PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM (PRRIP or Program)
Memorandum

TO: Governance Committee (GC)
FROM: Executive Director's Office (EDO)
RE: Pallid Sturgeon Background and Future Activities
DATE: August 31, 2016

Purpose

The purpose of this EDO memo is provide the GC context on recent issues related to pallid sturgeon in the lower Platte River and activities of the Program as well as some guidance on possible pallid sturgeon activities for the remainder of the First Increment and into the proposed First Increment Extension.

The final version of this memo is informed by input from the Technical Advisory Committee (TAC) and the Independent Scientific Advisory Committee (ISAC), both of which reviewed an earlier draft.

Background and Current Status

The EDO prepared a memo in 2010 at the GC's request providing a status update on pallid sturgeon and the Program. That memo is attached as **Exhibit A** and provides details on Program goals, objectives, and activities related to pallid sturgeon in the early years of the Program. Program activity on pallid sturgeon since 2010 focused on peer review of the stage change study and use of that final, GC-approved document to develop an assessment for Big Question #9 – *Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?* Based on the results of the peer-reviewed stage change study, the EDO assessed Big Question #9 as being answered in the affirmative and committed to using the stage change study tool to develop appropriate operational guidelines for Program water projects to ensure excess flows are not diverted at times the stage change study suggest could impact pallid sturgeon in the lower Platte River. The U.S. Fish and Wildlife Service (Service) does not concur with this assessment and provided direction for next steps in a presentation to the GC in June 2016 (attached as **Exhibit B**). This includes a recommendation the Program host a workshop of pallid sturgeon experts to provide insight into the current status of pallid sturgeon science and how the Program might engage in additional knowledge acquisition that could guide Program actions on pallid sturgeon in the future.

Independent Scientific Advisory Committee (ISAC) Commentary on Pallid Sturgeon

At the same June 2016 meeting, the GC asked the EDO to provide background on recent Independent Scientific Advisory Committee (ISAC) commentary on pallid sturgeon issues. The ISAC provided input to the GC on pallid sturgeon issues several times, including providing specific guidance on a step-wise approach to pallid sturgeon issues detailed in **Exhibit A**. Since that time, the ISAC offered additional guidance related to the stage change study, the proposed Service workshop, and additional Program actions. That ISAC commentary is best summarized in a recent email from ISAC member David Galat to the EDO:

Email to EDO from David Galat, ISAC Member, 06/10/2016

> Thanks for sharing this. Seems to me that the Service's lack of support for 2 thumbs up on BQ #9 goes beyond just the stage change study – at least that is how I read their PP:
>
> - Service suggests a clear description of a criterion (or criteria) to define Program impact
> - Translating 3-9% of 'pallid sturgeon habitat' loss to acres raises the question how many acres of habitat loss could occur without adversely affecting the species? Moreover, what exactly is 'pallid sturgeon habitat' on the Platte? for what life stage and at what time of year?

Note the ISAC is also on record as not supporting a 2 thumbs up assessment of BQ# 9:
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." October 2013 report (pg. 10, lines 413-431) and reiterated in our August 2015 Responses to the following question: 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? (L 39-108 and Appendix A).

How the Program has responded to our recommendations might revise that assessment. I agree that a workshop would be useful to communicate to the GC and others what is known about pallid sturgeon ecology, recruitment, limiting factors, etc. – in general, the role of tributaries and specifically for the Platte. How flow is anticipated to affect pallid life-history by life stage and season, and other questions on slide #3 of the Service presentation.

Clearly "uncertainties linger" now that pallids are migrating further up the Platte than previously thought and that spawning is occurring (although not sure if there is evidence of recruitment?). A workshop will communicate what is known, get the issues on the table, ID specific uncertainties and possibly begin the discussion of approaches to reduce them. However, I believe it would be naïve to think such a workshop will resolve the issues; rather I expect it will add fuel to a now smoldering fire. Whether that fire continues to smolder, goes out, or flares up somewhat depends on how the GC addresses the larger policy issue we highlighted in our August 2015 report:

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.*

Hosting a pallid workshop would also help tee-up a post-workshop time-frame for explicitly defining what the Program's objectives are relative to pallids. This seems to be the real issue that BQ# 9 is a part of. Over the years it seems the PPRIP has treated BQ# 9 as somewhat of an annoyance. I think those days are over, especially now that tern and plover recovery at the metapopulation scale is being successful.

