

CONSERVATION ACTION PLAN
FOR THE
EASTERN BOX TURTLE
(Terrapene carolina carolina)



Conservation Action Plan for the Eastern Box Turtle in the Northeastern United States

Part II of the Conservation Plan for the Eastern Box Turtle in the Northeastern United States

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The Northeast Eastern Box Turtle Working Group's (NEEBTWG) fundamental goal in the development of this Conservation Plan is to support the persistence and adaptive capacity of the eastern box turtle in the northeastern United States, encompassing the area from Maine to Virginia. The Northeast Eastern Box Turtle Conservation Area Network (NEBT CAN; Part I) provides a core strategy and distinct spatially-explicit elements (Focal Core Areas and Landscapes, Sampling Landscapes, and Management Core Areas) to guide efforts to address these goals. This Conservation Action Plan serves to articulate a core set of six objectives that are needed to accompany the NEBT CAN in order to achieve the fundamental goal of this plan. These objectives include (1) increasing collaboration at multiple levels, (2) addressing data-deficiencies, (3) implementing an adaptive conservation framework, (4) increasing strategic research, (5) combating illegal trade, and (6) reducing threats within Focal Core Areas and Focal Landscapes. Target timelines are provided for the *initiation* of each objective. Specific actions at multiple geographic scales (rangewide, regional, state, site) are proposed within each objective.

Objective 1. Increase Collaboration at Multiple Levels

Initiation timeline: <5 years (before 2028)

Expand Collaborative Network

Collaboration represents the foundation of the recent proliferation of regional turtle conservation in the Northeast (Willey and Jones 2014, Egger 2016, Jones et al. 2018, Erb 2019; Willey et al. 2022; northeastturtles.org) and will be necessary to ensure effective landscape-scale and long-term conservation for the eastern box turtle in the decades to come. Expanding collaboration at multiple levels — including local, regional, and rangewide scales — should represent an immediate priority in order to generate interest and concern for the species, and tackle the challenges of data collection and population monitoring of this widespread generalist. Among numerous benefits, establishing rangewide partnerships will help provide a better understanding of global status (and therefore relative regional responsibility), support the identification of emerging and potential threats, and allow an opportunity to share protocols and resources (BMPs, etc). With proper training and permits, local partnerships with land trusts, NGOs, local governments (e.g., towns and counties), universities, nature centers, and other entities (e.g., the North American Box Turtle Conservation Committee and The Box Turtle Connection) offer an important opportunity to increase the capacity

to monitor and understand individual populations and landscapes, and in some cases protect and manage habitats.

Intra-agency collaboration among departments represents another important and sometimes overlooked form of collaboration with the potential to improve the conservation outlook for eastern box turtle. For example, increased communication of priorities and coordination of efforts among biologists and land managers (foresters, burn crews, and other habitat managers) will reduce the likelihood that agency programs will play a role in population decline. Increased communication with outreach and land protection staff about the regional outreach materials and CAN priorities will also prove valuable.

Management Structure

To guide future conservation for the species in the Northeast, we propose a management structure consisting of two primary teams: the Northeast Eastern Box Turtle Steering Committee and the Northeast Eastern Box Turtle Working Group. This structure largely represents a continuation of the current system for this RCN-funded project. The Steering Committee will represent state biologists and biologists from other organizations and agencies that are actively involved in funded projects or regional conservation decision-making processes. The Steering Committee will meet monthly during actively funded periods to track progress toward objectives, share progress, establish regional goals, and potentially discuss sensitive data. During unfunded periods, the Steering Committee will aim to convene annually or biannually. The Working Group will consist of Steering Committee members and additional personnel involved in eastern box turtle conservation and monitoring throughout the region, but not serving in a leadership role. The Working Group will meet less frequently (e.g., quarterly, biannually) than the Steering Committee during funded periods. If there is interest outside of the Northeast, this management structure could become rangewide in scope by expanding to include biologists across the broader species (or subspecies) range.

