PILOT STUDY OF AN UNDIAGNOSED DISEASE AFFECTING FRESHWATER TURTLES IN A NORTHEAST LOUISIANA BAYOU

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Introduction

Freshwater turtles that inhabit the small stretch of Bayou Desiard that runs through the University of Louisiana Monroe campus have been studied by ULM Biology classes over the past 20 years. In this time, faculty have noticed turtles in the family Emydidae (*Trachemys scripta elegans, Psuedemys concinna concinna, Graptemys spp*.) were exhibiting chronic shell abnormalities/lesions (Figures 1 and 2). This is the first investigative study into the disease being done in this area and has therefore been deemed a pilot study. Investigators hope to assess the ecological impact of this event by determining the percentage of total turtle population affected as well as the geographic distribution. Investigators are currently trapping within the affected zone (deemed ***Ground 0***) as well as north and south of Ground 0. Measurements of water and sediment quality are being taken simultaneously to the trapping efforts. Infected turtles that are captured are maintained in the laboratory under normal conditions as behavioral and physical data are collected. The infected individuals are then euthanized. The development of a clinical guideline for the diagnostic investigation of individuals presenting with signs and symptoms common among the affected turtles is underway with the assistance of the National Wildlife Health Center (NWHC) Epidemiology Team in Madison, WI. It is the hope of the researchers that this study will standardize investigative efforts for future studies of this nature. Turtles with similar shell abnormalities have been documented in other states, but none diagnosed. The lack of information about the pathology of this disease is concerning and this pilot study hopes to aide in the dissemination of vital information.

