

# An Investigation into Micro Habitat Preferences of *Rana sphenocephala* In the Big Thicket National Preserve

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## Abstract

The Big Thicket National Preserve (BTNP) contains 106,000 acres of multiple ecological systems with enough biomass to make it America's most biologically diverse national preserve. One of the most abundant invertebrate inhabiting the area today is the southern leopard frog (*Rana sphenocephala*). This subspecies of the family *Ranidae* is incredibly successful in the BTNP. There are however other subspecies of the same family, specifically the northern leopard frog (*Rana pipiens*), whose numbers are declining almost anywhere they're found, except for a strip through middle America and Eastern Canada. Considering that this subspecies had, overtime, managed to inhabit most of the entire North American continent, this decline is alarming; and the prosperity of *R. sphenocephala* shows a sharp contrast, which made it an ideal target species. The purpose of this study was to identify habitat preferences of *R. sphenocephala* using a parameter test and the recorded conditions of eight habitat variables. A total of ten frogs were used in the experiment including two emergent's, six juveniles, and 2 adults. The results showed definite tendencies of the frogs towards certain ecological conditions, especially an inclination toward shady areas.

## Introduction

The data collected in the BTNP were on the micro habitat preferences of *R. sphenocephala*. The premise of this experiment was to try to determine habitat inclinations of *R. sphenocephala* by placing a one meter square grid in the area where one was found and recording data for eight variables observed within each location. The one meter grid was randomly tossed in an attempt to determine how finite in nature the habitat selection of *R. sphenocephala* was. Due to the success of this frog in the area, this experiment studies eight parameters to determine noticeable and re-testable patterns supporting the success of *R. sphenocephala* in the BTNP. Map 1 below shows the success of *R. sphenocephala* throughout the southeast. Compared to Map 2 a sharp contrast is obvious especially in Texas and the BTNP.

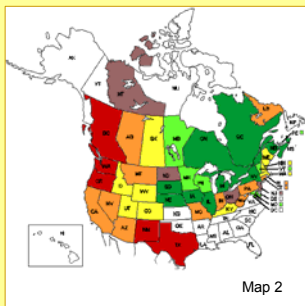


Figure 2. *Rana pipiens* (2)

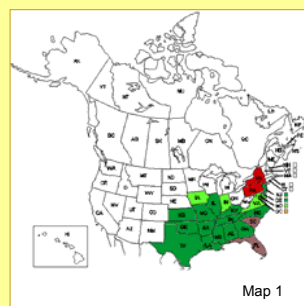
Map 1 (below, right) shows *R. sphenocephala*'s (Figure 1) prosperity in the southeast. Map 2 (below, left) shows *R. pipiens*'s (Figure 2) decline across much of the continent especially in the south, mid west, and coastal west.



