

The Turtle Connection

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The Turtle Connection (TC) is an innovative, collaborative scientific and educational study, which uses turtles to increase the public's sense of connectedness with the natural world, interest in the environment, willingness to contribute data, and understanding of how science contributes to public policy decision-making.

Box turtles are a charismatic, long-lived, and widely distributed species. With their amiable nature, manageable size, and overall appeal, box turtles are the perfect organism for engaging citizens in learning about the value of nature, processes of science, and the sources and uses of scientific data. The Eastern box turtle (*Terrapene carolina*) serves as a flagship species for the TC.

The scientific study builds upon, extends, and centralizes the organization and database management of several smaller, but highly successful studies that have incorporated citizen scientists into box turtle research (Budischak et al. 2006, Groves 2004, Hester et al. 2007, Matthews and Somers 2005, Somers et al. 2003). We are expanding these studies by creating a statewide network of citizen scientists who, working under the guidance of university and professional wildlife researchers, collect ecological and population data on box turtles. By involving members of the community in research and engaging them in celebrations and interactive exhibits, this project will promote scientific and environmental literacy and provide opportunities for informal learners of all ages to connect with the natural world in a meaningful way.

The TC is the vision of the Box Turtle Collaborative (Collaborative) which represents two universities (University of North Carolina at Greensboro and Davidson College), four North Carolina state agencies (NC Wildlife Resources Commission, NC Parks and Recreation, NC Zoological Park, and NC State Museum of Natural Sciences), and the Schiele Museum in Gastonia, NC. Because the members and agencies are positioned across the state, the Collaborative is uniquely able to bring the project to remote regions of the state to create a network of monitoring sites, such as state and county parks, the state zoo, nature centers, state

forests, residential neighborhoods with forested areas nearby, and schools with sufficient acreage to support box turtle populations.

Scientifically, this project will provide us with the first systematic inventory of box turtles across North Carolina, and provide us with baseline data for future research on this species. Given that box turtles are a long-lived species (individuals life spans can exceed 100 years), permanently marking individuals also gives us the opportunity to monitor not only population dynamics but also individual turtle behavior for decades. The Collaborative anticipates that this project will outlive its founders.

The educational aspects of the TC have been developed by UNCG faculty Matthews, Carlone, and Somers, with our partners at the Schiele Museum, as a mechanism for advancing humanistic science education (Aikenhead 2006), understanding science as story telling and story revising (Grobstein [2005a](#)), and as a response to the call from the National Science Board ([2008](#)) for more informal learning opportunities. Public celebrations and exhibits will focus on how science and traditional ways of knowing about the natural world are complementary. Citizens will learn about ways they can contribute to scientific data collection and conservation efforts by becoming citizen scientists.

Details of the Proposal

The TC will have three tiers, two of which are already underway (Tiers 1 & 3). Tier 1 activity involves citizens in reporting sightings of reptiles and amphibians online. The mechanism for electronic reporting, with UTM (Universal Transverse Mercator) locality data included, is already in place on the Carolina Herp Atlas (Atlas, www.carolinaherpatlas.org) developed and managed by our Davidson College collaborators Dorcas and Price. At this website, anyone can register and input locality data and see the general localities for organisms that others have reported. Upon registering, the user receives a personalized message from the Director of the Herpetology Lab at Davidson College and is typically delighted to receive a message from a “real scientist.” Users may also upload photos and make comments about their specimens. Given the deep interest in citizen science projects over the past 100 years (Tomasek 2006) it is clear that ordinary citizens dearly wish to report their science experiences and may indeed be able to contribute important information regarding distribution of species.

Online reporting provides a forum for citizen input and is a means by which users can learn the general localities of the sightings of others, hence learn more about the distribution of species that interest them. The Atlas also provides citizens access to scientists who are interested in and willing to listen to what people have to say and want to contribute to science and conservation.

Tier 2 activities will be a single-day or weekend informal educational event with a celebratory atmosphere called *Turtle Days* which will engage visitors with the scientific as well as the cultural aspects of human knowledge. A traveling exhibit will also be developed for extended stays at a variety of venues, many of which will be state parks. The event will occur near the beginning of the term of the exhibit. The nexus for the *Turtle Days* event, exhibit, and activities will be story telling. Scientist story tellers will be present along with cultural story tellers, inspiring audience enthusiasm for the learning and telling of stories. Every species has a story, every ecosystem has a story, and every person has a story – each having value.

The word *story* is meant to describe both cultural tales and the stories generated by scientific research, which produce data using strict scientific protocol. Data analysis is one of the paths of knowledge that allows us to make sense of the world and which inspires new questions and observations. The work of science is to generate stories in such a way that they can be offered to others for critique, revision, and analysis, and to make predictions. These stories contribute to our literal understanding of nature. The work of cultural narrative or story is to impart values and meaning about the natural world. Personal stories, the stories that ordinary people tell about their experiences in nature, can also impart values about the natural world, and can become precious heirlooms. The juxtaposition of these different types of stories will be a powerful way to elicit learning and behavioral changes, as research over the past two decades indicates that the idea of appealing to reason apart from emotion is an illusion (Denning 2007, Phelps 2006, Pessoa 2008).

Science described as story telling and story revising will allow audiences to appreciate science as process and can help shift popular perception away from the idea that science is an activity only for the privileged few members of a professional community (Grobstein 2005 [a](#), [b](#)). The story of how science is able to unravel some of the mysteries of the lives of turtles will be told in the exhibit along with the story of habitat loss, causes of mortality, and solutions to

maintaining healthy, diverse turtle populations in our state. North Carolina faces an uncertain future as its human population is one of the fastest growing in the nation. As a result, NC is expected to lose nearly two million acres of forest land and crop land in the next 20 years (Ouzts 2007). There is a great need to generate the data necessary to support policy and legislation which will responsibly address our environmental problems. Descriptions of the importance of data collection will be emphasized using stories from various species such as box turtles, bog turtles and sea turtles.

