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What Wading Bird Diet Can Tell Us About Habitat Values: Diverse Diets Across Diverse Landscapes

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What wading bird diet can tell us about habitat values: diverse diets across diverse landscapes



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Great Blue Heron (*Ardea herodias*) foraging on a *Lepomis* sp. at Big Slough (subirrigated linear wetland), Shoemaker Island, Hall County, Nebraska, 16-July-2019 (credit J. Malzahn).



Great Egret (*Ardea alba*) foraging on fish in a wooded pond in the suburbs of Minneapolis, Minnesota, 16 July 2016 (credit E. M. Brinley Buckley)



Great Egret (*Ardea alba*) flying with a frog depredated from a restored wetland on Shoemaker Island (Crane Trust), Hall
Count, Nebraska, 29 April 2016 (credit E. M. Brinley Buckley)



American Bittern (*Botaurus lentiginosus*) in a shallow cattail marsh resulting from a borrow pit wetland restoration, Shoemaker Island, Hall County, Nebraska, 14-April-2019 (credit J. Malzahn).



Adult Whooping Crane (*Grus americana*) and colt foraging on fish in the main (south) channel of the Platte River south of Shoemaker Island (Crane Trust), Hall County, Nebraska, 31 October 2019 (credit E. M. Brinley Buckley)



Methods: Diet and Habitat Assessment of Select Wading Birds

- Classify diet and habitat utilization for selected wading birds in the crane (Gruidae) and heron (Ardeidae) families relying primarily on *The Birds of North American* (Rodewald 2019).

- Food items categorized by relevant tax and valued as:

Score	Category	Description
3	<i>Major</i>	<i>A regular and significant component of the diet, at least seasonally/regionally</i>
2	<i>Minor</i>	<i>A regular but less significant portion of the diet, at least seasonally/regionally</i>
1	<i>Occasional</i>	<i>Opportunistically consumed</i>
0	<i>Not Consumed</i>	<i>Consumption has either not been documented or is exceedingly rare</i>

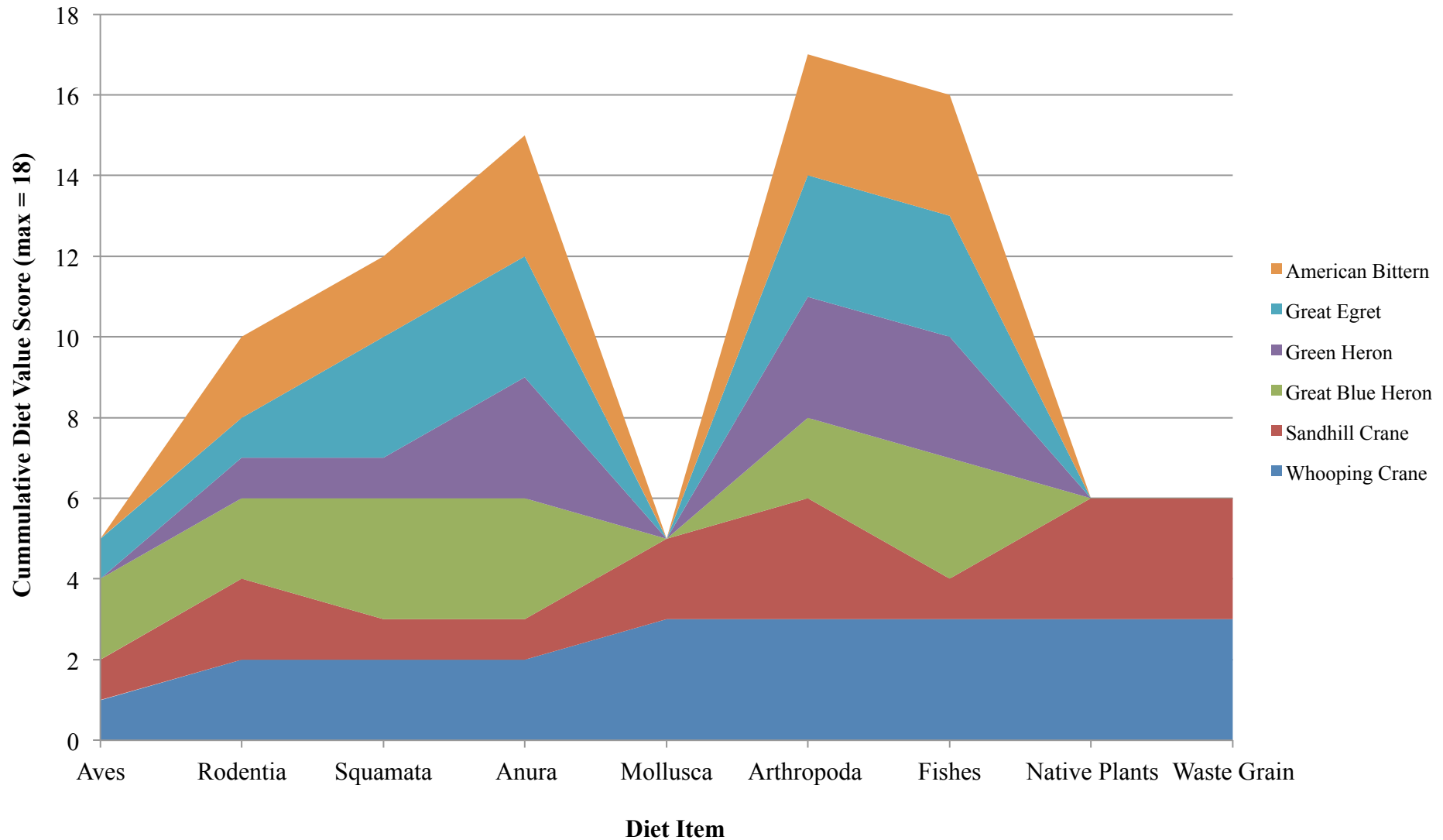
- Physical habitat characteristics categorized across gradients of wetland features (i.e. – steep vs. gentle bank slopes) and valued as:

