Summit Lake State Park Herpetofauna Survey, June – September 2016

A RESEARCH PAPER

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BY

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Introduction

Wetlands are important for a variety of reasons. Amphibians breathe and circulate water through their skin, so what is in their environment will have an effect on their overall health. If unnatural or toxic material is present in the water, these substances can get into their systems easily. Many amphibian species, including many that live at Summit Lake State Park, require an aquatic environment to lay their eggs. Fish can be a predator of some amphibians, especially in their larval and juvenile stages. Vernal pools, a type of wetland, do not contain fish so this type of habitat can be essential to amphibian species to reproduce without the risk of predation by fish. For the past few decades, amphibians have been facing an extinction crisis that threatens around 50% of all species (Crottini et al. 2014).

Prior to this study, there had been no sort of official listing of the reptiles and amphibians in Summit Lake State Park. It is important to know what kind of species are present in a park around you, not just for the sake of curiosity, but it can also give you an idea of what to look for when assessing the health of the wetlands present. Amphibians are bioindicators, meaning their health can give you an idea of the environment’s health, or vice versa (Dunson et al. 1992). Just beginning to monitor the species present can also give you a better idea of what conservation efforts to make when making plans for the future of the park.

Materials and Methods

Study Area

Summit Lake State Park (Fig. 1) has more than 1,084 hectares and is located in New Castle, IN (http://www.in.gov/dnr/parklake/2967.htm). This park is an area that contains a variety of
wildlife due to the diversity of ecosystems present. Many people come to Summit Lake State Park to hike, fish, bird watch, observe wildlife, and other recreational activities as well. Due to the many different types of wetlands here, such as vernal pools and larger lakes, it provides a variety of habitat types for reptiles and amphibians to thrive.

Figure 1: Map of Summit Lake State Park. Available at: http://www.in.gov/dnr/parklake/2967.htm

Survey Protocols

My survey of Summit Lake State Park was entirely opportunistic (Broderman et al. 2002). I went to the park twice a week for three months (early June – early September 2016). My visits to the park lasted around 1-2 hours. I would walk around on the trails, around the lake, and in the wooded areas looking for reptiles and amphibians. I would turn over logs, rocks, etc. and also went into vernal pools with a pair of waders. For organisms that were
farther away and unreachable, I used binoculars to observe them. I did observations at
different times of the day to see if I could see different organisms at different times. Many
times I went late at night and used a headlamp to help detect organisms. I found this
particularly helpful when observing and catching frogs because they seemed to freeze when the
bright light was pointed directly at them. I also noticed that many more frogs were out at night
as well. When not on hiking paths, I would be out by the lake using my binoculars primarily to
scan logs where turtles may be resting. I was told by security that there were two large
snapping turtles (*Chelydra serpentina*) on the north-west part of the lake so I spent some time
there searching as well. I attempted to photograph many of the organisms I was able to see
and capture but I was not able to photograph all species because some were far away or ran
away before I was able to photograph. I only counted organisms that I could successfully
identify from sight and sound or that I could capture and identify. Any individual that darted off
or that I would lose in the water or leaf litter without identifying to species was not included in
my results. I spent the majority of my time on hiking trails 1, 2, and 3, shown in Fig. 1 above,
but ventured to the outskirts of Summit Lake on several occasions.

**Results**

At Summit Lake State Park, I recorded 12 different species of reptiles and amphibians
totaling 193 individuals (Tables 1-4). The Anurans that I observed included the American toad
(*Anaxyrus americana*), western chorus frog (*Pseudacris triseriata*), green frog (*Lithobates
clamitans*), bullfrog (*Lithobates catesbeianus*), northern leopard frog (*Lithobates pipiens*), and
gray tree frog (*Hyla versicolor*). The Squamates that I observed included the eastern garter
snake (*Thamnophis sirtalis*) and the northern water snake (*Nerodia sipedon*). The Testudines that I observed included the painted turtle (*Chrysemys picta*) and the common snapping turtle (*Chelydra serpentina*). The Caudates that I observed included the red-backed salamander (*Plethodon cinereus*) and blue-spotted salamander (*Ambystoma laterale*).

