ISAC Comments on 2016 State of the Platte Report

General Comments

- **Format.** The format and content of the 2016 State of the Platte Report (SoPR) is excellent. It concisely summarizes information for the GC, while providing the TAC with more details through endnotes. Some improvements could be made to the format which would make the report even better.
    - **ISAC Recommendation: Include the following in the 2016 and future State of the Platte Reports to help the reader and improve clarity: 1) captions summarizing the bottom line messages below each figure; 2) a glossary of Acronyms; 3) a list of all peer reviewed papers and reports published by the Program by year; and 4) an appendix which shows progress on land and water.**
- **Expand the audience.** The 2016 SoPR is appropriate for GC and TAC members who have been attending the Adaptive Management Plan (AMP) reporting session for several years. However we suggest that the intended audience be viewed as a somewhat larger group than just those who have been active in the PRRIP for many years. New GC or TAC members have told us that they found the State of the Platte Report in need of more explanation and/or references. The Report should be concise, complete and understandable to multiple audiences, but with no particular knowledge of the PRRIP. Correcting this shortcoming should not require a great deal of effort. For the most part, some additional background (a few sentences or short paragraph) and references to the appropriate PRRIP report should be sufficient.
    - **ISAC Recommendation: Ensure that the State of the Platte Report is understandable to multiple audiences (decision makers, the well-informed public, scientists, engineers), but with no particular knowledge of the PRRIP.**
- **TABLE 1. 2016 Big Question Assessments.** We understand that this Table needs to be a succinct one-pager, as it is what everyone will read. However, the *Basis for Assessment* column does not consistently or very well provide *the underlying support or foundation for an idea, argument, or process;* the *justification for or reasoning behind something* (definitions). For 3 BQs it provides the basis (status) for the assessment (BQ#2, 9, 10). In one case the table lists what has occurred since the assessment is reported (BQ#1). In another case it explicitly provides the justification for the assessment (BQ#3). In numerous instances it references the foundational document where the justification can be found, a logical approach given space limitations (BQ's 2, 4-8). Here are two suggestions to consider. The first and simplest suggestion is to just rename the column heading to: *Source for Assessment* as in most instances it gives where someone can go to find the justification for the assessment, but is not necessarily the basis for it. This may seem quibbling about definitions (as basis and source are sometimes listed as synonyms). The second and more complex suggestion is to keep the current title (or change to Source), but have either a hyperlink to the referenced document in the box or a footnote to a hyperlinked reference. This will direct the reader to the actual basis for the BQ status.
    - **ISAC Recommendation: Improve the consistency of the contents under the column 'Basis for Assessment' in Table 1.**
- **Format for BQ 2-pagers.** These 2-page summaries provide an excellent synopsis for each BQ. The consistent section headings (e.g., What the Science says in 2016; Management Implications) are very helpful. However, it is not until the text box embedded in the second page figure where the reader learns the priority hypothesis underlying each BQ. In some cases these hypotheses form the basis for the analyses illustrated in figures, while in other cases the analyses have moved beyond the original hypotheses. There are often habitat suitability criteria in the figure captions, but the context for these criteria only become clear once one encounters the hypotheses. Ideally, the hypotheses and suitability criteria would come sooner in the BQ 2-pager (e.g., on the first page where the BQ is listed), but we recognize that some hypotheses are more relevant than others, and that you don't want to cram too much onto each page.

- **ISAC Recommendation: Please carefully consider how to more clearly link the hypotheses and suitability criteria to the Big Questions in the report.**

