data storage tag records of temperature matching the temperature profile of the Platte River, Nebr. (markedly different from mainstem Missouri River). See Delonay et al (2014) Annual Report.

2012 -- One probable wild female pallid sturgeon (PLS10-029) not evaluated prior to spawning during the spring, but was recaptured in post-spawn condition with few remaining free, viable oocytes in 2012 as it left the Platte River (suggesting a very recent spawn event). Repeated searches of the Missouri River did not locate the fish in the Missouri River during the spawning period. The fish was determined to have spawned in the spring of 2012. The fish was not located during the spawning period using telemetry. Spawning location was inferred from data storage tag records of temperature matching the temperature profile of the Platte River, Nebr. See 2012 Synthesis Report (final review)

2013 -- Two probable wild pallid sturgeon females that were previously believed to be Platte River spawners in 2011 (PLS11-016 and PLS11-020) return to Platte River to spawn. Both fish were evaluated prior to spawning and were gravid. The fish were not located during the spawning period using telemetry. Spawning location was inferred from data storage tag records of temperature matching the temperature profile of the Platte River, Nebr. See 2013 Annual Report (in final review)

Larval sampling for sturgeon and paddlefish in the Platte River in 2013, just upstream of the mouth, detected small numbers of drifting shovelnose sturgeon free embryos showing that shovelnose sturgeon are finding suitable spawning substrate and are successfully spawning in the Platte River. Interestingly, no paddlefish free embryos were collected. Paddlefish and shovelnose sturgeon free embryos are far more abundant in the Missouri River, and over a longer time period than in the Platte River. No free embryo pallid sturgeon were collected in the Platte River. See 2013 Annual Report (in final review)

2014 -- Two probable wild pallid sturgeon females (PLS11-015 and PLS10-029), both believed to be Platte River spawners in 2011 (PLS11-015) and 2012 (PLS10-029), returned to the Platte River to spawn. The location of both fish in the Platte River was verified using telemetry during the spawning period by USGS and NGPC, with PLS11-015 swimming upstream in the Platte River at least as far as the Elkhorn River confluence. It was relocated as it was passing the confluence and moving upstream. Both fish were recovered and were been determined to have spawned completely. See 2014 Annual Report (in review)

Larval sampling for sturgeon and paddlefish in the Platte River in 2014, just upstream of the mouth, detected small numbers of drifting shovelnose sturgeon free embryos showing that shovelnose sturgeon again found suitable spawning substrate and successfully spawned in the Platte River. Interestingly, again no paddlefish free embryos were collected. Paddlefish and shovelnose sturgeon free embryos are far more abundant in the Missouri River, and over a longer time period than in the Platte River. No free embryo pallid sturgeon were collected in the Platte River. Three free embryo pallid sturgeon were collected in the mainstem Missouri immediately upstream of the confluence with the Platte River. See 2014 Annual Report (in review)

2015 -- No known tagged, reproductive fish were detected or suspected of using the Platte River in 2015. No sampling for free embryos or larvae was conducted in the Platte River.

Significance--

The preponderance of the data is highly suggestive of pallid sturgeon spawning in the Platte River, Nebraska. Our data has not determined the location of spawning within the Platte River, nor has it measured the success of spawning attempts. Spawning aggregations of sturgeon were not documented, but numbers of tagged, known spawning adults in the Platte was low, tracking efforts were absent or minimal, and the transmitter used (acoustic only) did not allow rapid and effective tracking of pallid sturgeon in the Platte River. Few free embryo or larval shovelnose sturgeon were collected, but no pallid sturgeon embryos or larvae were collected. The relative importance of the Platte River to pallid sturgeon reproduction in the Lower Missouri River basin was not determined by our studies.

Data shows --

- Value of long-term data sets with individual fish.
- Critical need for recapture and reproductive assessment
- Exponential return on investment of implanted sensor technology and instrumentation of the river (gage data / temperature loggers)
- Spawning fidelity of 4 females (8 spawning events, by 4 females, over four years, with each female using the Platte during consecutive spawning cycles) to the Platte River across very different water years (indicates use is may not be opportunistic, but suggests selection or preference for the Platte River). The basis of fidelity is unknown (e.g., past experience, imprinting, or social cues from conspecifics).
- Spawning frequency of females is 2 to 3 years, though may be influenced by increased growth due to the flood of 2011, or growth enhancement during short time spent in hatchery by fish tagged and released in 2011.
- Advance knowledge of spawning destination or spawning sites (though limited) would be of great value in monitoring programs to assess management actions.

- Importance of genetics. These are probable wild fish (Probable because detection of hatchery progeny is not 100% reliable as of this memo). It is unknown whether the fish using the Platte are different than other wild fish, or stocked fish. There is currently no evidence to suggest that they are.
- Use of the Platte River for spawning opens possibility for the use of the Platte River as another comparative model for spawning habitat and natural flow experiments for the species--similar to the Yellowstone River.

A publication is in the preliminary stages of preparation, but the release date has not been determined.

Please contact me with any questions.

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Blog: http://www.usgs.gov/blogs/csrp/

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