The 2022 Northeast Lexicon: Terminology Conventions and Data Framework for State Wildlife Action Plans in the Northeast Region

Abstract

State Wildlife Action Plans (SWAPs) are comprehensive conservation blueprints that guide diverse partners to restore Species of Greatest Conservation Need and their habitats. To fulfill this role at a regional scale, SWAPs must provide consistent terminology to support comprehensive multi-state information compilation and assessments. This need was recognized prior to the 2015 federally required 10-year revision, when the Northeast Association of Fish & Wildlife Agencies' Fish & Wildlife Diversity Technical Committee (NEFWDTC) pioneered *The Northeast Lexicon: Terminology Conventions and Data Framework for State Wildlife Action Plans in the Northeast Region*. The resulting consistency in terminology among SWAPs served as a gateway to regional coordination and tool development such as the Northeast SWAP Database. Subsequently, this database has been used by the NEFWDTC to derive multistate priorities for landscape-level collaboration. In 2022, the NEFWDTC SWAP Subcommittee updated the Northeast Lexicon, incorporating current best practices and considering new opportunities for collaboration prior to 2025 SWAP updates. The 2022 Lexicon provides a data framework for the first five federally required Elements (i.e., species, habitats, threats, actions, monitoring), meets U.S. Fish and Wildlife Service expectations for SWAPs, aligns with national voluntary SWAP best practices, and prioritizes data fields needed for the Northeast SWAP Database and regional conservation planning analyses. While maximizing consistency, the Lexicon provides flexibility to realize the value of innovation and the need for SWAPs to be state-driven.

Table of Contents

Introduction

State Wildlife Action Plans (SWAPs) are comprehensive conservation blueprints that guide conservation actions of diverse partners to restore imperiled wildlife and their habitats. First produced in 2005, SWAPs comprise eight required Elements: (1) Species of Greatest Conservation Need (SGCN); (2) extent and condition of key habitats supporting SGCN; (3) threats negatively impacting the species or habitats; (4) actions proposed to mitigate these threats; (5) adaptive management and other monitoring programs; (6) plans to review the SWAP within 10 years; and (7) efforts to engage other agencies and (8) the public in SWAP revision and implementation. All states and territories develop and administer SWAPs to remain eligible for federal funding to support Plan implementation.

In 2015, the Northeast Association of Fish & Wildlife Agencies' Fish & Wildlife Diversity Technical Committee (NEFWDTC) pioneered *The Northeast Lexicon: Terminology Conventions and Data Framework for State Wildlife Action Plans in the Northeast Region* to facilitate regionwide compilation of SWAP information. Wildlife Action Planners from each state collaborated to find common ground in their approaches to drafting SWAPs and agree on a data framework for each required Element.

The 2013 Lexicon included several next steps:

- Implement the common Lexicon through the 2015 State Wildlife Action Plan revision process and refine language as needed
- Form a Northeast Lexicon Working Group comprised of Northeast Wildlife Diversity Program Managers and State Wildlife Action Plan Coordinators
- Develop a Northeast State Wildlife Action Plan Database application

- Work with the Northeast Conservation Information and Education Association to refine terminology related to outreach for incorporation in a toolkit to support states in their State Wildlife Action Plan revision and implementation

The 2013 Lexicon was followed by all 13 states and the District of Columbia in their 2015 revisions and a database containing SWAP data from all 14 Wildlife Action Plans was built. The SWAP Coordinators have formed an official subcommittee of the Northeast Fish and Wildlife Diversity Technical Committee, and through this subcommittee they have not only maintained the Lexicon but have created a forum where they can learn from invited guests on a variety of topics including outreach and education.

Most importantly, the resulting consistency in SWAPs made it possible to build the Northeast SWAP Database used by the NEFWDTC to derive multistate priorities for landscape-level collaboration. This publicly available database supports queries that link species, habitats, threats, and actions. State and federal conservation agencies, non-governmental organizations, and academic institutions use the database to efficiently access key information from all 14 Northeast SWAPs.

This report represents the 2022 update of the Northeast Lexicon, incorporating current best practices and new opportunities for collaboration prior to 2025 SWAP updates. The 2022 Lexicon provides a data framework for the first five federally required Elements (i.e., species, habitats, threats, actions, monitoring), aligns with national best practices, and prioritizes data fields needed for the Northeast SWAP Database and regional conservation planning analyses. The Lexicon maximizes consistency and provides flexibility to facilitate innovation and recognize the need for SWAPs to be state driven.