- Good progress has been made on evaluating the hypotheses. Over the next two years, it's worth doing a detailed assessment of these Big Questions and hypotheses (i.e., Assess step of AM cycle), building on what's been learned, in preparation for an extension of the First Increment in 2020. The main output would be a proposed set of revised hypotheses, **without proposing any new actions.** The revised Big Questions and hypotheses should reflect the larger view of how to integrate the use of water, sediment, herbicide and bulldozers to achieve intended objectives. Several hypotheses state "under a balanced sediment budget." While the ISAC agrees that a quasi-sediment balance is a necessary but not sufficient condition for maintaining habitat, it has proven to be very difficult to draw reliable conclusions on whether or not the sediment budget is balanced in the Central Platte, due to high levels of spatial and temporal variation in sediment transport. These hypotheses should be rethought, and rephrased, bearing in mind recent advances with Green LIDAR. See comments below on BQ3.
  - **ISAC Recommendation: Over the next two years, complete a detailed assessment of the Big Questions and hypotheses building on what's been learned, in preparation for an extension of the First Increment in 2020. The main output would be a proposed set of revised hypotheses, without proposing any new actions.**
- The ISAC has provided the EDO with many detailed comments to improve the graphics and/or text in the document; the following bullets focus only on major comments. The PRRIP will be best served by having annual responses to all ISAC recommendations.
  - **ISAC Recommendation: We recommend that the EDO provide responses to all ISAC recommendations, as was done in the final 2014 State of the Platte Report (but has not been done since then).**

Comments on the Assessments of Big Questions

BQ1: ISAC supports the conclusion of two thumbs down.

- There is no scientific rationale for continuing to test SDHF (defined as 5,000 to 8,000 cfs for three days) in the Central Platte River to benefit terns and plovers.

BQ2: ISAC supports conclusion of two thumbs down.

- There is no scientific rationale for implementing SDHF in the Central Platte River to create or maintain WC riverine roosting habitat.
- Herbicide treatments and disking provide the foundation for reaping the maximum benefit of natural high flow events in creating and maintaining WC riverine roosting habitat. Indeed, much longer duration events are the best predictors of unobstructed channel width, (e.g., 40-day mean peak flow). Sediment augmentation may be valuable for maintaining WC habitat below J2.
- It's worth assessing the vulnerability of the system to decadal-scale and longer term climate changes (e.g., effects of the choke point in the North Platte), and building in resiliency to wide ranges of climate variation. More herbicide and mechanical work will likely be required during drier periods.

    - **ISAC Recommendation: the Program should consider holding a Structured Decision Making workshop similar to that done for BQ#1, to seek a consensus on how to maintain WC habitat across a wide range of climatic conditions.**

BQ3:

- ISAC agrees that the one thumb up conclusion is justified, that there is degradation below the J2 return, and that you can estimate with confidence that it is worth doing sediment augmentation. The benefit of this action is for whooping cranes, not terns and plovers. However, you don't know *with confidence* that 80,000 tons is the right amount of sediment to be added annually, particularly with the recent discovery of sediment additions from a new channel bringing water and sediment from the north fork of the Platte. It's worth specifying a range of the required amount of sediment. The optimal amount in each year will likely need to be determined iteratively, using Green LIDAR to provide a census of annual channel change, and to separate incision from widening.
- Further downstream, the signal of sediment augmentation will likely get lost in the noise of year to year and spatial variation, even with assessment via Green LIDAR. Sediment augmentation may still be a good thing to do, even if you can only prove its benefit for the upstream area. Will sediment augmentation need to be maintained forever, or is there an alternative solution?
- Effect sizes should be defined for each performance measure used to assess whether or not sediment augmentation has been effective. If Green LIDAR works, then it should be possible to use Geomorphic Change Detection software.
    - **ISAC Recommendation: the PRRIP should consider publishing a paper on the lessons learned from attempting to assess sediment balance in very dynamic sandy rivers like the Platte.**
    - The main message of this paper would be that the spatial and temporal variability of sediment transport is too high to merit using standard approaches of monitoring cross-sections or sediment transport to assess sediment balance. Different methods are required, such as Green LIDAR.

