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

Technical Advisory Committee (TAC) Virtual Meeting

Meeting held in-person at ED Office in Kearney, NE

Day 1: Tuesday, July 18, 2023; 1:00 PM - 5:00 PM CST

Technical Advisory Committee (TAC)

State of Wyoming
Michelle Gess – Alternate
Jeremy Manley – Alternate

State of Colorado
Kara Scheel – Member

State of Nebraska
Caitlin Kingsley – Member
Jennifer Schellpeper – Alternate

Upper Platte Water Users
n/a

Downstream Water Users
Brandi Flyr – Member
Jim Jenniges – Member
Dave Zorn – Member

Bureau of Reclamation (Reclamation)
Brock Merrill – Member

U.S. Fish and Wildlife Service (Service)
Matt Rabbe – Member

Environmental Entities
Rich Walters – Member
Amanda Hegg – Member
Bethany Ostrom – Alternate
Melissa Mosier – Alternate

Colorado Water Users
Jason Marks – Member

Executive Director's Office (EDO)

Jason Farnsworth, ED
Chad Smith
Malinda Henry
Justin Brei
Tim Tunnell
Patrick Farrell
Mallory Jaymes
Kaley Keldsen
Jason Bruggeman
Jonathan Wentz
Seth Turner
Sarah Fancher
Ed Weschler
Helen Davis
Kristen Cognac
Libby Casavant

Other Participants

David Baasch – Crane Trust
Avery Dresser – NE DNR
Melissa Marinovich – NGPC
Joel Jorgensen – NGPC
Keith Koupal – NGPC
Brett Roberg – NGPC
Richard Belt – CO water user

WELCOME & ADMINISTRATIVE

Scheel called the meeting to order at 1:02 PM Central Time.

AGENDA MODIFICATIONS

Walters asked to add 5 min at beginning of the Sediment Augmentation section to discuss the EDO bringing Sed Aug to the GC for a decision on 2023 implementation prior to running it through the TAC.

01_07-18-2023 PRRIP TAC Meeting Agenda

MINUTES

Schellpeper pointed out a typographical error in line 114 - "wrap-p" to be changed to "wrap-up". This change was made to the minutes.

TAC MOTION: *Walters moved, and Zorn seconded to approve the April 12, 2023, TAC Meeting minutes with the above-mentioned change.* Minutes approved.

Document: 04-12-23 PRRIP TAC Meeting Minutes FINAL_0

SCIENCE PLAN

Germination Suppression

Turner provided an overview of the June 2023 Germination Suppression Release from the environmental account (EA). The objective of the release is to test the ability of Program water to suppress germination of cottonwoods and willows during June as a management action for maintaining unobstructed channel widths for WC roosting (Big Question 1 of Extension Science Plan). Turner compared the 2022 release to this year's release pointing out annual differences in release magnitude, duration, and ability to hit 1500 cfs target at Grand Island. In 2022 water demands for irrigation by mid-June and limited capacity through the choke point reduced our ability to hit the 1500 cfs target, whereas in 2023 abundant rainfall in Colorado coming through the South Platte without the chokepoint limitation allowed us to curtail the release early and resulted in flows above the 1500 cfs target for the full 30 days.

Rabbe asked how this will affect evaluation of effectiveness in terms of variability? Farnsworth said it includes the range of conditions we will need to manage under and will provide information on the upper limit of suppression, but will still introduce some noise into interpretation. Farrell's machine learning model takes this into consideration along with mechanical management. Farnsworth said we had planned on using up all our water by 2024 and be done with this management experiment, but this is not the case. Turner estimated we would have about 150,000-acre feet of water in the EA at the beginning of 2024. Farnsworth asked the TAC to consider what they want to do for 2024. Rabbe noted concern regarding a potential reset of the EA account. Baasch suggested a fall WC release. Rabbe said fall maintenance of the system and rotenone application limits the timing of fall releases, but there may be an open window the third week of October, with the water arriving at the end of October/beginning of November. Scheel asked about the reset volume? Farnsworth said it resets to 100,000-acre feet if the reservoir fills. Scheel asked about the volume used for germination suppression releases. Turner said it is variable each year, but in the past, it has been somewhere between 50,000 – 80,000 AF. Rabbe said if we could get the EA account down to 100,000-acre feet by the end of 2023, that would help. He said there may be potential for a fall WC release in late October of 2023 and a June 2024 germination

suppression release. Farnsworth and Farrell agreed that with high annual variability in these releases, continuing for 2024 will improve the power of the analysis. Farnsworth said at Rowe we have lost the battle, that area needs maintenance, and we have already learned that water won't work there. He suggests a reset there to increase learning potential for next year. Program budgeted $85,000 for disking in areas where vegetation growth has surpassed river flow ability to return channel to sand/water. Scheel asked about the process to make a fall release. Rabbe said without an EA Account Manager, the Service just planned for a single release in 2023. The process would involve the Service, EA RCC, and WAC. Farnsworth reminded there is no AOP this year for a 2nd Tier release. Jenniges said this should not be a problem since the Service already has a target flow set that makes WC migration releases a priority. Flyr asked who the interim FWS EA account manager is. Rabbe said Porath is filling this gap for now, but the Service could fill the position by the end of the year. Turner reminded the TAC how the germination suppression release was coordinated with twice weekly calls with the Service, downstream water users, and the EDO to collectively come up with a recommendation for the release that Porath signed off on. He suggested this as a way forward.

Presentation: Germination Suppression Presentation 2023-07-12

EDO ACTION ITEM: Contact the Service re: possibility of an EA water release during fall 2023 WC migration and development of a preceding AOP.

