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



Mandi Gordon

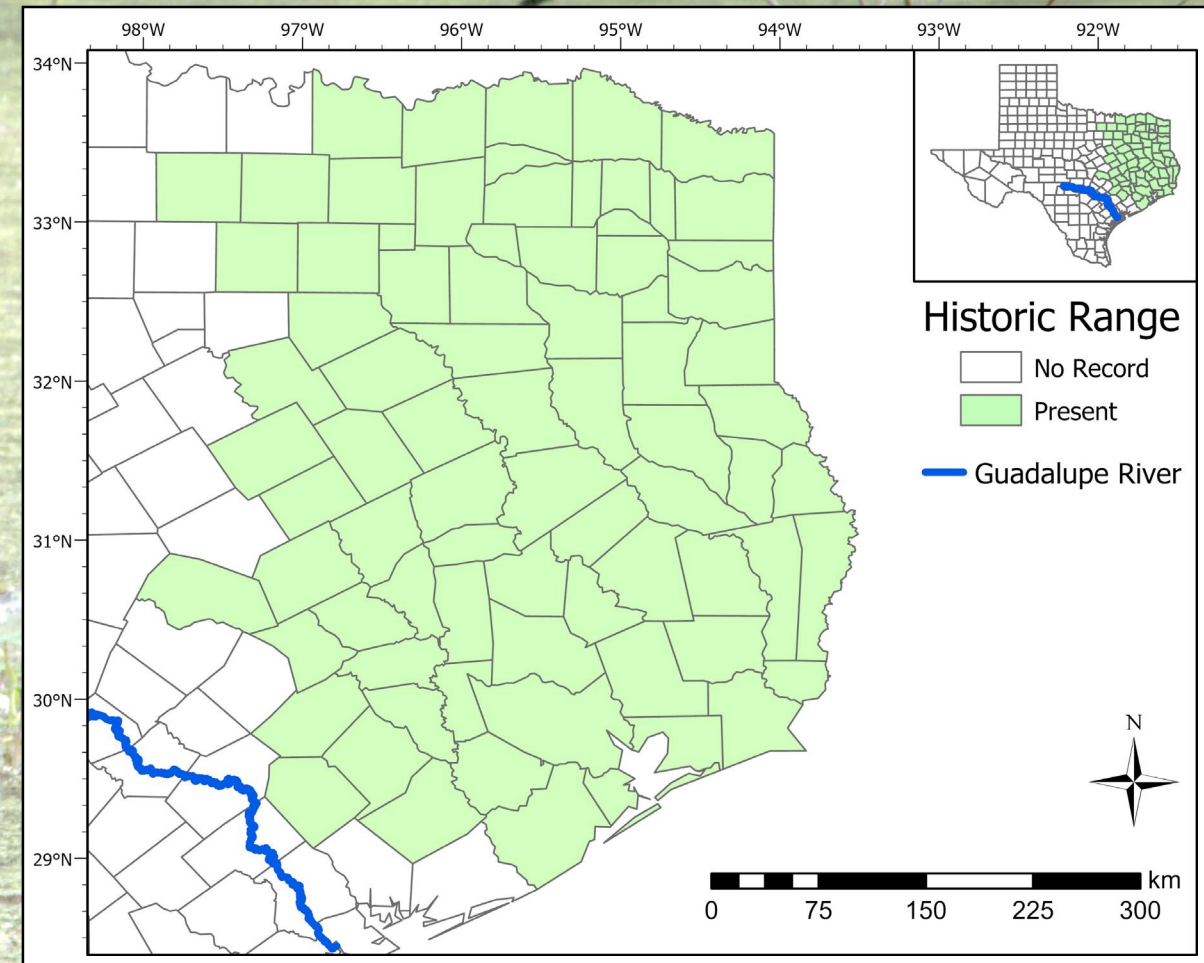
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East Texas Aquatics Working Group Stakeholder Meeting
15 October 2020

Western Chicken Turtles in Texas

- Historic range extends through east Texas to north of the Guadalupe river basin¹
- Typically found in ephemeral or depressional freshwater wetlands²
- Shorter life span and smaller population size may increase perception of rarity³
- Exhibit discrete seasonal activity patterns⁴



¹Dixon, 2013; USFWS, 2016

²Buhlmann et al., 2008; Ryberg et al., 2017

³Dinkelacker and Hilzinger, 2014

⁴McKnight 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

Environmental DNA Detection

- Less invasive than traditional surveying or trapping techniques⁵
- Used across a wide range of vertebrate species, especially hard to find species⁶
- Especially useful for cryptic or seasonally active species in freshwater systems⁷

