Terrapene Times

Adopt-A-Turtle Newsletter

October 2020 Volume 1, Issue 2

Research, education, outreach, & conservation

Inside this issue:

Students crossing state lines

Turtles, like all wild animals, have little regard for property lines, county lines, state lines, etc. With the help of generous landowners, the Washburn University turtle team has been able to continue to track turtles as they move throughout their home-ranges (the specific area a single animal lives in, as opposed to species range that is the total geographic area covered by all individuals of the species). This summer, we expanded our own ranges even more by tracking turtles across two states: Kansas and Nebraska. This summer five Washburn University students collaborated with three University of Nebraska-Lincoln (UNL) students and two post-graduate field technicians on a massive multi-state study investigating the relationships between individual behavior syndromes (think personality) and daily movement and microhabitat use, home-range size, and body condition (used to estimate fitness, a relative measure of offspring production). Three Washburn students spent 1 week, 3 weeks, and 6 weeks respectively, at Cedar Point Biological Station in western Nebraska where they worked with UNL students and field techs on this project. These students all also worked in Kansas for a substantial amount of time collecting behavior data on our local population of box turtles. The summer-long project was a huge success and students will be presenting oral talks of their work at upcoming conferences, including at the Kansas Herpetological Society meetings in early November.

Pictured L-R: Colin (WU), Sam (WU), Kaylyn (Tech), Aubrey (WU), Ben, Shelby (UNL). Photo cred- Derek G.

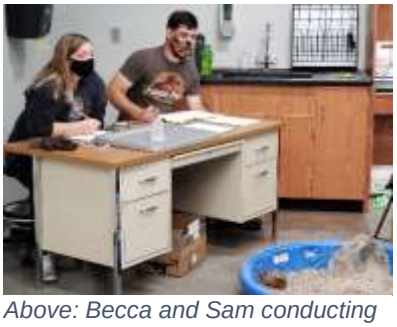
←The Adopt-A-Turtle fund helped cover the cost of equipment and WU student housing at Cedar Point Biological Station!

"BE NOT AFRAID OF GOING SLOWLY, BE AFRAID OF STANDING STILL."

-CHINESE PROVERB

Graduating Senior Highlights

This fall semester three of my research students are graduating. Sam, Steven, and Becca have worked with me on four major projects over the past several years. On top of their immense commitment to their research, they have all also taken Vertebrate Zoology and Movement Ecology Seminar with me and Becca was one of the first students to take our new Topeka Zoo internship for degree credit. Needless to say, I have gotten to know these three graduating students exceptionally well over the past several years and am truly grateful for having had the opportunity to work with them on some really neat projects they developed and executed. I have no doubt that each of these students (and Brice) will be hugely successful in their future careers. Thanks all!



Above: Becca and Sam conducting behavior assays at Baker Wetland this summer (2020)

A-maze-ing Display Terrarium; Dr. Paul Wagner does it again!

In the last issue I wrote about how Dr. Paul Wagner, a professor of physiology at Washburn University, built a collapsible maze for assessing spatial memory of animals. Needless to say, he designed and constructed a fantastic maze for Steven to use. To date, Steven has already used the maze for over 50 trial runs with turtles and we are just now getting our results solidified for an ah-maze-ing" presentation Steven will give at the upcoming Herpetological Society Meetings and elsewhere. We have found that turtles do improve their maze performance over successive trials but tend do more exploration after several initial trials indicating they've learned the maze and just want out once they find their food rewards. Dr. Paul Wagner also helped construct a terrarium complete with a shelter to house sick, injured or newly discovered box turtles in our Stoffer Science Hall display case. The turtles housed in this terrarium are excellent ambassadors for wildlife, their conservation, and our research. We provide short bios of each turtle housed in the terrarium and what sort of rehabilitation we might be doing. Thanks Paul!