Pursuit of Funding

Regional and rangewide funding opportunities dedicated to collaboration among state agencies and other entities, such as Regional Conservation Needs grants and Competitive State Wildlife Grants, should represent a priority in the near-term for implementing at least a portion of the actions outlined in this document, and furthering eastern box turtle conservation more generally. Pursuit of subregional by partners should be encouraged, particularly when the CAN and CAP represent core components of the proposal. If possible, the Steering Committee should consider providing guidance for subregional funding proposals when solicited.

Conservation Symposia

Conferences and symposia play an important role in promoting collaboration by offering opportunities to make new connections, share experiences, develop professional relationships, and generate new ideas that might not otherwise occur. Steering Committee and Working Group members should consider attending and contributing to specialized meetings such as the Box Turtle Conservation Workshops organized by the North American Box Turtle Conservation Committee

and the 2023 Conservation Symposium for Emydine Turtles. In particular, future regional eastern box turtle projects should consider providing financial and/or logistical support for the next Conservation Symposium for Emydine Turtles and aim to find ways to increase focus on eastern box turtle without detracting from other species.

Regional Database/Repository

Surveys.— There is a clear need for a secure, centralized data repository that is not controlled by a single individual or entity, and can be accessed for future regional analyses. Such a database was recently developed for Blanding's turtles in the Northeast, and may soon include other species such as the wood turtle and spotted turtle. The Steering Committee should explore the possibility of including eastern box turtle within this regional data repository and/or providing funding through future efforts to support this task.

Genetics.— This project collected hundreds of genetic samples and analyses produced numerous complex technical data files. Thus, in addition to managing the survey and occurrence datasets, there is also a clear need to develop a system for housing both electronic genetic data (including results) and physical samples. Plans should consider incorporating a capacity to also house future samples, which could reach several thousand samples if tissue collection efforts are similar to those of other regional conservation projects in the region (Jones et al. 2018).

Federal Partnerships

Encourage Monitoring on Federal Lands.— Federal lands offer an excellent opportunity to increase both distributional and population-level information throughout the region. The NEBT CAN has identified areas within federal lands that support eastern box turtles — these sites should represent opportunities for population monitoring with the aim of understanding relative abundance, population size, and demographic information. The standardized survey protocol should be provided to in-house biologists when possible. Department of Defense properties in particular could represent priorities for monitoring because several are known to support robust, regionally-significant eastern box turtle populations and qualified teams of biologists are typically available. A continuation of this regional conservation effort should consider developing a strategic federal outreach plan with the aim of sharing the population monitoring protocol and educating/training staff about the importance of understanding their population and contributing to the regional initiative.

NRCS Working Lands for Wildlife.— Currently, the Natural Resources Conservation Service (NRCS) Working Lands for Wildlife Northeast Turtles project primarily focuses on Blanding's, wood, and spotted turtles. The inclusion of eastern box turtle within this program would introduce much-needed management-oriented resources for the species in the Northeast. As highlighted in the Northeast Wood Turtle Conservation Plan (Jones et al. 2018), the additional expansion of the geographic scope of this project, which currently only encompasses ME, NH, VT, MA, RI, CT, and NY, to include the entire Northeast, would broadly benefit turtle conservation.

State Partnerships

Increase Interagency Awareness and Collaboration.— State agency collaboration represents the backbone of this regional effort (as well as those for other at-risk turtles in the northeast) and the NEEBTWG should aim to continue to foster a high level of collaboration among state agencies. Efforts by state biologists to share the products associated with this project both within and among agencies will help increase awareness and collaboration. A draft presentation that provides an overview of the Status Assessment (Erb and Roberts 2023) and this Conservation Plan has been provided to the state leads for this purpose.

Outreach

In conjunction with a future funded effort, the Steering Committee should consider increasing the scope and capacity of the regional outreach program, with particular emphasis on a dissemination strategy for recently developed materials (e.g., anti-poaching postcard, management guidelines, etc.). State wildlife agencies should consider directing outreach toward land trusts, landholding and purchasing agencies, and state DOTs with the goal of education around basic biology and ecology of turtles, the threats they face, and the specific actions these entities can implement to help mitigate threats.

