



St. Louis Box Turtle Project



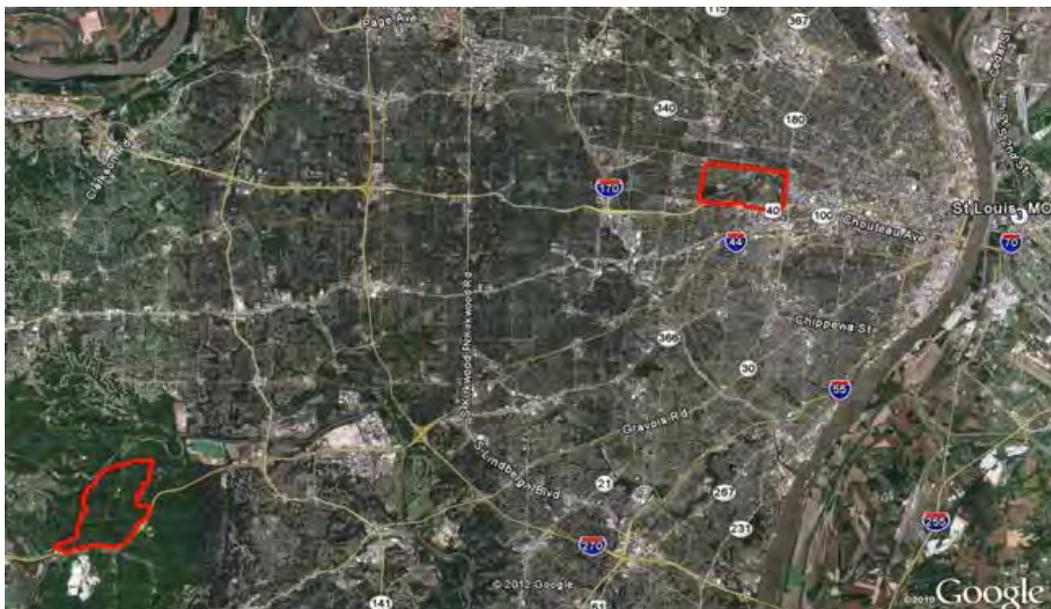
Left: Adult three-toed box turtle in leaf litter in Forest Park. Right: Adult three-toed box turtle at Tyson Research Center near St. Louis. Note the VHF tracking device fitted to the top of the carapace which allows researchers to track the turtle's movements.

What Is The Box Turtle Project?

The St. Louis Box Turtle Project was initiated in the spring of 2012 in response to 1) the growing threats facing box turtles in the Midwest and across the USA, 2) the lack of awareness of these problems, 3) the increasing disconnect between young people and the outdoors, 4) the incredible opportunity that exists on our doorsteps to experience nature, including box turtles, and 5) the paucity of scientific information available to help inform box turtle conservation. The well-known turtle biologist Archie Carr once noted that “everyone likes box turtles,” but how many St. Louisans know that wild, native box turtles are residents of parks in the heart of the City and surrounding countryside? Or that turtle numbers are probably declining throughout the state of Missouri due to road kills, habitat loss, and possibly disease? The goal of this project is to promote conservation of local urban and rural box turtles by improving our understanding of the ranging patterns, ecology, and health status of these delightful animals, and developing an education and outreach program. We work in Forest Park, one of the nation’s iconic urban parks that lies in the heart of St. Louis, and Tyson Research Center, a protected 2,000 acre natural area 18 miles from Forest Park. Our work at each site involves radio-tracking of box turtles to understand ranging behavior, surveys to estimate the abundance and distribution of turtles, research on turtle health status, and outreach to young people.