In 2022, the Northeast Association of Fish and Wildlife Agencies was awarded a USFWS Wildlife and Sportfish Restoration Competitive State Wildlife Grant to modernize the Northeast SWAP Database. Regional implementation of the 2022 Northeast Lexicon is critical to allow the NEFWDTC to efficiently identify refreshed regional conservation needs following 2025 SWAP revisions and enable access to 14 SWAPs by numerous conservation partners. The Northeast Region looks forward to addressing regional priorities collaboratively with Canada, the Southeast U.S. and the Midwest U.S. to deliver landscape-scale conservation for imperiled species and associated habitats.

How to use this report

Like the 2013 Lexicon, this report is organized by Element. For example, to understand regional goals for consistency on identifying threats, look to Element 3. Each Element leads with an introductory statement of the goals and purpose of the Element in the regional context. The National Advisory Acceptance Team required Element and suggested sub-Elements continue to serve as a foundation of the Lexicon and are available for reference (National Advisory Acceptance Team 2004). Each Element also contains a list of changes from 2013 with a brief explanation for the changes. This list of changes is followed by the main content which explains recommended methods and provides the data framework needed for the Northeast SWAP Database and regional collaborations over the next decade. Appendices A-D contain additional reference tables. Appendix A includes some of the most important external data and method resources with hyperlinks.

In addition to Appendices included with this report, the text-based data framework tables are also provided in an excel file to facilitate incorporating the Lexicon in each state's SWAP data management system. This file also includes crosswalks of the habitat and action classifications to the analogous systems used in the 2013

Lexicon. (The data framework for Element 1 and Element 3 were not significantly altered, so crosswalks to 2013 are not provided for those Elements.)

Acronyms

This document strives to minimize use of acronyms, but, for clarity, commonly used abbreviations can be found in Table 1.

Table 1. Definition of common acronyms used in this report.

Acronym	Term
AFWA	Association of Fish and Wildlife Agencies
CMP	Conservation Measures Partnership
ITIS	Integrated Taxonomic Information System
IUCN	International Union for the Conservation of Nature
NAAT	National Advisory Acceptance Team (a group of USFWS and state reps convened in 2004-2005 to define sub-Elements and guide review of the first Wildlife Action Plans).
NEFWDTC	Northeast Fish and Wildlife Diversity Technical Committee
RSGCN	Regional Species of Greatest Conservation Need
SGCN	Species of Greatest Conservation Need
SWAP	State Wildlife Action Plan
TNC	The Nature Conservancy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Wildlife TRACS	Wildlife Tracking and Reporting Actions for the Conservation of Species

New in the 2022 Northeast Lexicon

How was the Lexicon Updated?

The 2022 Lexicon was researched and drafted by Elizabeth Crisfield, contracted by the Northeast Association of Fish & Wildlife Agencies Fish and Wildlife Diversity Technical Committee, in consultation with a steering committee of SWAP leaders: Cathy Haffner, Pennsylvania Game Commission; Brian Hess, Connecticut Department of Energy and Environmental Protection; Amanda Freitas, Rhode Island Natural History Survey; and Becky Gwynn, Virginia Department of Game and Inland Fisheries. Input was solicited from Northeast SWAP Coordinators on webinars in February and June, with a survey concerning key points distributed in May 2022. A meeting to discuss outstanding issues was held in June and drafts were shared for review in August and September leading up to a presentation to the Northeast Fish and Wildlife Diversity Technical Committee (NEFWDTC) where the Lexicon was adopted.

The NEFWDTC is charged with coordinating with neighboring Canadian Provinces. While researching the threat and action classifications and exploring potential improvements, the steering committee was impressed by the expanded Conservation Measures Partnership (CMP) threat classification developed by the Quebec Ministry of Forestry, Wildlife and Parks (Ministere des Forets, de la Faune et des Parcs 2021) ([link](#)). A meeting with Philippe Lamarre, Maxime Chenier, Mark Dionne, and Yohann Dubois allowed Northeastern U.S. counterparts to share and learn from the analogous planning processes. While the threat classification report has been reviewed by some members of the CMP, the more recently developed action classification is currently under review. Despite the fact that the action classification has not been finalized, the steering committee agreed to use the Quebec improvements to the CMP threat and action classifications for Elements 3 and 4 because they are designed to work together, the CMP offers a stable system, and the

Quebec expansion of the system is well designed for state and provincial use. Northeast SWAP Coordinators will participate in the ongoing review process and adopt a subsequent version of the action classification as the Lexicon standard. As all parties strive for better inter-state and international cooperation in conservation, using the same classification system for threats and actions will facilitate effective conservation particularly given shifts in geographic range of climate niches anticipated over the coming decades.

What's new in 2022?