Recent Pallid Sturgeon Documents

In their Power Point presentation to the GC, the Service pointed to certain key documents recently published that provide a good summation of current pallid sturgeon science and key outstanding life history issues that need resolved through additional monitoring and research. These documents have been compiled and posted in the Public Library section of the Program web site and are available for download as a PDF portfolio here (NOTE: very large file, nearly 45 MB):

https://www.platteriverprogram.org/PubsAndData/ProgramLibrary/2016%20Pallid%20sturgeon%20reference%20documents.pdf

1) Pallid sturgeon research on Platte River (Marty Hamel, University of Nebraska-Lincoln) – Published research based on random of sampling of pallid sturgeon in the lower Platte River that concluded pallid sturgeon presence and use was tied to the flow regime.

2) Synthesis of pallid sturgeon research (USGS) – A comprehensive synthesis of pallid sturgeon science from 2005 through 2012. Comprehensive treatment of existing pallid sturgeon science relative to a detailed life history conceptual model. Identifies information gaps and needs for all pallid sturgeon life stages. Includes strategies for moving toward a better understanding of landscape scale genetics, spawning habitat and cues, embryo and larval dispersion, food availability, and the relationship of all these to river management.

3) Missouri River pallid sturgeon effects analysis – conceptual model, supporting science, and working hypotheses (U.S. Army Corps of Engineers, USGS) – Effort to determine how pallid sturgeon population dynamics are linked to Missouri River flow management actions. Comprised of refinement of the pallid sturgeon life history conceptual model, compilation and assessment of relevant science, and the development of working hypotheses that link pallid sturgeon and management actions.

Considerations for Future Pallid Sturgeon Activities

As per previous ISAC guidance on pallid sturgeon issues, the EDO recommends a step-wise approach for the Program going forward.

Step 1 - Internal PRRIP Workshop

Purpose: * Clarify intent behind Program goal ("testing the assumption that managing flow in the central Platte River also improves the pallid sturgeon's lower Platte River habitat") and the pallid sturgeon management objective in the AMP ("Avoid adverse impacts from Program actions on Pallid Sturgeon populations."), and attempt to resolve any discrepancy.
* Discuss pallid sturgeon AMP management objective and consider possible language changes.
* Discuss Program's current understanding of pallid sturgeon ecology and management relative to Program water management to identify critical uncertainties; begin to develop hypotheses/questions relevant to Program decision making – general theme would be *what don't we know but need to learn*; this includes a discussion of all relevant Program flow management actions including the existing pallid sturgeon target flow and possible revisions to that target flow.
* Discuss Big Question #9 ("Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?") and consider changes to phrasing of question or additional pallid sturgeon Big Questions.
* Begin to develop criteria for GC decisions related to Program implementation and pallid sturgeon.

Participants: GC, ISAC, TAC, EDO, facilitator (Compass)

Timeline: First half of 2017

Cost Estimate: Estimate of $50,000 in FY17 budget (ISAC time/preparation, facilitator time/preparation, room and equipment rental, food/beverages)

Product: * Workshop report (drafted by Compass), including statements of any decisions made by GC during workshop; if approved/accepted by GC, move to **Step 2**.

Step 2 – Expert Workshop

Purpose: * Small, focused workshop of Program participants and pallid sturgeon experts from the lower Platte River, Missouri River, and other relevant systems.
* Review current understanding of lower Platte pallid sturgeon and Program water management, assess Program information needs and planned activities, and provide independent expert recommendations on necessary Program activities, suggested design of monitoring and modeling studies, and GC decision criteria.
* Possible working hypothesis to guide workshop discussion (from Dave Marmorek) – *Releases of Program water to meet target flows will cause beneficial effects to pallid sturgeon in the lower Platte River.*

Participants: GC, ISAC, TAC, EDO, facilitator (Compass), pallid sturgeon experts

Timeline: First half of 2018

Cost Estimate: Estimate of $150,000-$200,000 in FY18 budget (expert time/preparation, ISAC time/preparation, facilitator time/preparation, room and equipment rental, food/beverages)

Product: Final report (drafted by Compass) summarizing workshop discussion and expert recommendations; if approved/accepted by GC, move to **Steps 3 and 4**.

