

**The Wood Turtle (*Glyptemys insculpta*) in the Northeastern United States:
A Status Assessment and Conservation Strategy**

*A proposal submitted to the
Northeast Association of Fish and Wildlife Agencies (NEAFWA)
Regional Conservation Needs Grant Program*

Topic 5. Design and implement conservation strategies for NE SGCN

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developed with the guidance of the Northeast Wood Turtle Working Group

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Project description.– Under Topic 5 of the Northeast Association of Fish and Wildlife Agencies' SRCN Grant process, we propose to develop a Conservation Strategy for the North American Wood Turtle in the Northeast Region (Maine to Virginia). Our primary objective is to gather all available occurrence and population data for this region, and undertake a series of spatial meta-analyses to evaluate region-wide trends in occurrence, occupancy, historic habitat loss, threats, and data deficiencies, and to make general and specific recommendations regarding the status and conservation of wood turtles in the Northeast region and at two finer scales. The final report will include a status assessment and conservation strategy with recommendations specific to each of 12 northeastern states and at least 12 major northeastern watersheds (HUC4-level). The Conservation Strategy will identify populations of region-wide significance, assess the likely historic and current occurrence of wood turtles, critically review the listing status, S-rank, and protective measures in each state, articulate research and inventory priorities, and identify data deficiencies. This project, though principally a conservation strategy (Topic 5), will by extension address major themes of RCN Topics 3 (identifying data deficiencies) and 4 (delineating corridors). Additionally, through this process we will generate Best Management Practices and evaluate Detection Protocols for the wood turtle in the Northeast Region. This project will require two years (January 2012-December 2013).

March 1, 2011

BACKGROUND AND TOPIC

The wood turtle (*Glyptemys insculpta* LeConte) occurs in riverine, riparian, and terrestrial habitats from Nova Scotia to Virginia and west to Minnesota (Akre and Ernst 2006; Saumure et al. 2007; Castellano 2008; Ernst and Lovich 2009; Jones 2009). Wood turtles are long-lived and become mature at ages ranging from 14 to 18 (Akre 2002; Jones 2009; Ernst and Lovich 2009). Recent studies in the northeast region and adjacent Canada have reported population declines (e.g., Garber and Burger 1995; Daigle and Jutras 2005) as well as elevated adult mortality caused by roadkill and agricultural machinery (Saumure and Bider 1998; Daigle and Jutras 2005; Saumure et al. 2007; Jones 2009). Population declines, elevated adult mortality, and/or prolonged reproductive failure have been reported from Québec (Daigle and Jutras 2005; Saumure 2004; Saumure et al. 2007), Maine (Compton 1999); Massachusetts (Jones 2009; Jones and Sievert 2009); Connecticut (Garber and Burger 1995), and Virginia (Ernst and McBreen 1991; Akre and Ernst 2006). Evidence of illegal collection has been reported in ME, MA, CT, MD, VA, and WV (Garber and Burger 1995; Akre and Ernst 2006; Hollowell 2011; E. Thompson, MDDNR, pers. comm.).

Wildlife biologists throughout the Northeast have expressed concern for the conservation status of wood turtles and have suggested that the species warrants federal listing consideration (Therres 1999). More recently, wood turtles have been identified by the Northeast Partners in Amphibian and Reptile Conservation (NEPARC) as a species of regional conservation concern, because it is listed in >75% of northeast Wildlife Action Plans. The wood turtle was also recognized by NEPARC as a species of high “regional responsibility” because >50% of the species’ range falls within Northeastern North America (NEPARC 2010). Most recently, the species’ status has been changed from Vulnerable to Endangered by the IUCN to reflect range-contraction and increased threats and impacts from human encroachment (IUCN 2011).

Given the widespread nature of apparent population declines, a regional approach to the conservation of this species is warranted. The Northeast Wood Turtle Working Group (NEWTWG) was initially convened in August 2009 to evaluate conservation and management priorities for this species. This group was modeled after the Northeast Blanding’s Turtle Working Group, which has worked cooperatively to develop a status assessment (Compton 2007). To pursue a regional conservation strategy, existing data must first be standardized and evaluated regionally. This proposal represents the first major effort of the NEWTWG to take a comprehensive view of the status of the wood turtle the northeastern U.S. By taking action for wood turtles now, we aim to avoid the need to list the species under the federal Endangered Species Act.