- The original sampling design for the system scale is described in the Platte AMP (pdf pages 214-222). This design proposed sampling 40 anchor points over the 90 mile system scale (145 km), or one anchor point every 3.6 km. Assuming an average channel width of 300m (J. Farnsworth, pers. comm.), that works out to one anchor point every 12 channel widths. At each anchor point there would be 10 cross-sections, each spaced 50m apart, extending 250m upstream and downstream of the anchor point. The design recommended that 15 pure anchor points be visited every year, with 5 rotating panel anchor points visited every fourth year.
- As described on page 3 of the 2016 Tetratech report, the amended design included 20 pure panel anchor points and 5 rotating panel points visited every year (i.e., 25 total per year), with only 3 cross-sections at each anchor point, spaced approximately one channel width apart. The overall number and spacing of anchor points didn't change (still 40 anchor points, with 12 channel widths between them), but some anchor points were sampled more frequently than anticipated in the original design.
- By contrast, the spacing of transects in other published studies of reach wide sediment budgets, in rivers less dynamic than the Platte, has been about one channel width (Ned Andrews, pers. comm.). So, from the ISAC's perspective, the spatial density of anchor points is about one twelfth what it should have been to assess sediment budgets on a system wide scale. Similarly, the sampling frequency of bedload and suspended load was too low to estimate sediment budgets through rating curves.
- The PRRIP realized that it wasn't feasible to address the question of sediment balance on a system scale with the required density of transects, and instead tried to focus at an appropriate density at somewhat isolated points (Jason Farnsworth, pers. comm.). According to the EDO, the big unknown is how representative those isolated locations are in relation to reach-level channel characteristics. The EDO intends to assess the representativeness of those locations once they get the fall 2017 LIDAR and can do a full system-wide evaluation. The ISAC supports this analysis.
- The proposed paper could build on a sensitivity analysis of the Shoemaker Island x-section data collected by Graham Matthews and Associates (see ISAC's report from November 2015, pg. 12-13), or (better) sensitivity analyses of recent results from Digital Elevation Models and successive overflights taking Green LIDAR. The objective of this analysis would be to add two types of confidence intervals to the estimates of reach-wide changes in sediment volume derived from the cross-section data (i.e., Figure 3.12b on page 70 in Tetratech's final 2016 report on channel geomorphology and vegetation): one based on a comparison of the fixed and rotating panel data to Green LIDAR, and another based on the Shoemaker Island data
- Preliminary analyses of DEMs by Jason Farnsworth indicate that locating transects every 800' (243m) results in errors of ± 30% in estimating the change in sediment volume. A transect spacing of 3.6 km could easily yield errors of greater than ± 100%.
- The paper could indicate what intensity of sampling would be required to reliably test hypotheses related to sediment balance using cross sectional data (it may be infeasible except at very small scales). Such a paper could save other investigators millions of dollars in not bothering to collect cross-section or bedload/suspended data that will be inconclusive for testing hypotheses on sediment balance in very dynamic rivers like the Platte, and instead moving to Green LIDAR. This

analysis could also help to suggest what subset of cross-section data may be worth maintaining to ground truth the Green LIDAR.

BQ4: ISAC supports the conclusion of two thumbs up for whooping cranes, but not for terns and plovers. Some of the phrasing of evidence needs to be improved to clarify that herbicide treatment and disking provide the foundation for reaping the maximum benefit of natural high flow events in creating and maintaining WC riverine roosting habitat as described in the ISAC's responses to BQ2.

BQ5: ISAC agrees with the corrected evaluation of two thumbs down.

BQ6: As the ISAC has mentioned in several previous reports, the Program needs to examine the likelihood of alternative hypotheses to explain the observed increase in tern and plover nesting (e.g., meta-population trends, movement of birds from non-program to program lands, movement of birds from Lake McConaughy). Response to BQ6 is still two thumbs up, but other hypotheses need to be addressed to fortify the conclusions. These hypotheses are not mutually exclusive.

BQ7: The ISAC concurs with the conclusion of two thumbs down.

- River survey and observational data, however, indicate the river is a valuable source of forage for both species as forage availability appears to be lower on off-channel habitats. The 2 thumbs down assessment should not imply that the river channel could dry up without affecting the birds.