Step 3 – Expanded/Enhanced Stage Change Study *(if Steps 1 and 2 suggest it is important)*

Purpose: * Apply current hydrologic/hydraulic metrics and modeling to expanded geographic scale in lower Platte and resolve uncertainties related to outcome of initial stage change study.

Participants: * EDO conducts hydrology piece in-house
* Contractor brought on through competitive selection to conduct modeling

Timeline: 2019-2020

Cost Estimate: Estimate of $520,000; will be informed by workshops

Product: Joint final report from EDO and contractor, peer reviewed through Program peer review Process, that concludes whether or not releases of Program water will cause detectable changes in flow in the lower Platte River.

Step 4 – Focused Habitat Selection Research *(if Steps 1 and 2 suggest it is important)*

Purpose: * Utilize existing pallid sturgeon use locations in the lower Platte and apply flow variability to analyze potential impacts on pallid sturgeon habitat impacts due to Program water management.

Participants: Potential sole-source contract with University of Nebraska-Lincoln (UNL)

Sole-Source Justification Summary:

- UNL has conducted the most recent pallid sturgeon research on the lower Platte River that includes habitat information at use locations.
- Utilizing UNL's existing use location data would provide substantial cost and time savings to the Program. This would prevent the expenditure of $1.5 million+ on our own full habitat selection research project that would include capturing and tagging pallid sturgeon.
- UNL and the Nebraska Game and Parks Commission are the only local entities with the experience and current permission to capture, tag, and otherwise conduct research on pallid sturgeon.
- If the Program developed a full habitat selection research project study plan and sought a contractor through competitive selection, the only likely logical bidders would be UNL and/or the Nebraska Game and Parks Commission. The USGS unit out of

Columbia, Missouri (Robb Jacobson, former ISAC member, leads this unit) is conducting pallid sturgeon research activities on the Missouri River but when asked by the EDO this month via email, Robb Jacobson said they would not likely pursue Platte River research. The other entities conducting pallid sturgeon research on the Missouri are generally state fish and wildlife agency personnel from Montana, South Dakota, etc. and bringing their crews to the lower Platte River would most likely be cost-prohibitive.

Timeline: 2019-2020

Cost Estimate: Estimate of $200,000; will be informed by workshops

Product: Final report from UNL, peer reviewed through Program peer review process.

EXHIBIT A
2010 GC Pallid Sturgeon Assessment

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM
Year Four (2010) Target Species Assessment – Pallid Sturgeon

Purpose

As requested by the Governance Committee (GC), the Executive Director's Office (ED Office) prepared this assessment of Platte River Recovery Implementation Program (Program or PRRIP) activities to date regarding pallid sturgeon (*Scaphirhynchus albus*), a Program target species. This assessment is presented in the context of implementation of the Adaptive Management Plan (AMP), which provides the scientific framework for the Program. The assessment includes an evaluation of key priority hypotheses, progress on specific pallid sturgeon tasks identified in the Integrated Monitoring and Research Plan (IMRP), and a discussion of important outstanding technical and policy issues.

This assessment is provided to the GC in an effort to convey science learning thus far to assist with management and policy decision-making regarding this target species.

Background

The Program's **overall long-term goal** is to improve and maintain the associated habitats, which includes:

"…3) testing the assumption that managing flow in the central Platte River also improves the pallid sturgeon's lower Platte River habitat." (Final Program Document, 2006)

For the purposes of the Program, lower Platte associated habitat is the reach between the Elkhorn River and Missouri River confluences, approximately a 40-mile (64-km) stretch. The assumption reflected in the long-term goal relates to the U.S. Fish and Wildlife Service's belief that existing water-related activities (those that depend on the Program for Endangered Species Act compliance) have at times reduced the quantity or rate of flow in the lower Platte between February and July and that further alterations (new depletions) to discharge patterns or channel morphology will degrade existing pallid sturgeon habitat in the lower Platte and thus impede recovery efforts.