Peer Review Process
Smith summarized the peer review scope of work, the peer review process and the TAC's role within that process. He presented an updated timeline proposed for peer review of the Wet Meadow Hydrology Study.

Flyr asked if the Program had used this peer review process before, especially the use of comment ratings and return of responses to peer reviewers. She said that the outlined process is not comparable to a journal publication process or rating scale. She asked how the Program might deal with a peer reviewer accustomed to the journal publication process and without proper Program-specific context? Do we have an out if some reviewer is just beyond what can be reasonably managed or important for decision-making? Smith said this is a hard process, but the rating system has been used previously and is in the Program's peer review guidelines. Our job is to onboard reviewers with regard to the Programs natural resource management context. The Program has the flexibility to step back or revise the process, and maybe the TAC wants to add that type of language into this document. Flyr said it is important to onboard useful reviewer suggestions for methods, but not be boxed in by a reviewer that may not understand Program context. Farnsworth said the TAC can help avoid this by providing Peer Reviewer Questions to be considered and addressed during the review. Farnsworth gave an example of a peer reviewer who would not accept Program science as they did not believe the central Platte River was important for terns and plovers. In those types of instances, the GC can say thanks but no thanks to their review.

Document: 03_PRRIP Wet Meadow Hydrology Peer Review Scope of Work_July 2023 DRAFT_0

EDO ACTION ITEMS:

- Send out calendar reminders to TAC marking deadlines for TAC feedback on documents according to the timeline established at the meeting.

TAC ACTION ITEMS:

- Review and provide feedback on Wet Meadow Peer Review Scope of Work, including providing additional questions to be addressed by peer reviewers by **Aug 11, 2023**.
- Inform their GC members of the peer review process and that they will be asked to approve peer review / appoint peer review panel members for the Wet Meadow Hydrology Study at the September GC meeting.

Wet Meadow Hydrology

Cognac provided context for the wet meadow hydrology study and summarized study objectives which were to:

- Improve understanding of wet meadow hydrology
- Quantify wet meadow controls
- Develop tools and methods that land managers can use to identify and manage wet meadows.

She reviewed methods and results that quantified the hydroregime at two Program managed wet meadow sites, linked distance to groundwater to vegetation communities at these sites, tested alternative management scenarios for improving wet meadow hydrology at Fox, and introduced a low investment method for screening the AHR to identify areas where hydrological conditions are more likely to support a wet meadow. Overall, the study helps us understand how variable wet meadow sites are in space and over time in terms of how wet they are and the vegetation they can support.

Jenniges and Baasch brought up the long-standing debate over the definition of a wet meadow, with several Program defined wet meadows not being wet. Cognac's work is helping to define this hydrologically and through vegetative community composition. What else would be helpful? Baasch asked if the response of wet meadows to river stage was included in the report? Flyr said the report didn't do an assessment of river stage to ground water elevation but provided a framework to do so. The model could be used to predict what a given change in stage can do to groundwater levels at each well that are located at different distances from the river. Baasch asked about applicability of the model to other areas? Cognac said you would need to calibrate the model to the specific site with a minimum of one well. Casavant asked about hydraulic conductivity. Cognac said it can be estimated through model calibration. Flyr said that she sees the relative elevation comparisons as a screening tool. Brei says it helps to identify sites with good potential. Tunnel mentioned that the Elm Creek site shown in the presentation was actually a Cottonwood Ranch wet meadow site. Flyr said the applications of this would be more apparent by better framing or set up at the beginning of the report that clearly states what the Program is getting from this analysis. Jenniges suggested the EDO simplify report conclusions and make the connection to management to provide context for the research. Schellpeper said stating objectives, what used for, and main takeaways or results at the beginning would be helpful. Baasch mentioned that the question "What makes a wet meadow wet?" is not really addressed in the report. Jenniges said there is a differential ecological gradient of wetness from west to east along the reach. Farnsworth provided context by stating that the original question was, "Do you want to use water to make a wet meadow wet?" Early on the Program said no. Cognac's work provides a tool for managers to address this question. Jenniges said we need to capture what percentage of sites are actually wet and are ecological wet meadows. Cognac said this varies across sites, within a site, and through time. So Henszey et al. (2004) helped to simplify it by saying that emergent and sedge meadow vegetation occur in the wettest portions of wet meadow sites. How much emergent and sedge meadow vegetation is attractive to whooping cranes? Farnsworth asked, how important is this to whooping cranes? Cognac said you can dig to decrease the distance to groundwater or you can add water over the top. The model is point-

specific (well-specific), so you would need to model over multiple wells over a single site to get a good estimate. Brei said we could produce a result for what 10,000 cfs for 7-day window would do to groundwater elevation at Binfield in the report. Jenniges said we should model a flow below flood stage at Fox for 1500-2000 cfs (simulate the germination suppression flow release) and see what this does to distance to ground water at multiple wells. Would help see what a range of possible changes across the Fox site might be in response to our germination suppression release. Baasch suggested we look at a six inch stage change rather than a one meter stage change (10,000 cfs). Brei said the goal is to understand how much flow is needed to create ground water elevation desired as opposed to demonstrating the limitation of current flow management. Rabbe asked how the GC would use this information. Rabbe, Zorn, and Jenniges talked about using groundwater wells available from COHYST wells that are publicly available. Brei said there is no specific Program Big Question for this study. Jenniges asked what the value is for the Program? Farnsworth said this is an effort to put a bow on wet meadow monitoring to help the Program understand what it would take at sites like Fox to make conditions similar to a gold standard like Shoemaker Island. The ways to get there are to put water on the top, dig down to ground water, and/or use river flow. He was reminded that there is no ridge-swale topography at Fox as it was leveled for agriculture. Farnsworth asked if there might be a better, or more useful place to do this? Baasch mentioned a location to the west of the Bergren tract in the Chapman Complex. Rabbe asked, can we identify spots with more potential for management as a wet meadow? Cognac's relative elevation comparisons is designed as a tool to do this. Cognac said you could use NDVI or other LIDAR products to identify areas with more potential as wet meadows. Baasch mentioned that soils are important to consider as well. Rabbe asked if we could use AHR LIDAR instead of public data in areas where we do not have wells? Flyr mentioned that the contouring done at Fox might not have been appropriate to support proper distance to groundwater. Brei suggested choosing better sites would be more effective than drastic re-contouring. Farnsworth said that this study provides learning and tools that can be applied to make restoration recommendations supported by data at a couple of choice spots to create gold standard wet meadows. We now know that Fox is a hard lift, but we could propose other sites and scenarios to the east that might be better, like south near Rowe that already has necessary groundwater data.