BQ8: The ISAC concurs with the conclusion of two thumbs down.

BQ9: BQ9 has been challenging to both the PRRIP and the ISAC. Table 1 below summarizes the conclusions on BQ 9 in past State of the Platte reports, and the ISAC Comments and Recommendations, including our recommendations for the 2016 State of the Platte report (final row of table, highlighted in yellow)

- In the past, the ISAC has advised the GC of the need to clarify the objective of PRRIP work on pallid sturgeon: ensuring that the Program is doing no harm (the focus of BQ9 and the First Increment, and the objective described on pg. 20 of the 2007 AM Plan[1]) vs. devising actions to benefit pallid sturgeon (as described on pg. 8 of the 2007 AM Plan[2], and on page 3 of the 2006 Final Platte River Recovery Implementation Program[3])). This clarification remains a high priority as the PRRIP ponders investing in research and monitoring activities for pallid sturgeon.

[1] "Avoid adverse impacts from Program actions on Pallid Sturgeon populations"
[2] "Program water activities would be designed to provide benefits for the target bird species in the central Platte River region with subsequent benefits to the pallid sturgeon in the lower Platte River region (below the confluence with the Elkhorn River)".
[3] "The Program's long-term goal is to improve and maintain the associated habitats. This goal includes: (1) improving and maintaining migrational habitat for whooping cranes, and reproductive habitat for least terns and piping plovers; (2) reducing the likelihood of future listings of other species found in this area; and (3) testing the assumption that managing flow in the central Platte River also improves the pallid sturgeon's lower Platte River habitat."

- The Structured Decision Making workshop with the GC on September 13-14 2017, and the subsequent meeting with pallid sturgeon experts from NGPC, USGS and UNL on October 18, 2017 points towards a multi-year collaborative effort to monitor the use of the Platte River by telemetered male and female sturgeon, so as to learn more about the timing, location and success of spawning in the Platte, and other uses of the Platte by adult pallid sturgeon. Acquiring such information will require substantial resources, but would hopefully provide a basis for evaluating whether or not PRRIP flow management is likely to have any effects on pallid sturgeon. The proposed research is generally consistent with work recommended in the 2007 AM Plan (section V.K.3, pg. 45), and consistent with the ISAC's comments in 2009 (Table 1).

Table 1: Summary of conclusions on BQ 9 in past State of the Platte Reports (SoPR), and ISAC comments / recommendations.

State of the Platte Report for year shown	**Conclusion on BQ 9 in State of the Platte Report**	**ISAC Comments / Recommendations** [page reference, date of ISAC report]
2009 (no SoPR)	n.a.	*ISAC was asked the following question about AMP objectives* [pg. 27, ISAC report dated September 10, 2009]*:* Q27) The Program's long-term goal is to "improve and maintain the associated habitats", which includes "testing the assumption that managing flow in the central Platte River also improves the pallid sturgeon's lower Platte River habitat". The specific management objective in the AMP related to pallid sturgeon is currently a "Do No Harm" objective. From a scientific and AMP implementation standpoint, how should the Program approach prioritizing actions related to pallid sturgeon in the lower Platte River as detailed on Pages 45 and 66 of the AMP? *Robb Jacobson of the ISAC responded as follows:* "Evidence supports the notion that Platte River pallid sturgeon are Missouri River sturgeon. Movement of fish between the Missouri and Platte is a fundamental issue that needs to be addressed through expanded telemetry. If it is demonstrated that Program-managed discharge events persist downstream to affect reaches occupied by sturgeon, the remainder of the actions will depend on establishing the relative numbers of sturgeon using the Platte, and whether the Platte (or Elkhorn) provides critical habitat for its reproduction."
2012	One thumb up	"The current conclusion is one thumb up, which is reasonable… 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 use 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." [pg. 10, ISAC report dated October 30, 2013]

