Platte River Recovery Implementation Program

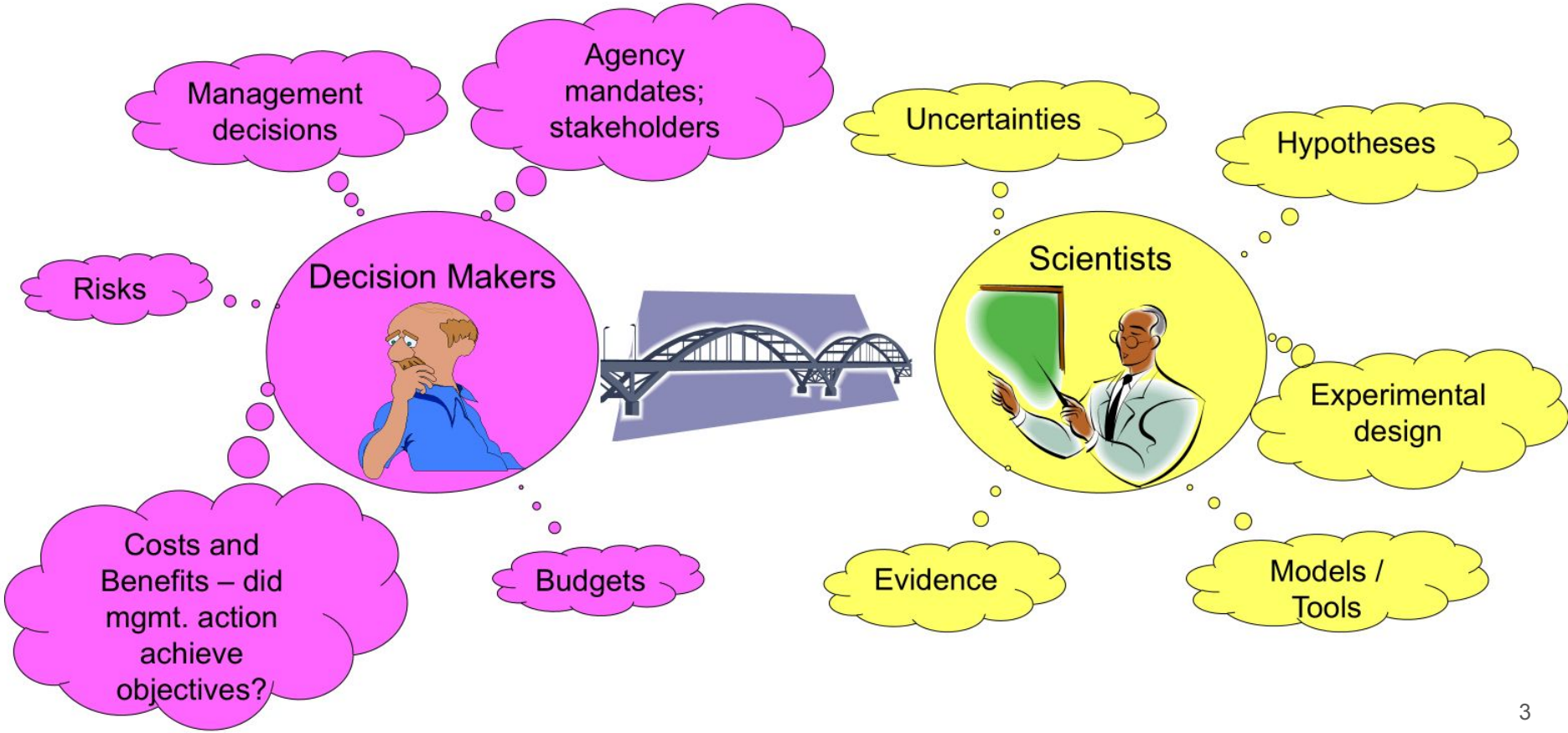
Summary of ISAC Report for July 2024 ISAC Meeting

September 4, 2024

ISAC Members

David Marmorek, ESSA Technologies Ltd. (Co-Chair)
Jennifer Hoeting, Colorado State U. Emeritus (Co-Chair)
David Galat, University of Missouri (Retired)
Alan Kasprak, North Rim Research, LLC
Aaron Pearse, U.S. Geological Survey
Michal Tal

Making science relevant to decisions



ISAC Question 1: Extension Big Question (EBQ) Reframe

What is the ISAC's Assessment of the following question for each EBQ presented in the Reframe Document:

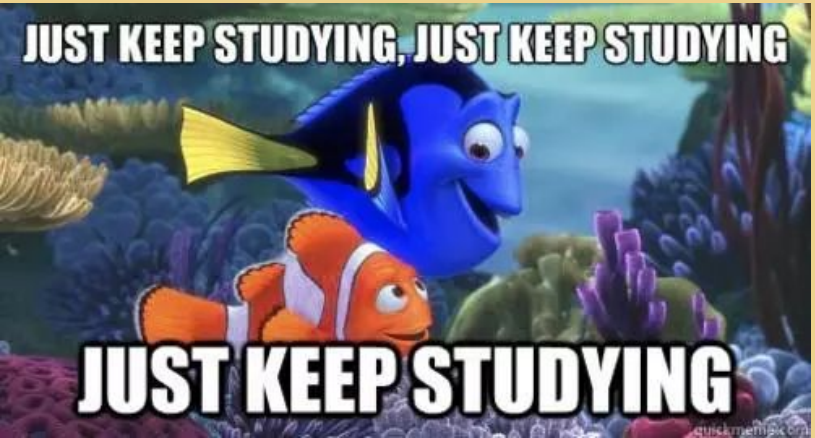
Do we know enough already to estimate relationships (with confidence) and stop focusing on this EBQ?

ISAC Question 1: Do we know enough already to estimate relationships?

Overview:

The ISAC recommends <u>further study</u> for all EBQs except EBQs 6 (fall vs spring WC use) and 10 (wet meadows).

Further study will substantially improve the quality of information available for PRRIP management decisions.

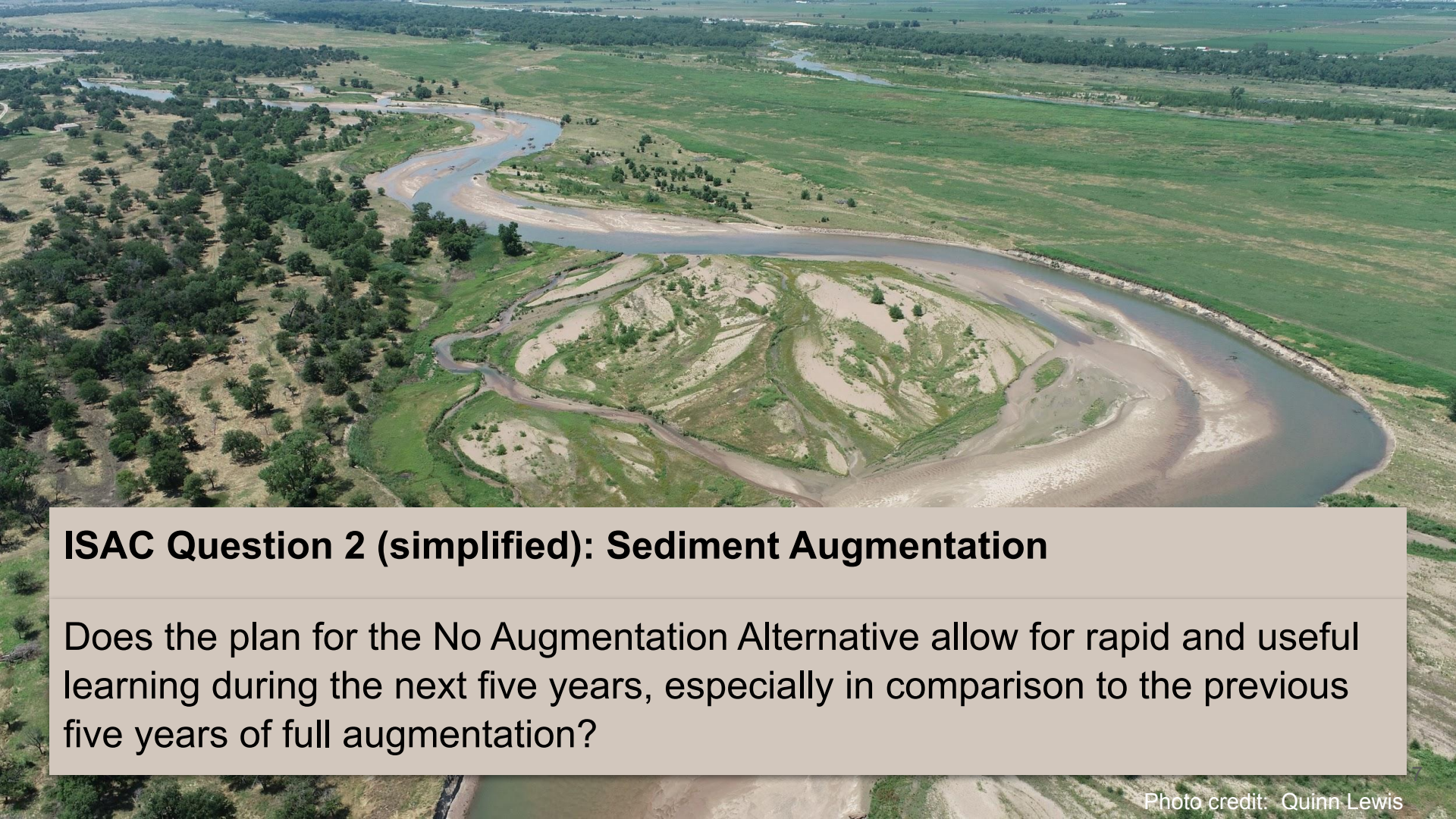


VS

ISAC Question 1: Overview

We recommend the EDO carefully consider defining success metrics for each EBQ.

