

# 2017 Annual Report: Survey of American Alligators (*Alligator mississippiensis*) in the Big Thicket National Preserve

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## Summary

A nighttime eye shine alligator survey of the Neches River and its tributaries was conducted on October 9-27, 2017, following Texas Parks and Wildlife Department procedures. Sixty-six alligators were observed, mostly in the northern (near Steinhagen Reservoir dam) and southern (downstream of saltwater barrier) portions of the preserve. One Lamar University graduate student (Jami Brown) and eight undergraduates, along with six individuals from the community, participated in the surveys. Funds from Thicket of Diversity were used to conduct the October surveys, \$550 for undergraduates and \$191 for fuel costs. Research will continue with a survey of potential alligator nests in January 2018 and two nighttime surveys in the spring and summer of 2018.

## Methods

The first of three alligator surveys was conducted on the Neches River and its tributaries between October 9-27, 2017. The survey covered all streams and rivers within park boundaries that were navigable with a motorized boat (Figure 1), including the entire length of the Neches River within Big Thicket National Preserve, from the dam at Steinhagen Reservoir to just upstream of Interstate 10, a total distance of 96 miles (Figure 2). The survey also covered the lower 15 miles of Pine Island Bayou and lower 1.5 miles of Village Creek. For both tributaries, we traveled upstream from the confluence with the Neches River until we were blocked by vegetation in the channel. We also entered Village Creek from Highway 96 and covered 2.7 miles until we were blocked by vegetation upstream and a massive sand bank downstream. Finally, we surveyed side channels along the river and streams, including Johns Lake, Cooks Lake, Lake Bayou, Ten Mile Bayou, and the LNVA Canal.

Alligators were identified using nighttime eye shine procedures set by Texas Parks and Wildlife Department, specifically 1) surveying 10 days before and after a new moon, 2) surveying when daily maximum air temperatures were greater than 70 °F, 3) starting the survey one hour after sunset, 4) maintaining a boat speeds of 4-7 mph, 5) at least two people spotting at any time, and 6) once an alligator was spotted, approaching slowly to visually estimate eye-to-snout length.

We also collected water quality data during the survey period. During the surveys, we stopped every five miles on the river and collected temperature, pH, dissolved oxygen, conductivity, and salinity data using a Hanna multiparameter sonde. Additionally, we collected water samples at

the beginning and end of the survey to test for 6 chemicals: nitrate, phosphate, iron, copper, lead, and mercury. The water samples were collected from 4 locations on the Neches River (Highway 1013, Highway 96, saltwater barrier, and Interstate 10), at Pine Island Bayou (Highway 69) and Village Creek (Highway 96). LaMotte test kits were used to detect these compounds and chemicals in the lab.

## Results

The October surveys were conducted on 12 nights from October 9-27, 2017. Sixty-six alligators were observed (Figure 2). The majority, 41, were observed in the 17 miles from the dam at Steinhagen Reservoir to the bridge at highway 1013, with alligator density decreasing as we moved further south. An additional 14 were observed between highway 1013 and Johns Lake, a distance of 29 miles. Furthermore, 7 alligators were observed in the 7-mile section of river below the saltwater barrier at the southern end of the park. The central portions of Neches River, Pine Island Bayou, and Village Creek contained very few to no alligators. We were unable to determine the size of 26 alligators due to submergence before we could get close enough for an accurate estimate. Of the remaining 40, four were over 7 feet long, six were 5-6 feet long, fifteen were 3-4 feet long, and nine were < 3 feet long.

## Student Involvement

Jami Brown has been the principal investigator as part of her Master's project at Lamar University. She has invested 116 hours into field and lab work related to this first survey. Eight Lamar University undergraduate students also participated in the surveys. Four were paid by funds provided by Thicket of Diversity and four volunteered. Additionally, six individuals from the community volunteered for at least one night during the survey.