As detailed in the AMP, Program participants developed a **conceptual ecological model** (CEM) as a graphical representation of the hypothesized understanding of the lower Platte River associated habitat relative to pallid sturgeon (Figure 1). The CEM includes inputs and management actions (some of which are predominantly outside the control of the Program) as well as a framework of "processes → response → indicators" that led to the development of several **priority hypotheses** related to pallid sturgeon. As with

other Program target species, those priority hypotheses are to be assessed against the pallid sturgeon management objective #3 that states:

> "Avoid adverse impacts from Program actions on pallid sturgeon populations" (Adaptive Management Plan, 2006)

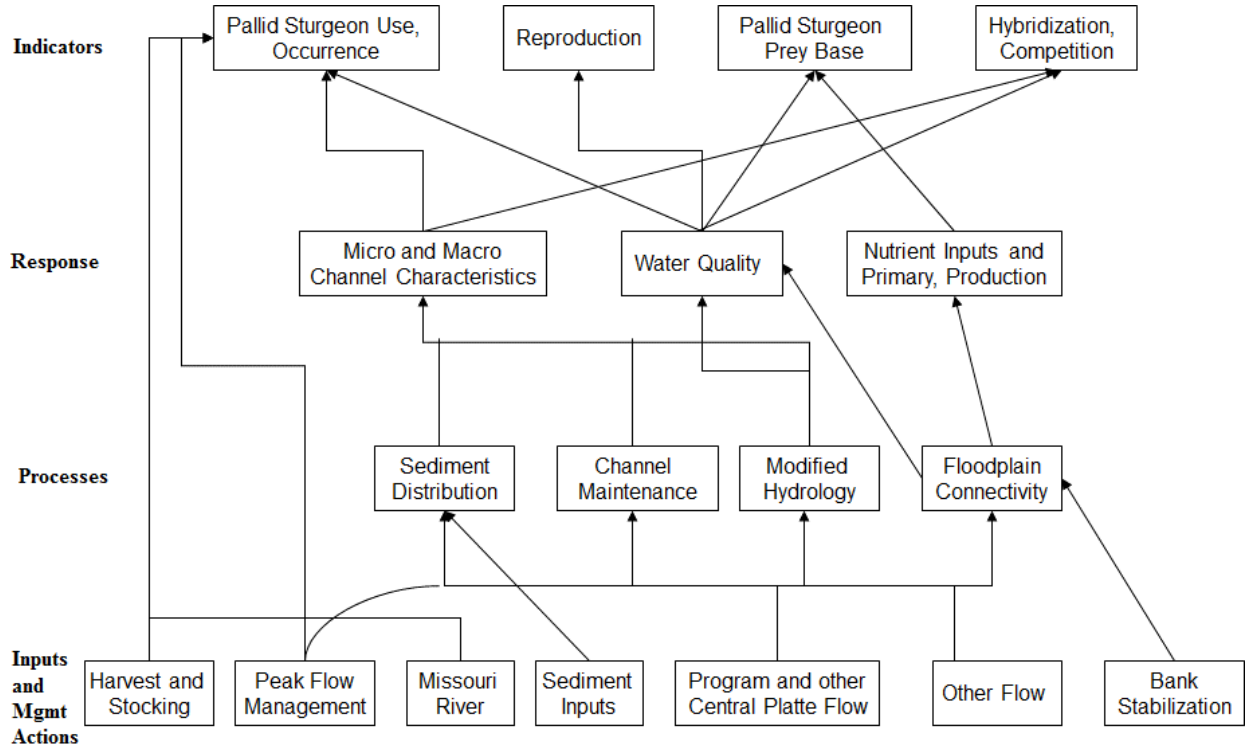

Figure 1. PRRIP pallid sturgeon conceptual model, AMP (2006).

