**PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM (PRRIP -or- Program)**

**PRRIP Extension Science Plan Target Species Summary: Whooping Crane (WC)**

January 2021

**Editorial Disclaimer:** This document serves as a PRRIP Executive Director’s Office (EDO) Working Draft summary of recent discussions with the Adaptive Management Working Group (AMWG) regarding the status of the WC within the Program as a target species and science learning priorities for the WC in development of the Extension Science Plan. AMWG meetings were held in accordance with direction from the Governance Committee (GC) as described below. This summary serves as a brief roll-up of initial AMWG commentary from initial WC discussions in late 2020 and early 2021. Some or all of the text below (as-is or as subsequently revised) may be integrated into the Extension Science Plan.

**AMWG Role in Development of PRRIP Extension Science Plan**

The GC re-constituted the AMWG in September 2020 and directed the group to be responsible for working collaboratively with the EDO to generate the technical content of the Extension Science Plan. Specifically, the AMWG was directed to work with the EDO to:

Science Plan content tasks:

1. *Evaluate and refine conceptual models* – ensure proper linkages between current Program understanding of river form and function and target species responses; identify areas and relationships with uncertainty needing further investigation.
2. *Identify important technical uncertainties and develop potential priority hypotheses* – based on areas of uncertainty in the conceptual models, brainstorm the language of hypotheses (determining *a priori* independent and dependent variables) for testing management actions, develop expected response functions (X-Y graphs for predicting response), and map out how answering hypotheses (and alternative hypotheses) will be communicated to the GC as an input to decision-making.
3. *Develop a new set of Big Questions for the Extension* – work collaboratively with the EDO to develop a proposed set of Big Questions for the Extension that serve as a roll-up of underlying hypotheses and that provide an organizational tool for tracking progress against management objectives and communicating science learning to the GC.

Science Plan process and communication tasks:

1. *Communicate technical information to the Technical Advisory Committee (TAC) and GC* – take ownership of content in the Extension Science Plan and present material at TAC and GC meetings.
2. *Participate in writing and technical review of the Extension Science Plan* – homework assignments, participation in numerous virtual and in-person (when allowable) meetings and workshops, and communication with the Independent Scientific Advisory Committee (ISAC).

The work of the AMWG was not intended to replace the review, recommendation, and approval authorities the Program Document delegates to the TAC and GC. Specifically, AMWG work products will be provided to the TAC for review and comment and the TAC will be responsible for recommending a final draft Science Plan for final GC review and approval. The frequency of AMWG interaction with the TAC will depend on Science Plan development progress but we anticipate regular check-ins to confirm that the larger body is comfortable with work products prior to advancing to each subsequent step of Science Plan development (see list above).

In developing the Extension Document, the GC decided that the current management objectives in the Adaptive Management Plan (AMP) should remain. As stated in the AMP, “management objectives are a means to evaluate effectiveness of different Program actions within an adaptive management framework.” Thus, management objectives are the currency with which the EDO and technical representatives of Program partners can communicate science learning and the effectiveness of management actions to the GC. The AMP does not prescribe a particular process for how this communication is to occur (i.e., who determines if the Program is meeting the management objectives and what does it mean to “meet” the objectives). The EDO intends to work with the AMWG going forward to iteratively evaluate whether the Program is currently meeting the management objectives, how those objectives are measured, and what it means for Program science learning as an input to GC decision-making. That evaluation will be transmitted to and discussed with the TAC and ISAC before being reported to and discussed with the GC via the annual *State of the Platte Report*.

**TARGET SPECIES MANAGEMENT OBJECTIVE: WC**

The current WC management objective in the AMP is:

Contribute to the survival of Whooping Cranes during migration.

1. Increase availability of whooping crane migration habitat along the central Platte River (indicators are the area of suitable roosting habitat, area of suitable foraging habitat, proportion of population, crane use days, etc.).

**There is a general opinion within the AMWG[[1]](#footnote-1) that as of January 2021 the PRRIP is meeting the WC management objective.** That general opinion is based on the following proxies:

* A proportional increase in crane use since the start of the Program in 2007 relative to the overall size of the migratory WC population.
* An increase in the amount of suitable WC stopover roosting habitat since the start of the Program in 2007 that resulted in increased WC use.