The following changes are itemized in each Element and provided together here to assist SWAP Coordinators in migrating from the 2013 Lexicon to the 2022 Lexicon. The 2022 Lexicon modifies or adds the following:

For Element 1:

- A regionally consistent definition of SGCN;
- The designation 'Assessment Priority' for species lacking substantive data to evaluate conservation concern level;
- The database key, and primary reference, for species taxonomy is the Integrated Taxonomic Information System (ITIS) Taxonomic Serial Number (TSN);
- Detailed taxonomic guidance to standardize naming conventions for uncertain and new taxonomy, subspecies, and populations;
- The expectation that changes to SGCN determinations between SWAP revisions are highlighted in the Plans; and
- An updated data framework that highlights a subset of fields for regional analysis, reflecting lessons learned from the Northeast State Wildlife Action Plan database development.

For Element 2:

- a regionally consistent definition of habitat that expresses the SWAP perspective that habitats meet species' needs;
- a focus on supporting regional analysis of shared priorities, and eliminating other aspects of Element 2 that are not needed for regional consistency;
- a habitat classification system defined by a combination of physical and vegetation characteristics establishing consistency at a coarse level; and
- recommended habitat modifiers to clarify specific features of a habitat types.

For Element 3:

- Four "Needs" in the 2013 Lexicon capturing drivers of administrative actions were removed in favor of a closer adherence to the Conservation Measures Partnership classification systems;
- A third level to the threat classification system, adapted from Quebec's Ministry of Forests, Wildlife, and Parks was adopted to more precisely indicate aspects of threats that can be acted on.
- A revised set of threat characteristics was adopted. Reversibility and Likelihood were not included in 2022. In part to identify threats that are being amplified by climate change, 'threat trend' is being added as a new characteristic.

For Element 4:

- The prior Wildlife TRACS classification system used in 2013 was replaced with the more comprehensive and stable system used by the Conservation Measures Partnership and enhanced by Quebec to include important details, particularly in the areas of habitat and species management.

- The list of action descriptions was compressed to represent the most important pieces of information, with a subset needed for the regional SWAP Database.

For Element 5:

- A suggestion that the NatureServe Threat Impact Score serve as a measure of conservation effectiveness that could be used at multiple scales without relying on measures of species population response to conservation action.

How are Climate Change and Habitat Fragmentation addressed?

Climate change and habitat fragmentation are two high priorities for regional collaboration (Association of Fish and Wildlife Agencies 2021). Both threats affect SGCN and their habitats (Elements 1 & 2), and both require specialized conservation approaches, best practices, and monitoring needs (Elements 4 & 5). In recognition of the challenge and importance of these threats, the Climate Adaptation Committee of the Association of Fish and Wildlife Agencies (AFWA) produced a targeted toolkit to provide resources specific to habitat types and planning processes (Albright et al. 2021).

Specific to Climate Change Adaptation, AFWA is updating a 2009 report to be released in Fall 2022 covering Voluntary Guidance for Climate Adaptation Planning (Association of Fish and Wildlife Agencies 2022). Updated guidance calls for fully integrating climate change into State Wildlife Action Plans including linking actions to climate vulnerabilities, managing for change, and considering broader landscapes and longer timeframes. In addition to the AFWA Guidance, SWAP Coordinators in the Northeast will rely on the Northeast Climate Adaptation Science Center's forthcoming Synthesis Report intended to support Wildlife Action Plans by providing easy access to relevant climate change science.

The 2025 revision of SWAPs will guide conservation through 2035 – a period of time likely to experience growing concern about these threats and mounting evidence of wildlife impacts. To enable the Northeast region to derive regional context for climate change and fragmentation impacts and conservation action, the Lexicon has addressed these complex topics in the following ways. Climate change is a direct threat to species and their habitats and can be captured in Element 3. Other aspects of climate impacts, adaptation strategies, and monitoring programs are documented in Elements 1, 2, 4 and 5. States will incorporate adaptation planning in many ways, therefore the 2022 Lexicon prescribes climate change information in only a few places. Data fields to document climate vulnerability are provided in Element 1. In Element 3, in addition to the direct climate threats that can be categorized, all threats may be identified as "intensifying" if climate change is amplifying the impact.

Other aspects of climate change can be indexed in a road map in the SWAP front matter to help readers find climate-related information that may be included in a SWAP including:

- Species climate vulnerability assessments
- Habitat climate vulnerability assessments
- Innovative ways to identify climate change as an amplifying threat worsening the impact of other ongoing threats
- State climate adaptation initiatives or programs
- Climate-smart planning approaches for actions addressing other threats
- Monitoring programs specifically intended to detect trends in populations responding to climate change
- Partnership opportunities, within state government or with private entities, to address climate change-related needs outlined in the SWAP

Habitat fragmentation is an indirect threat resulting from many of the named threats in Element 3 (see (Carter et al. 2019) for a review of how this threat is covered in SWAPs). Conservation action to reconnect habitats is an important regional goal highlighted in the SWAP and Landscape Report (Association of Fish and Wildlife Agencies 2021). Furthermore, the target of conserving 30% of lands and water by 2030 could facilitate efforts to improve habitat connectivity (U.S. Department of the Interior et al. 2021). Unfortunately, because habitat fragmentation results from many different anthropogenic threats and can be addressed using a wide range of strategies, it can be difficult to measure conservation effort and outcomes at the state and regional scales.

