

Regional Conservation of the Wood Turtle and Other Emydine Turtles
Wildlife Action Plan Narrative Relevant to Wood Turtles

CONNECTICUT

Conservation Actions described in Connecticut’s Comprehensive Wildlife Conservation Strategy (WAP) that benefit wood turtles:

Chapter 4

Statewide Conservation Actions (pp. 4-23 to 4-28)

- Provide Best Management Practices to benefit GCN species and their habitats to state, municipal, and local landowners and provide guidance on their use.
- Develop guidelines to minimize the impacts of residential and industrial development on GCN species.
- Enhance efforts to provide current information and guidance on GCN species and key habitats to land use planners, decision-makers, and the public at the local, regional, and statewide scales.
- Develop, in collaboration with Department of Transportation, Best Management Practices to manage roadside vegetation to reduce impacts to GCN species and their habitats.
- Compile baseline information for all GCN species for which information is lacking such as: ecology, biology, behavior, population dynamics, distribution, abundance, condition, and limiting factors using regionally consistent protocols where possible.
- Develop long-term monitoring protocols, consistent with regional protocols where possible, and implement research and management activities to conserve GCN species.
- Conduct surveys of declining GCN species.
- Map key habitats at the landscape level. Use periodic reviews of maps to monitor their status and condition.
- Determine and monitor the distribution, abundance, habitat use, and condition of GCN aquatic species.
- Develop and implement inventory, survey and monitoring protocols to determine and track the status and condition of key habitats and GCN plant species.
- Evaluate the impact of invasive species on GCN species and their habitats and implement management strategies.
- Develop an improved data collection, management, and retrieval system to track the status of GCN species and key habitats.
- Investigate the effects and impacts of climate change on GCN species.
- Determine level of existing degradation, threat of future degradation, and opportunities for conservation of key habitats.

Taxon and Species-Specific Actions – Reptiles and Amphibians (pp 4-35)

- Participate in regional conservation efforts, especially Regional Conservation Need projects for Regional Species of Greatest Conservation Need and Connecticut GCN herpetofauna, such as timber rattlesnake, Northern leopard frog, and diamond-backed terrapin.
- Develop Best Management Practices and provide technical assistance to municipalities and private landowners regarding the conservation of GCN reptiles and amphibians and their habitats.
- Develop standards for road crossings and road designs (e.g., curbs, box culverts) to reduce the mortality of GCN herpetofauna species.

Conservation Actions to Conserve Key Habitats and GCN Species- Inland Wetland Habitats (pp 4-59 to 4-72)

- Provide Best Management Practices to benefit GCN species and their habitats to state, municipal, and local landowners and provide guidance on their use.
- Implement wetland restoration and enhancement projects that benefit GCN species.
- Work with DOT and utility companies to minimize habitat fragmentation from transportation and utility corridors.

MAINE

Conservation Actions described in Maine’s Comprehensive Wildlife Conservation Strategy (WAP) that benefit wood turtles:

Element 4 – Conservation Actions: All Terrestrial and Freshwater SGCN (pp. 8)

- Map and distribute information on species distribution, habitat requirements, and conservation actions with a goal of increased voluntary conservation by landowners, towns, and land trusts.

Element 4 – Conservation Actions: All SGCN (pp. 8)

- Collaborate with partners to develop habitat management recommendations for all Priority 1 and Priority 2 SGCN and Guilds that are sensitive to certain intensive forest management practices.
- Ensure ETSC database tracking is in place and accurate for all Priority 1 SGCN, and develop a system for prioritizing ETSC database tracking for a higher proportion of Priority 2 SGCN than are currently tracked.
- Integrate SGCN habitat needs and Conservation Actions more explicitly into MDIFW Wildlife Management Area Plan reviews and updates, while maintaining the original management goals for each property.
- Continue and improve quality of mapping and tracking of documented populations using MDIFW's ETSC database.
- Increase public awareness of the economic and ecological value of SGCN and their conservation needs.