Table 1. Location and number of all Anurans encountered at Summit Lake State Park, June-September 2016

<table>
<thead>
<tr>
<th>Order Anura</th>
<th># of Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>American toad (<em>Anaxyrus americana</em>)</td>
<td>18</td>
<td>Hiking trails 1 and 2</td>
</tr>
<tr>
<td>Western chorus frog (<em>Pseudacris triseriata</em>)</td>
<td>38</td>
<td>Hiking trails 1 and 2</td>
</tr>
<tr>
<td>Green frog (<em>Lithobates clamitans</em>)</td>
<td>91</td>
<td>Hiking trails 1, 2, and 3</td>
</tr>
<tr>
<td>Bullfrog (<em>Lithobates catesbeianus</em>)</td>
<td>3</td>
<td>Hiking trail 1</td>
</tr>
<tr>
<td>Northern leopard frog (<em>Lithobates pipiens</em>)</td>
<td>4</td>
<td>Hiking trail 1 and 3</td>
</tr>
<tr>
<td>Gray tree frog (<em>Hyla versicolor</em>)</td>
<td>4</td>
<td>Hiking trail 1</td>
</tr>
</tbody>
</table>

Table 2. Location and number of all Squamates encountered at Summit Lake State Park, June-September 2016

<table>
<thead>
<tr>
<th>Order Squamata</th>
<th># of Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern garter snake (<em>Thamnophis sirtalis</em>)</td>
<td>5</td>
<td>Hiking trail 1</td>
</tr>
<tr>
<td>Northern water snake (<em>Nerodia sipedon</em>)</td>
<td>4</td>
<td>Outskirts of Summit Lake</td>
</tr>
</tbody>
</table>

Table 3. Location and number of all Testudines encountered at Summit Lake State Park, June-September 2016

<table>
<thead>
<tr>
<th>Order Testudines</th>
<th># of Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painted turtle (<em>Chrysemys picta</em>)</td>
<td>3</td>
<td>Outskirts of Summit Lake</td>
</tr>
<tr>
<td>Common snapping turtle (<em>Chelydra serpentina</em>)</td>
<td>1</td>
<td>Outskirts of Summit Lake</td>
</tr>
</tbody>
</table>
Table 4. Location and number of all Caudates encountered at Summit Lake State Park, June-September 2016

<table>
<thead>
<tr>
<th>Order Caudata</th>
<th># of Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red-backed salamander (<em>Plethodon cinereus</em>)</td>
<td>19</td>
<td>Hiking trails 1, 2, and 3</td>
</tr>
<tr>
<td>Blue-spotted salamander (<em>Ambystoma laterale</em>)</td>
<td>3</td>
<td>Hiking trails 1 and 2</td>
</tr>
</tbody>
</table>

**Individual Species Count**

*American toad (*Anaxyrus americana)*

I had no trouble finding American toads in the wetland areas of Summit Lake State Park, especially at night. I found the majority of them sitting on the sides of vernal pools while vocalizing. The majority of them seem to freeze when my headlamp was pointed at them which made them easy to capture. This was the most abundant species that I observed.

![American toad (*Anaxyrus americana*) on hiking trail 1](image)

*Eastern Garter Snake (*Thamnophis sirtalis)*
The eastern garter snake was surprisingly difficult for me to find. I expected to find more than I did. The second night that I went I found my first one so I was hopeful that I would end up seeing several of these, but that was not the case. The two eastern garter snakes that I found were in wooded areas, usually near a vernal pool but not on the edge of it like many of the amphibians. The two that I found were hiding under leaf litter, which may have been the reason that I did not see many, as I did not search through leaf litter as much as I just made visual observations.

**Western Chorus Frog (Pseudacris triseriata)**

Western chorus frogs were not difficult to find and they were even easier to hear. They seemed to prefer spending time along the banks of vernal pools, much like the American toads and almost every amphibian species I encountered. I seemed to find these organisms a lot, most of the time at night.

**Green frog (Lithobates clamitans)**

Green frogs were very easy to find and catch at night. Any time that I went after the sun went down, there was never a struggle to find these organisms. Not only because they froze when the light hit them, but because they are pretty large so they were easy to spot. Even on the nights when I was struggling most on finding organisms, these ones would never disappoint.
Green frog (*Lithobates clamitans*) and a six-spotted fishing spider (*Dolomedes triton*) in Summit Lake State Park

**Bullfrog (*Lithobates catesbeianus*)**

The bullfrog was a species that seemed to taunt me every trip to the park I made. I could hear these organisms basically every time I went, but seeing them was a rarity. They seem to hide in thick brush located in the vernal pools so they were very difficult to get access to. Also, when I got close to the majority of them, they would dart off underwater, never to be seen again. This was one of the more rewarding species for me to find and capture.

**Painted Turtle (*Chrysemys picta*)**

The painted turtle is another species that I only encountered a few times. I encountered one in the shallow waters of the lake and two in pools located in the wooded areas, all in shallow water. They did not seem very afraid, as they sat motionless on the bottom; I was able to walk right up to them and pick them up. The two I found in the woods were at night, and the one that I found in the lake was during the day.