Example: a success metric for WC habitat could be defined as the proportion of channel segments with widths ≥ 650 feet.



ISAC Question 2 (simplified): Sediment Augmentation

Does the plan for the No Augmentation Alternative allow for rapid and useful learning during the next five years, especially in comparison to the previous five years of full augmentation?

Photo credit: Quinn Lewis

ISAC Question 2: Sediment Augmentation

Overview

- The No Augmentation monitoring plan is well designed.
- The 5-year experiment may provide useful contrasts with the preceding augmentation period to inform decisions about sediment augmentation.
- Given the short timescale and potential confounding factors, the results will probably be messier than "it worked" or "it didn't work".

ISAC Question 2: Sediment Augmentation

What is the “off switch” for the no-augmentation experiment?

Program should identify clear benchmarks for making annual decisions regarding continuation, cessation, or alteration of the experiment.

- Establish quantitative and spatial metrics
- Example: “if x meters of bed incision are observed at location y, then the experiment will be ended”.

ISAC Question 2: Sediment Augmentation

Use available sediment/morphodynamic models and data to simulate the No Augmentation experiment:

- to determine appropriate metrics,
- to establish thresholds and traffic light ranges of metrics, and

  🟢all OK, 🟡potential problems, 🛑stop
- to assess the ability to detect exceedance of those thresholds (essentially a statistical power analysis).

ISAC Question 2: Sediment Augmentation

What are objectives for management in J2-Overton reach?

- Is goal to prevent degradation of Platte River channel at or downstream of Overton?
- Or, is goal to build and maintain habitat in J2 return channel?

Cranes are using habitat upstream of Overton bridge.

- Should Program goals be updated to maintain available habitat in J2 reach?

Is crane habitat along the J2 return channel a priority?

- If yes, then channel planform is an important consideration.
- If no, then evolution towards equilibrium channel is what matters, regardless of planform.

ISAC Question 2: Sediment Augmentation

Go further than 'does sediment augmentation work?'

Aspects of flow (magnitude, duration, rate of change) are just as important in river change as sediment supply.

Can changes in J2 flows be used in tandem with sediment augmentation to slow/stop degradation?

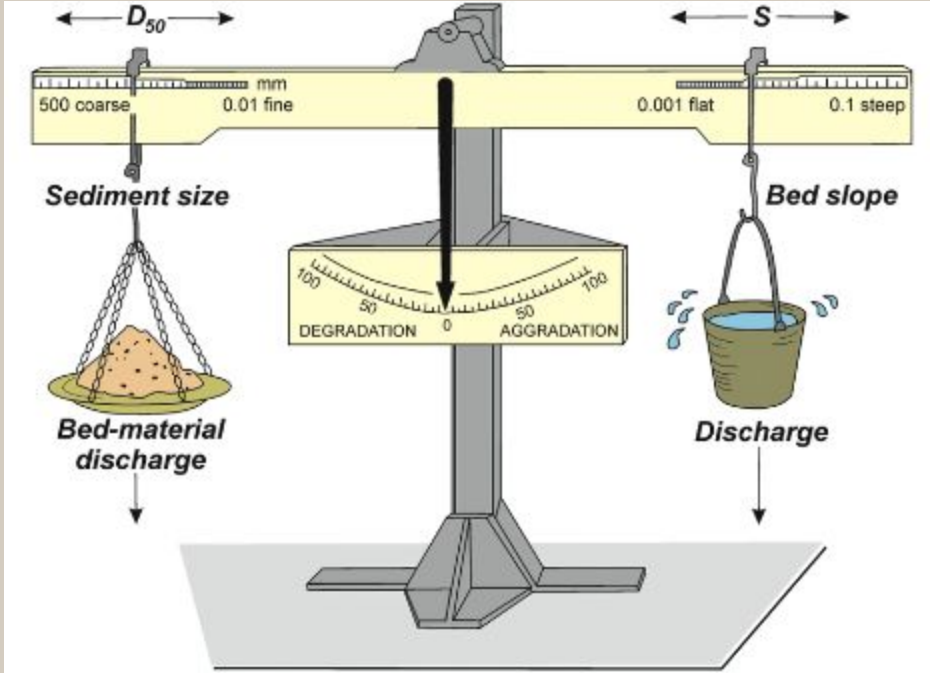


Figure 1: Illustration of Lane's Balance from Rinaldi et al.
https://www.researchgate.net/profile/Massimo-Rinaldi-2/publication/283538764

ISAC Question 2: Sediment Augmentation

Account for confounding environmental and geomorphic factors in the analyses including

1. Potential ***differences in flow*** between the augmentation and no-augmentation periods, and
2. Potential ***lag time*** between the cessation of sediment augmentation and the emergence of observable geomorphic change.

