Can eDNA Identify the Needle in a Haystack: Searching for the Western Chicken Turtle in Texas

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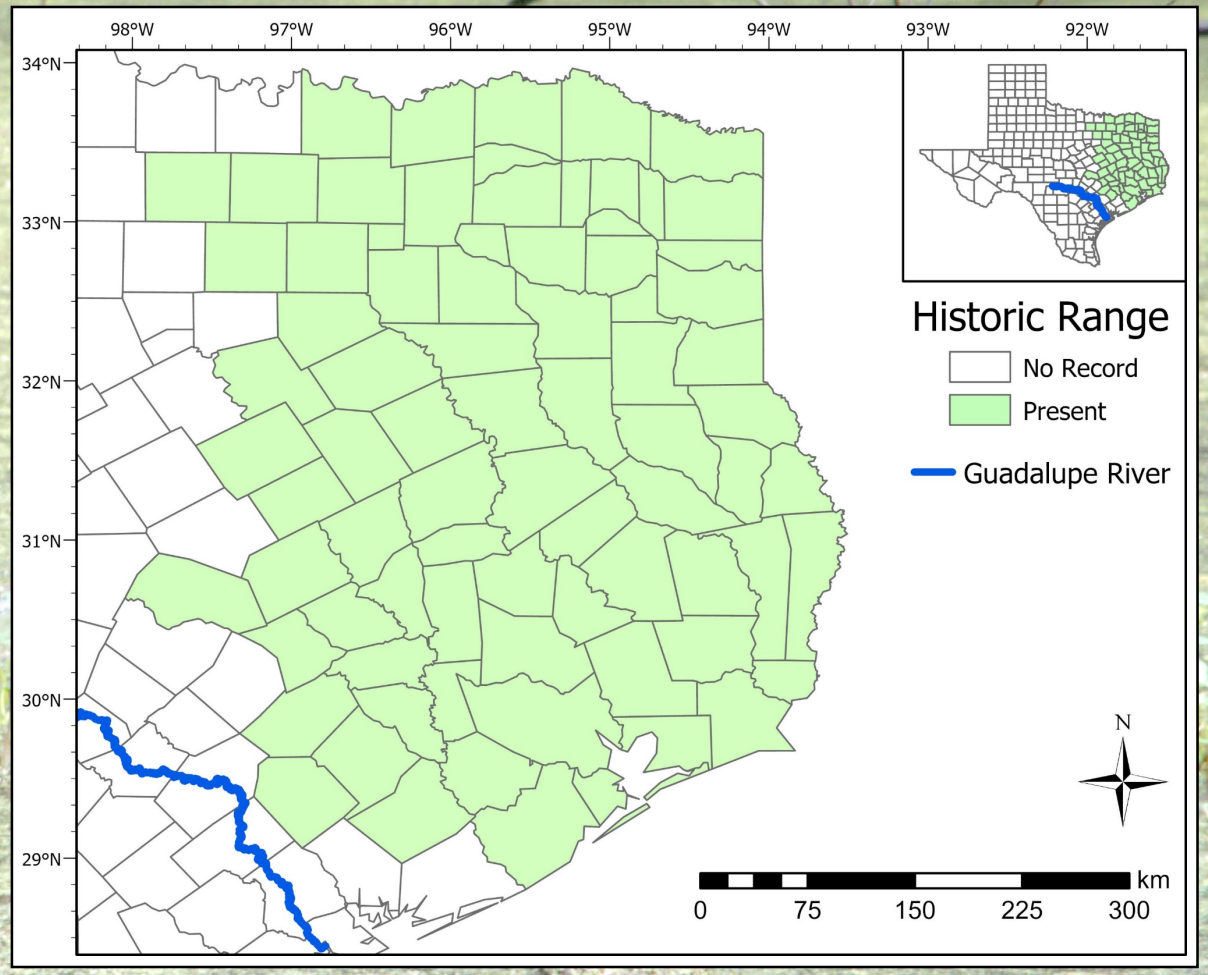
Western Chicken Turtles in Texas

- Historic range extends through east Texas to north of the Guadalupe river basin[1]
- Typically found in ephemeral or depressional freshwater wetlands[2]
- Shorter life span and smaller population size may increase perception of rarity[3]
- Exhibit discrete seasonal activity patterns[4]



