Pallid Sturgeon State of Knowledge Webinar

Platte River Recovery Implementation Program

July 10 2017

compass

Objectives

- **Workshop Objective**
  - Build a common understanding among GC members of the state of knowledge on pallid sturgeon
  - Clarify existing Program goals and AMP objectives with respect to pallid sturgeon
  - Identify and evaluate a range of actions the Program could undertake during the First Increment Extension relative to pallid sturgeon
- **Webinar Objective**
  - Provide an overview of key messages from the Task Group's work on the technical state of knowledge on pallid sturgeon
  - Familiarize GC members with the Pallid Pathway Database prior to the workshop

Overview of Project Scope

- Two streams of work – technical and policy:
- Policy work:
  - Clarify history (intent and discrepancies), and identify policy options moving forward and their implications
  - Not focus for this webinar or for discussion today, will contribute to the agenda and scope of the September workshop
- Technical work of the Task Group (State of Knowledge)

Overview of TG Progress to Date

- Five TG meetings
- Task to consolidate and synthesize technical knowledge of pallid sturgeon in the lower Platte River.
  - “Characterize the state of knowledge” means describe the weight of evidence, identify areas of agreement, disagreement, and uncertainty
  - Not asked to agree on what is "true" and "not true" about pallid sturgeon and Program impacts
- Outcomes include two sets of key messages, four knowledge summaries and a pathways impacts database

Key Messages & State of Knowledge

For Pallid Sturgeon in the lower Platte River

Materials: Key Messages and Knowledge Summaries

Task Group was charged with addressing the following:

- What do we know about pallid sturgeon ecology and use of the Lower Platte River?
- What could constitute an effect (adverse or beneficial) on pallid sturgeon?
- To what extent could Program actions cause an effect on pallid sturgeon?
- What are the key uncertainties about the Program's ability to cause an effect on pallid sturgeon?
- To what extent could these uncertainties be reduced and what would be the benefits?

Materials: Key Messages and Knowledge Summaries

1) Summary: Key Messages from the PS Task Group to the GC
2) Use of the Lower Platte River by Juvenile and Non-reproductive Adult Pallid Sturgeon Life Stages
3) Use of the Lower Platte River by Spawning Adult, Egg, and Larval Pallid Sturgeon Life Stages
4) Effects of Program Water Management on Juvenile and Nonreproductive Adult Pallid Sturgeon Life Stages
5) Summary of the Lower Platte River Stage Change Study
6) Key Messages about Downstream Impacts of Program Water Management

Key Messages from Task Group to GC

- After more detailed summary of knowledge summaries? Is a take-away summary of TG work/collective knowledge summaries …?

Lower Platte Use by Juvenile and Non-reproductive Adult Life Stages

- There is **strong evidence** that these life stages use the Lower Platte River, mostly below the Elkhorn.
  - Use the deepest available water habitat
  - Occurrence is highest during spring and fall
  - Are in good physical condition
  - Low summer flows increase potential for stress and/or mortality
- There is **some (but conflicting) evidence** that occurrence varies relative to discharge, season and within-day stage change due to hydrocycling.
  - Overall, there is no well-established relationship between discharge and flow-related variables.

Lower Platte Use by Juvenile and Non-reproductive Adult Life Stages

- **Remaining uncertainties** include:
  - Detailed understanding of flow/species relationships.
  - Reasons for lack of wild pallid sturgeon in the lower Platte
- **Our predictive ability would be enhanced:**
  - if key limitations in sampling methodologies or analyses were identified and addressed.
  - with improved understanding of differences in species variables as related to discharge.
  - with improved understanding of flow- and temperature-related factors that affect pallid mortality, condition, capacity, and movement in the lower Platte River.