Element 4 – Conservation Actions: All Reptile, Amphibian, and Invertebrate SGCN (pp. 9)

- Implement targeted professional surveys to better understand species distribution and status and to help direct conservation actions to newly documented populations.

Element 4 – Conservation Actions: Wood Turtle (pp. 27)

- Deter casual collection by educating the public on the importance of leaving turtles where they find them.
- Continue to build public awareness of risks to wood turtles posed by roadways with seasonally appropriate press release that also warns motorists to be on the lookout for turtles during spring/early summer.
- Install road crossing structures consisting of under-road passageways and guidance fencing where High-mortality road segments bisect habitat that hosts High priority populations.
- Identify potential road crossing hotspots using GIS and monitor mortality at those locations with road surveys to prioritize the most problematic road segments for mitigation measures such as cautionary signage and exclusionary fencing.
- Expand cautionary road crossing signage program to include wood turtle as important road crossing hotspots are identified for this species.

Element 4 – Conservation Actions: Habitat Conservation Actions (Headwater and Creeks and Streams, Rivers, Lakes, and Ponds) (pp. 42 to 48)

- Collaborate with partners to develop best management practices and provide technical assistance to landowners for riparian management in forest and agricultural lands.
- Encourage wood addition as a management objective for riparian areas.
- Use habitat modifications to reduce the vulnerability of habitats to species invasions, such as returning impoundments to free-flowing river conditions.
- Provide incentives for landowners to maintain riparian buffers.
- Provide support for municipalities implementing road stream crossing improvements.
- Conduct statewide/watershed scale connectivity planning.
- Encourage alternative road routes that do not interfere with streams or riparian areas.
- Increase habitat surveys and models for road stream crossings.

MARYLAND

Conservation Actions described in Maryland’s Comprehensive Wildlife Conservation Strategy (WAP) that benefit wood turtles:

Conservation Actions for Aquatic Habitats: Streams and Rivers (pp. 7-79 to 7-87)

- Conserve and protect habitat and appropriate corridors for movement and dispersal of SGCN.
- Pursue land protection/ conservation easements in stronghold watersheds and high quality aquatic habitats, and assess acquisition by evaluating SGCN and their key wildlife habitats.

- Limit infrastructure development for recreation (such as trails, parking lots, etc.) in key areas for SGCN that are sensitive to disturbance (e.g., wood turtle, timber rattlesnake, salamanders).
- Encourage farmers and landowners to become involved in Farm Bill programs and other landowner incentives, including the Conservation Reserve programs, for the maintenance of stream and riparian habitats and protection/conservation of wetlands, highly erodible lands, at-risk species and other wildlife on working lands.
- Work with landowners and farming community to develop and encourage BMPs for agricultural practices to conserve, restore and protect key wildlife habitats.
- Improve habitat connectivity in streams via blockage removal, culvert retrofit, and transportation BMPs; Prioritize these efforts into areas with the largest/best populations of SGCN and forage species supporting SGCN.
- Work with foresters and land managers in implementing riparian habitat management guidelines.
- Assess stream habitats and identify areas where restoration is feasible with high likelihood of success and prioritize for biological recovery.
- Incorporate conservation actions and BMPs into public land management plans by local, state, and federal agencies; include habitat protection, connectivity and restoration needs in public land management plans and overall improvement of managing state lands for the promotion and conservation of SGCN and their habitats.