Between 2009 and 2011, the NEWTWG identified a Status Assessment and regional Conservation Strategy as priority action items. We therefore propose to undertake a region-wide Status Assessment and develop a **Conservation Strategy for wood turtle at multiple scales in the Northeast Region (Topic 5)**.

METHODS

The USGS Massachusetts Cooperative Fish and Wildlife Research Unit at the University of Massachusetts Amherst (hereafter, UMass), will collect, analyze, and interpret range-wide data, in partnership with the NE Wood Turtle Working Group (representing most of the NE states and multiple NGOs). Several of the key components, including a literature review and evaluation of occupancy and detection protocols, will be developed by researchers from the Orianna Society and Longwood University. UMass will undertake the spatial analyses and prepare the regional status assessment and conservation strategy, with specific emphasis on state- and HUC4-level subdivisions. UMass will prepare the final report. All work will be conducted between January 2012 and December 2013.

Part I. Formally convene Northeastern Wood Turtle Working Group (Appendix A)

- (a) convene a technical review board to evaluate progress and refine priorities at three-month intervals throughout the project;
- (b) conduct a strategic conference calls and hold regional meetings (e.g., NEPARC) with the entire NEWTWG (see Appendix A).

Part II. Gather and standardize available data through an iterative peer-review process

- (a) gather and standardize element occurrence data from Natural Heritage Programs and experts throughout the focus area;
- (b) conduct a thorough literature review in order to gather and standardize occurrence information from previous studies and identify data deficiencies;
- (c) compile data collected in (a)-(cb) into a preliminary wood turtle occurrence data-layer;
- (d) conduct preliminary analysis to identify high-priority, data-deficient areas of regionwide significance (“Priority Conservation Areas;”)
- (e) conduct standardized surveys in data-deficient Priority Conservation Areas;
- (f) conduct peer review of a draft data layer of occurrence and populations by members of the NEWTWG;
- (g) delineate the extent of known “populations,” as well as occurrence data only from the information obtained in (a)-(i);
- (h) report new wood turtle occurrences to responsible state agencies using standardized rare animal documentation (e.g., Natural Heritage rare animal forms).

Part III. Analysis of occurrence, occupancy, and historic range

Using the occurrence and population spatial layers developed in Part II, we will develop spatially-explicit models of wood turtle occurrence, occupancy, and historic habitat suitability:

- (a) undertake multivariate modeling of potential historic distribution and distributional trends using verified occurrences and population data from Part II. Models will be developing using presence only techniques to evaluate habitat suitability (e.g., MaxEnt; Mahalanobis Distance, and/or GARP);
- (b) quantify and summarize element occurrence and population data by state and watershed;
- (b) conduct a GIS-based analysis of historic range loss using suitability map developed in part a in conjunction with region-wide landuse data layers (e.g., NLCD);
- (c) develop a multivariate model of present-day stream habitat suitability from Maine to Virginia (example variables: landuse, surficial geology, stream gradient, sinuosity, watershed area, stream width, USGS flow regime (if available));
- (d) develop a multivariate model of upland habitat associations (using data from Part II(e)) and identify trends range-wide.

Part IV. Summarize and critically review conservation and regulatory status

- (a) quantify and summarize element occurrence (EO) ranking criteria by state;
- (b) quantify subjective population-level assessments of “secure,” “at risk,” and “extirpated;”
- (c) conduct a regional assessment of existing land-use regulatory protections, with summary of regulatory actions taken from 2005-2010 and case studies;
- (d) conduct a regional assessment of possession and collection policies, with a summary of enforcement actions and case studies.

Part V. Draft Status Assessment and Conservation Strategy

- (a) compile information from Parts I – IV to draft a regional Status Assessment and Conservation Strategy (RCN Topic 5) with summary conclusions and recommendations by State and HUC4 watershed.