Score	Category	Description
2	<i>Valuable</i>	<i>A wetland habitat characteristic that this species selects for</i>
1	<i>Acceptible</i>	<i>A wetland habitat characteristic that this species can tolerate</i>
0	<i>Not Acceptible</i>	<i>A wetland habitat characteristic that this species can not tolerate</i>

- Data presented as an “area chart” displaying cumulative utilization of forage items and wetland habitat features.
- Broadness of habitat use and forage selection is calculated as the total score divided by the potential maximum score for each species.

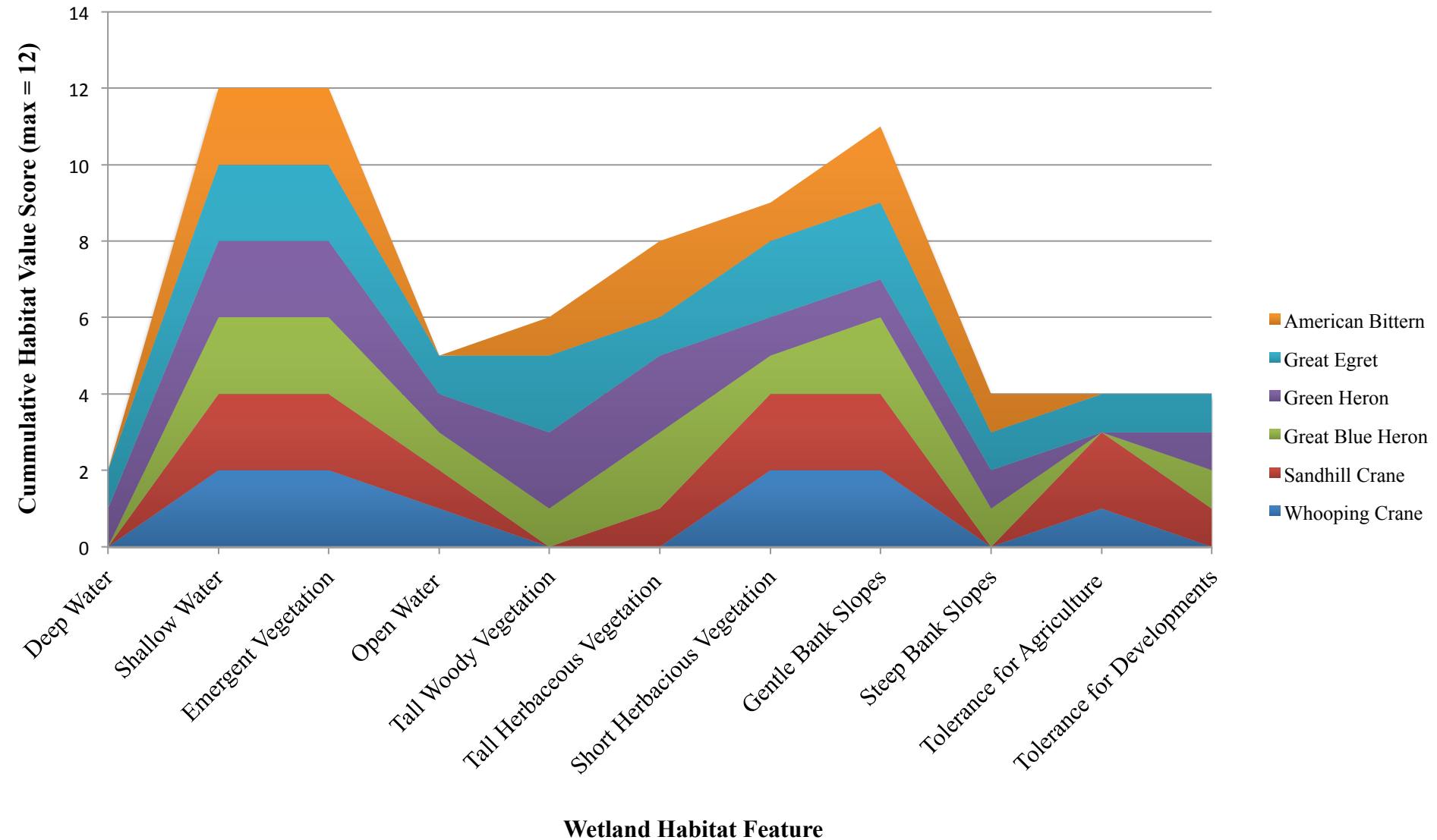
Results: Diet Item Utilization

Valuation of Diet Items for select North American Wading Birds including Cranes, Herons and Allies



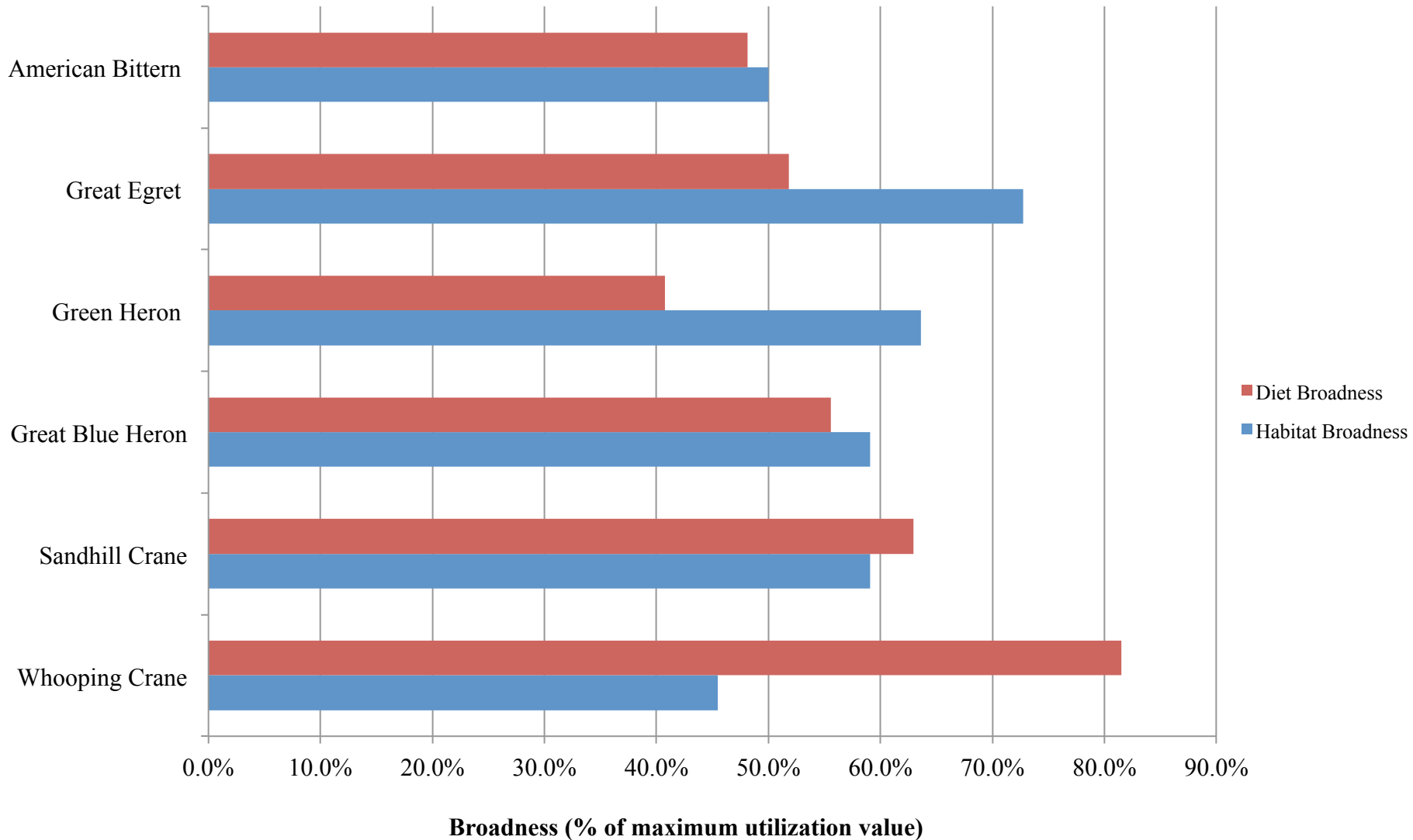
Results: Habitat Characteristic Utilization

