

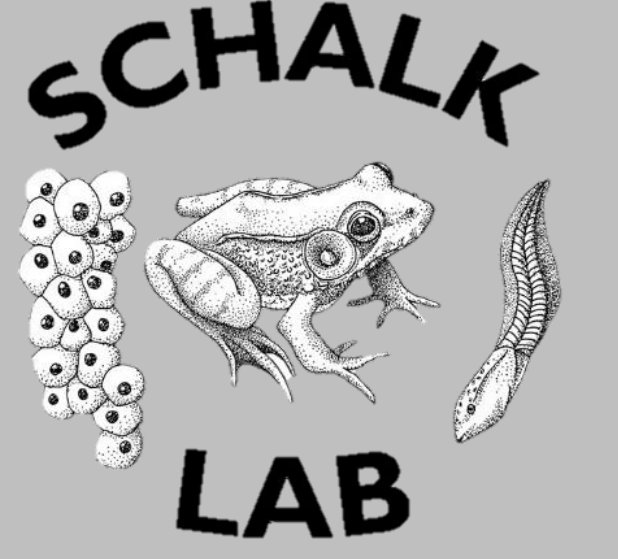
Distribution, occupancy, and mercury bioaccumulation of alligator snapping turtles in Texas



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Introduction

Increasing anthropogenic habitat alteration and fragmentation in TX are expected to further negatively impact freshwater systems.

Animal species in these systems that have low dispersal capabilities, are long-lived, and are dependent on the adult cohort for population stability, are vulnerable to anthropogenic factors including habitat alteration, accumulation of contaminants, and overexploitation.

The alligator snapping turtle (*Macrochelys temminckii*) exhibits these traits and is in decline throughout its range. Although not federally protected, it is legally protected as an S2 (imperiled) SGCN in Texas. Its last statewide distribution study occurred from 1999-2002.



Fig. 1: *M. temminckii* habitat (Caddo Lake SP) and a juvenile from Angelina Co.

Objectives

To attain a contemporary assessment of the species' distribution in Texas, we will resurvey sites from the prior study, as well as additional sites the species could be occupying. We will:

1) Use detection/no detection data to build an occupancy model in relation to microhabitat and landscape covariates (**Fig. 2**).

2) Evaluate correlations between total mercury concentrations in muscle tissue with intrinsic and extrinsic factors (**Fig. 2**).

This information will provide insight into land-use changes and human activities that are of significant threat to the species. Contingent on results, mercury data will be useful in discouraging illegal harvest of *M. temminckii* for consumption.

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Methods

During spring and summer 2020-2021, we will survey *M. temminckii* at sites in major river drainages of Texas that the species has been reported from (**Fig. 3**). At each site, 15 fish-baited traps will be set for 3 consecutive days, for a total of 45 trap nights per site (*sensu* Rudolph et al. 2002).

Traps will be selectively placed in microhabitats predicted to be favored by *M. temminckii* (see lower right quadrant of **Fig. 2**).

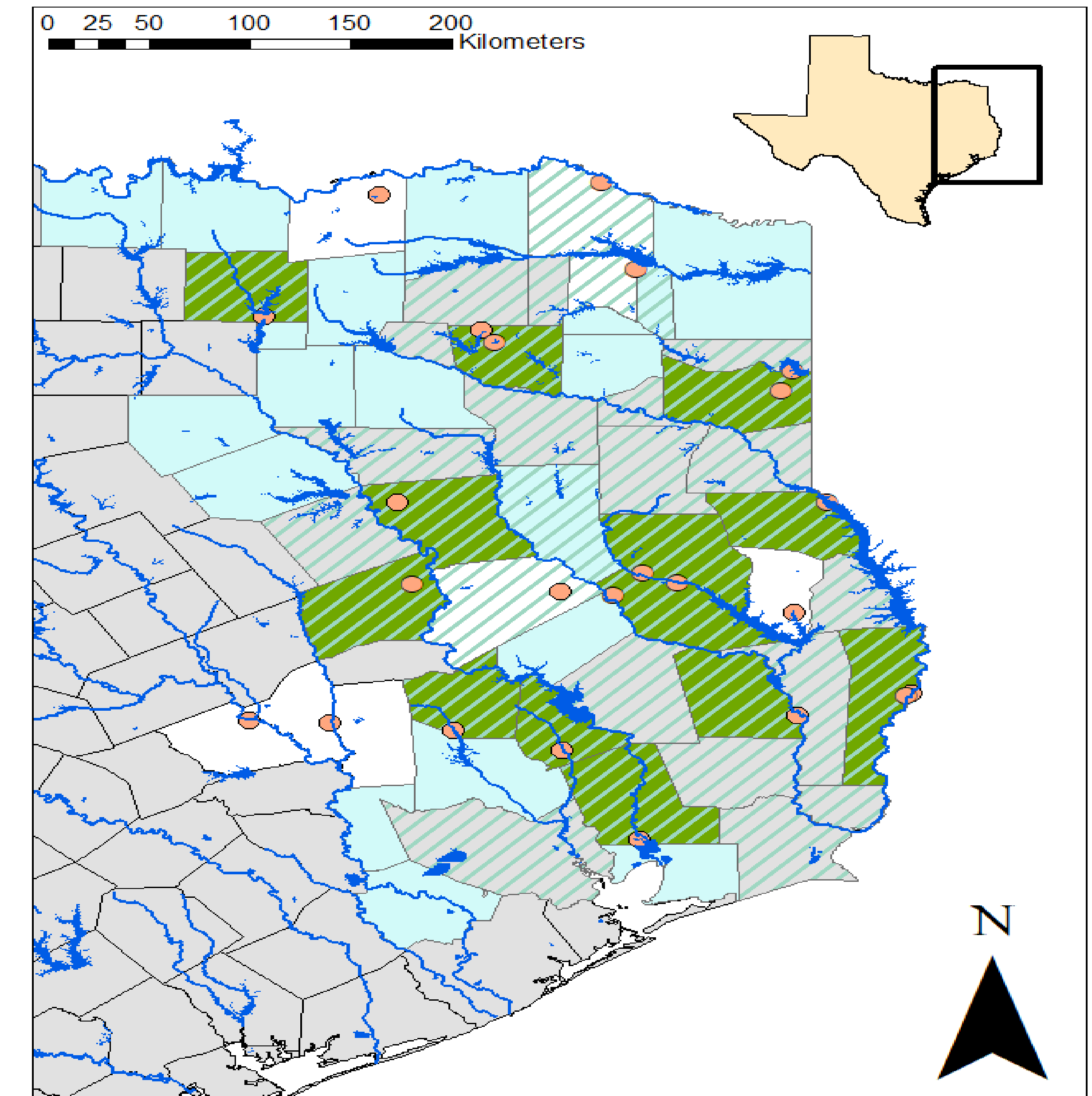
Individuals will be sexed, measured, and marked. Muscle samples will be collected with biopsy punches (Turnquist et al. 2011 *Ecotoxicology*).