[1]Dixon, 2013; USFWS, 2016
[2]Buhlmann et al., 2008; Ryberg et al., 2017
[3]Dinkelacker and Hilzinger, 2014
[4]McKnight et al., 2015

Western Chicken Turtle Identification

Western Chicken Turtle (*Deirochelys reticularia miaria*) Identification Sheet

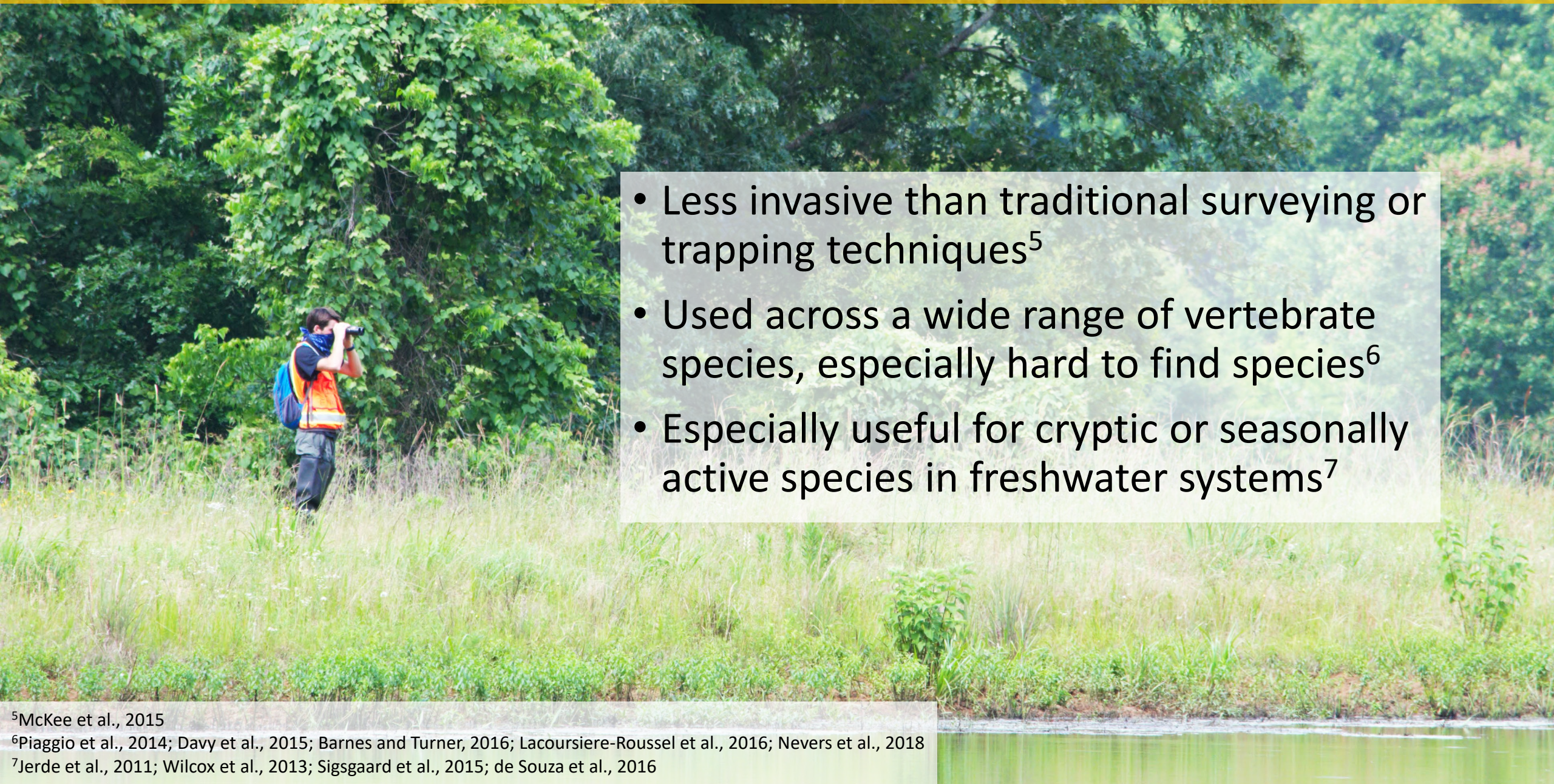
- Long neck with horizontal yellow stripes
- No “red ears” or other vertical yellow marks or crescents present in sliders, cooters, or map turtles
- The rim of the carapace (top of the shell) is yellow