Valuation of Wetland Habitat Features for select North American Wading Birds including Cranes, Herons and Allies



Results: Diet and habitat broadness

Breadth of diet and habitat utilization by wading bird species common name



Food Chain and Trophic Levels



Whooping Cranes (*G. americana*)
foraging, Baraboo, WI, 09-22-19
(credit A. Caven)

3
Secondary Consumer



Northern Crayfish (*Orconectes virilis*), Schainost 2016

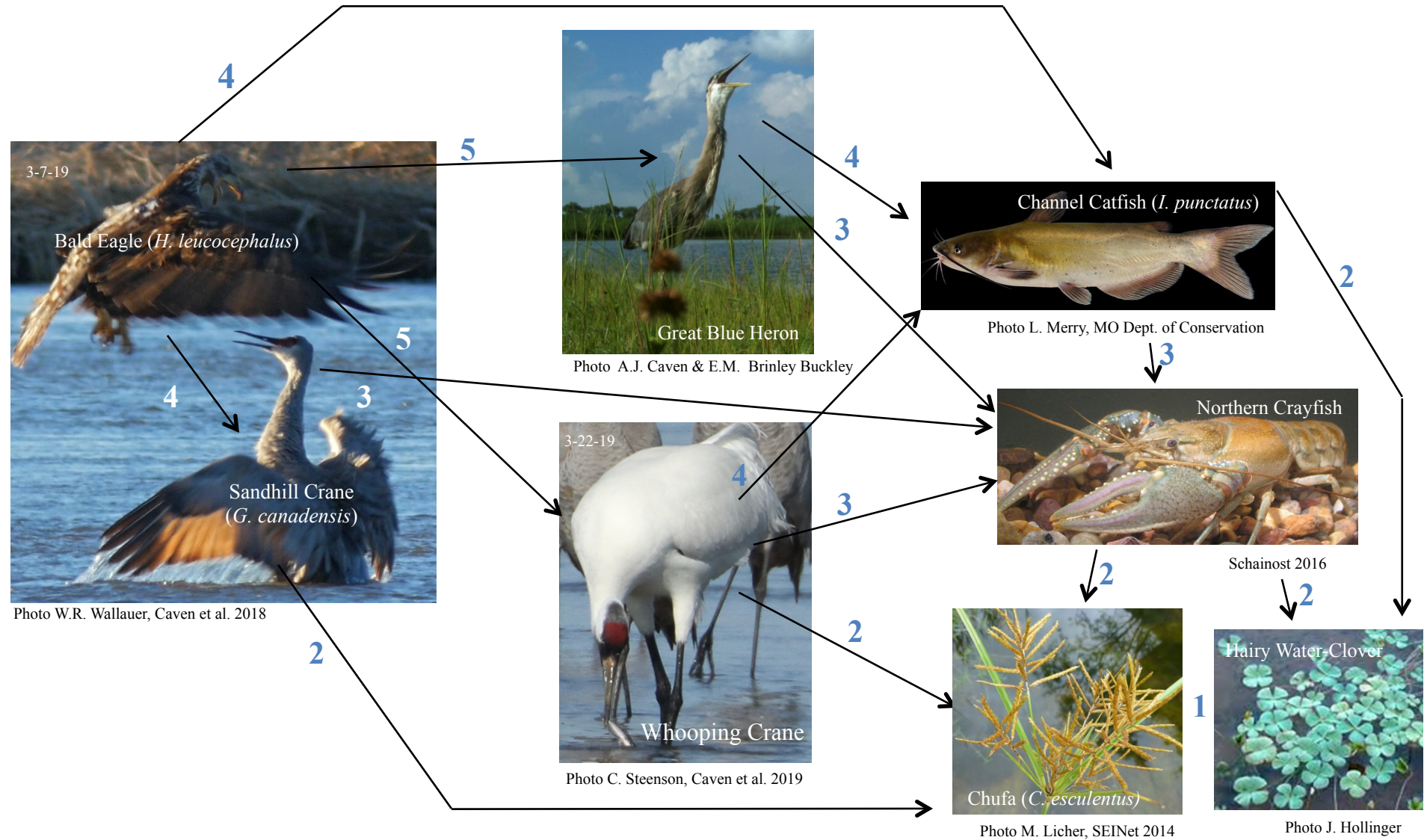
2
Primary Consumer

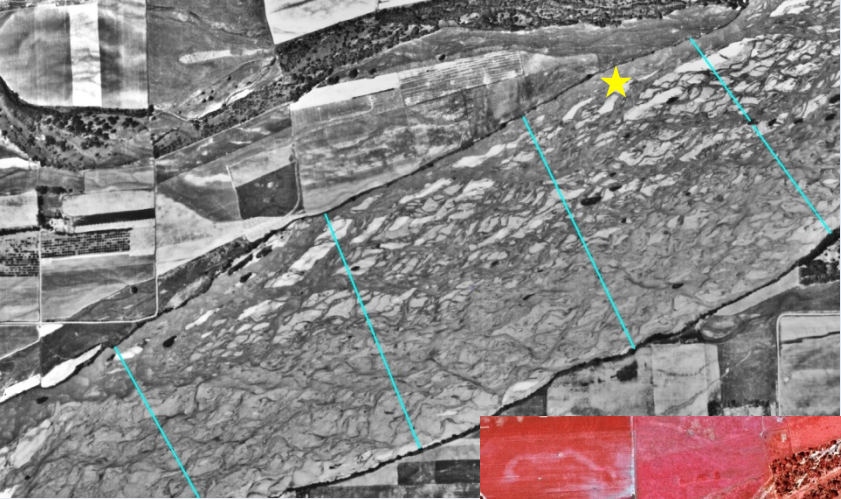


Hairy Water-Clover (*Marsilea vestita*) Jason Hollinger (SEINet)