Conservation Actions for All Reptile and Amphibian SGCN (pp. 7-134 to 7-137)

- Protect known occupied habitat, or largest/best populations.
- Develop site conservation design to better connect core populations into functioning metapopulations, especially on state and NGO lands.
- Minimize and reduce habitat fragmentation.
- Minimize direct and indirect impacts of energy development to SGCN, especially on state lands.
- Identify potential high road-kill crossing areas statewide by conducting a GIS-based "causeway" study similar to NY/Cornell effort (wetlands within 100 meters of both sides of road) followed by field verification. These would then be areas to focus mitigation efforts.
- Manage public and private conservation lands to benefit SGCN found in specific, limited microhabitats.
- Restore known occupied habitat of aquatic species, especially in areas where populations are declining.
- Implement appropriate habitat management practices.
- Manage invasive non-native and problematic native plants impacting key wildlife habitats.
- Maintain or increase water quality and wetland hydrology through various methods, including improved sediment and erosion control.
- Conduct targeted, intensive surveys to determine species distribution and status for those SGCN for which this information is lacking, inadequate, or out-of-date.
- Conduct long-term studies to monitor population health (e.g., abundance, demographics, reproduction, etc.) at known locations for which there is no current (last 10 years) data.

- Determine impacts of emerging pathogens.
- Continue working with other states on range-wide conservation projects.
- Re-evaluate state legal status for many SGCN herpetofauna.

Conservation Actions for Turtle SGCN (specific to or including Wood Turtles) (pp. 7-140 to 7-142).

- Protect and restore nesting and/or basking habitat.
- Prohibit use of wild turtles in Turtle Derbies.
- Maintain and increase water quality through various methods, including improved sediment and erosion control.
- Conduct targeted, intensive surveys to determine species distribution and status (de novo surveys).
- Monitor population health (e.g., abundance, reproduction, etc.) at known locations.
- Continue working with other states on range-wide conservation projects.

MASSACHUSETTS

Wood Turtle Specific Actions (pp. 285)

Chapter 4

- Manage already-protected riparian forests to remove exotic invasive species, particularly in the vicinity of known rare plant and animal occurrences, including but not limited to high-priority Wood Turtle populations and exemplary floodplain-forest natural communities.
- **Continue participation in regional efforts to monitor the distribution, abundance, and trends in Wood Turtle populations and to assess Wood Turtle genetics.**

General Actions Relevant to Wood Turtle Objectives (pp. 285)

Chapter 4

- Research riparian forest SWAP species to determine their actual distributions and population sizes in Massachusetts, as many species are undersurveyed and little-understood.
- Combine geospatial approaches to assess the importance of intact floodplain forests in contributing to water quality and open-water habitats of rare and/or state-listed species. Models should be used to prioritize restoration, land conservation, and regulatory protection of floodplain forests and associated aquatic habitats.
- Research the impacts of invasive species on wildlife habitats in riparian forests.
- Inform and educate the public about the values of these habitats and the issues related to their conservation through articles in conservation organization publications and other forms of public outreach, in order to instill public appreciation and understanding.
- Continue efforts to educate the public about the effects of collection on turtle populations.
- Develop detailed conservation and recovery plans for SGCN associated with riparian forests. Conservation and recovery plans are essential blueprints for setting and achieving conservation objectives. Conservation plans should include detailed needs, actions, and schedules specific to each SGCN, as well as metrics to determine the effectiveness of

each action and the overall impact on these SGCN populations. Specific recommendations should be prepared for the most viable sites of riparian forest.

- On lands owned by the DFW, and potentially on lands owned by other land conservation partners (DCR, The Trustees of Reservations, Mass Audubon, The Nature Conservancy, and some land trusts), reintroduction of rare plant and animal species in appropriate habitats should be considered, where the habitats can be appropriately managed and maintained for these species.

NEW HAMPSHIRE

Species and Habitat Actions (directly or indirectly benefit wood turtles) (pp. 5-3 to 5-18)

Monitoring

- Conduct surveys to describe distribution.
- Detect changes in the condition of wildlife and wildlife habitats.
- Monitor populations of threatened and endangered species.
- Measure direct effects of management.
- Monitor ecological responses to management.
- Select an efficient set of indicators by habitat.