The *Turtle Days* event may involve an annual census for finding new and previously captured turtles and demonstrating how data are collected and used to yield information about the status of and threats to box turtles. Barnett's video program on box turtles, *Gems of the Forest*, will be shown throughout the day. Some participants will want to learn how they can become citizen scientists and contribute to ongoing scientific research in a meaningful way by getting involved with Tiers 1 and 3 of the TC.

The cultural aspects of the *Turtle Days* celebrations provide a social context for informal learning and, while focused on turtles, may also include wildlife photography exhibits, nature art displays, writing contests, costumed events like the parade of local species, musical performances, discussions of historical uses of turtles, and the telling of turtle legends and stories. With Native American educators and museum curators, we intend to develop a program called *Turtles in the Native American Tradition* that will include stories, art, and artifacts of indigenous peoples in the Americas and stress conservation values. Indigenous wisdom and science will be described as complementary ways of knowing about the natural world.

Early, joyful experiences in the natural world can be transformative in igniting a deep connection with nature (Berry 1999; Louv 2005; Wilson 1984); remembering and telling these stories can evoke a powerful response in the storyteller and listener. Opportunities will be provided for participants to record stories from their personal experience with nature using the model of StoryCorps (<http://www.storycorps.net/>). This model utilizes an interview format where the interviewer and the interviewee are people who care about each other and are often related (Isay 2007). When people communicate stories of formative events that are consciously important to them, values and knowledge are also communicated. Stories have the power to connect people to nature and to each other. Interviewees come to value their own experiences in the natural world and

the telling of these stories increases the desire to tell them again and again. Listening is also a part of the experience (Isay 2007) and inspires the listener to recall and tell stories of their own as well as the ones they have heard.

Tier 3 activities involve a statewide, long-term, mark-recapture box turtle study using citizen scientists to collect data at specific sites across the state, including some state parks. North Carolina is one of the most biologically diverse states in the nation and our state parks hold examples of an incredible variety of biological communities. The TC provides opportunities for citizens and scientists to collaborate in data collection and to answer questions such as: What factors influence distribution of box turtles? What is the age structure of the populations? How does elevation affect distribution of box turtles in NC? How do roads affect population structure and gender ratios of affected populations? Do habitat preferences of box turtles vary across the state?

Tier 3 participants are willing to make a long term commitment to collecting data using strict scientific protocol and entering data electronically into a centralized database. These data will allow scientists to monitor population dynamics and establish baselines for populations at the sites. Data can be a powerful tool when legislative action is needed to address environmental issues (see inset).

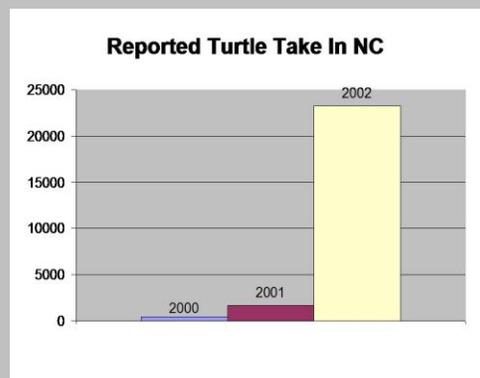
Data Made The Difference

The story of the NC Turtle Bill

The NC Nongame Wildlife Advisory Committee (NWAC) knew the international trade in turtles was a potential threat to the freshwater turtles of the Old North State. Although the danger was clear, no data existed to support legislation until the numbers of turtles collected in 2002 NC shot up and provided the data necessary to make a case for protection.

Soon after the data were reported in early 2003, a resolution was passed by the NWAC. The Wildlife Resources Commission responded swiftly by drafting legislation and together these organizations worked to get the word out to the public and to legislators.

The response from the public and legislators was immediate. North Carolinians clearly wanted their turtle protected and SB 825 sped through the tortuous process all bills usually face. Section 3, which stated that the bill would become effective 1 October 2003, was amended to move the date up to 1 July. In the end there were no No votes and the bill was signed into law on 31 May 2003. Such a rapid and positive response to a conservation issue is remarkable (Stephan 2003). Data made the difference.



Some of the turtles we mark will outlive us, so we are beginning studies that will be passed onto future generations, such as the one on Long Island, where a turtle found in 2003, first marked by J. Nichols, bears the date 1921 (Nelson 2003), and the Patuxent National Wildlife Refuge study which continues to yield turtles first marked by Lucille Stickle in the 1940s (Henry 2003).

Tier 3 volunteers undergo a one-day training to understand the reasoning behind the protocols, how to conduct surveys, and how to take morphometric measurements, determine gender, and record age-class information. Turtles in defined study sites will be permanently marked. The scientific protocols and standardized methods have already been assembled into a reference manual ([Somers and Mathews 2006](#)). These data will be submitted to a centralized database using an online form to be developed and maintained by our collaborators at Davidson College. Data will be analyzed by students working with researchers at collaborating universities or other researchers and the results will be disseminated to the public by means of news articles and displays in state parks and at *Turtle Days* events, and to the scientific community by publications in scientific journals and presentations at scientific meetings. The 2008 pilot study is already underway with nearly a dozen sites and project leaders. If funded, our efforts will focus on rural regions in three different physiographic areas our state: the coast, piedmont, and mountains, in order to meet the needs of economically disadvantaged and traditionally underserved populations.

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