Document: 04_DRAFT_Wet Meadow Hydrology Report – July 2023 TAC
Presentation: Wet Meadows_2023 – July TAC

TAC ACTION ITEMS:

- Review and provide feedback on Wet Meadow Hydrology Study by **Aug 11, 2023**.

Sediment Augmentation

Walters asked the TAC for their thoughts on the process for bringing the sediment augmentation decision to the GC for 2023. The EDO brought that decision to the June GC prior to TAC discussion. Walters said it is important for the TAC to give insight into projects like sediment augmentation and then recommend actions for the GC to consider. Farnsworth explained the timing mismatch with the sed aug report and the crunch for making a decision on implementation of sed aug for the fall of this year. Jenniges and Scheel suggested in situations like this with a timing mismatch, the TAC could do an online meeting or document review and vote on items like this between quarterly TAC meetings as necessary. Farnsworth said he understood the TAC's concern and the EDO will avoid this in the future.

An EDO team consisting of Weschler, Fancher, and Casavant presented the draft Sediment Augmentation Synthesis Report being developed for TAC review in late August and early September. The report provides information to address Extension Big Question #3: Is sediment augmentation necessary to create and/or maintain suitable whooping crane habitat. Results from the evaluation of trends in incision prior to full scale implementation was presented by Weschler. Fancher presented the evaluation of longitudinal change after sediment augmentation. Casavant presented volume analysis of aggradation, degradation, and lateral erosion both pre- and post-augmentation.

Henry asked how problematic is station 70,000, an area of incision within the J-2 return channel pointed out in the longitudinal analysis? Is it a problem due to the breakthrough channel that has been fixed, or is it a current, ongoing process that may propagate downstream? Jenniges asked what the EDO's interpretation is, should we keep adding sediment or not? Will the incision make it to Cottonwood Ranch given the north channel sediment supply? Rabbe asked how much of the incision in the J2 reach is due to lateral erosion which we don't care about vs. bed erosion which we do care about. Farnsworth said sed aug and lateral erosion each contributed to reducing bed erosion in the J2 reach. The slope of the upper J2 reach dropped enough to generate more meanders and lateral erosion. Farnsworth said the incision and meander seen in the J2 reach will likely reach Cottonwood Ranch eventually, but we cannot predict when. The idea is to reach sediment balance by Overton bridge to avoid that. A sand dam to provide a source of sediment is one idea the EDO has been thinking about. Jenniges said that a sand dam will change the reach balance point as sediment will not be coming from the north channel, but rather from the sand dam. Stability downstream of Overton is partly due to the breakthrough in 2019, partly from north channel, and partly from sediment augmentation. Fancher was asked to predict what would happen when the incision in the J-2 channel hits the confluence of the north and south channel. She would expect a head cut and incision in the north channel that then moves down into the Cottonwood Ranch area. Fancher predicted between 20-30 years for the meander and incision to reach Overton bridge given similar conditions. Moving forward, it is good to keep in mind that a sand dam and sed aug are not necessarily mutually exclusive. Zorn reminded that the problem to avoid is abandonment of the north channel. Zorn said we are talking about Cottonwood Ranch as something to protect as whooping crane habitat, but whooping cranes have used the J2 return reach recently. So, we should stop considering the J2 reach as "not whooping crane habitat". Farnsworth summarized options to consider: 1) sand dam option; 2) stop sed aug to get rates of incision without augmentation; 3) continue as have been doing, but don't learn more than already have at this scale; and 4) double up on sed aug to maximize learning. Jenniges said other options include moving or lowering the gas pipeline to open up the breakthrough channel. Rabbe said the TAC will need to make a recommendation before the next June GC to decide what to do for 2024. Brei reminded because of the lag in LIDAR data, the TAC will not have information from the 2023 year without augmentation to help with the decision on what to do for 2024. Farnsworth summarized the big picture takeaways: Lateral erosion in the J2 and sediment from the north channel helping to keep sediment balance downstream of the Overton bridge. Smith said we need to sync up gaming out of options with GC and TAC involvement. We will need to engage the GC and bring them along with the science and in the development of sed aug alternative management actions, otherwise may get immediately shot down at the GC level. He suggested we need more engagement than just recommendations to the GC from the TAC. Rabbe and Jenniges said the TAC will review the science and make recommendations, but will let the GC make their own decision. Farnsworth said that any management action that has to be done indefinitely is not ideal. Jenniges and Farnsworth agreed that the "no go" decision made by the GC for 2023 provides money for developing alternatives

like the sand dam option and getting a better idea of the cost for this option to compare to the cost of sed aug.