Lower Platte Use by Spawning Adult, Egg and Larval Life Stages

- There **is not enough known** about how these life stages use the Lower Platte River to amount to **“strong evidence”**.
- There is **some (but inconclusive) evidence** that spawning occurs in the Lower Platte
  - Pallid sturgeon presumably spawn but has not been observed directly in the lower Platte River.
  - There is no evidence that spawning is successful.

Lower Platte Use by Spawning Adult, Egg and Larval Life Stages

- **Remaining uncertainties** include:
  - Understanding of flow/species relationships.
  - Do pallids successfully reproduce in the Lower Platte (i.e. do they spawn and eggs successfully hatch)?
  - If spawning occurs in the Lower Platte River, where?
  - If spawning occurs and eggs hatch, do free-embryos or larvae remain in the Lower Platte or drift into the Missouri River?
- **Our predictive ability would be enhanced:**
  - If key limitations in sampling methodologies or analyses are identified and addressed.
  - Improved understanding of pallid movements and spawning habitat in the Lower Platte during the spawning period.
  - Improved understanding of the presence/absence of free-embryos and larval pallid sturgeon in the Lower Platte River.

Effects of Program Water Management: Juvenile and Non-reproductive Adult Life Stages

- There is **strong evidence** that:
  - Pallid sturgeon are most frequently captured in the deepest portions of the lower Platte River.
  - Very low flows in the lower Platte River can result in pallid sturgeon mortality.
  - PRRIP-related water activities will both decrease and increase river stage and associated flow depth in the lower Platte River.
  - The magnitude of stage (and associated depth) change will be dependent on the magnitude of flow withdrawals/releases in the central Platte, flow losses and attenuation in central and lower Platte River, and lower Platte River discharge.

Effects of Program Water Management: Juvenile and Non-reproductive Adult Life Stages

- There is **some (or conflicting) evidence** that:
  - Flow reductions (sub-daily to seasonal) reduce the overall capacity of the Lower Platte by reducing the availability of deep water habitat. However,
  - There is no established relationship between pallid sturgeon capacity and quantity of deepest and swiftest waters.
  - Flow reductions during low flow periods may decrease physical habitat suitability related to channel connectivity and decrease mobility.
  - There is no established relationship between pallid sturgeon use and connectivity.
  - Flow reductions during low flow periods increase water temperature.
  - Pallid sturgeon mortalities reported in 2012 when discharge was less than 1,000 cfs and water temperature was > 86°F.

Effects of Program Water Management: Juvenile and Non-reproductive Adult Life Stages

- **Remaining uncertainties include**:
  - Limitations in sampling methodologies/analyses and understanding of flow/species relationships.
  - Relationship between:
    - flow depth/velocity and pallid sturgeon habitat suitability
    - habitat suitability and pallid sturgeon occurrence/condition
    - discharge and channel connectivity
    - channel connectivity and pallid sturgeon mobility
  - Strength of any relationships between:
    - discharge, stream temperature, stream turbidity, food resources and pallid sturgeon habitat suitability/condition.
    - discharge, pallid food resources, and pallid sturgeon habitat suitability/condition.

Effects of Program Water Management: Juvenile and Non-reproductive Adult Life Stages

- **Our predictive ability would be enhanced:**
  - If key limitations in sampling methodologies or analyses are identified and addressed.
  - With improved understanding of
    - pallid sturgeon food resources and flows needed to support these resources.
    - the relationship between flow and temperature exceedances detrimental to pallid sturgeon.
    - flow-related variables and pallid sturgeon capacity in the lower Platte River.
    - pallid sturgeon movements in relation to channel connectivity in the lower Platte River.