ISAC Question 2: Sediment Augmentation

- **Compare Pre-Aug to Aug and No-Aug**

  A quantitative/volumetric approach may not be possible, but even a qualitative comparison would be valuable.

- **Compare downstream of J2 to a control reach**

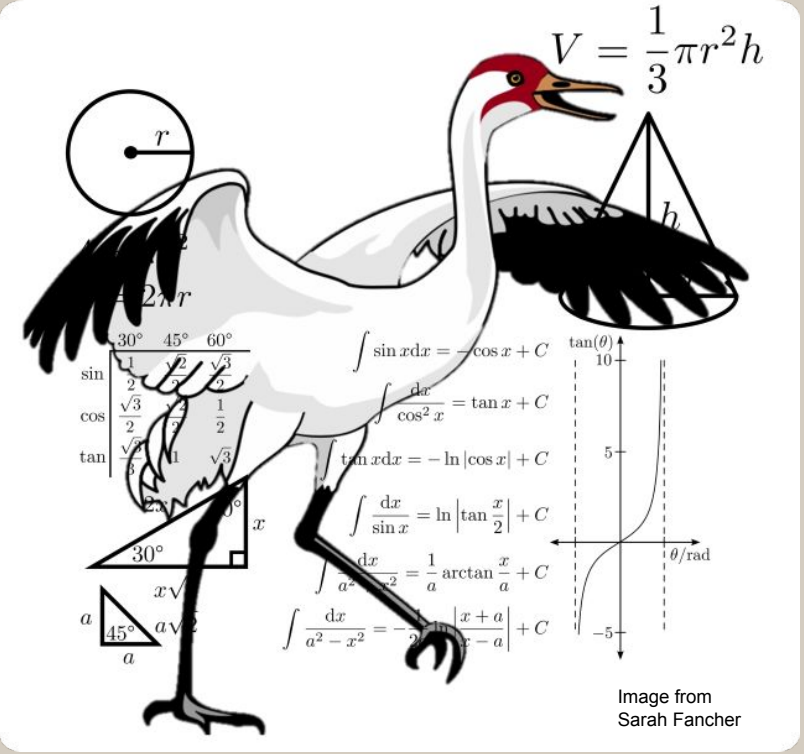


Image from Sarah Fancher

ISAC Question 2: Sediment Augmentation

- We have discussed the main recommendations for ISAC Q2.
- See the ISAC report for many additional technical recommendations.

ISAC Question 3 (Simplified): Whooping Crane Roost Site Selection Technical Report

- How might the Program assess the uncertainty in resource selection relationships to estimate resource allocation tradeoffs?
- Example: how much confidence would you place in WC response to incremental increases in UOCW past 500 ft, 650 ft, 800 ft, 1,000 ft, etc.?
- What data would you use as SDM input for expected outcome?

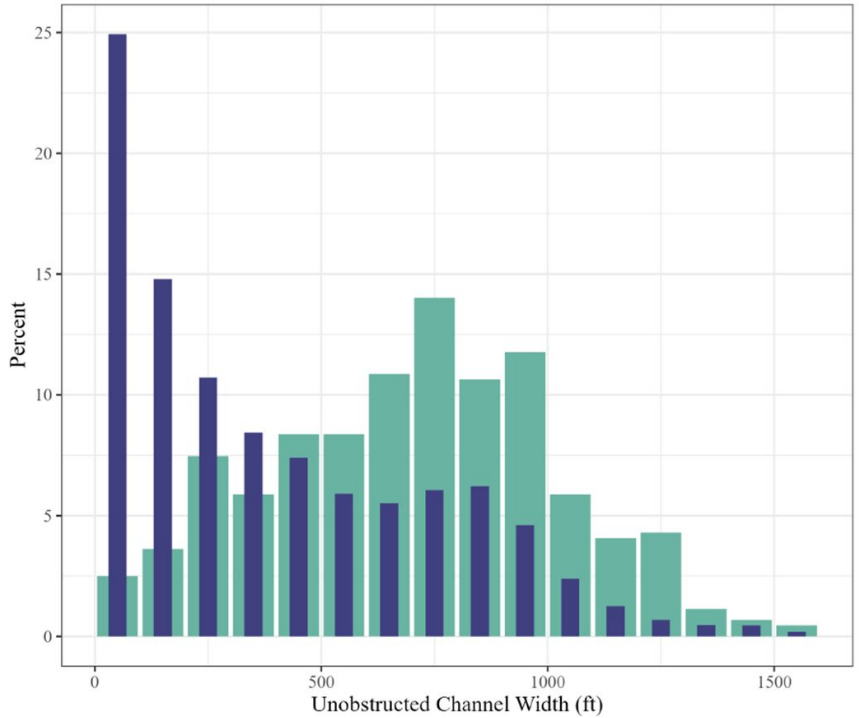
Photos: texashighways.com & Mallory James

ISAC Q3: Policy issues

Demonstrate and report the impact of the PRRIP on channel widths managed for WC use on Program-managed land.