**Northern Leopard Frog (*Lithobates pipiens*)**
The northern leopard frog was not an easy species to find, but I seemed to find them on several occasions. I tended to find them almost exclusively in the vernal pools, usually resting on a log or against a tree trunk at night. They seemed to be a little more cautious than green frogs, they seemed to frighten easily and jump into the water unless I snuck up behind them.

**Red-Backed Salamander (Plethodon cinereus)**

I was surprised at the number of red-backed salamanders. All the ones I found were under some sort of log, rock, leaf litter, etc. I did not see them in June but it seemed like their numbers started to pick up early to mid-July.

![Red-backed salamander (Plethodon cinereus) on hiking trail 1](image)

**Common Snapping Turtle (Chelydra serpentina)**
The common snapping turtle was an exciting species to see, she was very large. I was told by a security guard at the park that he had seen this turtle sitting on rocks during the day so I decided to check out the northwestern part of the lake. I was not able to get pictures because it was far away, but I was able to see it well with my binoculars; it was about the size of a car tire.

**Northern Water Snake (Nerodia sipedon)**

The northern water snake was the most abundant snake that I observed. I have noticed that snakes tend to be out more during summer and I had seen this species a lot on a trip to Goose Pond Wildlife Area a couple months prior. I did not find any of these until August. I found one of these in the leaf litter in the woods and the others in the water, near the banks of the main lake.

**Gray Tree Frog (Hyla versicolor)**

I was only able to find two gray tree frogs, both of them on trail 1 near the walking path. Physically I could not distinguish these frogs from cope’s gray tree frogs (Hyla chrysoscelis) but those species are not known to be in northern Indiana so I made the assumption that they were gray tree frogs. Both individuals I found on the ground, along the path.
Gray tree frog (*Hyla versicolor*) on hiking trail 1

Blue-Spotted Salamander (*Ambystoma laterale*)

The blue-spotted salamander was not as common as the red-backed salamander, but I still did not have that hard of a time finding them. They are much bigger than the red-backed salamander so they were much easier to spot. I seemed to find them mostly under large rocks on hiking trail 1.
Discussion

I expected to find more snakes than I did. When the temperature rises in the summer months, snake activity also tends to rise (Moore et al 2001). I believe that more snakes than I found are present in Summit Lake State park but strictly opportunistic sampling is not the best way to account for them. To get a better idea of what is there and how much, I think opportunistic sampling for longer periods of time and more often during the week would have been great. Also setting up traps near water would have been a good idea as well. The number of salamanders I found was to be expected, but I did not see any eastern tiger salamanders (Ambystoma tigrinum) and I expected too. Again, this could be the bias of a strictly opportunistic sampling method. I tended to see more salamanders at night when it was cooler as they were out of hiding and searching for food (Brodman and Jaskula 2002). The number of frogs and toads I found was to be expected, if not exceeding expectations. Even though there were frogs and toads that I could not see, I knew they were all around me based on vocalizations. I could see a lot of them during the daylight hours but they were much more
likely to dart off when approached at this time. Another factor that could have played a role in the number of amphibians seen was the humidity. This summer in east central Indiana was humid for the most part. Many frog and toad species tend to be more active when there is more moisture in the air and also after periods of rainfall (Bellis 1962).

According to a study done by Minton, *et al.* (1982), they recorded 82 species of amphibians and reptiles in Indiana. Some species that Minton *et al.* found in Henry County that I did not included: small-mouthed salamander (*Ambystoma texanum*), spotted salamander (*Ambystoma maculatum*), eastern tiger salamander (*Ambystoma t. tigrinum*), eastern newt (*Notophthalmus viridescens*), northern dusky salamander (*Desmognathus f. fuscus*), spring peeper (*Pseudacris crucifer*), eastern box turtle (*Terrapene c. carolina*), map turtle (*Graptemys geographica*), midland painted turtle (*Chrysemys p. marginata*), five-lined skink (*Eumeces fasciatus*), rat snake (*Pantherophis obsoletus*), and milk snake (*Lampropeltis triangulum*). The time of year I went effected what reptiles and amphibians I saw compared to Minton *et al.* (1982). I have seen spring peepers, small-mouthed salamanders, spotted salamanders, eastern tiger salamanders, eastern newts, and many others listed above in the past at Summit Lake State Park, just not in the summer months when I did my survey.

**Acknowledgements**

I would like to acknowledge and thank the staff at Summit Lake State Park for allowing me free access to the park to conduct this survey. I would also like to thank my advisor, Dr. Kamal Islam, for assisting me in the preparation for this survey as well.
References