Objective 2. Address Data-Deficiencies

Initiation timeline: 0-5 years (before 2028)

Consistent Element Occurrence Tracking by State Agencies

Effective conservation planning is driven by consistent and robust data collection. Currently, due to the varying levels of priority for conserving eastern box turtle across the region, there are considerable inconsistencies among state agencies with respect to tracking of element occurrences. Some states do not actively track eastern box turtle records (e.g., Maryland and Virginia) or do so at a relatively low priority level. Increased tracking (and funding for such efforts) of eastern box turtles will dramatically improve the understanding of the fine-scale distribution within the species in the region and, in conjunction with population monitoring (below), should represent the *highest priority* action for this objective.

Population Monitoring

The current RCN-funded project supported the development of an Eastern Box Turtle Population Monitoring Protocol (see Status Assessment, Chapter 3), but largely relied upon volunteer effort for data collection (although some additional funding for surveys was provided in 2022). Therefore, there is an immediate and pressing need for increased standardized population sampling across the entire region with the goal of (1) collecting a large sample of Rapid Assessment sites to assess relative abundance and habitat relationships, and (2) establishing a smaller number of ecologically representative long-term Demographic Assessment sites intended for estimating population size and demographic trends. While a volunteer-based sampling strategy has proven useful, there is a distinct need for a funded, regional sampling effort that employs experienced biologists to sample across a

representative range of ecological and jurisdictional contexts. We also recommend additional actions, including refining the monitoring protocol (e.g. continue to compare circular plots vs. feature surveys), considering new sampling methods (e.g. Royle and Turner 2022), identifying environmental gradients of interest for sampling (e.g., development, agriculture, road density), and sampling within Focal Core Areas and Focal Landscapes. In general, state lands could represent a priority for sampling because they represent some of the best opportunities for management and land protection. In conjunction with consistent element occurrence tracking by state agencies (above), should represent the *highest priority* action for this objective.

Regionwide Citizen Science Programs

Public engagement and citizen science programs offer promise for large-scale data collection, particularly for understanding the fine-scale distribution of eastern box turtles throughout the region. For example, from 2020-2021, the West Virginia Division of Natural Resources (WV DNR) developed and implemented an eastern box turtle citizen science program that reported 6,045 verified records from across the state, including two county records. This effort more than quadrupled the number of records within the WV DNR database. We recommend the expansion of similar state-based eastern box turtle citizen science programs throughout the region, particularly within data-deficient states and Sampling Landscapes identified in the Conservation Area Network. However, data sensitivity should be emphasized, and no citizen science efforts should jeopardize data security.

Genetic Sampling

A small genetic sampling effort and analysis was conducted in conjunction with this RCN-funded project, although this effort was limited in geographic scope and primarily focused on understanding genetic structure for the purpose of repatriation (see Status Assessment, Chapter 5). A previous effort by Kimble et al. (2014) aimed to characterize genetic structure across the subspecies range, but their samples were heavily biased toward the western portion of the range, with relatively few samples from the northeastern U.S. We recommend the continuation of genetic sampling with the goal of developing a geographically and ecologically representative dataset that will facilitate a more refined understanding of genetic differentiation, population clusters, patterns of relatedness, landscape connectivity, and (sub)population genetics (genetic diversity, allelic richness, etc). Research focused on understanding genetic diversity and/or where selection is occurring (Andrews et al. 2016), will be particularly important in achieving the overarching goal of maximizing adaptive capacity.

Collaboration.— There are several studies that have collected genetic data for eastern box turtle in the northeastern U.S., including Martin et al. (2013), Kimble et al. (2014), the Turtle Survival Alliance, and other projects. In addition to widespread genetic sampling, future efforts should consider collaborating with other entities with data in order to increase the scope and statistical power of analyses. Collaboration at the rangewide level may also prove valuable.