Presentation: Sed_Aug – July 23 TAC

EDO ACTION ITEMS:

- Send out Sediment Augmentation Report together with Peer Review Scope of Work for this report to TAC by **Aug 21, 2023**.
- Work with TAC to develop alternatives to current sediment augmentation implementation plan for GC to consider by June 2024.

TAC ACTION ITEMS:

- Review and provide feedback on Sediment Augmentation Report, accompanying Peer Review Scope of Work, as well as provide questions to be addressed by peer reviewers by **September 15, 2023**.
- Inform their GC members of the peer review process and that they will be asked to approve peer review / appoint peer review panel members for the Sediment Augmentation Report at the December GC meeting.
- Work with EDO to develop alternatives to current sediment augmentation implementation plan for GC to consider by June 2024.

ISAC

ISAC Feedback from Science Plan Reporting Session

Smith provided an overview of the feedback provided by the ISAC in their ISAC Report on February 2023 Science Plan Reporting Session (SPRS). The EDO Responses shared with the TAC now and also with the ISAC in October reflects that the EDO is listening and responding to a GC appointed ISAC. TAC are being asked to review both ISAC feedback and check in on EDO responsiveness. Is the EDO doing enough to address ISAC concerns? Are there other things we should do? Please add your comments to the EDO Responses spreadsheet.

Jenniges asked the EDO to follow the ISAC suggestion for presentations on pallid sturgeon genetics, and make a plain language summary of objectives, outcome (what does it mean and how used by the Program) for all documents and presentations. Farnsworth said that the *Phragmites* study will be contracted out for next year. The EDO is developing an RFP and Scope of Work for the 2024 field study. Henry mentioned some of the things the EDO had done in 2023 to modify the *Phragmites* study to address ISAC comments. She wanted TAC to know that study was very much still ongoing and being led by Bruggeman for the 2023 growing season.

Documents:
05_ISAC Final Report on Feb 2023 SPRS
06_EDO Responses to ISAC Recommendations_Feb 2023 SPRS

EDO ACTION ITEMS:

- Work with EDO staff to include a plain language summary at the front of all documents and presentations.

TAC ACTION ITEMS:

- Review ISAC Report and EDO Responses from February Science Plan Reporting Session and provide any additional comments by **September 22, 2023**.

Filling Open ISAC Position

Smith gave the TAC an update on the selection process for filling the open ISAC geomorphology position. The selection panel chose five candidates to interview. It is now up to the selection panel to make a recommendation to the GC. The plan is to have the GC review candidate information and vote electronically to approve the candidate selected and a 3-year agreement for service on the ISAC.

DAY #1 REVIEW & WRAP-UP

Scheel reviewed the action items from the first day and invited TAC members to a group dinner. Action items and motions from both days are combined in a meeting wrap-up at the end of this document.

Kingsley asked if the Peer Review Scope of Work for the Sediment Augmentation Synthesis Report would come together with that Report on Aug. 21st for review and TAC input? Smith said yes. Jenniges asked if the TAC could add additional feedback to the ISAC feedback on the Science Plan Reporting Session as well as comment on EDO responses to the ISAC. Smith said yes, we want it all. If there are additional comments that need to be addressed with the TAC, please let us know so we can put them on the agenda.

DAY 1: TAC MEETING END

The TAC meeting adjourned at 4:52 PM Central Time.

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

Technical Advisory Committee (TAC) Virtual Meeting

Meeting held in-person at ED Office in Kearney, NE

Day 2: Wednesday, July 19, 2023; 8:00 AM – 12:00 NOON CST

Technical Advisory Committee (TAC)

State of Wyoming
Michelle Gess – Alternate
Jeremy Manley – Alternate

State of Colorado
Kara Scheel – Member

State of Nebraska
Caitlin Kingsley – Member
Jennifer Schellpeper – Alternate

Upper Platte Water Users
n/a

Downstream Water Users
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WELCOME & ADMINISTRATIVE

Scheel called the meeting to order at 8:02 AM Central Time.

AGENDA MODIFICATIONS

01_07-18-2023 PRRIP TAC Meeting Agenda

Baasch asked to circle back for a moment to the wet meadow study. He asked why the Program chose to peer review the wet meadow hydrology study, what is the use relevant to Program objectives? Farnsworth said the study is both a wrap-up of wet meadow hydrology monitoring that the Program has been doing for years, and a Science Plan Big Question to be finished up with peer review. Jenniges said the Land Plan has a wet meadow component. Walters said the peer review serves as a check on methods and conclusions.

TARGET SPECIES

Whooping Crane Riverine Roost Site Selection

Farrell presented the current update to the Program's whooping crane roost site selection analysis. He explained that this analysis is an update to a previous analysis done by the Program that adds five more years of data and serves as a check in on the factors that are important for roost site selection. The current analysis also includes area-based landcover composition around roost and available sites as explanatory variables in the analysis, which is different than the previous analysis of point-based on-channel metrics only. Farrell summarized methods and initial results from the analysis for on-channel metrics only, explaining that the EDO had found an error in the final landcover product used to quantify landcover around roosts and available sites. This error must be corrected and the analysis run again, thus results in the document sent out to the TAC are subject to change. The EDO will correct the error, revise the document, and send it back out to the TAC for review by September 18th.