- The rear of the thigh has alternating black and yellow bars, also may be described as “stripy pants”
- The bridge that connects the carapace with the plastron (bottom of the shell) has a dark horizontal strip

- The forearms have a wide yellow patch that runs the length of the limb from the shoulder to the feet
- The plastron is usually unmarked and varies from yellow to orange

Developed by: Paul Crump (TPWD) and Brandon Bowers (TAMU-TNRI)

Environmental DNA Detection

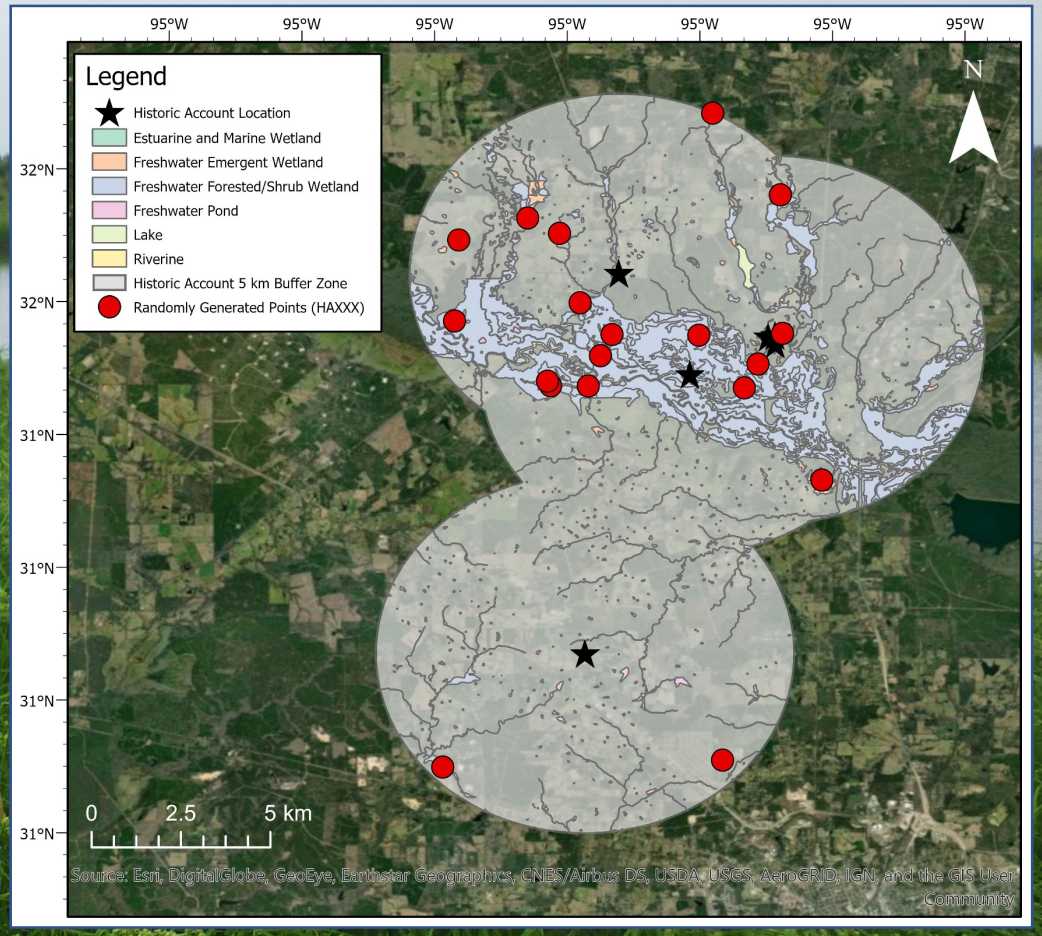


- Less invasive than traditional surveying or trapping techniques[5]
- Used across a wide range of vertebrate species, especially hard to find species[6]
- Especially useful for cryptic or seasonally active species in freshwater systems[7]

[5]McKee et al., 2015
[6]Piaggio et al., 2014; Davy et al., 2015; Barnes and Turner, 2016; Lacoursiere-Roussel et al., 2016; Nevers et al., 2018
[7]Jerde et al., 2011; Wilcox et al., 2013; Sigsgaard et al., 2015; de Souza et al., 2016