1
Producer

Food Web

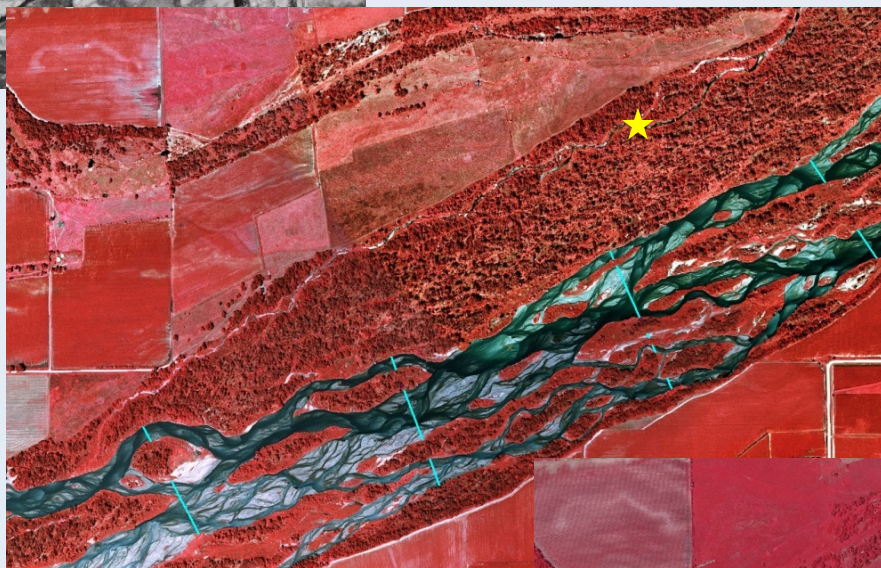




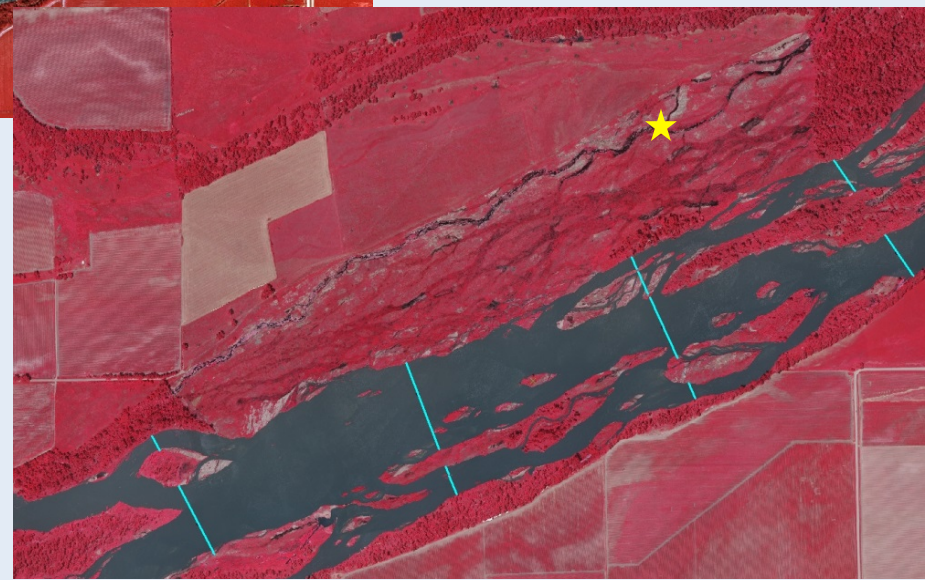
1938

Riparian wet meadow restorations

Dippel Island, Buffalo County, Nebraska



1998



2016

Restored Wet Meadow, Dippel Island, Buffalo County, Nebraska

13 September 2016





Photos by E. Nugent
NRCS



Conclusions

- Wading birds in the Heron and Crane families overlap significantly in their foraging and habitat use patterns
- Arthropods, Fish, and Frogs/Toads are broadly utilized forage items
- Shallow water, emergent vegetation, and gentle bank slopes represent broadly utilized wetland habitat features



Credit E. M. Brinley Buckley

- Wading birds tend to exist within the middle to upper trophic levels (of the food web) and therefore depend on ecologically functional and productive wetlands
- Management and restoration practices are often oriented toward maintaining shallow wetland habitat with herbaceous emergent vegetation, frequently with a stated objective of preserving appropriate Whooping Crane stopover habitat.
- These management and restoration practices likely benefit a host of additional wading birds

Temporospatial shifts in Sandhill Crane staging in the Central Platte River Valley in response to climatic variation and habitat change