Above: Terrarium designed by Dr. Paul Wagner. So far we have used this space to rehabilitate a turtle heavily parasitized by flesh flies, monitor a turtle that was found with burn wounds shortly after a prairie fire, and to house a potential hybrid turtle we did genetic testing on, plus more.

Brice: A Plant Guy Doing Turtle Research

Occasionally the stars align, and research projects and personnel come together at the same time. That is exactly what happened with Brice, another superb graduating senior this semester. Brice came to me with an already strong track record of research success and know-how. However, despite having already completed his research requirements necessary for his degree in environmental biology, Brice was looking for more research experience related to fire ecology. As it so happened, many of the sites we conduct research experience controlled burns from time to time. Fortunately, for Brice and I, there were several controlled burns scheduled for some of my research areas this summer and early fall. Brice developed a project using thermochrons (remote programmable temperature sensors) to monitor the ground temperature at various soil depths pre, during, and post prairie burns. Brice developed a massive grid where we collected thousands of temperature data points to investigate the impact of fire on below-ground temps at depths we typically expect to find turtles. These studies are going to be the basis of a long-term monitoring effort to investigate the ecological impact of fire on turtles, their food supply, and their possible refugia sites. We found that if turtles can get buried deep enough, quick enough, they will likely be fine. However, we also found several turtles fleeing the fire, with some sustaining burns during their escape. Thus, although we know prairie burns are hugely important for maintaining the health of a prairie, we must also consider when the burns are conducted to mitigate turtle and other animal loss.

Brice using a thermochron reader to determine ground temperatures before, during, and after a prairie burn. Photo cred- Sam W

"We must consider when the burns are conducted to mitigate turtle and other animal loss"

A juvenile turtle found during the middle of a prairie fire in March. The ground temps became hot enough that this small turtle emerged from his hole presumably to escape the heat.

New equipment helps students find turtles

For me, one of the most fun aspects of turtling (looking for turtles) is finding an excellent fresh candidate hole with all of the signs of turtle activity. Unfortunately, many of the holes we come across are quite deep or the hole curvature is such that we cannot see far inside or around the bend. Every student, as part of their field pack, is provided a flashlight; however, for holes with a bend the flashlight is of little use. Agitated by the number of holes we were finding that we could not properly assess for turtles, I decided to buy the team two borescopes with my own money. I was unsure how well the borescopes would work and thus did not want to use Adopt-A-Turtle funds for them. Needless to say, the new borescopes are super fun to use and allow us to fully search deep, curvy holes. One borescope is a standalone handheld device with a monitor while the second one I purchased connects to the phone. As the weather changes and turtles seek shelter in holes (see article below), our chances of finding turtles aboveground this late in the season continue to diminish. Thus, with the help of the new borescopes we can continue to get visuals (and check for health/condition) of radio-tagged turtles plus look for new turtles in the holes we come across as we do our radio telemetry. A future Adopt-A-Turtle issue might feature some of the pictures of the various creatures we are finding!

Bottom photo: Becca (left), Kelsey (middle) and Chase (right) learning how to use their new borescope while looking for new turtles in holes!

Brumation: a long winter's nap

Do you ever wonder what a box turtle does once the weather turns cold, food availability plummets, and winter begins? For ornate box turtles, the answer is they enter into brumation, a sort of hibernation-like state. To be technical, hibernation occurs when endotherms, through physiological processes, suppress their metabolic rates, heart rates and respiration rates and allow their body temperature to drop below their normal operational temperature. Ectotherms ("cold-blooded, although this is a misnomer), on the other hand, have limited capacity to reduce their body temperature via physiological processes, instead their body temperature covaries with environmental temperatures. During brumation, ectotherms cease to behaviorally thermoregulate and instead allow their body temperature to drop, sometimes below freezing temps!