Research

- Prioritize research needs.
- Facilitate funding of priority conservation research.
- Research the direct and cumulative effects of development on wildlife and habitats.
- Develop ecological models to identify critical processes for recovery and persistence.

Population Management

- Evaluate the viability of wildlife populations and vulnerability to threats.
- Augment rare and declining populations.

Habitat Management

- Restore or maintain natural flow regimes.
- Restore and maintain watershed connectivity.
- Encourage creation of collaborative, landscape-scale management projects to develop a mosaic of habitat types and forest age classes.

Land Protection

- Develop a comprehensive land protection support program.
- Protect land identified as highly ranked by ecological condition in Wildlife Action Plan maps.
- Protect riparian and shoreland habitats and other important wildlife corridors through conservation within the Shoreland Protection Zone.
- Protect lands critical for persistence of threatened and endangered wildlife and plants.

Working with Landowners

- Protect habitat of threatened and endangered species through candidate conservation agreement with assurances and safe harbor agreements.
- Provide and promote Best Management Practices (BMPs) for reducing negative impacts from forestry, agriculture, and recreational activities.
- Provide technical assistance to landowners on habitat management that benefits wildlife.
- Provide guidance and assistance to owners of smaller parcels interested in providing wildlife habitat on their property.

NEW JERSEY

Appendix J: Threats and Conservation Actions for the Focal Species of Greatest Conservation Need: Wood Turtle (pp. J-933 to J-965)

- Secure and promote the protection/restoration of riparian and floodplain habitats, inland wetland habitats (marsh, vernal pool, fen, emergent shrubland, forest), and other aquatic habitats (including open waters) and/or biologically appropriate buffers through incentive programs.
- Restore and/or enhance suitable travel corridors connecting conserved habitats for SGCN by restoring unsuitable (or less optimal) habitats.
- Restore and/or enhance riparian and floodplain habitats, inland wetland habitats (marsh, vernal pool, fen, emergent shrubland, forest), and other aquatic habitats (including open waters) and/or biologically appropriate buffers to minimize degradation, alteration and/or changes in hydrology and subsequent disturbances to and behavioral changes of wildlife (e.g., restoring biologically appropriate buffers, revegetation or restoration efforts, etc.).
- Restore and/or enhance terrestrial and aquatic habitats proximate to but not adjacent to roads and other transportation corridors for terrestrial-bound SGCN species whose behavior (i.e., dispersal across roads) may be altered by doing so, and therefore decrease road mortality of such species (e.g., amphibians, snakes, turtles, small mammals).
- Restore and/or enhance terrestrial and aquatic habitats to promote the regeneration of native vegetation and enhance structural diversity to benefit SGCN (e.g., vegetative buffers of aquatic systems, allow coarse, woody debris to remain in terrestrial, aquatic and riparian habitats to provide shelter, riparian stabilization and necessary microclimates, plant native trees, shrubs and grasses, etc.).
- Conduct vegetation management in native terrestrial and aquatic habitats to provide suitable and appropriately sized areas to improve ecological diversity.
- Conduct vegetation management adjacent to roads for SGCN species whose behavior (i.e., dispersal across roads) may be altered by doing so, and therefore decrease road mortality of such species (e.g., amphibians, snakes, turtles, small mammals).
- Increase structural habitat diversity around and when feasible, within agricultural landscapes by managing vegetation for a variety of species, in particular, those farms that have removed scrub-shrub habitat and/or fragmented forests, and by implementing

ecologically best practices (e.g., no-till farming, maintaining hedgerows, buffer set-asides, etc.).