This objective is commonly paraphrased as a "Do No Harm" objective and contains no measurable performance measures to assess progress, evaluate species response, or guide management actions. Instead, Program actions related to pallid sturgeon were to begin with **specific tasks** in the IMRP centered on better identifying sturgeon habitat and use rather than addressing specific in-river actions aimed at learning about species response (as done for other Program target species). Thus, Program activities since 2007 have been directed at monitoring and research designed to help fill existing data gaps and include:

1. A summary of existing information on the pallid sturgeon.
2. Micro- and macro-habitat use/selection by adult and juvenile sturgeon.
3. Identify the physical effects of subtly different rates of flow over time on connection, construction, maintenance, and evolution of pallid sturgeon habitat components.
4. Characterization of selected water quality parameters in the lower Platte and tributary contributions.
5. Periodic evaluation and peer review of information.

All but one (#2) of those activities is now complete or underway and can be evaluated in comparison to key priority hypotheses. An initial evaluation (Table 1) of the eight pallid sturgeon priority hypotheses

identified in the AMP suggests two are most critical (Tier 1) and actions to test those two hypotheses are necessary first steps in the Program addressing pallid surgeon issues:

- ***PS-2:*** Program water management will result in measurable changes on flow in the lower Platte River.
- ***PS-4:*** Flows in the lower Platte will affect pallid sturgeon habitat suitability.

Assessment of Pallid Sturgeon Priority Hypotheses

PS-2*: Program water management will result in measurable changes on flow in the lower Platte River.*

Assessment strategy and rationale

To test this hypothesis, the Program initiated the Lower Platte River Stage Change Study (IMRP pallid sturgeon activity #3) in 2008 to develop a tool to evaluate the potential effects of Program water management activities (storage projects, re-timing, water conservation, depletions covered by state and federal depletions plans) on stage and how stage changes might affect the physical characteristics of the lower Platte River. Field sampling, 1-D and 2-D modeling, and analysis were completed in 2009 and the study is now final.

Space and time frames

Study scale

The full study scale was the lower Platte River from the Elkhorn River confluence to the Missouri River confluence, as defined in the Program document. Intensive fieldwork and modeling were conducted on a smaller study reach from the Highway 50 bridge to the reclaimed Pedestrian Bridge near Louisville, Nebraska.

Time scale

Data collection and modeling began in September 2008 and concluded in October 2009. A final report was delivered to the ED Office in December 2009 and the study team made a presentation to the GC in March 2010.

Performance measures, expected response, analysis, and conclusions

Performance measures

- **Water depth and velocity** between 3,700 cfs and 40,000 cfs
- **Percentage of Program water** reaching Louisville
- **Changes in habitat classifications** (slackwater, flat, riffle, run, isolated pool, plunge) between 3,700 and 40,000 cfs
- **Number of days** below 4,000 cfs @ Louisville (Dry Conditions Analysis)
- **Range of flows** below 4,000 cfs @ Louisville (Dry Conditions Analysis)
- **Number of consecutive days** below 4,000 cfs @ Louisville (Dry Conditions Analysis)

Expected response

We predicted that given the influence of the Loup and Elkhorn Rivers on lower Platte flows, water management activities in the lower Platte, flow attenuation, and their size and timing, Program water

management activities would not have a statistically significant impact on lower Platte flows or on the type or availability of pallid sturgeon habitat (as defined only by the study's habitat classifications).

Analysis and conclusions

Percentage of Program water reaching Louisville: Analysis of historic reach gains and losses showed not all flow reaching Grand Island is translated downstream to Louisville and that predicted changes in discharge due to Program water management activities is likely within the range of gage uncertainty.

Changes in habitat classifications: 2-D modeling accurately predicted changes in the six habitat classifications over the range of modeled discharges.

Dry Conditions Analysis: The period of record was analyzed for one period in the spring and one in the fall when flows were above target at Grand Island, the Program could divert some portion of that excess, and flows were simultaneously in the 4,000-6,000 cfs range at Louisville. Assuming habitat connectivity is important for pallid sturgeon and that connectivity declines below 4,000 cfs, this analysis showed that short-term connectivity could be problematic, but only for one or a few days.