➔ What percent of the roost and non-roost sites are managed by the Program?

➔ Which sub-reaches the AHR have a UOCW of 650? Which of these are managed by the program and which are not?



ISAC Q3: Biology / Policy issues

If there is uncertainty in the Program as to whether the 650 ft UOCW target should be changed, use SDM to proceed.

- Which sub-reaches of the AHR could have an UOCW of 650, 800, or 1000 ft?
- How much would it cost to increase the UOCW to 1000 ft?
  Does the cost vary by AHR section?

ISAC Q3: Biology / Policy issues

If desired, one possibility for a new management strategy:

- 650 feet minimum,
- 1000 feet (or similar) in locations where the river can maintain such widths.

ISAC Q3: Biological issues

Consider multiple lines of evidence when considering how to identify resource allocation tradeoffs in a SDM framework:

- Resource selection model,
- Probability of stopping at the river and length of stay (EBQ 4 & 5),
- Crane use by river channel width categories,
- And more

ISAC Q3: Biology / Policy issues

Multiple lines of evidence

Resource selection relationships developed in the Program report are useful for understanding

- what factors influence differential use of Platte River roost sites, and
- what values those factors would need to be at to maximize site selection.

ISAC Q3: Biology / Policy issues

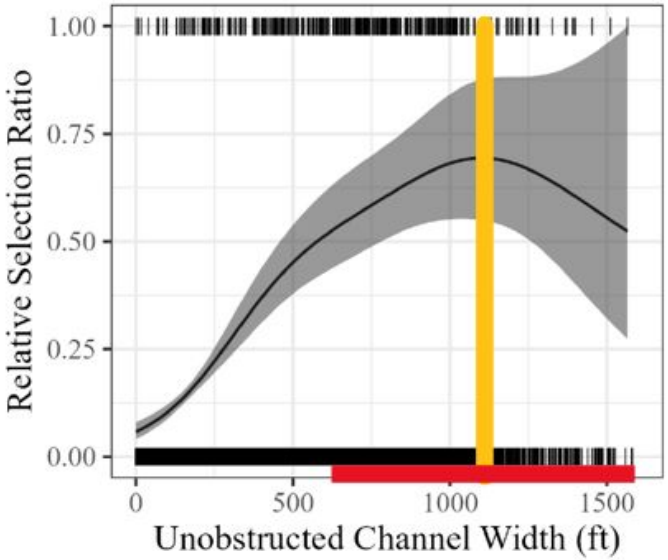
Multiple lines of evidence

Analyses of probability of stopping at the river and length of stay (EBQ 4 & 5) should provide useful insights to supplement what has been learned from the resource selection report.

ISAC Q3: Statistical issues

What are appropriate uses of the resource selection function model?

- Appropriate: for a specific UOCW, what is a 95% CI (or PI) for the Relative Selection Ratio (RSR)?
- Can't do: what is a 95% CI for UOCW when RSR is above 50%?
- Can't do: what is a 95% CI for UOCW around the maximum RSR?



ISAC Q3: Statistical issues

When appropriate, use advanced statistical tools like bootstrapping to make inference for the Resource Selection model.