Identifying and Tracking Disease

Climate change and land-use change are likely to increase the severity and geographic scope of this threat (e.g., Price et al. 2019) in decades to come. Disease-induced population declines have been reported at a number of individual populations (e.g., Adamovicz et al. 2018), but currently there is very little data about prevalence or how, and at what scale, diseases are influencing populations. Thus, understanding disease prevalence within populations and establishing a sustainable surveillance strategy aimed at detecting trends over time should represent an important consideration. Understanding current patterns of disease prevalence and individual recovery in wild populations may also be helpful in informing decision-making frameworks regarding repatriation of confiscated turtles. In addition, we recommend incorporating spread prevention and screening methods into the regional population monitoring protocol to reduce the potential of spreading disease via project sampling and to document potential cases as they occur.

Objective 3. Implement an Adaptive Framework

Initiation timeline: 5–10 years (2028–2033)

Update the Conservation Plan and Conservation Area Network

The Conservation Area Network is intended to function as a “living” document with periodic updates, such that regional conservation for the eastern box turtle follows an adaptive framework. We view this as an *essential* feature of the Conservation Plan that will allow for the incorporation of new data that may shift conservation priorities across the region. We recommend that the Conservation Area Network updates and associated sampling efforts eventually occur at regular intervals ranging 5–10 years. However, the next regional collaborative effort should occur within 5 years in order to increase data collection to inform the distributional data gaps, increase the number of rapid assessments, and establish baseline data for long-term demographic assessment sites.

Future updates to the Conservation Plan and Conservation Area Network should (re)consider and/or prioritize:

1. **Incorporating new information/data.** Types of important information/data include occurrence records, survey data, population size, demographic parameters, genetic results, regional datalayers (e.g., National Land Cover Database, Designing Sustainable Landscapes), and findings from technical and peer-viewed literature.
2. **Spatial representation.** As new data is collected and the general understanding of the species is improved (e.g., via analyses generated by regional collaboration), it may be necessary to refine methods for delineating Core Areas and Landscapes of the Conservation Area Network. For example, this may involve adjusting the Core Area mapping buffer distances (larger, smaller, or regionally varying).
3. **New selection criteria.** Ranking metrics and selection criteria should be revisited and updated to include new information (e.g., ensuring representation of new genetic populations clusters identified) and/or improve current methods (e.g., future analyses may

reveal more nuanced relationships with development that may warrant adjusting ranking metrics).

4. **Conservation benchmarks.** Once data-deficiencies are sufficiently addressed, specific conservation benchmarks should be established that clearly defines a vision for conservation “success” at the regional level.

Adaptive Management

We encourage the adoption of an Adaptive Management (Schreiber et al. 2004, Williams et al. 2009) framework for all habitat management that occurs within Conservation Area Network Core Areas, with particular emphasis on pre- and post-management data collection with respect to both population and environmental (habitat) change. The NEEBT Steering Committee should consider developing basic habitat monitoring protocols for tracking change over time.

Objective 4. Strategic and Experimental Research

Initiation timeline: 0–15 years (before 2038)

Population Estimates and Long-Term Trends

High-precision estimates of population size will be critical for understanding long-term population trends. Therefore, establishing initiatives geared toward capture-mark-recapture at regionally important populations, ecologically representative areas, and along environmental gradients (e.g., different land-use types), should represent an immediate priority. Efforts to understand the persistence and importance of small/low density populations for metapopulation dynamics and gene flow will be valuable. Prior to future intensive monitoring efforts, the Steering Committee should also consider testing and assessing feasibility of utilizing spatial capture-recapture (Royle and Turner 2022) within the regional monitoring protocol.

Land Use and Landscape Ecology

As highlighted in the Status Assessment, there is a pressing need to understand population responses to anthropogenic land use. With the accumulation of standardized population monitoring data, research efforts should prioritize studies that aim to understand the relative effect of land use types (and their most relevant spatial scales) on demographic parameters. Conservation planning efforts will also benefit from a greater understanding of thresholds in suitable habitat and degree of fragmentation and habitat loss from urbanization, agriculture, and other factors.

Population Vital Rates and Viability

In addition to understanding population trends, there should be an emphasis on estimating population vital rates along environmental gradients of interest, with the specific goal of understanding how anthropogenic threats influence population viability.