- Implement best management practices (BMPs), protective strategies, and guidelines when removing tile drains and drainage ditches to maintain and enhance healthy, SGCN-associated habitats while minimizing (if not avoiding) incidental take of resident and migratory fish and wildlife and/or disturbance to them (in particular during breeding periods) on public and private lands for maintaining populations in perpetuity.
- Investigate diseases/pathogens impacting SGCN and/or their habitats.
- Develop and implement strategies to combat the impacts of diseases/pathogens impacting SGCN and/or their habitats, track disease occurrences and monitor/research impacts to SGCN populations and their habitats.
- Conduct long-term monitoring of resident and migratory SGCN populations using standardized survey protocols to determine the variables that may impact their long-term persistence in the State (e.g., population viability, distribution, dispersal, home range and habitat use, travel corridors, food availability, vulnerability to pollutants and disease, etc.). Compile this information to determine the likely causes of population declines and to understand metapopulation dynamics. Provide data to NJ DEP for integration into the Biotics database, Landscape Project and permitting review processes.
- Gather baseline data on SGCN inhabiting permanently protected natural lands regarding their distribution and population (e.g., abundance, dispersal, demography including productivity and survival, etc.), and identify (through surveys/studies, literature searches, review of available data, enlistment of species experts, etc.) critical and supporting habitats within those landscapes.
- Conduct long-term studies on SGCN inhabiting permanently protected natural lands to develop population trend data and changes in demography, and to determine if critical and/or supporting habitats are limited or changing; i.e., diminishing in value, acreage or connectivity.
- Collect baseline data to document species distributions, in particular SGCN, and current habitat for future analysis of possible distribution shifting as a result of habitat shifting or alteration associated with climate change impacts.
- Evaluate the effectiveness of strategies to restrict human activity (e.g., recreational, maintenance work, etc.) from sensitive habitats/areas such as avian nesting sites, reptile and amphibian breeding areas (nesting or gestation/birthing and breeding pools, respectively), and bat hibernacula, and federal buffers for marine mammals through research and monitoring. Develop and provide NJ DEP and other appropriate governing agencies/commissions a summary of findings and recommendations to improve such efforts.
- Develop, implement and conduct studies to evaluate the effectiveness of methods implemented to reduce road mortality of wildlife (e.g. wildlife underpasses, road closures).
- Conduct wildlife surveys on resident and migratory SGCN regarding their population abundance and trends.

- Identify (through surveys/studies, literature searches, review of available data, enlistment of species experts, etc.) and investigate the suitability of corridors that connect large, contiguous tracts of similar habitats to increase their effective size (i.e., forest with forest, grassland with grassland, wetlands with wetlands, etc.) for dependent SGCN.
- Assess the availability and suitability of forest habitats for SGCN species (particularly reptiles and amphibians, birds, pollinators, and tiger beetles) in southern forests since Superstorm Sandy.
- Conduct long-term monitoring of resident and migratory SGCN habitats using standardized survey protocols to determine changes in habitat quality/suitability and threats (e.g., habitat loss and degradation, increased edge habitat, water quality) and other variables that may impact their long-term persistence in the State and to provide information needed for determining causes of population declines and understanding metapopulation dynamics.
- Develop best management practices (BMPs), protective strategies, and guidelines for maintaining and enhancing healthy, SGCN-associated terrestrial and aquatic habitats and associated riparian habitats, and to minimize (if not avoid) incidental take of resident and migratory fish and wildlife and/or disturbance to them (in particular during breeding periods) on public and private lands for maintaining populations in perpetuity.
- Develop strategies to combat the impacts of diseases/pathogens impacting SGCN and/or their habitats.
- Develop/improve strategies to restrict human activity (e.g., recreational, maintenance work, etc.) from sensitive habitats/areas such as avian nesting sites, reptile and amphibian breeding areas (nesting or gestation/birthing and breeding pools, respectively), and bat hibernacula, and federal buffers for marine mammals. Methods may include, but are not limited to, managing the landscape to deter access, diverting recreational and other activities from sensitive areas during critical periods through permit processes or blocking access (trails, roads, etc.), posting (if appropriate), increasing law enforcement presence, conducting management activities at appropriate times to avoid disturbance and/or harm to wildlife (e.g., habitat management, beach raking, etc.), and decreasing noise and light pollution.
- Secure and protect riparian and floodplain habitats, inland wetland habitats (marsh, vernal pool, fen, emergent shrubland, forest), and other aquatic habitats (including open waters) and/or biologically appropriate buffers to minimize degradation through an appropriate combination of fee title, non-fee title and landowner agreements.
- Increase the protection of riparian and floodplain habitats, inland wetland habitats (marsh, vernal pool, fen, emergent shrubland, forest), and other aquatic habitats (including open waters) and/or biologically appropriate buffers to minimize degradation through conservation area designations.
- Incorporate habitat connectivity and preservation of natural areas into state and local landuse policy and the environmental review process to minimize habitat fragmentation and other related threats associated with development.