"Box turtles typically bury themselves three feet deep overwinter"

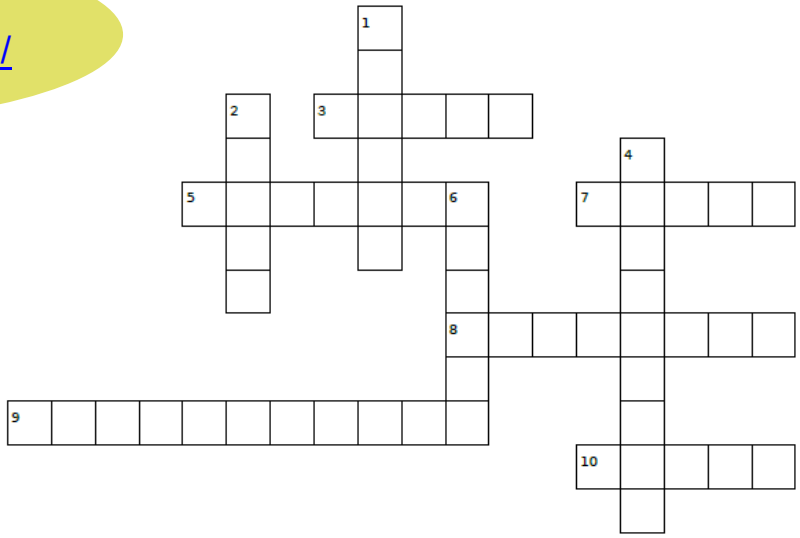
During brumation, ectotherms also often occupy extremely hypoxic (low oxygen) or apoxic (no oxygen) conditions, sometimes surviving for months with little to no oxygen at all! Box turtles typically bury themselves on average of three feet deep in carefully selected microhabitat areas where the substrate, above-ground plants, drainage, and slope face appear to be considered. Although turtles regularly use holes of other animals they really only dig a true hole for brumation.

Field Stations Galore

Over the past four months members of the turtle team have had the unique opportunity to conduct research at three different field stations on top of working at our private property field sites. These field stations included Cedar Point Biological Station (UNL affiliated), Baker University Wetland, and Karlyle Woods (Washburn affiliated). I would like to extend a massive thank you to Irene Unger, the director of Baker Wetland, and her staff for generously offering us their laboratory space and various supplies so that we could conduct behavior assays in a controlled environment. I would also like to thank Janeen and Danny Walters at WU's Karlyle Woods field station for helping us find turtles there, providing us with water and snacks, and for maintaining a healthy and suitable habitat area for box turtles. For the research students, it is another feather in their cap to be able to list several field stations they have worked at on their CV's/resumes. This fall, several students and I also went to Konza Prairie Field Station (K-State) to determine if that could be a location of study.

We're on the Web!

https://wu-turtle.weebly.com/



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Down:

1. student specifically studying spatial memory
2. Cedar _____ Biological Station
4. term used to describe what turtles do overwinter
6. "Be not afraid of going____"

Across:

3. one of the first students to do WU's new zoo internship
5. term to describe relative reproductive output of animal
7. student specifically studying fire ecology
8. Baker ____ Biological Station
9. layman's term for behavioral syndromes
10. Karlyle _____ Biological Station

Summer 2020 Highlights

These newsletters tend to have lots of text, perhaps too much. Thus, I have created a website (link above) where a collage of photos can be seen on the homepage.

Here is an abridged 2020 highlight reel related to the chelonian (turtles) research program at Washburn University

- Washburn Day of Transformation grants awarded to both Aubrey and Brice. Congrats!
- Research highlighted in the inaugural Cedar Point Biological Newsletter
- Well over 2,000 GPS locations collected on turtles this summer via radio telemetry
- 59 turtles repeatedly assayed for the determination of their 'personality' across two states, the largest such study of its type on any turtle species. 50+ maze trials completed as well!

- Two new students joined the ranks this August: Chase & Kelsey. Welcome to the team!
- Research conducted at 3(!) different university owned field stations and 2 other field sites.
- Ben and Kaylyn rescued their first ever three-toed box turtle while it was crossing a road in Missouri. This was while they were searching for new potential study areas!