

**Independent Science Advisory Panel Evaluation
of the Fort Peck Adaptive Management Framework
for the Upper Missouri River Pallid Sturgeon**

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Introduction

The Fort Peck Framework is a “potential approach” to formulating and evaluating flow releases on the upper Missouri River to benefit pallid sturgeon

- The Framework uses the “best available science” to identify, build, and inform its assessment of management action alternatives
- It follows the approaches and procedures described in the SAMP for scoping and planning management actions in an adaptive framework
- It acknowledges the importance of HCs (human considerations) in decisions regarding upper-river flows actions and the need to monitor their effects on system attributes of HC concern

The Framework in its current state of development prompts a number of action-specific and programmatic observations by and concerns from the ISAP that can be readily responded to by Corps and are worthy of open discussion

Answers to specific “questions” posed to the ISAP follow

1) Was the best available scientific information and analysis used in formulating the Level 1 studies, conceptual hydrographs in support of Level 2 prescribed test flows, and other adaptive management actions and activities described in the Fort Peck Adaptive Management Framework?

- AM Framework is based on three observations:
 - spawning during 2011 flood conditions
 - upriver movement of three female pallid sturgeon during 2018 high discharge from Milk River
 - collection of age-1 pallid previously released as embryo
- Observations from high flows in 2011 and 2018, which are not easily reproduced given operational constraints on the system
- These observations do not imply a self-sustaining pallid sturgeon population in UMR

1) Was the best available scientific information and analysis used - continued

- Suitable H&H models (ResSim, HEC RAS) used to analyze conceptual flow regimes
- Indices of Hydrological Alteration (IHA) used appropriately to evaluate regulated and unregulated flow regimes
- Results of completed embryo drift modeling to help define decreased discharge after spawning
- Pallid population model could estimate recruitment required for self-sustaining population

1) Was the best available scientific information and analysis used - continued

- Best available science (including expert elicitation) was used to identify factors important to pallid reproduction, drift, and recruitment
- Remaining uncertainties include
 - relationships between pallid sturgeon, flows, temperature, and turbidity
 - variability among fish reproductive responses to identical conditions
 - micro- and meso-scale habitat conditions and spawning

1) Was the best available scientific information and analysis used - continued

- ISAP supports continued evaluation of test flows to assess effects on pallid recruitment on the UMR
- Framework document should clarify:
 - viability and importance of spawning opportunities in both the Yellowstone River and UMR
 - rationale for the details of the example hydrographs (e.g., duration, peak flows)
 - timing when Tables 5 and 6 enter the prioritization process
 - difference between maximizing learning and maximizing benefits to pallid sturgeon (Figure 7)

1) Was the best available scientific information and analysis used - continued

- Framework could better describe current limitations on increasing temperature and turbidity below Fort Peck Dam
- Could describe how Level 1 and 2 study results inform temperature or turbidity manipulations

2) Does the Framework reflect the intent and process for resource management under the Missouri River Recovery Program as described in the Science and Adaptive Management Plan...?

- Level 1 and 2 studies do not require AM as indicated in the SAMP
- Framework demonstrates ability to formulate Level 1 and 2 studies within AM, if desired
- Effective use of active links from Effects Pathways to detailed information in supplemental material
- Expert elicitation confirmed previous identification of factors controlling pallid reproduction

2) Does the Framework reflect the intent and process for resource management under the Missouri River Recovery Program as described in the Science and Adaptive Management Plan... - continued

- Expert recognition of uncertainty associated with effects of turbidity on spawning
- Implications of remaining uncertainties on design of test hydrographs that have sufficient “signal strength”

2) Does the Framework reflect the intent and process for resource management under the Missouri River Recovery Program as described in the Science and Adaptive Management Plan... - continued

- Near-term need to develop relationships between pallid reproduction, recruitment, and absolute magnitudes, timing, and duration of the four components of managed hydrographs
- Recognition of the limitations defined by current infrastructure on the design of managed flow regimes
- Explore implications that individual components of managed hydrographs can be separately implemented
- Address efficacy of opportunistic flow management, corresponding signal strength, and likely pallid responses

2) Does the Framework reflect the intent and process for resource management under the Missouri River Recovery Program as described in the Science and Adaptive Management Plan... - continued

- Presumption that detailed monitoring programs would accompany actual planned managed Level 3 and 4 actions recommended by results of Level 1 and 2 studies
- Table 6 “if-then” statements do not lead to concrete decisions, but rather support (or not) continuing studies
- Need to define the term “sufficient to have a population-level effect”
- Need monitoring benchmarks that are tied explicitly to conceptual hydrographs

2) Does the Framework reflect the intent and process for resource management under the Missouri River Recovery Program as described in the Science and Adaptive Management Plan... - continued

- AM governance only generally referred to in the Framework (pages 27 and 48)
- No mention of information management and communication (as per the SAMP) in the Framework document

3) Is the Framework structured and presented such that the evaluation of Human Considerations (HCs) is apparent in management-action planning and decision-making, project implementation, and project assessment?

- Overall conclusion is yes
- The Framework acknowledges that HC monitoring will likely be needed once alternative management actions are defined
- Appendix A.4 indicates that decisions to proceed from Level 1 field experiments to Level 2 manipulations of flow and sediment would require that those actions be implemented “without unacceptable impacts to HCs or authorized purposes”

Details on How HCs are Reflected in the Framework

- Stakeholder meetings were held as part of the development of the Framework
- HCs in general are referred to throughout the Framework
- Framework acknowledges the need for definition of specific HC monitoring metrics once the Management Actions are identified
- Prediction of HC impacts are to be made and results used as part of the determination of whether to implement low-flow measures. Follow-up HC monitoring would be performed to track any HC impacts from implementation

Details on How HCs are Reflected in the Framework - continued

- There is a short and very general HC Monitoring section (3.4.3) in the Framework that also references the Science and Adaptive Management Plan (SAMP) related to HC monitoring
- Appendix A.4 provides specific reference to HCs as part of the “If-Then Decision Criteria” for whether the USACE would move from Level 1 Field Experiments to Level 2 Field Implementation

Summary and Recommendations

- Suggest fast-tracking the development and application of the pallid sturgeon population model
- Identify and validate metrics, indicators, surrogates, and proxy measures in support of monitoring
- Evaluate the effectiveness of flow management within the feasible “decision space” as beneficial to pallid sturgeon
- Planning for management actions should not be released without substantive details on monitoring design and biologically significant decision criteria

Summary and Recommendations - continued

- No need for substantial revisions to Framework
- Reduce confusing use of “Framework” – reserve for title of main document only
- Future economy in documents by referencing the SAMP
- Future documents might be added as appendices to the SAMP
- Open Framework discussion with USACE and Panel response to the two additional questions