In response to Farrell's explanation that the relationship for unit discharge is likely explained by the lack of roosting in side channels which typically have higher unit discharge, Baasch suggested combining flow across channels to control for the effect of side channels on unit discharge. Farnsworth said the hydraulic model splits flow, so we have channel-specific flow information. Rabbe asked if the unit discharge metric was trying to get at water depth? He reminded the TAC that the ISAC had said they did not like this unit discharge metric, and asked if we could just use depth instead. Farnsworth said we do not have real depth at the roost location, unless we go out and measure it at the time the crane is using it. We will need to use telemetry data to get at flow to resolve the temporal mismatch between when whooping cranes are observed and when they are deciding to stop on the Platte. Baasch said there is probably a correlation between wetted width and unit discharge that we could look at with a correlation matrix. Jenniges mentioned a correlation between unobstructed channel width and unit discharge is shown in the report. Farnsworth said hydraulic metrics like wetted width and unit discharge should be correlated. Unobstructed channel width is a habitat metric that combines both channel morphology and vegetation height. The better way to address questions about flow is with telemetry data. Baasch expressed concern that we may not have enough stops within the AHR to do a powerful statistical analysis. Baasch asked if the EDO was going to reanalyze the nearest forest metric as well, given the error in landcover pointed out? Farrell said yes. Hegg asked about the definition of nearest forest, is it a single tree or a row of trees you measure from? Farrell said the decision rule was made from a whooping crane perspective in terms of site obstruction, thus any single tree or group of trees nearest to whooping crane location was measured. Hegg asked the EDO to use Program data to see if that

nearest forest metric was different depending on the scale of the stand of trees from which it was measured. Farnsworth said we can look at whooping crane data after 2017 with LIDAR to look at how close stands of 3m or less in size, stands of 6m, 9m, etc. are to roost locations. Davis said we could group by tree patch size and see which patch sizes influence nearest forest metric. This could be done along a revised timeline, as it will take some time to do. Rabbe asked if there were any value in running flow as an explanatory variable by itself? Farnsworth said roost locations and available locations are paired with each other within 10 miles upstream and downstream. Thus there is only one gage-derived flow at both use and available locations that are being compared. With telemetry we can do this better. Ostrom asked if we could use flow at different gages. Cognac said the hydraulic model already accounts for flow differences in side vs. main channels that impact unit discharge. Farnsworth said flow is meaningless without channel relationship. Flyr said what you really want is stage, that would be most useful. Farnsworth said we want average and variability for each channel section. Baasch asked if we might want to eliminate unit discharge as a variable since it is problematic. Farnsworth said what unit discharge really shows is the difference between side channels and main channels. Casavant said this analysis uses the 1D HEC-RAS model, so unit discharge is really an approximation over large temporal and spatial scales. Ostrom asked about collecting information on the relationship between flow, stage, unit discharge in the field when whooping cranes aren't there. Bruggeman mentioned that the EDO is collecting water surface elevations to calibrate the model at multiple points across the reach. Jenniges said that unit discharge is really just a legacy variable from the previous analysis. It is not very important to the model, it is hard to interpret, and he recommended throwing it out. Henry asked about how the TAC and GC feel about eliminating the only flow-related variable being tested for impact on roost site selection given the Extension focus on water? Baasch thought the GC would be okay with eliminating this variable. Casavant asked about replacing unit discharge with wetted width? Farnsworth said it is correlated with unobstructed channel width. The TAC agreed that if unit discharge as measured is not an appropriate variable hypothesized to impact whooping crane roost site selection, it should be discarded so it is not misinterpreted.

Document: 07_WC Riverine Roost Site Selection Analysis Update TAC July 2023
NOTE: Revised version of document will be sent out by September 18th.
Presentation: Whooping Crane Roost Site Selection Analysis Update TAC July 2023 Final

EDO ACTION ITEMS:

- Revise WC Riverine Roost Site Selection Report:
  - correct errors in tree clearing layers
  - remove unit discharge as an explanatory variable
  - rerun analysis
  - revise report accordingly
  - send revised report to TAC by **September 18, 2023**
- Explore effect of single tree vs tree patches on our distance to nearest forest metric and share with TAC.

TAC ACTION ITEMS:

- Review and provide feedback on WC Riverine Roost Site Selection Report by **October 2, 2023**.
- TAC discussion of WC Riverine Roost Site Selection Report at **October 10, 2023** TAC meeting.

Spring 2023 Whooping Crane Monitoring Report

Bruggeman presented the 2023 Spring WC Monitoring Report to the TAC. He provided context for why and how the Program conducts monitoring of whooping crane use of the AHR during migration. He also summarized monitoring effort, groups observed, and stopover metrics such as proportion of the population observed along the AHR through Program systematic monitoring, and number of crane use days documented by Program efforts. River discharge at gages nearest to whooping crane observation locations as well as unobstructed channel widths and distance to nearest forest at whooping crane observation locations were presented. Bruggeman also reviewed the change to the report that followed from the TAC recommendation and GC approval of reporting performance metrics over time for only those observations made during the dates encompassing the 5th and 95th percentile of whooping crane group observations in Nebraska according to the FWS public sighting database.