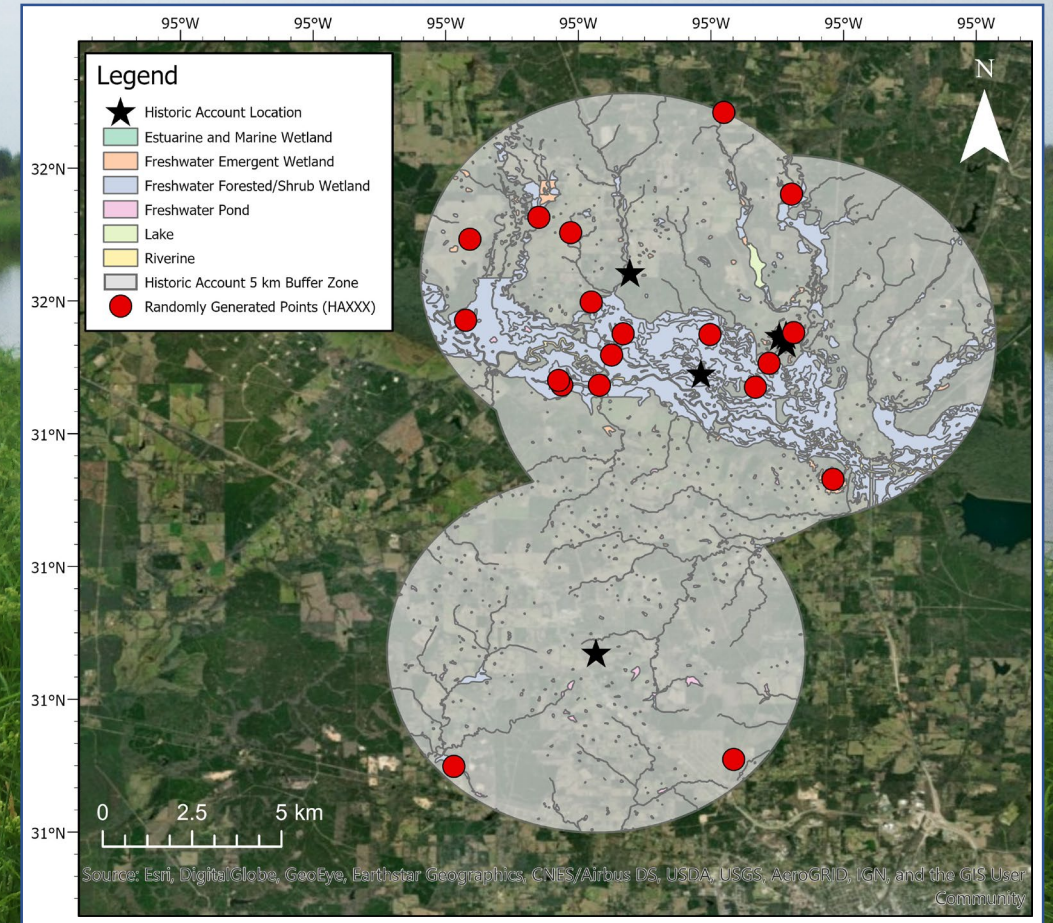
⁵McKee et al., 2015

⁶Piaggio et al., 2014; Davy et al., 2015; Barnes and Turner, 2016; Lacoursiere-Roussel et al., 2016; Nevers et al., 2018