Conclusion: *Generally, Program water management will not result in measurable changes on flow in the lower Platte River.* However, given that short-term connectivity could be problematic under certain but infrequent hydrological conditions and assuming the biological significance of habitat connection for pallid sturgeon above 4,000 cfs, the study tool could be used by the Program to implement proactive measures (e.g. altering excess-to-target-flow diversion timing or duration) to prevent potential negative impacts on habitat connectivity. Use of the tool for this purpose would be greatly enhanced if additional data were collected and analyzed regarding what defines pallid sturgeon habitat in the lower Platte and how that habitat is being utilized (see discussion regarding Priority Hypothesis PS-4).

Outstanding Issues

With respect to PS-2, several issues have been identified and are expanded upon in the concluding *Technical and Policy Issues to Address* section of this assessment. In brief form, the issues are as follows:

1) Peer review of the Lower Platte River Stage Change Study
2) Assessment of the representativeness of the stage change study's 2-D modeling section
3) Definition of pallid sturgeon habitat and use

PS-4*: Flows in the lower Platte will affect pallid sturgeon habitat suitability.*

Proposed assessment strategy and rationale

Before testing additional pallid sturgeon hypotheses, more progress is required on better defining pallid sturgeon habitat in the lower Platte River, how that habitat is being utilized, and whether this habitat selection is resulting in pallid sturgeon reproduction and recruitment (IMRP pallid sturgeon activity #2). The Peters and Parham study of pallid sturgeon habitat use and movement on the lower Platte River did provide useful information on pallid sturgeon ecology and additional information on pallids is being

collected through an ongoing University of Nebraska-Lincoln sturgeon population characteristics study. However, that study is only capturing incidental pallid sturgeon (it is a shovelnose study), it is not providing habitat selection data, and even Peters and Parham (2008) suggested that additional habitat selection work is required.

In its 2009 report (Marmorek et al., 2009) the Program's Independent Scientific Advisory Committee (ISAC) provided the following guidance for addressing the pallid sturgeon priority hypotheses and management objective:

- Use a contingent, incremental approach for the sturgeon objective, only progressing to more detailed studies once initial questions have been answered. The stage sensitivity study will document the hydrologic sensitivity of lower Platte to central Platte flow management. If there is a change in flow which could be significant to sturgeon, then the next logical step would be to use a sparse, stationary telemetry framework to define migrations of sturgeon in/out of the Platte. If the telemetry results suggest that sturgeon are using the Platte for spawning, then consider studies of larval recruitment. One ISAC member has suggested that sparse telemetry studies *could* be done as a first step to determining the level and location of use of the Platte by pallid sturgeon, but to do such studies as part of the Missouri River Restoration Program (in coordination with the PRRIP).
- 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.

While the stage change study showed that, in general, lower Platte flow is not negatively impacted by potential Program water management activities, there are hydrological conditions and Program water actions that could result in some short-term loss of habitat connectivity unless preventative measures were undertaken to avoid the potentially negative impacts. According to the ISAC guidance, a next step should be taken through telemetry and habitat selection research to determine how pallids move from the Missouri to the Platte and if this movement is related to reproduction and recruitment (among other life history requirements). Then, results of this research could be used to test priority hypotheses PS-4 and potentially additional Tier 2 or Tier 3 hypotheses. In addition, this data could be used to refine the pallid sturgeon CEM and develop measurable indicators for assessing the current pallid sturgeon management objective.

Additional IMRP pallid sturgeon tasks also link to this potential habitat selection research:

IMRP Task #1 – Summary of existing information on the pallid sturgeon
Status: Complete; information review completed in 2008 and all documents available for consideration.

IMRP Task #4 – Characterization of selected water quality parameters in the lower Platte and tributary contributions
Status: Ongoing; annual water quality monitoring for temperature, turbidity, dissolved oxygen, and specific conductivity in both the central and lower Platte continues; sets baseline data on water quality

parameters believed to be of importance to pallid sturgeon; will be analyzed in conjunction with additional habitat data

IMRP Task #5 – Periodic evaluation and peer review of information
Status: Ongoing; this assessment, the upcoming workshop, and additional ISAC and other peer review will continue.

Outstanding Issues
With respect to PS-4 and the other tasks linked to habitat selection and use, it is the very issues of habitat definition, selection, and use that need addressed and these issues are expanded upon in the concluding *Technical and Policy Issues to Address* section of this assessment.