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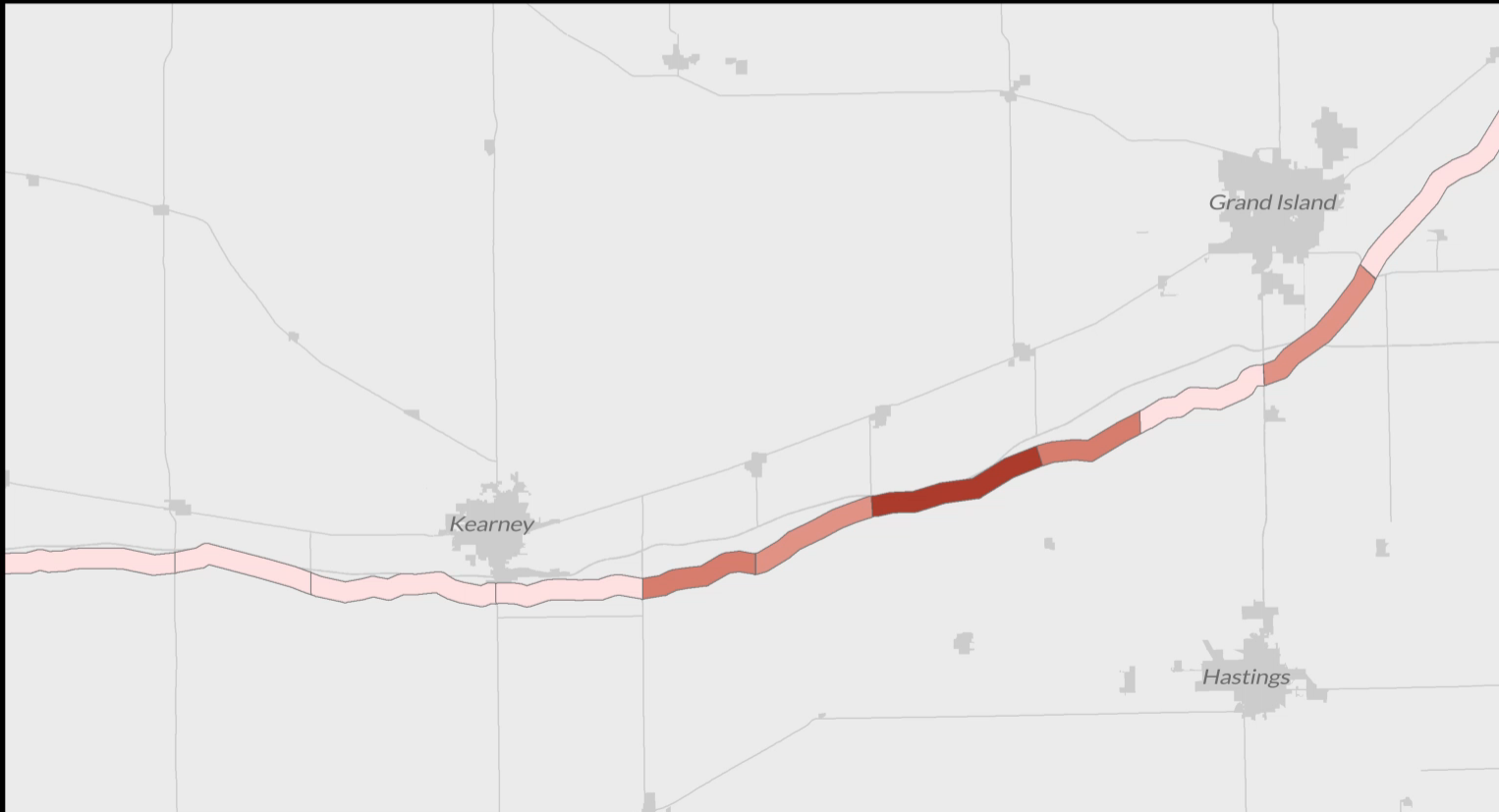
ABSTRACT.—Over 80% of the Mid-Continent Sandhill Crane (*Antigone canadensis*) Population (MCP), estimated at over 660,000 individuals, stops in the Central Platte River Valley (CPRV) during spring migration from mid-February through mid-April. Research suggests that the MCP may be shifting its distribution spatially and temporally within the CPRV. From 2002 to 2017, we conducted weekly aerial surveys of Sandhill Cranes staging in the CPRV to examine temporal and spatial trends in their abundance and distribution. Then, we used winter temperature and drought severity measures from key wintering and early migratory stopover locations to assess the impacts of weather patterns on annual migration chronology in the CPRV. We also evaluated channel width and land cover characteristics using aerial imagery from 1938, 1998, and 2016 to assess the relationship between habitat change and the spatial distribution of the MCP in the CPRV. We used generalized linear models, cumulative link models, and Akaike's information criterion corrected for small sample sizes (AICc) to compare temporal and spatial models. Temperatures and drought conditions at wintering and migration locations that are heavily used by Greater Sandhill Cranes (*A. c. tabida*) best predicted migration chronology of the MCP to the CPRV. The spatial distribution of roosting Sandhill Cranes from 2015 to 2017 was best predicted by the proportion of width reduction in the main channel since 1938 (rather than its width in 2016) and the proportion of land cover as prairie-meadow habitat within 800 m of the Platte River. Our data suggest that Sandhill Cranes advanced their migration by an average of just over 1 day per year from 2002 to 2017, and that they continued to shift eastward, concentrating at eastern reaches of the CPRV. Climate change, land use change, and habitat loss have all likely contributed to Sandhill Cranes coming earlier and staying longer in fewer reaches of the CPRV, increasing their site use intensity. These historically unprecedented densities may present a disease risk to Sandhill Cranes and other waterbirds, including Whooping Cranes (*Grus americana*). Our models suggest that conservation actions may be maintaining Sandhill Crane densities in areas that would otherwise be declining in use. We suggest that management actions intended to mitigate trends in the distribution of Sandhill Cranes, including wet meadow restoration, may similarly benefit prairie- and braided river–endemic species of concern.