Effects of Conservation-Oriented Management Practices

There is growing concern that management practices aimed at enhancing biodiversity and rare ecosystems, such as prescribed burning and forest management, may have severe population-level effects on eastern box turtles (Buchanan et al. 2021, Jones et al. 2021). Currently there are separate efforts underway in Massachusetts (a partnership between MassWildlife, USGS Cooperative Unit, and UMass Amherst) New Jersey (New Jersey Fish and Wildlife) and Pennsylvania (The Mid-Atlantic Center for Herpetology and Conservation, East Stroudsburg University) to quantify the effects of prescribed fire at individual and population levels and identify potential practices for mitigating negative outcomes. Rapidly developing a thorough understanding of this potential threat will require a high level of collaboration across the region not only among biologists, but also land managers and burn crews, which operate on fairly unpredictable schedules. Any collaborative effort should be centered around a key set of well-grounded fundamental research questions/objectives that are aimed at maximizing conservation value and yielding actionable guidelines. In the absence of an ongoing collaborative effort, or when adhering to protocols are not possible, opportunistic collection of data before and after prescribed burns using the regional population monitoring protocol and/or other methods (e.g., radio telemetry), should still present an important opportunity.

General questions related to prescribed fire might include:

- Are there correlative patterns of eastern box turtle population density or abundance at historically burned vs unburned sites?
- What specific fire characteristics pose the greatest risk of mortality of eastern box turtles? For example, does altering fire intensity (reaction intensity, fireline intensity, temperature, heating duration, radiant energy), burn area, fire height, severity (loss of or change in organic matter aboveground and belowground), season of year, frequency, flame angle, flame depth, and scorch height reduce the risk to eastern box turtles?
- What are the short- and long-term health effects for individuals that survive fires?
- Does fire affect disease prevalence?
- Does fire change habitat selection (e.g., nesting and overwintering sites)?
- How does weather (particularly temperature) influence mortality during burns in early spring and late fall?
- Does susceptibility to fire vary by sex and age?
- Do population- and individual-level effects vary regionally?
- Does recruitment change after fire events?

Genetics

As mentioned in the Genetic Sampling subsection above (Objective 2), a key goal should be to increase the general understanding of genetic differentiation, population clusters, patterns of relatedness, landscape connectivity, and population genetics (genetic diversity, allelic richness, etc). Research focused on understanding genetic diversity and/or where selection is occurring (e.g. Martin et al. 2020) will be particularly important in achieving the overarching goal of maximizing adaptive capacity.

Illegal Collection

Research is clearly needed regarding the illegal trade of turtles. Specifically it will be important to develop an understanding of the magnitude of the problem, trends in the illegal trade market over time, disease risk, methods of illegal collection, and geographic origin of wild turtles, among other important questions. We highlight three important potential areas for future research below.

Determining Geographic Location through Genetic Analysis.— We recommend continued, intensive genetic sampling to improve the understanding of genetic differentiation across the region and species range as well as the accuracy of efforts to determine geographic origin of confiscated turtles. In particular, researchers should aim to develop a more precise understanding of the spatial scale of genetic differentiation (i.e., the distance within which (sub)population genetics are not significantly different and therefore demographically independent) and how this scale may vary geographically.

Illegal Trade Market.— Successful deterrence of illegal trade will require a solid understanding of the market trends (see Tracking Confiscations, Objective 5). It will be particularly important to further refine the baseline understanding of the extent of illegal turtle trade, estimate valuation trends (via online markets), and understand how price may vary by demographics (female, male, juvenile) and other factors (coloration, etc).

Disease and Confiscations.— Numerous diseases are often present within groups of confiscated turtles and therefore represent a potential threat to recipient facilities and wild populations (if repatriation is under consideration). Increased research regarding disease presence and diversity associated with confiscations will be critical in guiding the decisions and protocols related to confiscation management (see Managing Confiscations, Objective 5).