Baasch asked how the off-channel unique crane group was identified? Jaymes said that Brian Peterson made the observation during a ground search near Cottonwood Ranch as part of the monitoring protocol. Baasch noted that nearest forest was the metric reported, but that unforested corridor width might be a better variable to present. Henry asked if Baasch would like to see that metric in the report. Baash said not necessarily, but it might be better since it takes into account what is on both banks. Baasch also asked how the EDO adjusted performance metrics (proportion of the population and crane use days) if birds stayed longer or arrived earlier than the dates encompassed by the 5th and 95th percentiles? Bruggeman said all observations made through PRRIP monitoring effort are included in the report as numbers of groups and individuals observed over the season (also summarized in Appendix B). However, for the sake of comparability across time, observations made outside the dates encompassed by the 5th and 95th percentile were not included in the adjusted proportion of the population and adjusted number of crane use days (Fig 4 b and Fig 5) which documents observations made by systematic PRRIP monitoring efforts within the 5th and 95th percentile date range over time. Rabbe asked how long figures for both the unadjusted and adjusted performance metrics would remain in the report. Bruggeman said that both figures will again appear in the fall monitoring report to demonstrate any adjustments to previously reported metrics due to standardization of reporting only observations falling within the 5th and 95th percentile dates. He suggested maybe including both figures for another season after that, but then only presenting the adjusted figure. Bruggeman asked how long the TAC would like to see both adjusted and unadjusted figures? Rabbe and Zorn said they thought it was important to capture all the observations from monitoring and would like that reported somewhere. Henry said both figures were included here for a couple of reasons. The EDO wanted to document the change to reporting performance metrics over time standardized to the dates corresponding to the 5th and 95th percentile date of observations for the previous 10 years. In the future, you can refer to these reports to understand why, when, and how the change was made. Secondly, the TAC and GC could see how this change shifts performance metrics that were reported in the past and contained within older approved reports. It is useful to document the change. The idea was to do this over a couple of seasons for the sake of record keeping and transparency but reporting two values (unadjusted and adjusted) for proportion of the population observed using the AHR and crane use days may be confusing for the GC. Which value is correct? In addition, the TAC recommended and the GC approved the change to standardize these performance metrics to the 5th and 95th percentile dates because they believed that was the better way to present comparable data over multiple years. Henry, Rabbe, and Zorn agreed that the full dataset with all observations of WC groups during the monitoring season is included in Appendix B and in the FWS public sighting data contained within Table 7, so that information is not lost. Baasch

asked if the fall 2023 monitoring period would be changing according to the TAC recommendation? Bruggeman said, no, the monitoring period change does not go into effect until spring of 2024.

Document: 08_Implementation of the Whooping Crane Monitoring Protocol – Spring 2023 Draft Report
Presentation: Whooping_Crane_Spring_Report_TAC_2023_071923

TAC MOTION: *Jenniges moved, and Rabbe seconded to recommend the 2023 Spring WC Monitoring Report to the GC for their review. There was no opposition to the motion, and the motion passed.*

Tern and Plover Predator Monitoring Manuscript
Henry reminded the TAC of the EDO plan introduced at the April TAC meeting to revise a chapter from Keldsen's master's thesis for possible publication. The chapter tested the effectiveness of predator fencing and panel wings placed at the entrance of tern and plover nesting peninsulas for reducing predator presence on the nesting site. Though the pilot study was useful for identifying the predator community at nesting sites, and demonstrated effectiveness at reducing breaches at the peninsula entrance, study design limits conclusions that can be drawn and value for publication. The EDO would like to let Keldsen's thesis serve as the published work documenting this research effort and devote time and effort to evaluating current predator management with the benefit of a better study design.

Jenniges said it is up to the EDO on items like this whether they would like to publish it or not. Hegg asked if the EDO would be using the pilot study data. Henry said we learned about our mammalian predator community from the pilot study and that we needed more than just a barrier at the land bridge, which led us to our current fully fenced nesting sites for testing. We will use the long-term tern and plover reproductive data from that pilot study as well. The camera data may not be relevant for our current study because of differences in study design and camera effort. Baasch said he agrees with not publishing the pilot study, saying we have indicators of effectiveness, but annual and site level variability make it hard to publish. Hegg asked if we have other variables to consider in the analysis? Henry asked if she meant site, year, weather, etc.? Henry said we have also included type of predator such as mammalian vs. avian. We are looking at comparing predator presence and productivity before and after at the same site, and accounting for high variability by using control sites as a baseline in a BACI type design. Bruggeman said our first round of effectiveness evaluation is scheduled for 2024.

RELEVANT SCIENCE ONBOARDING

Relevant Science Articles
Henry reminded the TAC that the Ecotope article was discussed at the April TAC meeting and was brought back to the TAC at their request for further discussion. The goal for the discussion was to recap the information contained within the article so everyone was on the same page, decide if and why this article is important for the Program, decide how to convey this information to the GC, and decide if the TAC would like to make any formal recommendations to the GC with regard to onboarding the science presented in the article.

Jenniges said the ISAC already dealt with this issue at the Reporting Session by saying there would always be contradictory science. They advised to recognize it exists; if relevant, address; if no changes in Program management, move on. Smith asked what was meant by address it, that is what we are trying to get at here. Scheel asked if there were any management implications. Jenniges said the implication is on the Program's definition of a wet meadow. We need to address what is a wet meadow, it is at the