## Budget

Of the allotted \$12,480, only \$741 were used for the October surveys. We expected to use about \$1200 for undergraduate student salary, but only spent \$550 due to 4 students deciding to volunteer instead of being paid. The excess money for undergraduates will be used to pay undergraduates in January 2018 to help search for alligator nests and other alligator sign at lakes within the preserve (see future work below). We expected to pay approximately \$720 for fuel costs during this survey, but only spent \$191. This was partially due to use of Lamar University's fuel station (paid for by the Lamar's Biology Department) at the beginning of the study before our TOD account was set up by the University. We expect fuel costs to be higher as we search for alligators in 2018. The \$6,000 set aside for Jami Brown's salary will be used in the fall of 2018 and spring of 2019.

## Future Work

Beginning on January 8, 2018, we will begin visiting lakes and ponds located within the Big Thicket National Preserve looking for signs of alligators, specifically, alligator nests, holes and pull-outs. These are locations where we cannot safely conduct nighttime surveys, since we would need to leave the safety of the boat and hike to them in the dark. We have identified 44 possible locations within the park (Figure 3), mostly oxbow lakes along the Neches River, but also other ponds and lakes within the park. It is unlikely we can visit all 44 waterbodies, so we will prioritize the largest and closest to the river. We will hike to the lake from a road or, in the case of oxbow lakes near the Neches River, from the river via boat.

Two additional nighttime eye shine surveys of waterways will be conducted in 2018, one in April-May, during mating season, and the other during the summer. Jami Brown will compile data and write her thesis and report during the fall of 2018 and spring of 2019.



*Figure 1. Boat, crew and equipment at Johns Lake in preparation to conduct night-time surveys.*

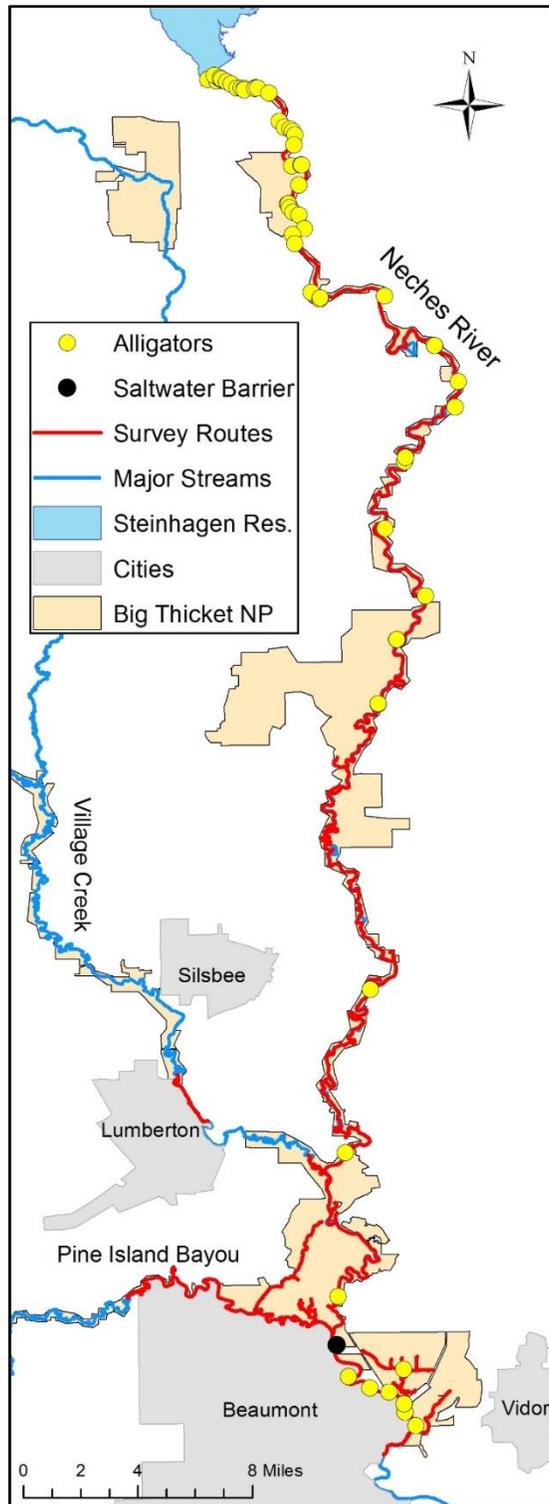


Figure 2. Survey routes (red lines) and observed alligators (yellow dots) on the Neches River and its tributaries from October 9-27, 2017.