PENNSYLVANIA

Appendix 1-4 (Reptiles): Wood Turtle (pp. 766-769).

- Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.
- Conduct targeted surveys across their range.
- Examine nesting ecology and nesting habitats of *G. insculpta* in Pennsylvania, including identification of critical nesting habitats in need of protection or management.
- Assess relationships between *G. insculpta* population dynamics and specific agricultural and forest management practices.
- Continue species occurrence surveys to confirm sites and search for additional records.
- Continue long-term monitoring sampling of established sites.
- To identify, protect, manage, and enhance functional riparian and riverine habitats for wildlife in New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Virginia, and the District of Columbia through coordinated conservation actions identified in the 2011-2013 (NEAFWA RCN) Wood Turtle Status Assessment, outlined in SWAPs across the region, and necessary to support healthy and persistent populations of wood turtles and other riparian and riverine Species of Greatest Conservation Need.

General Strategies Relevant to Wood Turtle Objectives

Chapter 4

- Roads are often an impediment to the movement of amphibians and reptiles and in places where critical habitat is fragmented. Tunnels may provide a safe alternative route. Tunnel design is important and should be based on species anticipated to use the structure (Jackson 2003). Where SGCN are involved, tunnels should be incorporated into all new road construction and road re-construction project (p. 4-33).
- Invasive species pose a substantial, long-term threat to Pennsylvania's SGCN and their habitats (Chapter 3). Once established, invasive species removal can be difficult, expensive, and perhaps impractical, especially if the invader is found in an open system (e.g., a river, large lake with an outlet) and can rapidly colonize new habitats. A comprehensive approach, under the auspices of Pennsylvania Invasive Species Council (PISC) and its members has been developed to address this diverse and dynamic threat (Pennsylvania Invasive Species Management Plan) (PAISMP) (PISC 2009). The following PAISMP goals are relevant to the Pennsylvania Wildlife Action Plan and should be considered when SGCN and their habitats are impacted by invasive species (p. 4-39 and 4-40):
 - Prevention
 - Early Detection and Rapid Response
 - Survey and Monitoring
 - Data Management
 - Research
 - Outreach
 - Communication and Coordination
- Water management can be a vital component of an overall habitat management strategy, especially in areas where water levels can affect breeding, resting or feeding activities of

fish and wildlife. Proper water management can make available high-quality habitats for fishes, amphibians and birds. Wetlands and lakes (i.e., impoundments with control structures) are primary habitats where this conservation action may be implemented (p. 4-42).