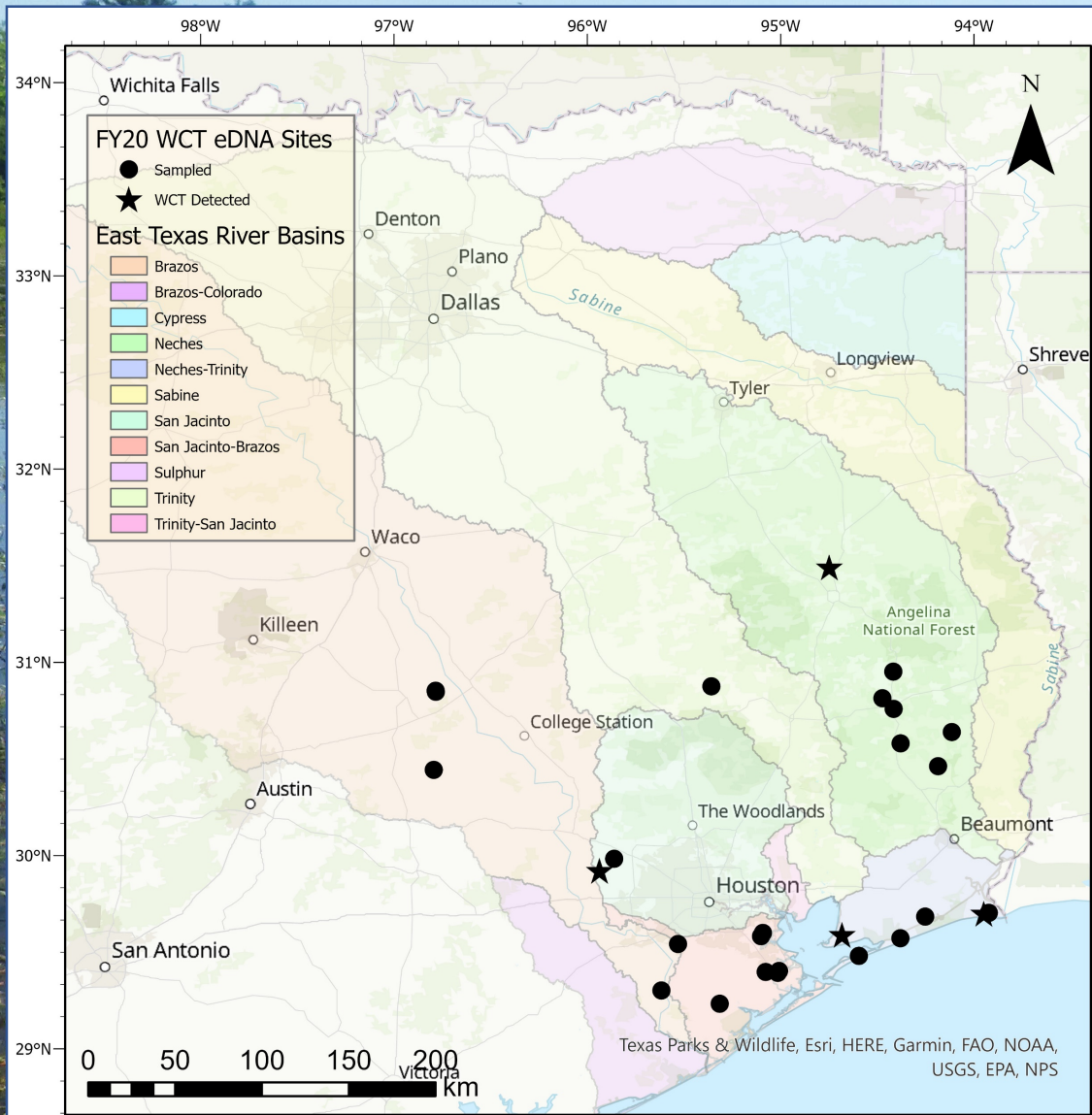
⁷Jerde et al., 2011; Wilcox et al., 2013; Sigsgaard et al., 2015; de Souza et al., 2016

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 NWI⁸
- Combination of sample types:
 - Ambient water
 - Resuspended sediment
 - Soil