CONSERVATION DELIVERABLES

The Wood Turtle in the Northeastern U.S.: Status Assessment and Conservation Strategy

- Part I. Status and Conservation of Wood Turtles in the Northeast Region
 - (A) Current and historic distributional trends
 - (B) Significant populations (GIS appendices & action items)
 - (C) Significant data deficiencies
 - (D) Significant threats to population stability
 - (E) Critical review of regulatory status by State
 - (F) Regional research strategy
 - (G) Summary Conservation Strategy for NE Region, with recommendations for the region and by State.
- Part II. Status and Conservation of Wood Turtles in HUCs 1 and 2 (New England and Mid-Atlantic)
 - (A) Current and historic distributional trends, by HUC 4
 - (B) Significant populations (GIS appendices & action items), by HUC4
 - (C) Significant data deficiencies, by HUC4
 - (D) Significant threats to population stability, by HUC4
 - (E) Research strategy, by HUC4
 - (F) Summary Conservation Strategy, by HUC4
- Part III. Evaluation of Survey and Detection Protocols for the Wood Turtle in the Northeastern U.S.
- Part IV. Best Management Practices for the Wood Turtle in the Northeastern U.S.: Three Land-use Scenarios

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Appendix A. Principal Investigators and Northeast Wood Turtle Working Group Members

Principal Investigators:

Paul Sievert, Ph.D. (Project Director), Assistant Leader, USGS Cooperative Fish and Wildlife Research Unit, University of Massachusetts. Dr. Sievert has conducted studies of albatross, snowshoe hare, turtles, and amphibians in the U.S. and Asia. Dr. Sievert and his team will manage the overall project.

Thomas Akre, Ph.D., Assistant Professor, Longwood University. Dr. Akre has conducted intensive field studies of wood turtles in Virginia for over ten years. His dissertation research addressed the growth and reproduction of individuals in Virginia (Akre 2002; Akre and Ernst 2006).

Christina Castellano, Ph.D., Director of Turtle Conservation, Orianna Society. Dr. Castellano's dissertation research focused on the ecology and genetic diversity of wood turtles in the Delaware Water Gap, New Jersey (Castellano 2008). Dr. Castellano will coordinate the development of an independent literature review and contribute to the development of the final report.

Michael Jones, Ph.D., Postdoctoral Fellow and Adjunct Assistant Professor, University of Massachusetts. Dr. Jones has studied wood turtles in Maine, New Hampshire, and Massachusetts since 2003 (Jones 2009). Dr. Jones will undertake most of the proposed spatial analyses, undertake field surveys in priority conservation areas, and compile the final report.

Northeast Wood Turtle Working Group and Technical Review Board Members:

State Biologists:

Maine: Phillip deMaynadier and Jonathan Mays (Maine Department of Inland Fisheries and Wildlife); Nancy Sferra (Nature Conservancy of Maine)

New Hampshire: Michael Marchand (New Hampshire Fish and Game Department)

Vermont: Steve Parren, (Vermont Department of Fish and Wildlife)

New York: Angelena Ross (New York State Department of Environmental Conservation)

Massachusetts:

Lori Erb (Massachusetts Division of Fisheries and Wildlife)

New Jersey: Dave Golden and Brian Zarate (New Jersey Division of Fish and Wildlife)

Maryland: Ed Thompson and Scott Smith (Maryland Department of Natural Resources)

Virginia: J.D. Kleopfer (Virginia Department of Game and Inland Fisheries)

Federal Biologists: Leighlan Prout (US Forest Service, White Mountain National Forest)

Independent Expert Biologists: Dr. Raymond Saumure (Springs Preserve); Dr. Chris Jenkins (Orianna Society); Dr. Barry Wicklow (St. Anselm College); Daniel Zeh (Antioch New England); Jim Andrews (Vermont Amphibian and Reptile Atlas); Mark Powell (VT River Conservancy); Dr. Glenn Johnson (SUNY Potsdam); Dr. Russell Burke (Hofstra University); Dr. Kurt Buhlmann (Savannah River Ecology Laboratory); Steve Krichbaum (Wild Virginia); Bradley W. Compton and Lisabeth Willey (University of Massachusetts)