



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

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

February 2021

Editorial Disclaimer: This document currently 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 science for 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 (built on text from the 08_21_20 EDO memo distributed to and discussed with the GC at their September 2020 Quarterly Meeting). This summary serves as a brief roll-up of extensive AMWG commentary and feedback over the course of several virtual meetings in the last half of 2020 and early in 2021. The entirety of the language below does not, at this time, represent full AMWG consensus and will be the topic of continued discussion and revision during development of the Extension Science Plan in 2021. However, some or all of the text below (as-is or as subsequently revised) may be integrated into that 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. General task process for the Extension Science Plan:

Extension Science Plan – AMWG & EDO content tasks:

Task 1: *Assess the WC management objective* – discuss whether and how the Program is meeting the WC management objective, performance indicators, and how to communicate Program progress toward and effectiveness at meeting the management objective to the GC over time.

Task 2: *Evaluate and refine WC conceptual model* – ensure proper linkages between current Program management actions, habitat responses, and target species responses; identify areas and relationships with uncertainty needing further investigation.

Task 3: *Identify important WC 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.

Task 4: *Develop a new set of WC 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.

Extension Science Plan – AMWG & EDO process and communication tasks:

- *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.



- *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, LAC, WAC, 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. Neither the Final Program Document nor the AMP (which is Attachment 3 in the Program Document) 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*.

TASK 1: ASSESS THE WC MANAGEMENT OBJECTIVE

The current WC management objective in the AMP is:

Contribute to the survival of Whooping Cranes during migration.

- a) 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 AMWG¹ 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.

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.



TASK 2: EVALUATE AND REFINE WC CONCEPTUAL MODEL (CM)

A revised CM was developed and discussed with the AMWG both in 2019 and again in the fall of 2020. That revised CM will be presented in the Extension Science Plan with a summary of AMWG discussions on and guidance for reducing any critical uncertainty linkages identified by the AMWG.

In terms of communicating the measure of relative success of Program actions while ensuring the WC management objective continues to be met during the Extension and beyond, the AMWG is interested in exploring the possibility and effectiveness 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. To communicate with the GC, risk ratings could be reported (based upon consequences to the target species and likelihood of failure to meet the management objective) based on categories of risk: 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.

TASK 3: IDENTIFY IMPORTANT WC TECHNICAL UNCERTAINTIES AND DEVELOP POTENTIAL PRIORITY HYPOTHESES

The AMWG is in the process of discussing potential priority hypotheses relative to uncertainty linkages in the revised WC conceptual model. Will include a summary of that discussion here in the Extension Science Plan.

TASK 4: DEVELOP A NEW SET OF WC BIG QUESTIONS FOR THE EXTENSION

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 Program 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:

- a) Time of day – Initial analyses suggest time of day to be important in predicting stopovers, with all 8 stopovers occurring after 3:00 PM.
- b) Flow
- c) 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?

2) Can we use water to maintain unobstructed channel width (UOCW) for WC use?

- a) Can we use a fall short-duration high flow (SDHF) to maintain UOCW?
- b) Can we use germination suppression flows in the spring and/or summer to maintain UOCW?

3) What are the conditions that influence length of stay along the AHR?

4) 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.

**FOR FURTHER SCIENCE PLAN DEVELOPMENT DISCUSSION:**

Table 1 below is a set of higher order “parking lot” AMWG discussion topics moving forward into development and refinement of the WC section of the Extension Science Plan. Editorial, grammar, and finer-scale edits have been integrated into the document above. The AMWG member comments below are the result of in-meeting discussions and written feedback on earlier versions of this WC summary document. The issues below will be addressed during subsequent AMWG meetings and through the process of developing and refining the Extension Science Plan. Areas of agreement/disagreement and issue resolution will be added to the “Extension Science Plan Resolution” column over time.

Table 1. AMWG comments on WC language for Extension Science Plan.

Text Location	Key Text/Issue	AMWG Comment from:	Comment	EDO Comment/Response	Extension Science Plan Resolution
Lines 129-130	a) and b) under possible BQ #2	Jojo La	Specify that this is using Program water, or does this also include EA water?		
Line 146	“...three (3) miles...”	Andy Caven	We may need some more thinking to put an <i>a priori</i> bounds on this. This is too small a distance from my perspective – from a landscape conservation perspective, the Loup River and the Rainwater Basins remain viable alternatives that the birds sometimes choose over the Platte. These can be reached within <35 miles of the Platte River.		
Line 148	“...with this behavior?”	Andy Caven	Also, what were the wetland conditions at the alternative stopover locations?		