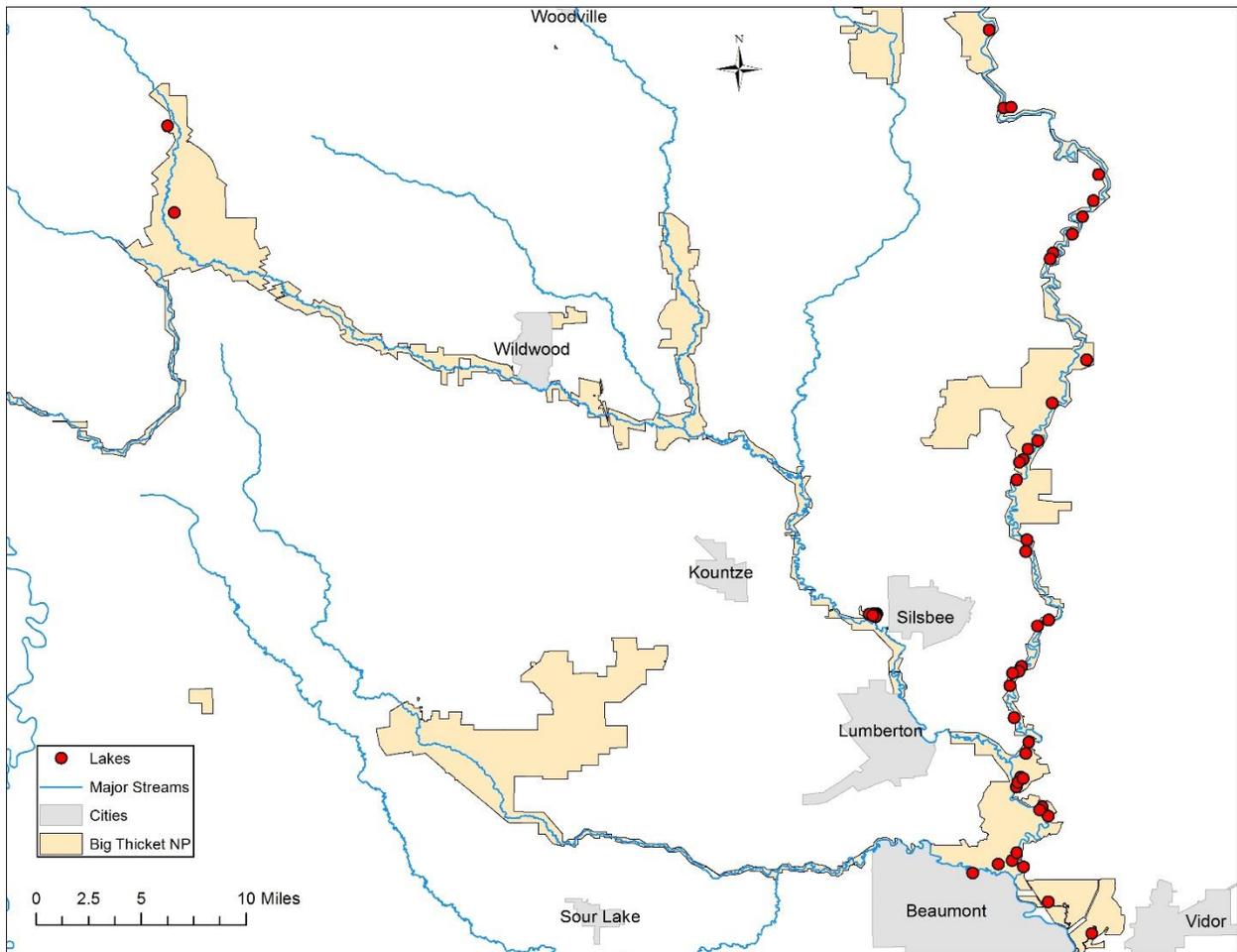


Figure 3. Ponds or lakes within Great Basin National Preserve with possible alligator nesting sites.