SANDHILL CRANE (*ANTIGONE CANADENSIS*) ROOST DENSITY

Central Platte River Valley, Nebraska

LOW  HIGH

| 2002 |

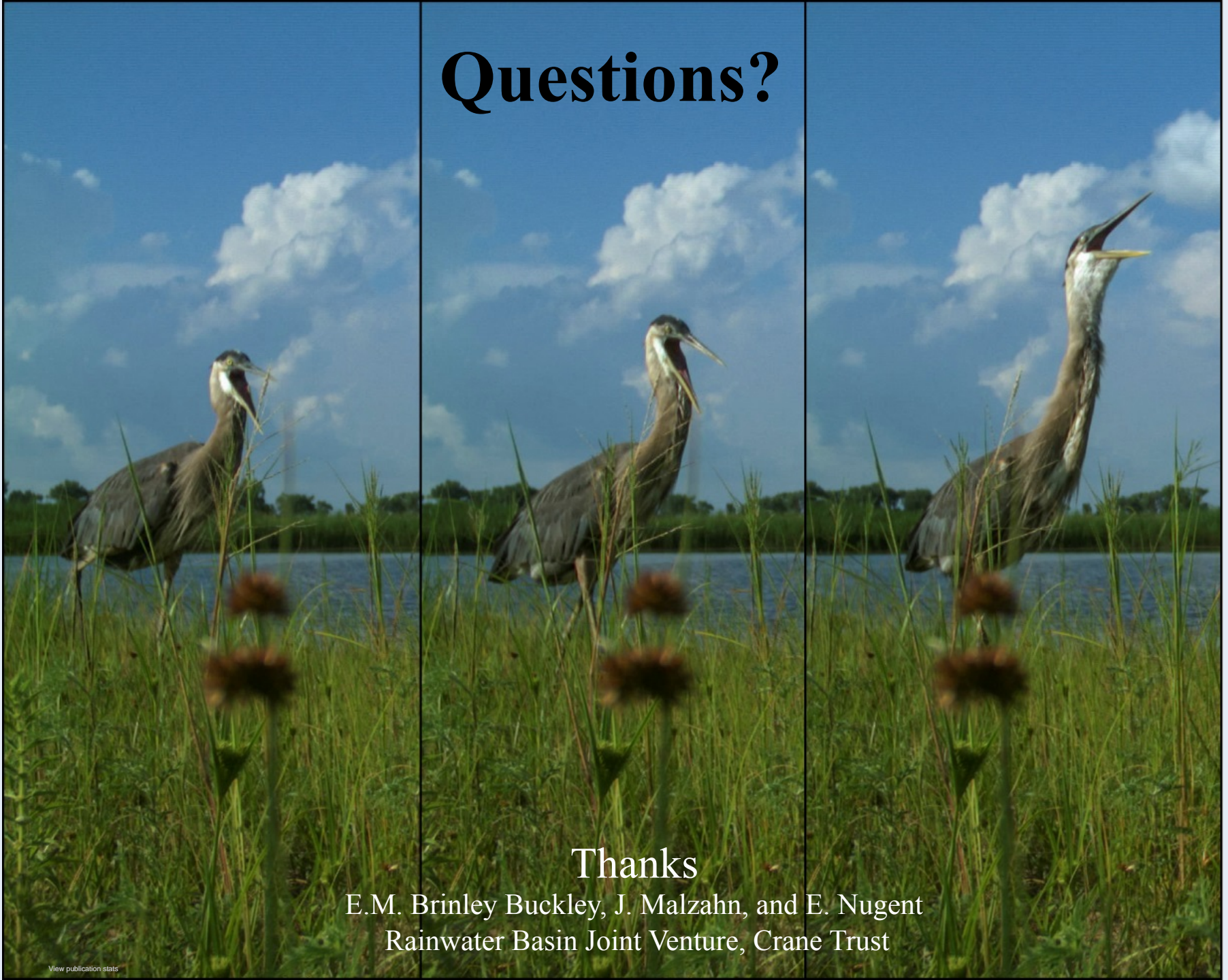


By Emma Brinley Buckley | See Caven *et al.* 2019 for details

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Questions?



Thanks

E.M. Brinley Buckley, J. Malzahn, and E. Nugent
Rainwater Basin Joint Venture, Crane Trust