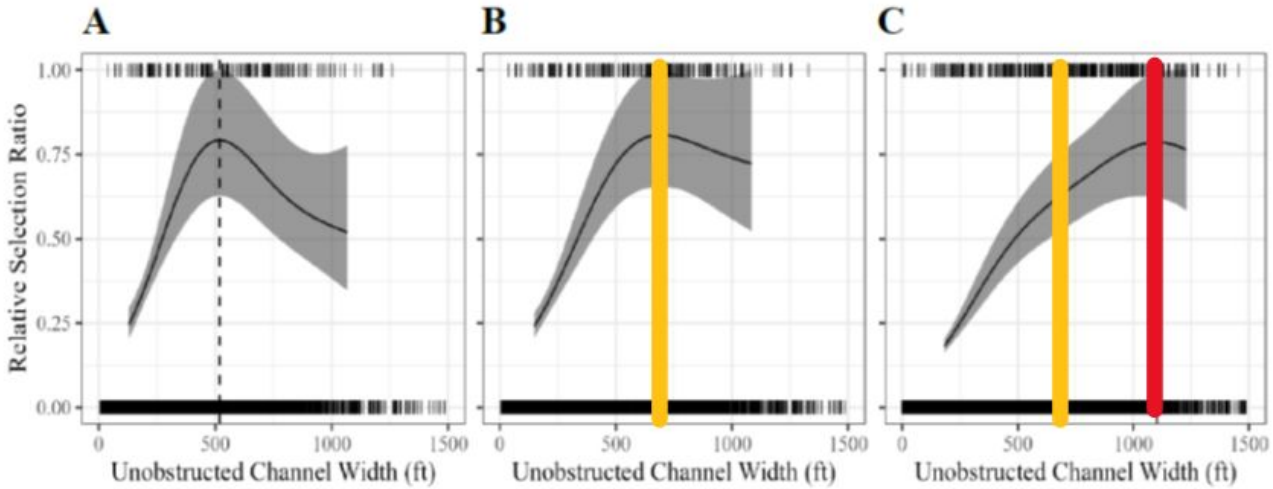


Figure 9. Predicted relative selection ratio of unobstructed channel width (UOCW) estimated from whooping crane roosts collected by systematic aerial monitoring from Howlin and Nasman (2017; A), Baasch et al. (2019a; B), and the current study from spring 2001 – spring 2022 on the central Platte River in the Associated Habitat Reach (C). The selection relationship for Howlin

Returning to ISAC Question 1

Extension Big Question (EBQ) Reframe

What is the ISAC's Assessment of the following question for each EBQ presented in the Reframe Document:

Do we know enough already to estimate relationships (with confidence) and stop focusing on this EBQ?

EBQ1: How effective is it to use Program water to maintain suitable whooping crane roosting habitat?

ISAC Recommendations

1. Examine multi-year patterns of discharge, and their eco-geomorphic implications.

2. Calibrate hydraulic models and improve morphodynamic models at the reach scale using existing data. This will create robust predictive tools for decision makers.

3. Generate outputs for the machine-learning model for individual reaches along the AHR in addition to the output averaged over the entire AHR - if possible using the current model.

EBQ2: How effective is Program management of <u>Phragmites</u> for maintaining suitable whooping crane roosting habitat?

- It is worthwhile to continue to collect data showing Phragmites responses along gradients of herbicide treatments and flow (which is the design of the current study).

- Beware: Phragmites is a super-ratchet.

  No inundation flow ⇨
  leads to vegetation growth in river bed,
  then next inundation flow is less effective

Ratchet, the Transformer

EBQ3: Is sediment augmentation necessary to create and/or maintain suitable whooping crane habitat?

Already covered above in ISAC Question 2

EBQ4: What factors influence WC decision to stop or fly over the AHR?

EBQ5: What factors influence WC stopover length within the AHR?

ISAC recommendation:

Develop a contingency plan for when the telemetry study ends in case there isn't a definitive answer to EBQ #4 and #5.

EBQ4: What factors influence WC decision to stop or fly over the AHR?

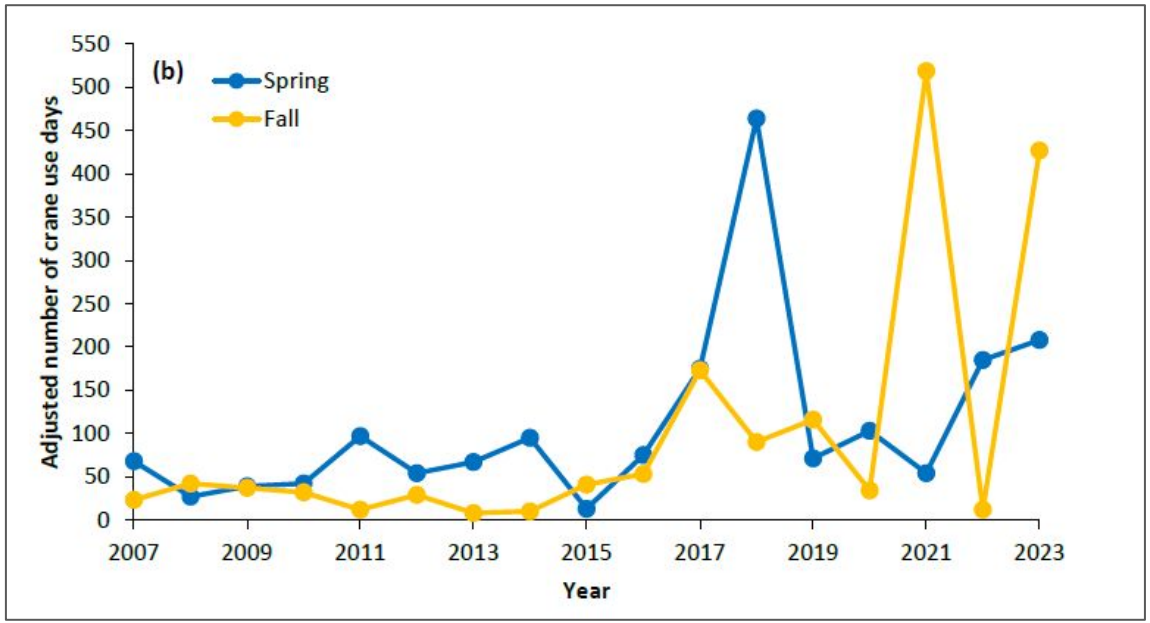
- Using water to maintain MUCW may have a longer term benefit than using water to attract WCs to stop.
- Both functional relationships (i.e., MUCW vs inundation flows; and WC stopping vs flows) need to be better understood.
- If MUCW is more correlated with WC stopovers than flow metrics, then consider using water for maintaining MUCW rather than to attract WCs to stop.