heart of the issue. Farnsworth said the ISAC thinks in terms of science, that is their job, but the EDO and the TAC need to focus on providing information to the GC on how to allocate resources moving forward into the 2nd Increment. We do not want to get into a situation where we have competing science without a clear path indicating which way to move forward. Schellpeper said it is a TAC obligation to provide decision-makers with information as it comes in. In the ISAC Report from the Reporting Session they provide a framework for evaluating this science as it comes in. It is the TAC's job to do a technical evaluation. Jenniges asked what is the question the GC will have to answer relevant to this article? Will there be more land acquisition? Do you want it to be more wet meadow? Jenniges said no information is "off-limits" in negotiations. Redoing analysis with new landscape is waste of time. We do not know the conditions of wetlands experienced when cranes were there. Jenniges said maybe we wait for the telemetry to see what whooping cranes actually use. Baasch said we may not have enough data from telemetry. Jenniges pointed out that saying this article is not relevant to the Program because it used different methods or because Program analyses say whooping cranes don't use wet meadows is a very different argument than saying the article isn't relevant because there are no more wet meadows to buy, or we are not changing management anyway so it isn't relevant. Schellpeper asked if we changed management because of the WEST diurnal analysis. Baasch asked if wet meadows got left out of the Science Plan because Program study said whooping cranes didn't use it. Jenniges said yes, management was based upon vegetation height instead of wetland components. Farnsworth said we used the regulatory definition of wet meadows (tract-level) instead of other definitions. Results indicated non-selection of wet meadows. Whooping cranes selected the river and corn more often than wet meadows for diurnal use. From then on wet meadows were no longer a focus for target species. Jenniges said the Land Plan still requires 640 acres of wet meadow at each complex. No one is promoting getting rid of wet meadows. Farnsworth said wet meadows became more important for the benefit of other species. The Ecotope article says that whooping cranes use the wet part of wet meadows. What can we do to help the GC understand what these differences in study findings mean? Are wet meadows important for whooping cranes or not? Rabbe asked what management actions you could take either way? Look for and acquire more wet meadows. Restore wet meadows or make them wetter by adding water over the top. Management intensity and cost will determine how much certainty is needed around whether that action will benefit whooping cranes or not. Other species can benefit from maintenance of wet areas off-channel. Jenniges asked, but are whooping cranes going to use them? We never saw use of these. Broadscale recharge has lots of waterbird use when its full, but not whooping cranes. Dippel and Johns have some, but not a lot. Baasch said the Ecotope article suggests a different definition for wet meadows, and if adopted, would break wet meadows into drier and wetter components. In the past, if a large block of grassland remained it was assumed it would be too wet to farm, and was defined as a wet meadow. Maybe a 300 acre wet meadow tract becomes 60 acres of true wet meadow with the rest being upland grassland. Walters asked if we should use the Ecotope definition of a wet meadow. Jenniges said it provides a more defined wet area within grasslands, and we could manage those areas differently. The wet meadow hydrology study could be used also to help delineate wet meadows. Farnsworth asked what is the downside of doing the WEST-Ecotope comparison? Jenniges said both have the same temporal mismatch, don't know how much water was at a location at the time of use. Jenniges thought we would probably get the same result as the Baasch Ecotope paper. The original study by WEST did not use the hydrology piece with no minimum wetland component to it. Schellpeper asked how a wet meadow was defined originally. Rabbe said that goes back to the joint study with the intent of protecting remaining grasslands next to the river. Some whooping cranes used these areas, but protection of grasslands was priority. They were hooked up to whooping cranes to protect them. Thought of as a 5th Program species with ¼ of all land complexes supposed to be wet meadows. Rabbe

said the GC should memorialize existing wet meadow grassland in the Program. Jenniges said these grasslands are more valuable for other species that may enter into ESA. Walters said we need to refine the land plan definition of wet meadows and how to manage these areas. Baasch said the implication of the Ecotope article is how we define a wet meadow. Henry said she does not expect a re-do of the WEST analysis to provide same results as the Ecotope paper given the differences in dataset and analysis framework and scale. Studies were done differently with the Program pairing up use sites with available locations within 10 miles as a discrete choice, but Ecotope considered the entire AHR as available. Jenniges said we should keep the discrete choice framework. Baasch supported this as well. Farnsworth asked if we need to find out why there are differences and how to explain those differences. Rabbe said the results are not surprising given whooping crane's preference for water. Ostrom asked whether Program results back this up. Henry said the WEST study found the most important explanatory variable explaining whooping cranes diurnal use sites was the river. The Ecotope article eliminated all diurnal use of the river to ask what was important for diurnal use off the channel only. Rabbe said there was also a temporal difference between the studies, the WEST study was conducted earlier under a different set of climate conditions and amount of habitat wetness. Baasch said the Program use dataset is tied to 1st observation of the day which is riverine. Farnsworth said diurnal use was defined by a set time cut off. Flyr said that 10 years from now new folks will need reference to solid foundational documents that provide context and perspective, 1–2-page document that provides a solid background on what we know. How do we communicate these steps and decisions so new people can be up to speed when they first enter the Program for their entity? Ostrom supported re-running the WEST analysis with the updated landcover product, using the Program's previous analysis framework to do a better job with updated landcover classes. The results from that updated analysis will then be the Program's answer. Jenniges reinforced Rabbe's comment for the GC to memorialize the importance of wet meadows for their own sake. Schellpeper summarized what she had heard from the TAC thus far in an attempt to develop definitive statements for the GC:

1) The Ecotope article is a peer-reviewed, published paper.
2) If separate the wet portion of wet meadows from the tract as a whole you will get a different answer.
3) This moves us to redefine a wet meadow from a science and land management perspective. We need to add clarity to the definition as all wet meadows are not alike. What is a wet meadow in relation to whooping cranes? What is a wet meadow in relation to the regulatory definition?
4) if all grasslands are not equal in terms of whooping crane habitat, can we manage the wetter portions of them differently, focus management on those wetter portions rather than just managing them for structure?
5) Rerun WEST analysis with updated landcover information to better compare results of Ecotope and WEST studies. Jenniges asked if the EDO would need additional staff to re-run the WEST analysis. Farnsworth said no, Farrell can do the analysis. For clarification Scheel recapped that no one was talking about getting rid of wet meadows, there were not many of them out there to acquire, and the TAC was not proposing excavation for wetland restoration.
6) The Science Onboarding process is not a one-time thing. It is something the TAC will need to deal with as new information comes along. The process will need to be question specific and problem specific.