Environmental DNA Study Design

- Goal: sample 87 sites throughout the western chicken turtle historic range
- Randomized Site Design:
  - Counties associated with historic accounts
  - Counties without historic accounts
  - Variety of wetland types from NWI[8]
- Combination of sample types:
  - Ambient water
  - Resuspended sediment
  - Soil

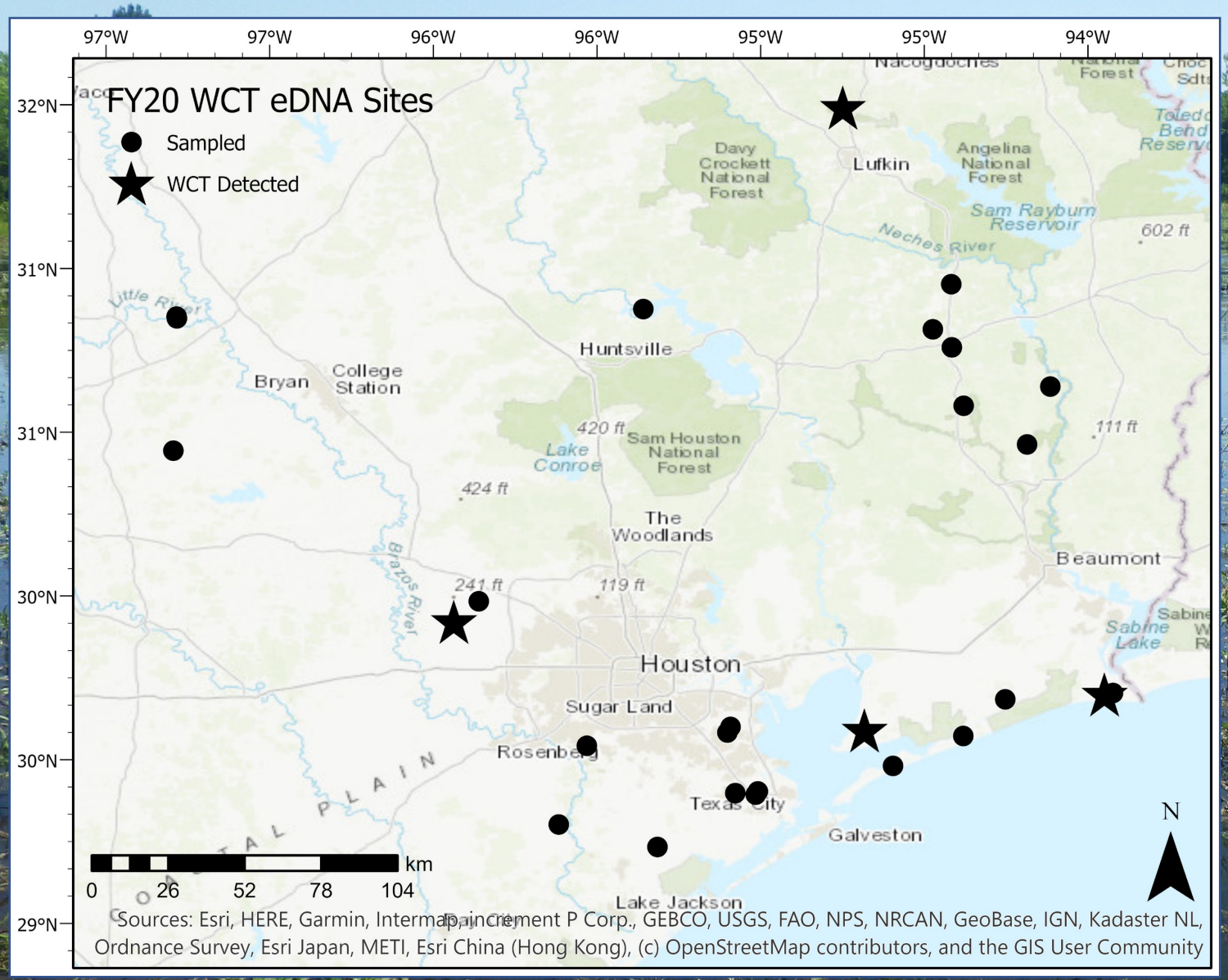


Research funded by:

Texas Comptroller of Public Accounts

[8]USFWS, 2019

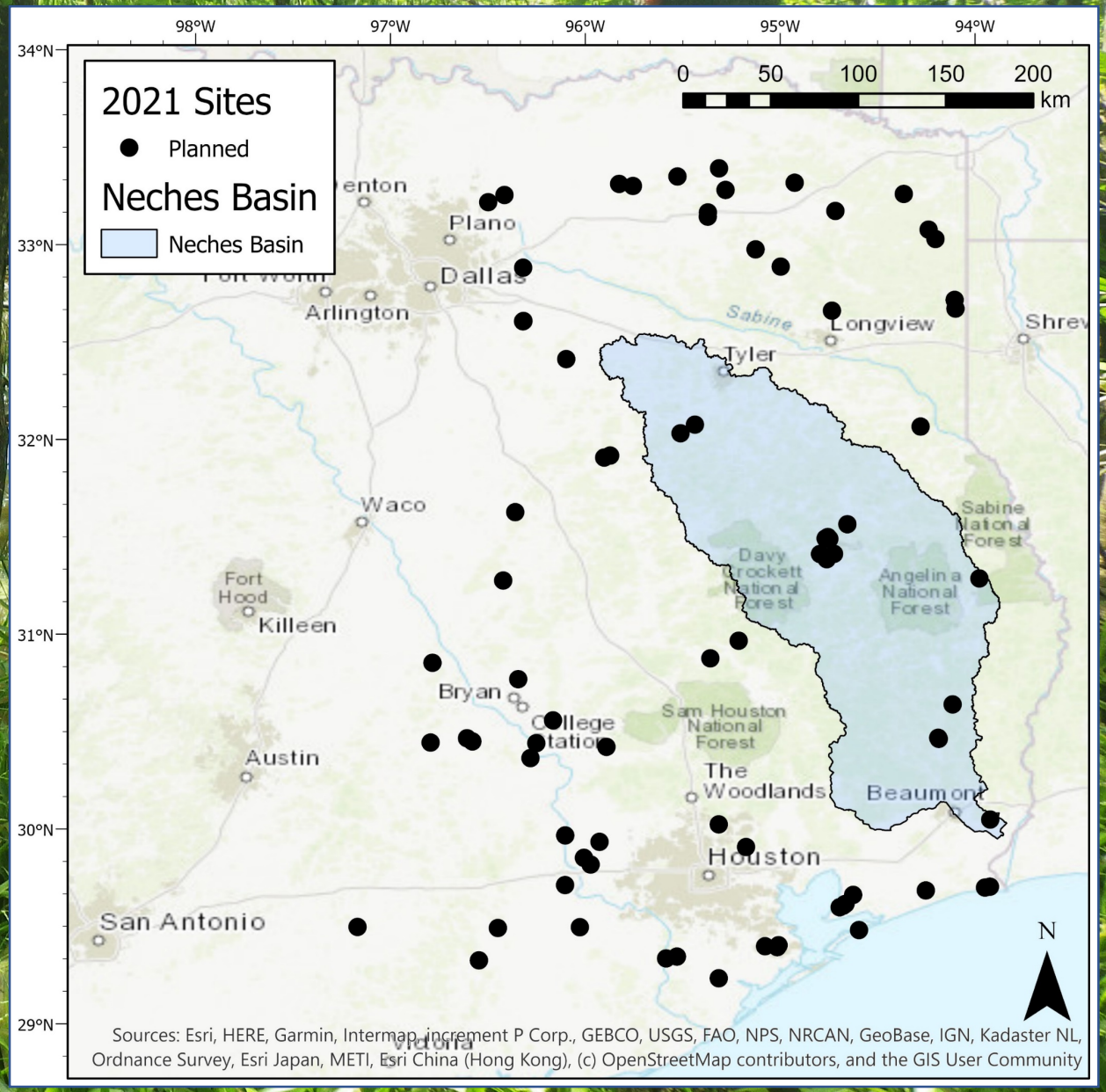
2020 eDNA Sampling



- 27 sites sampled
- eDNA detections at 4 sites (15%)
  - Includes 1 site in Neches basin
- 9 observations through visual surveys

Future Directions

- 60 eDNA site remaining
  - Includes 12 within Neches Basin
  - Pending landowner access approval
- Intensification of efforts at sites with positive eDNA detections
  - UAV surveys
  - Trapping efforts
  - Remote sensing



Thank You

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