- Wildlife diseases are found in all populations, but can become epidemic when introduced into populations or, as a result of other stressors (Chapter 3) for more explanation of diseases). These diseases may have the potential to quickly eliminate entire populations of wildlife. Some wildlife diseases are transferred between species including, from wild animals to humans and from humans to wild animals. Emerging infectious diseases, (i.e., zoonoses), are all stressors in the environment that make it increasingly challenging to conserve wild populations. Significant examples include white nose syndrome and chytrid fungus (Chapter 3) which, in the species infected, have resulted in the most dramatic population declines in our lives (p. 4-43).
- Recent technological advances in data storage and management have enhanced greatly decision-making processes that support SGCN and their habitats. In the northeast region, this technology is supporting the design and development of the Northeast Regional Database which will enhance species management and foster communication through use of standard terminology found in the Northeast Lexicon (Crisfield 2013). The system will allow all northeast State Wildlife Action Plan jurisdictions to report on conservation actions conducted in support of regional SGCN. This database, which is under development at the writing of this plan, will be an important tool for comprehensive regional assessments. Within Pennsylvania and throughout the northeast region, increasing use of geospatial landscape-scale assessments has been achieved through technical advances, such as improved computational capabilities, better land-use coverages, and improved habitat modeling (p. 4-43 and 4-44).
- Effective species and habitat management implementation requires a well-planned approach, with goals, objectives and desired outcomes clearly identified through a planning process. We anticipate this conservation action to be used extensively throughout the implementation period of the 2015 Pennsylvania Wildlife Action Plan. The focus of this conservation action will be on species where detailed planning has yet to be conducted to secure their protection, or where such planning is necessary to update current plans. As noted in Conservation Action 9.1 (Land-Use Planning), detailed mapping for a significant subset of the SGCN identified in this Plan are presented in this product and can help inform users for detailed conservation planning (p. 4-54).
- Technical Assistance can involve all SGCN and a broad range of activities (e.g., guidance on habitat encroachment, highway, airport, and mass-transit projects, pollution, herbicide & pesticide applications, habitat management) that protect environmentally sensitive habitats and species. For example, this support may include recommendations or assistance with implementing on-the-ground activities such as habitat enhancements provided through PGC's Private Landowner Assistance Program (PLAP) or PFBC's Technical Assistance Program (TAP) for streams and lakes. Other agencies (e.g., USDA-NRCS, County Conservation Districts) and organizations also may offer technical assistance for program needs (p. 4-57).
- The conservation of SGCN is the primary purpose of the 2015 Pennsylvania Wildlife Action Plan. This fundamental objective is pursued through maximizing quality habitat that supports SGCN (p. 4-61).

- Maintain existing quality habitat through management or protection conservation actions.
- Improve marginal habitat to enhance SGCN populations through management and restoration.

RHODE ISLAND

Chapter 4: Taxa-Focused Conservation Actions: Herpetofauna (pp. 60 to 61)

- Establish discussions with state and local DOT.
- Identify areas of significant road effects in focal areas.
- Develop and provide educational program/materials to reduce incidental mortality and take from humans.
- Coordinate incidental take programs with regional or national initiatives.
- Monitor spatial qualities of habitat.

Chapter 4: Priority Habitat Conservation Actions by Key Habitats (directly or indirectly benefit wood turtles) (pp. 77 to 88)

Agricultural

- Prepare site-specific management plans and determine proper management of grazing animals to protect nesting birds.
- Support conservation programs implemented by NRCS and other agencies.
- Prepare site-specific management plans and determine proper times for mowing/haying that protect nesting birds.

Coastal Stream

- Preserve and restore cover for streams, and mitigate runoff.
- Protect and manage land; mitigate runoff

Deciduous Woodlands and Forests

- Identify and acquire key parcels for fee purchase and easement.
- Identify and influence mechanisms for incentivizing landowners for conservation and watershed protection (e.g., farm, forest and OS; local planning policies that make it possible for land owners to economically benefit).
- Control public access at priority sites.
- Conduct research on vulnerability of individual species to warming climate.