EBQ5: What factors influence WC stopover length within the AHR?

1. Both the telemetry data and the non-telemetry data are helpful for addressing EBQ #5.
2. Compare Platte WC stopover patterns to stopping patterns on the Niobrara, Elkhorn and the Loup.
3. Use care when interpreting stopover length results.
    - Some researchers have inferred habitat quality based on time at a stopover site based on correlational relationship.
    - Stopover length may be due to other factors such as poor quality habitat requiring WC to stay longer to forage.

EBQ6: Why is Spring WC use of the AHR greater than Fall use?

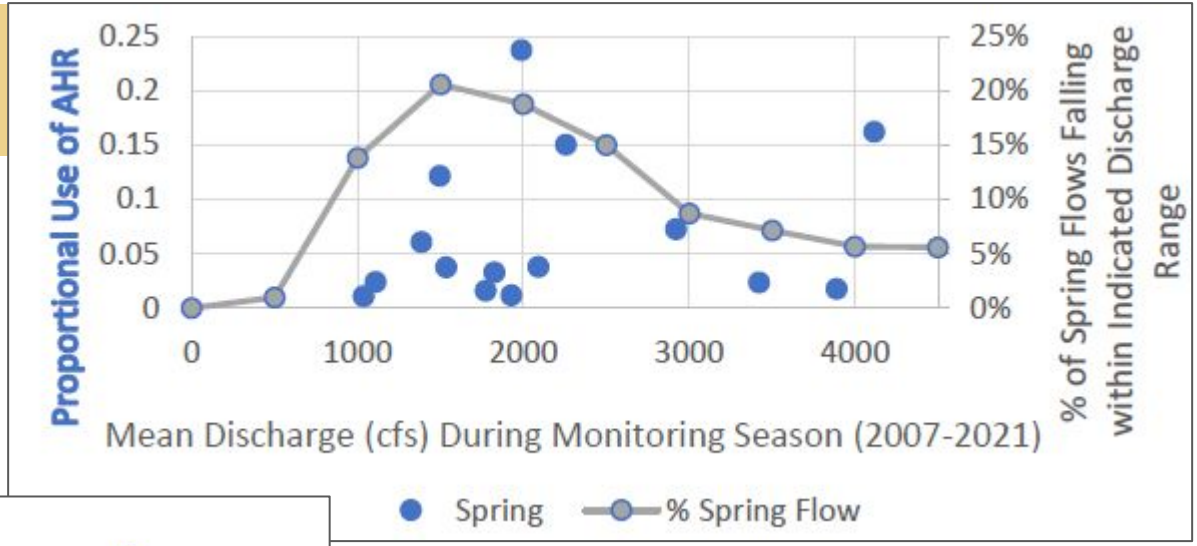
- The ISAC does not support additional research to address EBQ #6.
- It is no longer clear that spring WC use is greater than fall WC use.
- Could address seasonality under EBQ #4 and #5 and remove EBQ #6.