The Collaborative to Combat the Illegal Trade in Turtles (CCITT; see Objective 5) Research Working Group is working toward addressing a number of research needs including those highlighted above. The NEEBT Working Group should aim to support the CCITT Research Working Group where possible.

Climate Change

The potential future effects of climate change on eastern box turtles remain largely unknown. Researchers should explore thoughtfully-crafted approaches to understanding the potential effects of climate change on habitat suitability, demographic parameters (e.g., sex ratio, recruitment), range shifts (expansion or contraction), future subspecies range dynamics, and other aspects of eastern box turtle ecology. In addition, considering climate change forecasts suggest that much of the northeast is expected to receive increased precipitation, research geared toward understanding the effect of flooding on overwintering survival and nest success may prove valuable.

Objective 5. Combat Illegal Trade

Initiation timeline: long-term (2023–)

Support the Collaborative to Combat the Illegal Trade in Turtles

The Collaborative to Combat the Illegal Trade in Turtles (CCITT) was formed in 2018 with the mission of “advancing efforts to better understand, prevent, and eliminate the illegal collection and trade of North America’s native turtles” and is made up of state, federal, tribal, academic, and NGO biologists as well as law enforcement personnel. Their stated priority is to “build professional relationships between law enforcement, biologists, and social scientists to address needs associated with illegal trade in turtles.” CCITT has Working Groups dedicated to confiscation and repatriation, data and research, human dimensions, law enforcement, and regulatory and judicial matters. The NEEBT Working Group supports CCITT and aims to collaborate, where needed, with CCITT on efforts that will benefit eastern box turtles, including the actions listed below.

Improving Regulatory Guidelines

Differences in possession rules among states (Erb and Roberts 2023) have made rangewide and even regional enforcement challenging. Currently, the Association of Fish and Wildlife Agencies (AFWA) and the Judiciary and Regulatory Working Group of CCITT are collaborating to update state herpetofaunal regulatory guidelines (originally developed by the Partners in Amphibian and Reptile Conservation [PARC]), with the goal of closing major loopholes and increasing ability of law enforcement to enforce state regulations.

Coordination and Education within Judicial System

Commercial poachers often receive lenient penalties often because judges are not aware of the severity of the problem. With the goal of stricter penalties for illegal commercial collection, the CCITT Judiciary and Regulatory Working Group is also working to educate judges and prosecutors about the significant ecological implications of illegal turtle collection and the breadth of the problem. Another goal is to establish a precedent for providing restitution to state agencies (or other entities) for care, repatriation, and other needs for confiscated turtles, the cost of which can be very high.

Law Enforcement Education and Protocols

Increased consistency and education regarding optimal operating enforcement procedures will be critical in reducing illegal trade. Thus, there is a clear need to collaborate with law enforcement to (a) develop protocols for chain of custody, biosecurity, and supporting prosecution and (b) establish standardized educational materials. The Law Enforcement Working Group of CCITT is leading efforts around both of these topics and the NEEBT Working Group should provide support when possible.

Tracking Confiscations

An effective response to illegal trade will require consistent and standardized data collection, which among many purposes, will help provide an understanding of short- and long-term confiscation trends, needs for funding and staff time, and potential geographic collection hotspots. Therefore it is imperative that greater attention is devoted to establishing a streamlined system for tracking turtle confiscations at state, national, and international levels.

Managing Confiscations

The process of managing turtles after confiscation can be extremely burdensome on state and federal agencies, which currently lack the resources and infrastructure to house and care for large numbers of turtles (single confiscations can include >100 turtles, and occasionally thousands). To address this issue, the Confiscation and Repatriation Working Group of CCITT, Association of Zoos and Aquariums, and the Turtle Survival Alliance are working to establish a network of facilities that are capable of housing confiscated turtles. The Confiscation and Repatriation Working Group is also developing protocols for guiding biologists and law enforcement through confiscation cases, with particular attention to turtle health, chain of custody of evidence, and timely transfer to care facilities. In addition to these efforts, the Working Group should consider incorporating use of Passive Integrated Transponders (PIT tags) into protocols where possible to reduce false identification rates.