Effects of Hydrologic Change on Pallid Sturgeon Spawning, Embryos and Larvae in the Lower Platte River

- There is **no evidence** specific to the Lower Platte to support understanding of effects on these life stages.
- **Remaining uncertainties include:**
  - Factors not related to flow could also affect our understanding of flow/species relationships.
  - Relationship between discharge and spawning habitat availability.
  - If flow-related variables in the Platte River influence spawning cues and spawning occurrence, and if so, what is the relationship between flow and spawning cues/occurrence.
  - Relationship between flow-related effects to habitat and spawning success
  - Relationship between flow-related effects to habitat and egg incubation success

Effects of Hydrologic Change on Pallid Sturgeon Spawning, Embryos and Larvae in the Lower Platte River

- **Our predictive ability would be enhanced:**
  - If key limitations in sampling methodologies or analyses are identified and addressed.
  - With improved understanding of:
    - flow-related variables that affect spawning cues, pallid movement, and access to spawning habitat in the Lower Platte River during the spawning period.
    - whether spawning cues, movement, and access to spawning habitat affects spawning occurrence, spawning success, and/or egg incubation success.

Summary of the Stage Change Study

- There is **strong evidence** that:
  - Stage changes in the Lower Platte River (below the Elkhorn River confluence) due to Program water management activities in the Central Platte are small enough that they are muted by additions from more proximate tributary inputs.
  - The greatest potential for negative habitat impacts would occur when lower Platte River discharges are low (4,000 – 6,000 cfs) but central Platte River discharges are high enough that flow could be diverted into storage for retiming.

Summary of the Stage Change Study

- There is **some (or conflicting) evidence** that:
  - Impacts to pallid sturgeon can be avoided through development of operational rules that prohibit Program diversions when lower Platte River discharges fall below 4,000 cfs. However, the relationship between sub-4,000 cfs and impacts to pallid sturgeon capacity and habitat connectivity is not known.
  - Predicted changes in Lower Platte River pallid sturgeon habitat resulting from Program water management actions in the Central Platte are similarly small to undetectable and thus these changes should not provide additional stress to the pallid sturgeon population. However, uncertainties remain.

Summary of the Stage Change Study

- **Remaining uncertainties include:**
  - The relationship between discharge and channel connectivity and the relationship between channel connectivity and pallid sturgeon mobility.
  - The relationship between physical habitat conditions and pallid sturgeon occurrence / condition.
  - Hydrocycling from the Loup River Hydroelectric Project could affect the detection of Program water.
- **Our predictive ability would be enhanced if**:
  - The stage-change study was expanded to encompass the full range of physical channel conditions in the lower Platte River.
  - The stage-change study was extended upriver to include the section between the Loup and Elkhorn confluences, or upstream to the Associated Habitat Reach (Chapman).
  - Resource selection analyses were developed based on physical conditions at sample and capture locations (depth, velocity, temperature). This would improve our understanding of the relationship between discharge, physical habitat conditions, and pallid sturgeon occurrence.
  - Increased telemetry tracking effort in the lower Platte would improve our understanding of pallid sturgeon movements in relation to channel connectivity.

Key Messages about Downstream Impacts of Program Water Management

- **Program water operations impacts on the lower Platte River**
  - Understanding of highly uncertain relationships (flow/stage, habitat suitability/connectivity/availability, and use/condition) is required to quantify impacts.
  - Reductions due to PRRIP retiming projects and late-spring pulse flow release may change habitat suitability and channel connectivity, however it is unknown if magnitude of change is biologically important.
- **External factors affecting the Program's influence**
  - Loup River hydrocycling
  - Future depletions

Q&A

Questions & clarifications
Discussion topics or info needs for the workshop

PATHWAYS DATABASE

Overview of the pathways database and how to use it

September Workshop

- Clarify existing Program goals and AMP objectives with respect to pallid sturgeon
- Identify and evaluate a range of actions the Program could undertake during the First Increment Extension relative to pallid sturgeon

Day 1:

Recap: task group findings on pallid sturgeon state of knowledge

Overview of policy options and approach to evaluation

Day 2:

Exploring policy options

Understanding implications of policy options

Agreeing on a path forward
- Priorities for the first increment extension
- Further pallid expert/technical work

Synthesis and next steps

Questions or input?

Thanks!

Feedback?