2020 eDNA Sampling



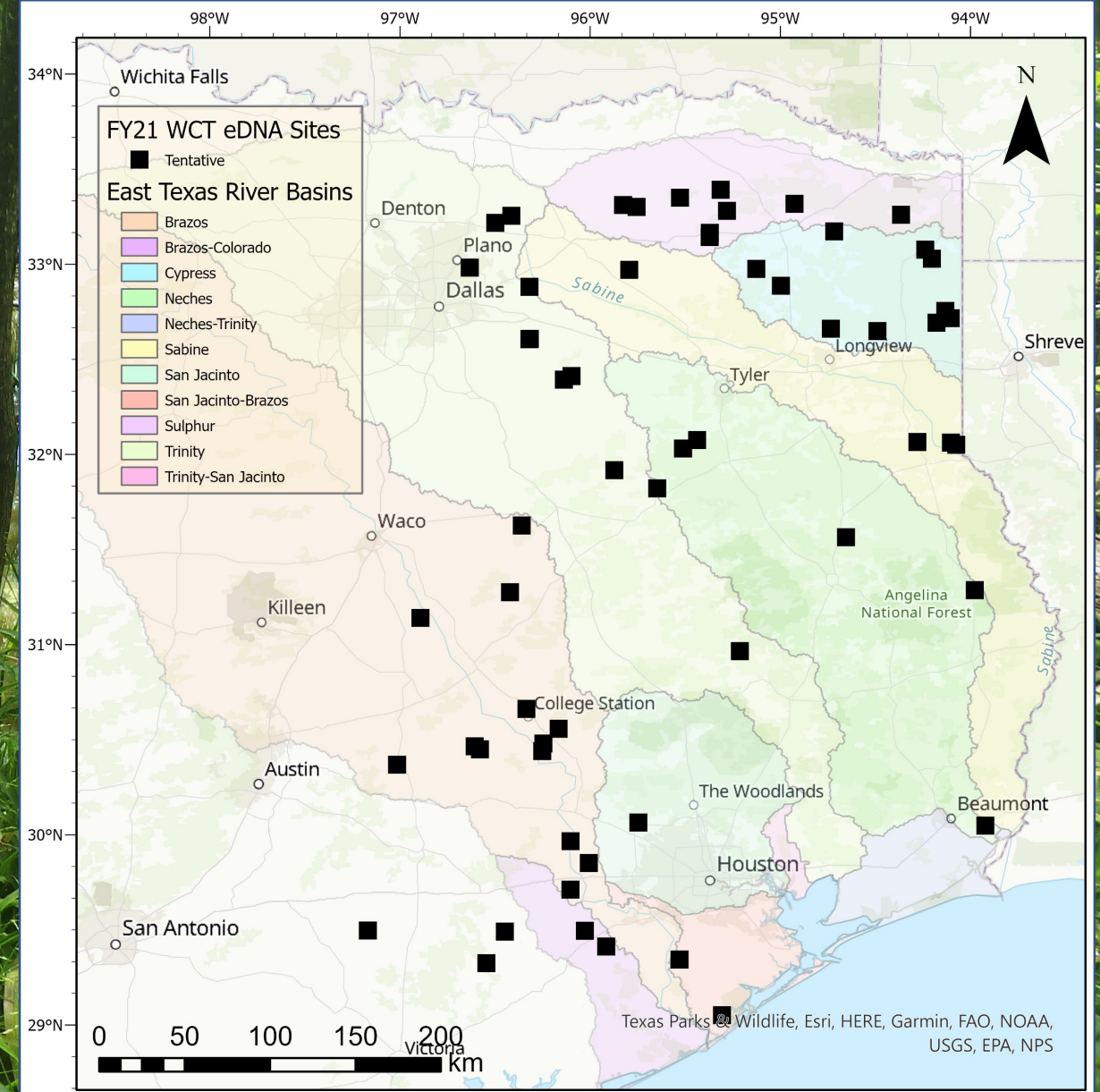
- 27 sites sampled
 - Restricted to southeast Texas due to COVID-19
- eDNA detections at 4 sites (15%)
- 9 observations through visual surveys

County	Mar	Apr	May	Jun	Jul	Aug
Nacogdoches			CSS			
Waller						
Chambers						
Jefferson						

BAVS = Binocular Assisted Visual Surveys; CSS = Canid Scent Surveys

Future Directions

- 60 eDNA site remaining
 - Includes sites in north and central east Texas watersheds
 - Pending landowner access approval
- Intensification of efforts at sites with positive eDNA detections
 - UAV surveys
 - Trapping efforts
 - Remote sensing



Spring 2021 Online Questionnaire

Distribution and Habitat Associations of the Western Chicken Turtle in Texas

Current Projects

Completed Projects

Equipment and Capabilities

Publications

Research Staff

Contact

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Purpose/Objectives

The primary objectives for this study are to:

1. Conduct surveys utilizing various methods at sites representative of all habitat types within the western chicken turtle's range in Texas.
2. Estimate the current range and distribution and determine habitat associations for the western chicken turtle in Texas.
3. Evaluate the efficacy and efficiency of various survey methods for western chicken turtles.

Report sightings on [iNaturalist.org](https://www.inaturalist.org)

<https://www.uhcl.edu/environmental-institute/research/current-projects/western-chicken-turtle>

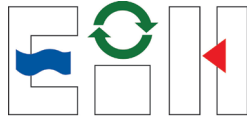
Thank You

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Research funded by:



Texas Comptroller of Public Accounts