Figure 1 *P.c. concinna* male

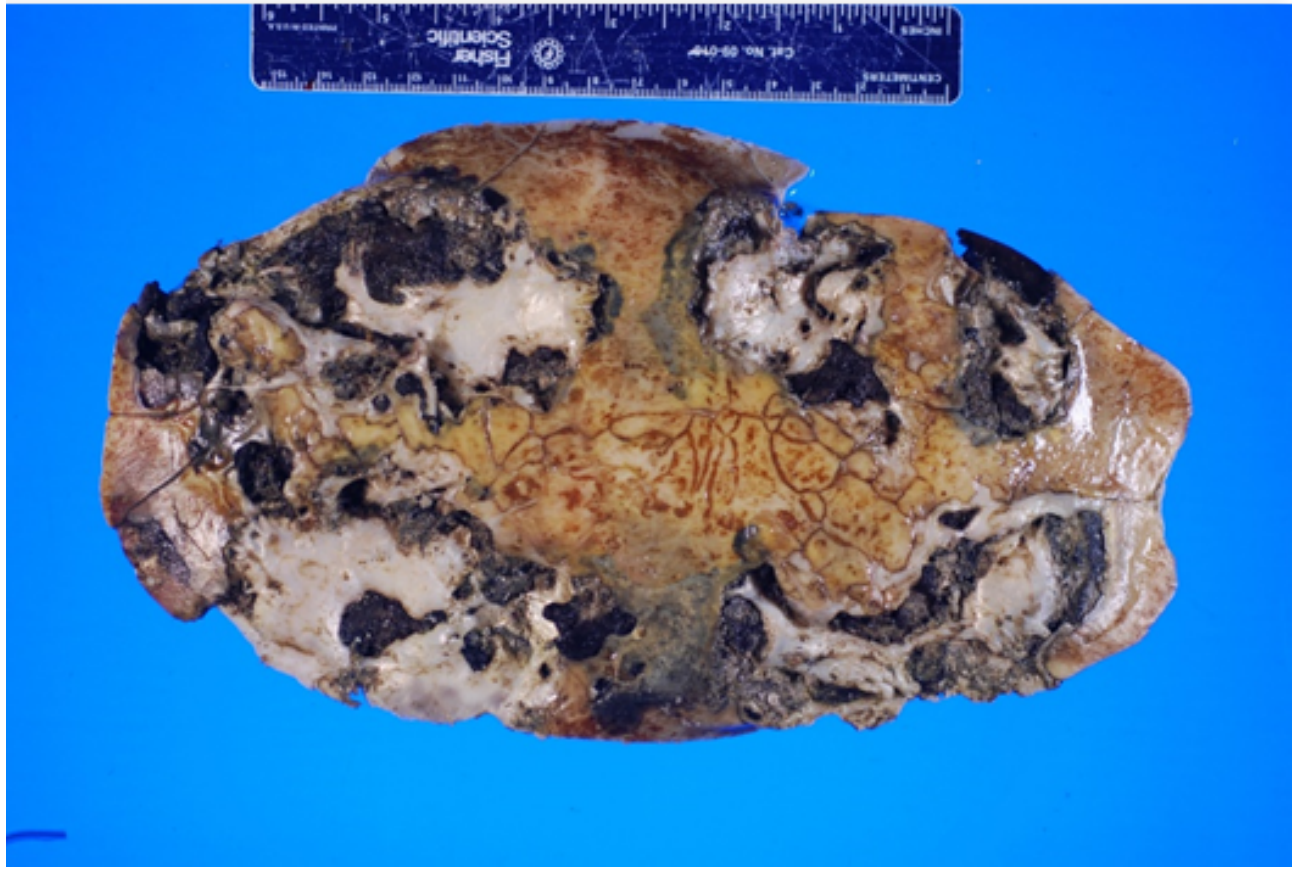

Figure 2 *P.c. concinna* submitted to NWHC for histopathology report

Study Site Description

- Monroe, Louisiana: a 28 mi long bayou that drains into the Ouachita River (Figures 3, 4, and 5)
- In this section of the bayou, the banks and surrounding areas are kept mowed and the bayou itself is routinely sprayed for vegetation control
- Students are often seen feeding the turtles by throwing commercial pet food and food intended for human consumption into the bayou
- Multiple drainpipes divert water runoff into the bayou from the landscaped grounds

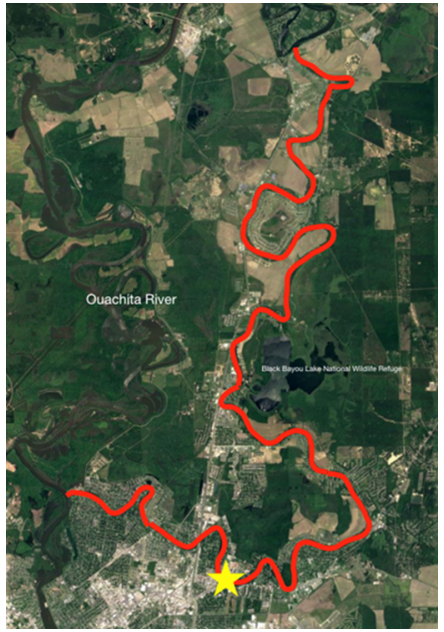

Figure 3 red marks Bayou Desiard, gold star marks Ground 0

Figure 4 Aerial photo of Ground 0

Figure 5 one of the many trap sites

Materials and Methods

Trapping

- Mar 2021 – Oct 2021 – optimum trapping season for freshwater turtles
- Baited hoop nets, passive fyke nets and basking traps, dip nets, hand capture
- Trap sites randomly selected
- Environmental data (ambient temp., water temp., pH, etc.) collected at each trap for each day deployed
- Mark recapture surveys being conducted simultaneously for all turtle species captured

Cruise Surveys

- Feb 2021 – Oct 2021
- Conducted from boat or on land
- A set distance and time for each transect
- Environmental data collected at beginning and end of each transect
- All turtle species recorded

Laboratory Diagnostics

- Behavioral and physical data recorded for each diseased turtle captured
- Euthanasia according to IACUC and AVMA guidelines
- Blood/tissue collection for future panels and heavy metals determination
- Complete histology/pathology diagnostic work done by NWHC Epidemiology Team
- Diseased gravid females captured will be induced to oviposit for egg viability and reproductive capabilities assessment

Objectives and Hypotheses

The primary objective of this study is to define the parameters for a preliminary investigation and to assess the ecological impact by determining the percentage of the population of turtles affected. The welfare of these turtles is a primary concern. Determining the cause of the disease is the end goal but may be beyond the scope of this pilot study. The knowledge gained from this investigation will lay the groundwork for more long-term investigative efforts. As this investigation is the first of its kind being done in this area, investigators are working with the hypotheses that:

1. Diseased turtles are restricted to a specific region in the bayou.
2. The disease only affects emydids.
3. Heavy metals in the environment contribute to the etiology of this disease.
4. The incurred parasite burden is a co-occurrence in infected individuals.

It is the hope of the investigators that what knowledge can be acquired through this pilot study will aide similar future studies in other locations. The lack of information about the pathology of this disease is concerning and this pilot study hopes to aide in the dissemination of vital information. Upon a review of the literature, this type of disease event is not isolated to northeast Louisiana.

Management Implications

Upon the completion of this project, investigators hope to apply the knowledge acquired during this pilot study to devise a long-term management/course of action plan for the affected turtles. The knowledge expected to be obtained is as follows:

- Set geographic parameters of diseased zone
- Reference intervals established from blood and tissue samples collected from unaffected specimens to be used in future studies
- Data explaining the relationship between parasitic load and infection
- Physical qualities of soil and water surrounding disease zone
- Trapping requirements and description of trap sites to be used in future studies to capture affected turtles
- Data collected on egg viability and reproductive capabilities of affected females
- Mark recapture data collection of species who live in the bayou and are unaffected

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