Potential for Repatriation

Repatriation of healthy, disease-free turtles to the precise location of collection represents the ideal outcome following confiscation. Unfortunately, this is very rarely possible given that little is typically known about origin or history of care. Thus, when developing protocols for repatriation it will be critically important to carefully weigh the risks and ethical considerations associated with different outcomes, including releasing turtles to non-origin populations (which could result in outbreeding depression), releasing turtles with diseases or potentially harboring disease, and euthanization, among others. In developing such protocols, it will be particularly important to seek input, feedback, and consensus from a geographically representative audience consisting of a diverse range of expertise.

Stable Isotopes.— In addition to ongoing efforts to support repatriation via genetic assignment, future efforts should consider the benefits of complimentary stable isotope analyses, which have proven potentially useful for determining whether wood turtles were wild or captive-born (Hopkins et al. 2022).

Data Sensitivity

Public Disclosure and Spatial Representation of Population Locations.— Providing spatially-explicit location information about populations — particularly within technical documents and publications — increases the likelihood that those populations will be targeted for illegal collection. Therefore, we recommend that spatial information is shared sparingly and only for conservation purposes. State agencies and other data-holding entities (e.g., atlas projects) should carefully consider conservation value of sharing data as well as long-term risks (e.g., what happens to the data after a project is complete?).

Social Media and Citizen Science.— Location information posted to social media platforms and citizen science websites (that do not protect the data) can be used by poachers to identify collection sites. We strongly recommend efforts to encourage the general public to refrain from providing specific

location information beyond the county and state on social media and make sure data submitted to citizen science projects is obscured or hidden from the general public.

Data-Sharing Agreements and Permits.— We recommend that all state agencies require data-sharing agreements in order to obtain and work with spatial data.

Outreach

Commercial collection, resulting in many individuals collected per population across numerous populations, likely represents the most significant threat to eastern box turtles with respect to illegal collection, but incidental collection by the recreationists at low levels may still contribute to population decline (Garber and Burger 1995). The NEEBT Working Group should continue to develop, distribute, and refine public outreach materials (Fig.) to increase awareness of the vulnerability of turtles to collection and how to report suspicious activities.

Help Protect Eastern Box Turtles

Leave them in the Wild!

Identifying an Eastern Box Turtle

5-6 in

Eastern box turtles have a dome shaped carapace and many will have bright yellow to orange irregular patterns on top of their shell.

The plastron of eastern box turtles may be yellow to dark brown or black. They may sometimes be a mixture of these colors with an irregular pattern.

Keep Eastern Box Turtles Wild

Despite eastern box turtles reaching sexual maturity around age 10-13 in the northeast, it may take them decades to produce an offspring that survives to adulthood. If a turtle is collected from the wild, it cannot contribute to future generations. Wild turtles kept in captivity often become sick and die prematurely. Collecting turtles is not only unethical but also prohibited by law in most states.

To Learn More About the Turtles in Your State and Their Regulations, Visit:

How You Can Help

- If mowing during the active season of the eastern box turtle, raise your mower blades >7 inches.
- Assist turtles across the road. When it is safe to do so, move turtles across the road in the direction they were headed.
- If you find a severely injured turtle, contact a local wildlife rehabber by visiting: <https://ahnow.org/>
- Don't share location information online about the turtles you see. Poachers may use this information to find sites for collecting turtles
- Report Suspicious Activity. If you suspect someone is involved in the illegal collection of wild turtles, report it to the U.S. Fish and Wildlife Service's tip line (1-800-FWS-TIPS)

Active Period in the Northeast

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Active	Active	Nesting	Nesting	Incubation	Incubation

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Figure 1. Anti-poaching card developed by the Northeast Eastern Box Turtle Working Group.