Local microhabitat data will be collected on-site within a 5m radius of traps, including sediment samples for mercury analysis. Landscape and watershed-scale data will be compiled and analyzed with ArcMap.

Distribution

Fig. 3: Distribution of *M. temminckii* in TX. Points indicate survey sites in the original survey that will be resampled. Green-colored counties indicate detection from 1999-2001, in the original survey, while white counties indicate no detection. Blue counties are additional potential survey sites for 2020-2021.

- known range in TX (Dixon 2013)
- further survey counties
- counties surveyed 1999-2001**
- no M.t. detection
- M.t. detection
- survey site



Predictions for mercury load and occupancy

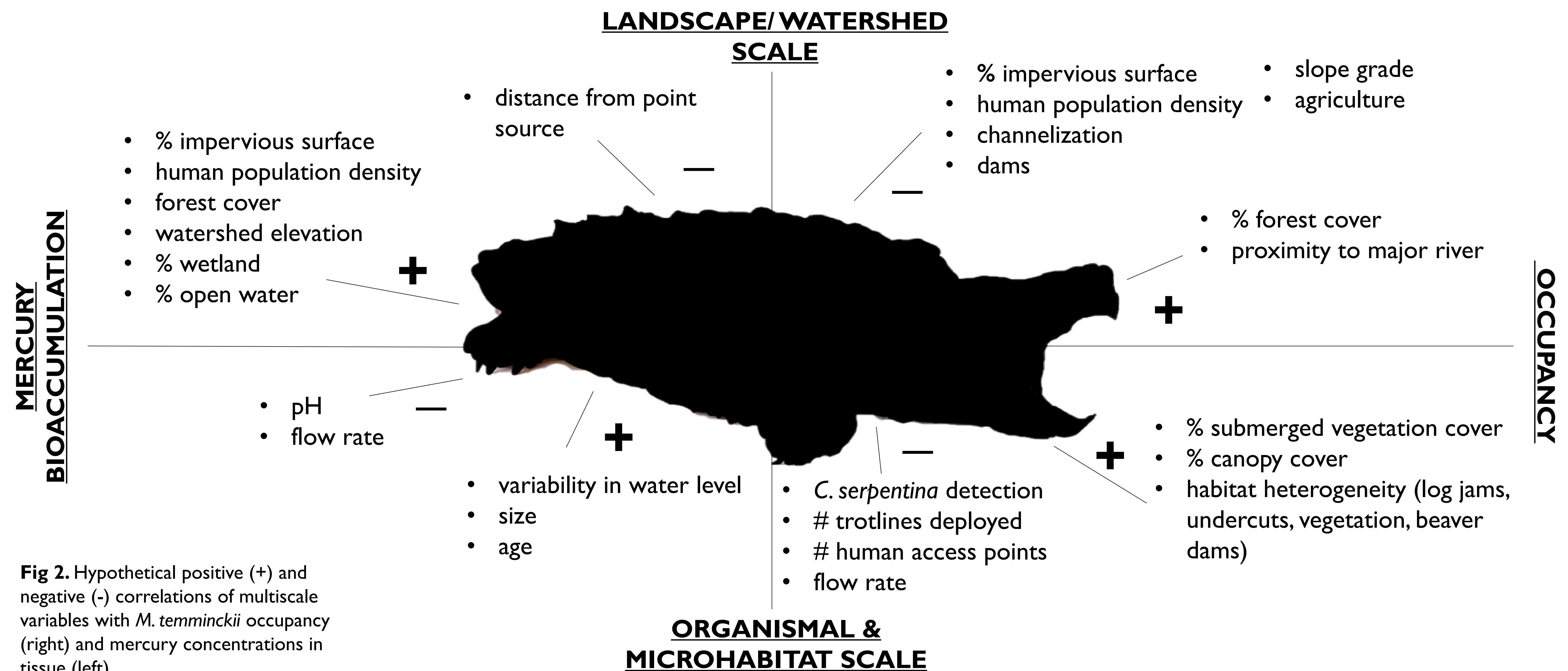


Fig 2. Hypothetical positive (+) and negative (-) correlations of multiscale variables with *M. temminckii* occupancy (right) and mercury concentrations in tissue (left).