Gess asked the TAC to clarify whether or not the TAC was looking to redefine wet meadows in terms of land goals. How would redefining a wet meadow impact the Program's land goals? Jenniges and Rabbe agreed that this would not change policy-level definitions, goals, or the Land Plan. Redefining wet meadows would mean to do so in terms of science and management only. Steps moving forward today from the TAC discussion are for the EDO to take a first shot at revising document 10 (below) sent out as

a pre-read for this discussion to reflect TAC discussion today. The TAC will review/revise that memo. If needed, the TAC can participate in a virtual meeting to resolve any disagreement or modify approach. Then the memo will go to the GC for their September meeting. Schellpeper asked why the Ecotope research was done outside the Program? She asked if the TAC had been made aware of or discussed the research prior to publication. Baasch said there was a question around why the meadow marsh signal was different in the AHR when compared to a corridor-wide analysis. The wet meadow polygons used by the Program seemed inappropriate and they wanted to adjust for the discrepancy. Rabbe said there had been no real consensus on the definition of a wet meadow, rather the Program's definition was agreed upon as a compromise between several different definitions from many perspectives, so they did it on their own.

Documents:
09_Baasch et al. 2022 Whooping Crane (*Grus americana*) use patterns in relation to an ecotope classification in the Central Platte River Valley, Nebraska, USA. https://doi.org/10.5751/ACE-02311-170235
10_DRAFT 2023 PRRIP Ecotope Article Onboarding Memorandum

EDO ACTION ITEMS:

- Draft a memo to summarize information TAC would like to provide to the GC with regard to the Baasch et al. 2022 Ecotope paper and potential implications this paper may have for Program science, management, and policy. Memo will contain a list of TAC recommendations to the GC. By **July 28, 2023**.
- Incorporate TAC feedback to finalize memo by **September 11, 2023.**
- Onboarding of Baasch et al. 2022 Ecotope paper presented to the GC at September meeting.
- Pending GC guidance from September meeting, rerun the WEST analysis with updated, finer scale landcover product from the Baasch et al. 2022 Ecotope paper.

TAC ACTION ITEMS:

- TAC review of EDO draft memo to summarize information and make TAC recommendations to GC with regard to the Baasch et al. 2022 Ecotope paper by **Aug 15, 2023**.

TAC MOTION: No motion made at this time.

FUTURE AGENDA ITEMS

Future TAC Agendas

Baasch let the TAC know that he was asked to review a new USGS Northern Prairie Wildlife Research Center paper on the intensity of tern and plover nest monitoring, so to keep an eye out for that paper.

TAC MEETING REVIEW & WRAP-UP

Meeting Feedback

Scheel circled back with the TAC to summarize ACTION ITEMS and TIMELINES.

ACTION ITEMS

EDO:

- Work with EDO staff to include a plain language summary at the front of all documents and presentations.
- Finalize April TAC minutes and post as public document.
- Send out calendar reminders to TAC marking deadlines for TAC feedback on documents according to the timeline established at the meeting.

Germination Suppression Release

- Contact the Service re: possibility of an EA water release during fall 2023 WC migration and development of a preceding AOP.

Science Onboarding

- Draft a memo to summarize information TAC would like to provide to the GC with regard to the Baasch et al. 2022 Ecotope paper and potential implications this paper may have for Program science, management, and policy. Memo will contain a list of TAC recommendations to the GC. By **July 28, 2023**.
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Sediment Augmentation

- Send out Sediment Augmentation Report together with Peer Review Scope of Work for this report to TAC by **Aug 21, 2023**.
- Work with TAC to develop alternatives to current sediment augmentation implementation plan for GC to consider by June 2024.

WC Riverine Roost Site Selection

- Revise WC Riverine Roost Site Selection Report:
  - correct errors in tree clearing layers
  - remove unit discharge as an explanatory variable
  - rerun analysis
  - revise report accordingly
  - send revised report to TAC by **September 18, 2023**
- Explore effect of single tree vs tree patches on our distance to nearest forest metric and share with TAC.

TAC:

Wet Meadow Study

- Review and provide feedback on Wet Meadow Hydrology Study by **Aug 11, 2023**.
- Review and provide feedback on Wet Meadow Peer Review Scope of Work, including providing additional questions to be addressed by peer reviewers by **Aug 11, 2023**.

- Inform their GC members of the peer review process and that they will be asked to approve peer review / appoint peer review panel members for the Wet Meadow Hydrology Study at the September GC meeting.

Science Onboarding
- TAC review of EDO draft memo to summarize information and make TAC recommendations to GC with regard to the Baasch et al. 2022 Ecotope paper by **Aug 15, 2023**.

Sediment Augmentation
- Review and provide feedback on Sediment Augmentation Report, accompanying Peer Review Scope of Work, as well as provide questions to be addressed by peer reviewers by **September 15, 2023**.
- Inform their GC members of the peer review process and that they will be asked to approve peer review / appoint peer review panel members for the Sediment Augmentation Report at the December GC meeting.
- Work with EDO to develop alternatives to current sediment augmentation implementation plan for GC to consider by June 2024.

ISAC
- Review ISAC Report and EDO Responses from February Science Plan Reporting Session and provide any additional comments by **September 22, 2023**.

WC Riverine Roost Site Selection
- Review and provide feedback on WC Riverine Roost Site Selection Report by **October 2, 2023**.
- TAC discussion of WC Riverine Roost Site Selection Report at **October 10, 2023** TAC meeting.

TAC MOTIONS
- April 12, 2023, TAC Meeting Minutes approved with typo corrected in line 114.
- TAC recommendation to GC to approve the 2023 Spring WC Monitoring Report. Will go to GC for approval at September meeting.

Future calendar events:
- September 18-19, 2023 GC meeting, Kearney Public Library, Kearney, NE
- October 10-12, 2023 TAC + fall ISAC meeting, Kearney, NE

DAY 2: TAC MEETING END

The TAC meeting adjourned at 11:46 AM Central Time.