Figure 1. *Rana sphenocephala* photo by Michael Black



Map 2

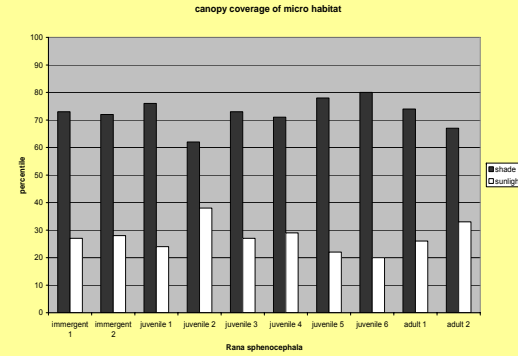


Map 1

Frog	Soil type & moisture (1)	Leaf litter depth (2)	Leaf litter type (3)	Vegetation (4)	Decomposing wood/coverage (5)	Distance to water (6)	Depth of Water (7)
Emergent 1	CW	3 cm	N.A.	V 7%	DWM 7%	27 m & 47 cm	16.4 cm
Emergent 2	CW	2cm	DLC 25%	N.A.	DWD 10%	1m & 45 cm	11 cm
Juvenile 1	SCM	4 cm	DLC 90%	V 1%	DWM 15%	3 m & 4cm	11.4 cm
Juvenile 2	SCM	9 cm	DLC 80%	V 10%	DWD 70%	4 m & 20 cm	14.3 cm
Juvenile 3	CD	3 cm	DLC 40%	V 60%	DWD 15%	7 m & 4.4 cm	4 cm
Juvenile 4	CM	1.5 cm	P DLC 10% & 40%	V 40%	N.A.	6 m	6 cm
Juvenile 5	CW	1 cm	DLC 15%	N.A.	DWD 35%	1 m & 5 cm	7 cm
Juvenile 6	SM	N.A.	P DLC 35% & 30%	V 85%	N.A.	N.A.	N.A.
Adult 1	CW	3.5 cm	N.A.	V 5%	DWD 30%	2 m & 15 cm	8 cm
Adult 2	CW	3 cm	DLC 35%	N.A.	DWM 5%	1 m & 65 cm	3 cm

Table 1. Addresses the results for all recorded variables except for canopy coverage (listed in Graph 1). All abbreviations detailed in Key 1 (Below). N.A. stands for not applicable and is used whenever the specific variable was not found. All percentages were estimated.

Habitat variables	Habitat elements	Conditions
Soil Type/Moisture	sand=S clay=C sandy clays=SC	dry=D moist=M wet=W
Leaf Litter Depth		measured in metric
Leaf Litter Type	deciduous leaf coverage= DLC	
Vegetation	vegetation=V	
Decomposing Wood & Coverage	decomposing wood=DW	dry=D moist=M wet=W
Distance to Water		measured in metric 45 cm from water line
Depth of Water		measured in metric 45 cm from water line



Graph 1. shows preference of shady areas by *R. sphenocephala*

## Methods

Data for this project were gathered from the bottom lands of the Turkey Creek Unit of the BTNP. A one meter square grid composed of four sections of PVC pipe was used to determine habitat preference. The guidelines for determining the general age of the frog are 1-2 cm for emergent, 2-3 cm for juveniles, and 3 cm + for adults.

## Results

Ten southern leopard frogs were observed in this project (Emergent 1 & 2, Juvenile 1-6, and Adult 1 & 2) with eight habitat variables recorded for each. Variables included were; soil type and moisture, leaf litter depth, leaf litter type, vegetation, decomposing wood and its moisture, and the distance to and depth of the water; these seven variables are covered in Table 1 above. The eighth variable was canopy coverage which showed an obvious preference of *R. sphenocephala* towards shade in all three life stages observed; this eighth variable is covered in Graph 1 above. Things like extra shade, vegetation, and ground moisture accounted for Juvenile 6 who was found in a dryer area with no water in the vicinity. Juvenile 2 was exposed to the most sunlight but was found in the deepest leaf litter depth (9 cm) recorded and had 70% of decomposing wood covering its parameter, which was 35 % more than any other subject, as well as the deepest water recorded in the study.

## Discussion

The results obtained in this study identified habitat preferences for *R. sphenocephala* in the area. All eight variables showed patterns and made the frogs success in the BTNP justifiable. Only two of the subjects were found in areas without either deciduous leaf or pine needle coverage and both of them were found in wet clay that were temporary pools just days earlier. The three exceptions to low % of vegetative coverage (40%, 60%, and 85 %) were either found in an area with dry soil conditions as with Juvenile 3, very little leaf litter depth and no decomposing wood as with Juvenile 4, or with no leaf litter and only 2 % decomposing wood as possible protection from sunlight as in the case of Juvenile 6; this frog also had the least amount of sun exposure. The subject with 70 % of decomposing wood found within its' parameter was also the frog exposed to the most sunlight. One definite reason for the success of *R. sphenocephala* in the BTNP is the amount of canopy coverage. Juvenile 2 was found under more sunlight than the others and had habitat variables that accounted for the discrepancy. Since amphibians make up for most of the invertebrate inhabitation in both wet-land and terrestrial ecosystems they also supply a sizeable transfer of energy between aquatic and terrestrial habitats (3). This would indeed make them just as crucial, if not more crucial, to the biodiversity of these areas as any other living organisms inhabiting those same areas; and with the global decline of amphibian population, even more clout is added to the importance of habitat conservation (4).

## Literature Cited

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