In terms of communicating continued progress toward meeting the WC management objective during the Extension and beyond, the AMWG is interested in exploring the possibility of using the tool of risk analysis (Consequence (C) ratings, Likelihood (L) ratings, Risk (CxL) ratings, color-coded risk matrices) to identify performance indicator red flags. These would be longitudinal red flags, meaning over some longer time increment rather than concern about intra-annual changes in productivity metrics. For example: to communicate with the AMWG and the TAC, we could agree to numerical ranges that make sense based on Program learning, historical and recent literature, guidance from other programs, and guidance from the Service as to what is important re: the Biological Opinion. To communicate with the GC, we could just report risk ratings (based upon consequences to the target species and likelihood of failure to meet the management objective) and say if a performance indicator falls into a **green range**, nothing to see here; if an **orange range**, we are good but keeping an eye on things; or if a **red range**, the TAC recommends research or changes to management actions. The EDO, in consultation with the AMWG, the TAC, and the ISAC, would still assess annually in the *State of the Platte Report* whether the Program is meeting the management objective but that would be weighed against expected changes over time.

**TARGET SPECIES UNCERTAINTY: WC**

The AMWG identified additional areas of WC uncertainty that the EDO grouped into the following categories:

* Habitat selection by WC.
* Minimum habitat requirements for WC survival and recovery.
* Use of water to create WC habitat.
* Setting Program water operations priorities.
* Differential fitness of WC that stop along the AHR.
* Factors affecting length of WC stay along the AHR.
* Seasonal patterns in WC use of the AHR.

**Big Questions = things we do not know but want to learn**

1. **What are the conditions that influence whether a WC will stop or flyover the CPR?**

During the First Increment (2007-2019), the Program designed and conducted research to identify a suite of on and off-channel characteristics associated with roosting sites and diurnal use locations.

*Uncertainty Factor = Landscape-Level Cues*

The AMWG identified remaining uncertainty focused on landscape-level cues that WC may be using to select the AHR as a stopover location during migration. Potential explanatory variables explored by the EDO utilizing an initial dataset including data from 49 individual birds with 8 stopovers and 89 flyovers as they encountered the AHR during 6 migratory events from Fall 2017 - Spring 2020 include:

1. Time of day – Initial analyses suggest time of day to be important in predicting stopovers, with all 8 stopovers occurring after 3:00 PM.
2. Flow
3. Maximum Unobstructed Channel Width (MUCW)

Neither flow nor MUCW add significant explanatory power to the current logistic regression model predicting WC stopovers over and above what can be predicted initially from including only time of day.

In regard to landscape-level cues, a question of interest: What are the factors associated with stopovers vs. flyovers of WC as they encounter the Associated Habitat Reach (AHR) during migration?

1. **Can we use water to maintain unobstructed channel width (UOCW) for WC use?**
2. Can we use a fall short-duration high flow (SDHF) to maintain UOCW?
3. Can we use germination suppression flows in the spring and/or summer to maintain UOCW?
4. **What are the conditions that influence length of stay along the AHR?**
5. **Are WC that stop along the AHR more fit?**

**Constraints and Future Discussion Topics**

* The WC dataset is small and will grow slowly over time, but the dataset will always contain more flyovers than stopovers which make up on average only 8% of the dataset.
* The number of explanatory variables is limited by the small dataset, so hypothesis testing must be limited to those items that are priority and that the Program can manage.
* A Program priority may be to answer the following questions: How much water do we need in the channel for stopovers? Where are the limits of WC tolerance to flow, flows above or below which WC do not stop along the AHR?
* The range of available flows for which we have WC response do not include very low flows. Is the Program willing to allow low flows during WC migration for science learning during the Extension?
* Can we more effectively utilize flyovers to gain information about what habitat WC do not select? Can we look at birds that flew over the Platte and did not stop, but stopped within three (3) miles beyond the Platte River (looked at available Platte River habitat and did not select it)? What were the conditions on the Platte associated with this behavior?
* Can we obtain a wider dataset to understand stopover patterns over a larger spatial and temporal scale?

**REVISING THE EXTENSION SCIENCE PLAN**

At this time, the AMWG is continuing to explore additional new Big Questions and specific priority hypotheses related to the WC for the Extension to be addressed through a rigorous application of the adaptive management (AM) six-step cycle. There may be additional areas of uncertainty related to WC use of the AHR identified during continued development of the Extension Science Plan in 2021 or during subsequent implementation of the Science Plan that might require review and development of an AM approach to address related uncertainty. For now, the AMWG will work with the EDO to further identify, refine, and specify additional WC Big Questions and priority hypotheses for the Science Plan and determine areas of uncertainty to be reduced through application of AM and other WC issues that may be better explored through a more traditional approach to monitoring status and trends over time.

1. The AMWG notes that the Program should continue to ask where it can make habitat improvements within Program constraints to provide benefits and that the Program may need to consider if WC that stop along the Associated Habitat Reach (AHR) are better off than those that do not stop. That would necessitate defining and quantifying what “better off” means, within the context of the Program being able to implement management actions that would contribute to this. [↑](#footnote-ref-1)