Objective 6. Reduce Threats within Focal Core Areas and Focal Landscapes

Initiation timeline: 5+ years (2028–)

Land Protection

Land protection should be prioritized within Focal Core Areas to prevent land conversion and its associated negative effects. While land protection specifically designated for eastern box turtles is uncommon at the state agency level, conservation easements through land trusts and landowners offer promising potential. There is also the possibility for state biologists to facilitate “piggy-backing” conservation whereby land protection for a population is secured through land protection decision-making process for a higher priority co-occurring species. In such cases, the knowledge that a “regionally significant” eastern box turtle population is present may influence the decision-making for a higher-priority species. Similarly, the NEEBT Working Group should consider the possibility of incorporating high-priority eastern box turtle Focal Core Areas into regional and state planning tools that land trusts and others use to prioritize conservation (e.g., Connect the Connecticut, Chesapeake and Delaware Blueprints, New Jersey Conservation Blueprint, BioMap in Massachusetts). The Regional Conservation Partnership Network (<https://wildlandsandwoodlands.org/rcpnetwork/about-the-rcp-network-2/overview/>).

Roads

Roads represent a particularly challenging threat to mitigate for eastern box turtles because the terrestrial and generalist nature of this species means that road-crossing hotspots are often not apparent. The most effective method for reducing the threat of road mortality is to prevent further road construction near known activity areas. Seasonal signage during peak movement periods may help to reduce mortality. Where curbs are deemed necessary, public works officials should consider gradient curbs (also called “Cape Cod curbs”), which facilitate box turtle movement off of roads.

Agriculture

The Status Assessment (Erb and Roberts 2023) identified hay and agricultural fields as a potentially significant land-use threat in the Northeast. These cover types are likely associated with mortality resulting from mowing machinery (Erb and Jones 2011). Crop fields may also represent a reproductive sink if females nest in fields when the crop is short, but subsequent crop growth limits solar exposure. Nests may also be crushed or dug up with machinery before hatchlings emerge. Where this threat has been identified as a clear threat to a local population, willing farmers could consider delayed mowing, buffer strips, and shifting to crop varieties more compatible with eastern box turtle ecology (see Best Management Practices, Appendix C, D).

Recreation

Outdoor recreational activity can negatively influence turtle populations through incidental collection (functional mortality), habitat degradation, and direct mortality. Trail relocation, removal, and prevention represents an important strategy for reducing human encounters and lowering the risk of off-road vehicle collisions. In some cases, restricting access to areas via road closures may reduce recreation. Future conservation efforts should also consider the development and dissemination of outreach materials oriented toward recreationists (e.g., hikers and hunters) that discourage collection.

Succession

Across much of the northeastern United States, natural disturbance processes that historically generated important early-successional, open conditions for eastern box turtles are no longer present or as influential as they once were. Carefully implemented management should be considered at populations with minimal early-successional cover in order to increase structural complexity for thermoregulation and create potential nesting sites (see Best Management Practices, Appendix C, D). In some cases, regular, incremental, low-intensity management of a site can be sufficient to generate early-successional conditions without needing to utilize heavy machinery.

Land Management

Land management practices, particularly those that involve heavy machinery and/or prescribed fire have the potential to cause mass mortality events if implemented during the active period within high-activity areas. In addition to the threat that timber harvesting can pose to eastern box turtles via direct mortality (i.e. crushing) from tractors, skidders, and other heavy equipment, complete (or near-complete) canopy removal within small, isolated forest fragments may negatively affect populations by eliminating suitable overwintering and summer habitat, thus leading to mortality or triggering population-wide dispersal responses. Managers developing management plans within occupied eastern box turtle habitat should consult the Eastern Box Turtle Best Management Practices (Appendix C, D). Generally, management should proceed with some awareness of the relative regional or statewide significance of the population.

Tracking Database

We recommend the development of Focal Core Area site-level management action tracking tables after the next update of the Conservation Plan when data-deficiencies related to population sampling are at least partially addressed. Similar to the Northeast Wood Turtle Conservation Plan, important aspatial and geospatial information (e.g., important threats, nesting habitat availability, habitat change) should be tracked and reevaluated periodically. Population and resource-related information should be recorded, including estimated population size, age structure, sex ratio, extent and quality of nesting habitat, and proportion of site protected.

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