VIRGINIA

Northern Virginia Local Action Plan (pp. 15)

- Maintain and restore wetland habitats: 1) Work with appropriate entities on wetlands permitting process to ensure adequate mitigation and restoration procedures are in place; 2) Implement living shorelines where feasible; 3) Establish or enhance vegetative buffer areas inland of existing wetlands; 4) Utilize relevant data (e.g., the Virginia Department of Conservation and Recreation’s wetlands catalog) to identify priority areas for conservation, acquisition, and restoration; and 5) Control invasive species.
- Enhance, maintain, and restore aquatic and riparian habitats: 1) Restore stream corridors and riparian areas; 2) Establish riparian buffers; 3) Implement storm water treatment BMPs; 4) Reduce urban storm water runoff; 5) Eliminate illicit connections that allow untreated or partially treated sewage to enter the storm drain system; 6) Correct failing septic systems and “straight pipe” discharges to prevent the discharge of human waste into streams; 7) Maintain sewer systems; 8) Exclude livestock (primarily cattle and horses) from streams; 9) Work to limit opportunities for dog feces to contaminate waterways; 10) Continue to identify impaired waters within the planning region; 11) Monitor and address invasive species impacts; and 12) Adopt land use practices or policies through zoning or other means to help improve the health of aquatic systems.
- Maintain and restore forest habitat: 1) Protect land through acquisition, easement, incentives, or other mechanisms; 2) Implement vegetative buffers around extractive practices and development; 3) Work with state and federal agencies to ensure implementation of appropriate best management practices; 4) Maintain forest health to help ensure forest viability; and 5) Monitor and control invasive species. 6) Reduce deer numbers.
- Maintain and restore open habitats: 1) Restore of native grasses, shrubs, and forbs; 2) Maintain existing open habitats with periodic disturbance (e.g., prescribed burning, mowing, disking, etc.); and 3) Conserve, via acquisition, easement, collaboration, or agreement, patches from 20 acres to 100 or more acres.

Central Shenandoah Local Action Plan (pp. 19)

- Protect karst habitats: 1) Maintain vegetative cover within watersheds where subterranean species occur; 2) Establish vegetative buffers around springs and sinkholes; 3) Minimize nutrients and sediments flowing into the system; 4) Establish parks, greenways, or other conserved lands above karst systems; 5) Develop water conservation and use strategies to help minimize groundwater depletion; and 6) Better control fecal matter and sewage.
- Maintain and restore wetland habitats: 1) Work with appropriate entities on wetlands permitting process to ensure adequate mitigation and restoration procedures are in place; 2) Establish or enhance vegetative buffer areas inland of existing wetlands; 3) Utilize relevant data (e.g., Virginia Department of Conservation and Recreation’s wetlands catalog) to identify priority areas for conservation, acquisition, and restoration; and 4) Control invasive species.
- Enhance, maintain, and restore aquatic and riparian habitats: 1) Establish vegetated and/or forested buffers along streams and sinkholes; 2) Reforest erodible pastures; 3) Exclude livestock from streams and areas around sinkholes; 4) Improve pasture and loafing lot management to prevent tainted runoff; 5) Implement conservation tillage; 6) Establish

storage facilities for animal waste and runoff retention ponds; 7) Prevent erosion after timber harvests; 8) Repair or replace failing septic systems and “straight pipes;” 9) Establish rain gardens; 10) Sweep streets; 11) Stabilize dirt roads; 12) Reclaim abandoned mine lands; 13) Work to prevent pet waste from entering the watershed; 14) Continue to identify impaired waters within the planning region; 15) Restore aquatic connections; 16) Monitor and address invasive species impacts; and 17) Adopt land use practices or policies through zoning or other means to help improve the health of aquatic systems.

- Maintain and restore forest habitat: 1) Protect land through acquisition, easement, incentives, or other mechanisms; 2) Implement vegetative buffers around extractive practices and development; 3) Work with state and federal agencies to ensure implementation of appropriate best management practices; 4) Maintain forest health to help ensure forest viability; and 5) Monitor and control invasive species.
- Maintain and restore open habitats: 1) Restore native grasses, shrubs, and forbs; 2) Maintain existing open habitats with periodic disturbance (e.g., prescribed burning, mowing, disking, etc.); and 3) Conserve, via acquisition, easement, collaboration, or agreement, patches from 20 acres to 100 or more acres.
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