Technical and Policy Issues to Address
Based on the preceding material several issues have been identified that should be addressed. These issues are explored individually below, with options for action and estimated costs associated with the actions. In the opinion of the ED Office, Items #1 and #3 are necessary for scientific defensibility.

Peer Review of Stage Change Study

1. If the Governance Committee approves at the June 2010 meeting, then seek **peer review of stage change study.** The Program would contract with three to four independent peer reviewers representing expertise in pallid sturgeon biology, hydrology, and engineering in summer 2010 to provide a peer review of the study's methodology and conclusions.
   Estimated Cost: $20,000
   Funding: Existing funding for this peer review is available in the approved FY 2010 Program budget (line item PD-3: AMP & IMRP Peer Review)

Following from #1 ⇨

2. If the peer review suggests revisions are necessary and the TAC and GC agree, then contract with HDR to **complete stage change study revisions.**
   Estimated Cost: $10,000-$30,000
   Funding: Existing funding for potential study revisions is available in the approved FY 2010 Program budget (line item PS-2: Lower Platte River Stage Change Study)

Habitat Definition, Selection, and Use
To advance the discussion of habitat definition, selection, and use, tapping into the knowledge of pallid sturgeon experts from the Platte River and Missouri River in a workshop setting is recommended. The series of potential actions that could follow is provided below.

3. If the GC approves at the June 2010 meeting, then convene a **lower Platte River pallid sturgeon workshop** in fall 2010 with TAC members, ISAC members, and pallid sturgeon experts from the Platte River and Missouri River. Workshop discussion topics will include:
   - Whether the stage change study reach is representative of the associated habitat below the Elkhorn River confluence for purposes of further applying the study tool.
   - Based on results of the stage change study and additional data, is there potentially a change in lower Platte flow due to Program actions that could be significant to pallid sturgeon (is there a

possibility that the Program is violating its "avoid adverse impact" objective for pallid sturgeon?)?

- If so, assess the extent and scope of necessary habitat selection research.

Estimated Cost: $25,000

Funding: Existing funding for this workshop is available in the approved FY 2010 Program budget (line items PD-4: AMP Workshops and PD-11: AMP Reporting).

Following from #3, either #4 or #5 ⇨

4. If consensus at the pallid sturgeon workshop is the study reach is representative of the lower Platte associated habitat and if no revisions are necessary to the study (or after those revisions are complete; see #2 above), then determine logistics of **using the stage change study tool in conjunction with Program water management activities.** ED Office needs to explore how best to utilize the stage change study tool in planning for and operation of Program water management activities.
   Estimated Cost: N/A
   Funding: Existing funding for this work is available as staff time in the approved FY 2010 Program budget.
5. If consensus at the pallid sturgeon workshop is the study reach is not representative of the lower Platte associated habitat, then solicit TAC recommendation and GC approval of contracting with HDR to **revise and update study accordingly.**
   Estimated Cost: Depends on extent of revisions necessary; $25,000-$100,000+
   Funding: Additional funding for this activity would be included in proposed FY 2011 Program budget under line item PS-2; solicit GC approval in December 2010

Following from #3 ⇨

6. Pallid sturgeon have been sampled upstream of the Elkhorn River confluence (Hamel et al., 2010). If consensus at the pallid sturgeon workshop is the lower Platte upstream of the Elkhorn River confluence should be evaluated, then solicit TAC recommendation and GC approval in fall 2010 to **extend the stage change study** to cover the reach of the lower Platte from the Elkhorn River confluence upstream to the Loup River confluence near Columbus, Nebraska.
   Estimated Cost: Phase I (scalability assessment) – $30,000-$50,000; Phase II (perform stage change study based on Phase I assessment) – $200,000
   Funding: Additional funding for this activity would be included in proposed FY 2011 Program budget under line item PS-2; solicit GC approval in December 2010

Following from #3 ⇨

7. If consensus at the pallid sturgeon workshop is habitat selection research (telemetry study) should be conducted on the lower Platte, then develop **objectives, scope of work, and schedule; assemble funding partners** to allow Program to be a minor funding partner (in association with other Platte