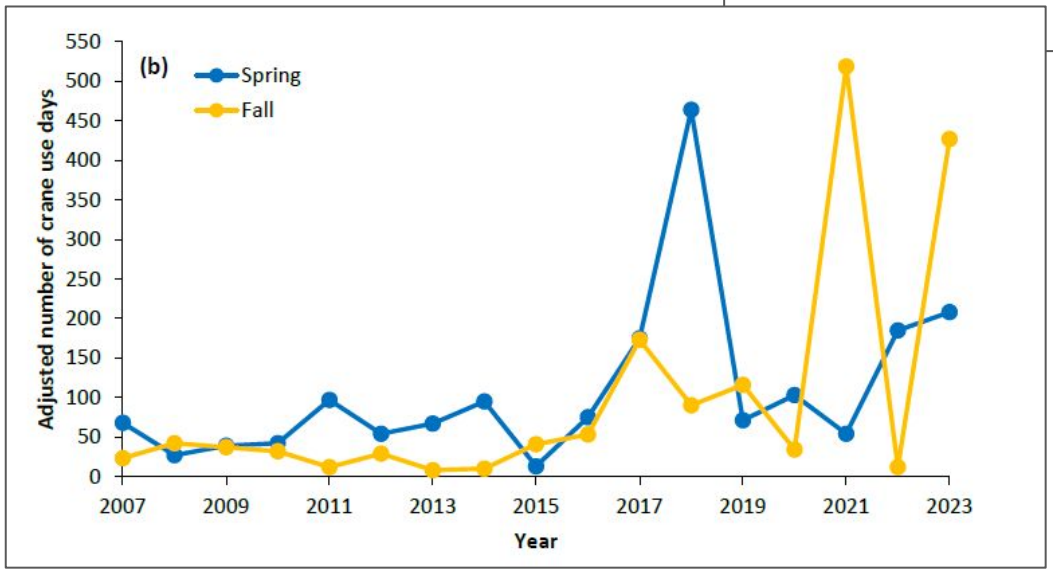


EBQ6, cont.

Use all the data!

Use the appropriate plot!





EBQ7: Pallid sturgeon (PS)

Continue with planned research

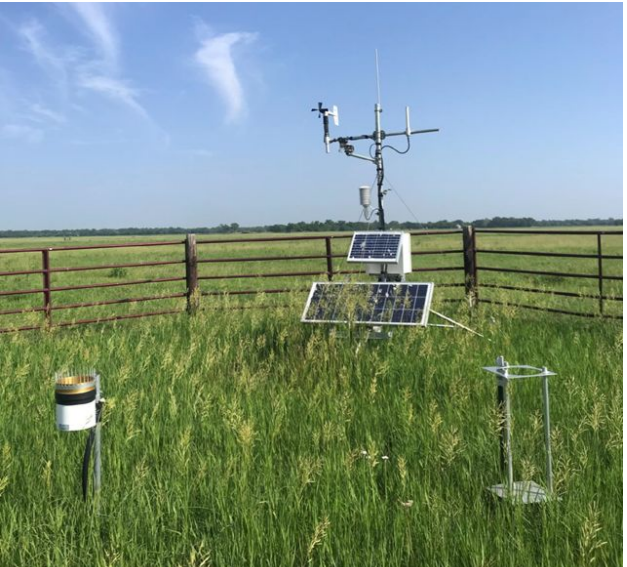
- PS models should include temperature
  - PS movement and spawning are correlated with temperature.
  - Hydraulic models should include change in temperature as a function of Program water management
- Focus of the UNL research is on Learning Objective 1
  - Should the Program re-examine the Learning Objectives for the pallid sturgeon habitat and spawning research?

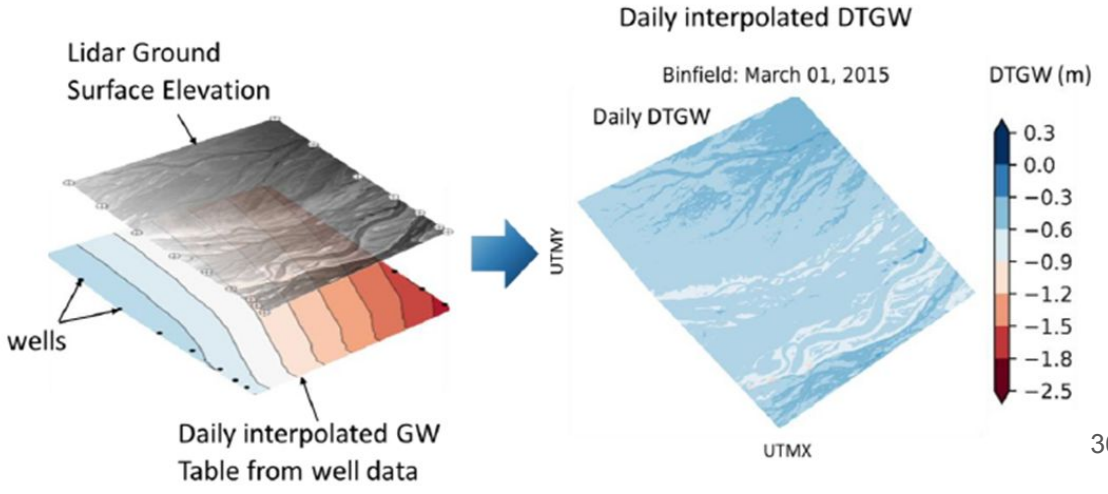
EBQ8 and 9: Piping Plover productivity and predation

- Conduct 1-2 more seasons of data collection.
- Examine costs and benefits to determine the most cost-effective type of predator control at OCSWs.
- Compare predation losses in the Platte to losses in the Missouri River.

EBQ10: Wet meadows research

- Produce a final wet meadows report ASAP
  - Based on peer review recommendations
- Consider examining costs and benefits of enhancing some AHR wet meadows
  - Use model developed by the Program to select the sites





Overall conclusions

- Continue to stress the decision-relevance of all PRRIP applied science activities.

- EDO continues to do high-quality scientific research in support of the PRRIP.

Keep up the good work!

Discussion and Questions