State of the Platte Report for year shown	Conclusion on BQ 9 in State of the Platte Report	ISAC Comments / Recommendations [page reference, date of ISAC report]
2013	One thumb up	"ISAC agrees with this conclusion. No new information was presented to change this assessment" [pg. 10; ISAC report dated Nov. 16, 2014].
2014	Two thumbs up	**"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"** [pg. 3, ISAC report dated August 21, 2015] "**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"** [pg. 3, ISAC report dated August 21, 2015]
2015	Scratchy head, based on new observations of pallid sturgeon, and changes in the meaning of BQ9	"Based on the ISAC report from Aug 2015, it's reasonable to conclude 2 thumbs up for the area below the Elkhorn River. **The ISAC recommended more study above the Elkhorn based upon observations of adult pallid sturgeon above the Elkhorn.** Predicted changes in water surface elevations and velocities above the Elkhorn are likely to be within the error range of model accuracy." [pg. 1, ISAC report dated October 26, 2016]
2016	Scratchy head, based on same rationale as 2015 report	As the ISAC stated in our report from October 26, 2016, it's reasonable to conclude 2 thumbs up for the area below the Elkhorn River. **We continue to recommend more study above the Elkhorn based upon observations of adult pallid sturgeon above the Elkhorn.** **The ISAC recommends that a simple sensitivity analysis be completed to test the hypothesis that changes in flow and channel geometry above the Elkhorn will be within the range of model accuracy.** Since the questions of interest on pallid sturgeon have changed, **the ISAC recommends that the Program formulate a new Big Question and associated hypotheses.**

BQ10:

- The ISAC agrees that the number of tern and plover nests have increased coincident with increases in suitable off-channel habitat. As described above for BQ6, other hypotheses should be investigated.
- The ISAC agrees that herbicide treatment, disking, and high natural flows have been effective in increasing the amount of suitable roosting habitat for whooping cranes.
- It can be misleading to estimate an annual average percent utilization based on either: 1) the FWS approach of computing [sum of WC in both spring and fall] / [prior winter population estimate]; or 2) the EDO approach of computing [WC_{spring} + WC_{fall}] / [prior winter population plus following winter population]. Both approaches make unsupported assumptions: e.g., there's no evidence that birds migrating through the Platte in the fall are different individuals from those migrating through the Platte in the spring, as would be assumed by the FWS approach. Hence, we favor the use of separate metrics for fall and spring (PUPIS and PUPIF).
    - **ISAC recommendation: whooping crane use should be calculated in terms of two metrics:**
        - **Percent Using Platte in Spring (PUPIS) = [# WC observed through PRRIP protocols in spring] / [prior winter population in Aransas]**
        - **Percent Using Platte in Fall (PUPIF) = [# WC observed through PRRIP protocols in fall] / [following winter population in Aransas]**
- No single algorithm for computing annual average percent utilization is assumption free or superior to both PUPIS and PUPIF for purposes of reporting program results. All reported percentages must be accompanied by an explanation of how they were derived.
    - **ISAC recommendation: the PRRIP work with the FWS on the most appropriate metrics for the PRRIP to use in the State of the Platte report, and other studies to be referenced.**
- The ISAC agrees that spring use of the Platte AHR by WC has increased, but that there has been no trend for fall use, based on presentation 11 (slide 42) at the AMP Reporting Session. These graphs should be included in the State of the Platte Report. Alternative explanations for these trends (e.g., changes in available habitat, changes in the availability of alternative stopover habitats in Nebraska) should be investigated.
- Given these concerns the ISAC supports the Program's one thumb's up assessment for 2016
    - **ISAC recommendation: Due to the difficulties of proving causality, the phrasing of BQ10 should be changed**
        - **FROM: Do Program management actions in the central Platte River cumulatively 1) produce detectable changes in the physical environment (i.e. habitat) and 2) result in a detectable increase in tern, plover and whooping crane use of the associated habitats?;**
        - **TO : Do Program management actions in the central Platte River cumulatively produce detectable changes in the physical environment (i.e. habitat) that are associated with in a detectable increase in tern, plover and whooping crane use of the associated habitats?;**