River and Missouri River efforts); and solicit TAC recommendation and GC approval in fall 2010 to **move ahead with research in 2011.**

Estimated Cost: Habitat selection research was estimated to cost roughly $2.6 million (Adaptive Management Plan, 2006) during the First Increment; $650,000 (25% of original estimate)

Funding: Funding for this activity would be included in proposed FY 2011 Program budget under new line item PS-3: Pallid Sturgeon Habitat Selection and Use Research; solicit GC approval in December 2010

References

Adaptive Management Plan. 2006. Final Platte River Recovery Implementation Program. U.S. Department of the Interior, State of Wyoming, State of Nebraska, State of Colorado.

Final Program Document. 2006. Final Platte River Recovery Implementation Program. U.S. Department of the Interior, State of Wyoming, State of Nebraska, State of Colorado.

Hamel, M.J., Pegg, M.A., Hammen, J.J., and Anderson, T.L. 2010. Interim report: Population characteristics of sturgeon in the lower Platte River, Nebraska (Year 1). University of Nebraska-Lincoln.

HDR. 2009. Lower Platte River State Change Study Final Protocol Implementation Report.

Peters, E.J. and Parham, J.E. 2008. Ecology and management of sturgeon in the lower Platte River, Nebraska. Nebraska Game and Parks Commission, Neb. Tech. Ser. 18.

EXHIBIT B
U.S. Fish and Wildlife Service Pallid Sturgeon Presentation
June 2016

Pallid Sturgeon in the Platte River Basin

U.S. Fish and Wildlife Service

Ecological Services - Nebraska Field Office

PRRIP Governance Committee Meeting

June 8, 2015

Pallid Sturgeon in the Platte River Basin

Summary:

- The Service does not support two thumbs up for Big Question 9 because of lingering uncertainties
- The Service believes a Program workshop/symposium involving experts knowledgeable about pallid sturgeon biology is an essential step toward addressing these uncertainties

Pallid Sturgeon in the Platte River Basin

Proposed Questions for the Pallid Sturgeon Workshop:

1. What is pallid sturgeon use of the Platte River?
2. What is the relationship between pallid sturgeon use and flow?
3. To what extent does Program water management affect flow?
4. What is an adverse impact for pallid sturgeon on the Platte River?

Pallid Sturgeon in the Platte River Basin

Big Question 9: Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?

- **Big Question 9 concludes no adverse impact**
- **Did not specify type of impact(s)**
- **Service suggests a clear description of a criterion (or criteria) to define impact**
- **Then assess if Program water management has impacted the pallid sturgeon**

Pallid Sturgeon in the Platte River Basin

Big Question 9

Program Water Effects to Habitat:

- Program water management activities would be very small to undetectable
- Decreases in pallid sturgeon habitat is generally around 3 percent
- The maximum potential reduction in habitat is 9 percent

Pallid Sturgeon in the Platte River Basin

Big Question 9

Inability to detect Program water does not equal "no adverse impact":

	Species Impact	
Flow Detection	Detect Flow, Impact	Detect Flow, Not Impact
	Not Detect Flow, Impact	Not Detect Flow, Not Impact

Big Question 9 only addresses flow detection

Pallid Sturgeon in the Platte River Basin

Big Question 9

Program Water Effects to Habitat:

- Downstream of the Elkhorn River confluence – 3 to 9 percent habitat loss equates to 192 to 640 acre reduction in pallid sturgeon habitat
- Pallid sturgeon is documented upstream of the Elkhorn confluence
- Downstream of the Loup River confluence - 3 to 9 percent habitat loss equates to 640 to 1,984 acre reduction

Pallid Sturgeon in the Platte River Basin

Additional Research

1. Pallid sturgeon research on Platte River (M. Hamel, UNL)
2. Synthesis of pallid sturgeon research (USGS)
3. Missouri River pallid sturgeon effects analysis (USACE, USGS)

Pallid Sturgeon in the Platte River Basin

Summary:

- The Service does not support two thumbs up for Big Question 9 because of lingering uncertainties
- The Service believes a Program workshop/symposium involving experts knowledgeable about pallid sturgeon biology is an essential step toward addressing these uncertainties


Questions?