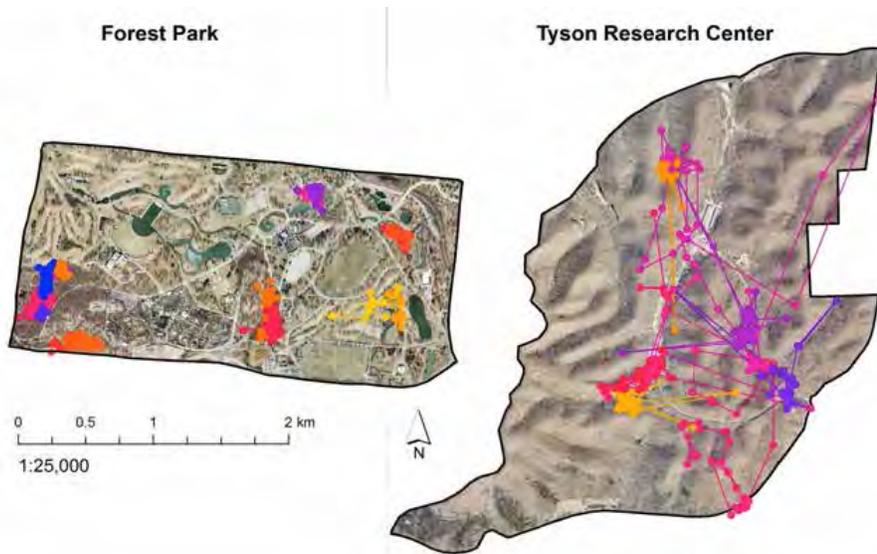
Box Turtle Highlights

- There are 17 species of turtles in Missouri including two box turtles, ornate and three-toed.
- Ornate box turtles (*Terrapene ornata ornata*) prefer grassy habitats such as prairies, while the three-toed box turtles (*T. carolina triunguis*) occur mostly in woodlands.
- Three-toed box turtles are the state reptile of Missouri.
- Box turtles can live for 50+ years.
- Adult shell length is between 4-6 inches, and weight is up to 1.5 pounds.
- Turtle diet is broad including worms, insects, fruit, mushrooms, leaves and grass.
- Nest temperature of incubating eggs determines sex: (think “cool dudes and hot babes.”)
- Box turtles brumate (hibernate) in winter and can withstand freezing!



Turtle Tracking

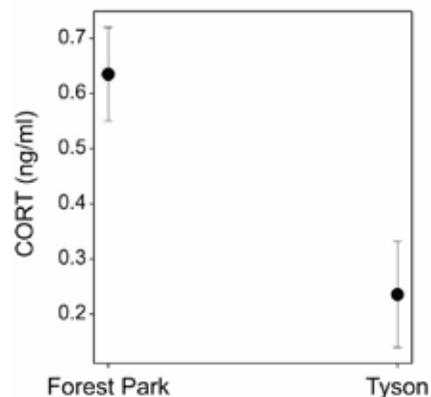
We currently have 18 radio-tracking tags on turtles (12 in Forest Park and 6 at Tyson). The tags are specially designed for turtles and weigh only a few grams. Tags are attached to the shell of the turtles using a small amount of non-toxic plumber's epoxy. The weight of the tag plus epoxy never exceeds 5% of the turtle's bodyweight. Each tag emits a regular radio pulse with a unique frequency. We use a radio receiver and a special antenna to track and locate each turtle once every 7 to 10 days. We found that Forest Park turtle home ranges are much smaller than Tyson turtles, possibly because of the small fragmented forest patches in Forest Park compared to the larger contiguous forest cover at Tyson. Some of the Tyson turtles are particularly mobile, moving over 1 km between extremes of their home range (see turtle movement figures below).



Turtle Health

Understanding the health of wildlife populations is increasingly seen as a critical part of conservation. Turtles may be threatened from a variety of disease risks including those related to stress, and pathogens such as ranavirus and *Mycoplasma* spp., which can cause high mortality. We have completed physical exams to document lesions and other abnormal clinical signs, as well as body weight, condition, and tick infestations. In addition, we have collected blood samples from over 100 turtles at both sites and are working to complete a suite of analyses to determine turtle health status. Preliminary analysis indicates that stress, based on hormone levels, are strikingly different between sites.

Stress Hormone Levels



Outreach

In 2013 we worked with a variety of local institutions in the St. Louis area including Captain Elementary School in Clayton, the Institute for School Partnerships at Washington University in St. Louis, Forest Park Forever, St. Louis Science Center, and the St. Louis Academy of Sciences (St. Louis BioBlitz and Teen Science Cafes). Our approach is to introduce people to turtles, their habitats and ecology and our research using practical methods in the field. We are also connecting young people in St. Louis and the Galapagos Islands through a common interest in the conservation of box turtles and iconic giant tortoises. You can now "like us" on Facebook at www.facebook.com/stlouisboxturtleproject and see a video about this project on YouTube. Go to "Box Turtles, Nature's Ambassadors."

Goals For 2014

In the coming year we hope to 1) complete population surveys of the turtles in Forest Park, 2) discover where Forest Park turtles nest and assess the vulnerability of nest sites, 3) monitor turtle movements (or lack thereof) in relation to changes in temperature during hibernation, 4) continue to document the movement and health status of turtles at both sites, 5) assess risks to populations and consider management options, and 6) promote the next generation of conservation scientists through programs of hands-on field activities at both Tyson Research Center and Forest Park. For more information on this project, go to stlzoo.org/conservationmedicine.

Turtle Movements

- VHF tags were fitted in early 2012. Currently there are 12 tagged turtles in Forest Park, 6 at Tyson.
- Home range size variation is extreme (0.4-3454 ha). Tyson turtles have much bigger home ranges than urban turtles in Forest Park.
- One Tyson turtle (called Mum) moved 600m in one week.
- Forest Park turtles are primarily restricted to small forest fragments.

Outreach in 2012-2013

- Introduced 100+ school aged children to the project through field trips and classroom visits.
- Provided summer internships for five undergraduate and four high school students.
- Project was featured on local TV networks, radio shows, newspapers, and numerous web sites.
- Developed a smart phone application (using rephoto) for box turtles that records photos and location data to the web for use in citizen science.
- Obtained funding to develop educational curricula and train 20 teachers from local St. Louis schools in turtle research and conservation methods.

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