Element 1: Species of Greatest Conservation Need

Species of Greatest Conservation Need (SGCN) are foundational to SWAPs and this Lexicon chapter seeks to build regional consistency to highlight the species most in need of conservation across all taxonomic groups. The Lexicon meets the requirements as determined by Congress (*Pub. L. No. 106-553* 2000), described in NAAT 2004 guidance (see inset), and subsequent revision guidance (USFWS & AFWA 2017). More importantly, it supports regional objectives, including the Northeast SWAP Database and landscape-scale conservation.

SGCN are determined by each state fish or wildlife agency and typically include native species with declining populations or vulnerabilities that will benefit from strategic conservation attention. SGCN selection methods are based on best available data, such as population status, trend, and/ or known threats. Specific methods, like thresholds for each factor and additional considerations, are determined by each state and described in the individual Plans.

What's New in 2022?

Element 1 of the 2022 Lexicon takes a similar approach to the 2013 Lexicon, but adds the following important details:

- A regionally consistent definition of SGCN to improve communication with conservationists who may be less familiar with SWAPs;
- The designation 'Assessment Priority' for species lacking substantive data to evaluate conservation concern level, clarifying that these data-deficient species have needs but are not SGCN;
- The database key, and primary reference, for species taxonomy is the Integrated Taxonomic Information System (ITIS) Taxonomic Serial Number (TSN) because the ITIS system addresses the breadth of taxonomy in SWAPs more comprehensively than the NatureServe unique identifier, provides valid names and recognized synonyms, and the Northeast RSGCN Database has already made this switch;
- Detailed taxonomic guidance to standardize naming conventions for uncertain and new taxonomy, subspecies, and populations;
- The expectation that changes to SGCN determinations between SWAP revisions are highlighted in the Plans; and

Required Element 1. Information on the distribution and abundance of species of wildlife, including low and declining populations as the State fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the State's wildlife.

Suggested sub-Elements (NAAT 2004):

A. The Strategy [Wildlife Action Plan] indicates sources of information (e.g., literature, data bases, agencies, individuals) on wildlife abundance and distribution consulted during the planning process.

B. The Strategy [Wildlife Action Plan] includes information about both abundance and distribution for species in all major groups to the extent that data are available. There are plans for acquiring information about species for which adequate abundance and/or distribution information is unavailable.

C. The Strategy [Wildlife Action Plan] identifies low and declining populations to the extent data are available.

D. All major groups of wildlife have been considered or an explanation is provided as to why they were not (e.g., including reference to implemented marine fisheries management plans). The State may indicate whether these groups are to be included in a future Strategy revision.

E. The Strategy [Wildlife Action Plan] describes the process used to select the species in greatest need of conservation. The quantity of information in the Strategy is determined by the State with input from its partners, based on what is available to the State.

- An updated data framework that highlights a subset of fields for regional analysis, reflecting lessons learned from the Northeast SWAP Database development and the reality that more states are working from an existing database now than in 2013, facilitating systematic production of standardized species reports.

Definitions

Species of Greatest Conservation Need (SGCN) – Defined by each state fish or wildlife agency in its Wildlife Action Plan, typically a native species with declining populations, or vulnerabilities expected to benefit from strategic conservation attention.

State Assessment Priority Species –Species for which more information is needed to fully understand status and trends to determine the level of conservation concern or SGCN status. These species, separate from SGCN, are a priority for additional assessment or survey to address data deficiency analogous to regional Watchlist-Assessment Priority species in the September 2022 RSGCN Update.

Regional Species of Greatest Conservation Need (RSGCN) – Native species for which the Northeast region has a stewardship responsibility due to high conservation concern and/or populations that are concentrated in the Northeast Region and that have been identified as SGCN by at least one Northeast state. (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022)

Proposed RSGCN – A species that meets the criteria for RSGCN but is not currently identified as an SGCN within the region. (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022)

Selection Methods and Data Sources

The Northeast Lexicon outlines common data sources but does not prescribe selection criteria for SGCN, and, importantly, does not set thresholds for selection criteria. Each state is free to select its SGCN according to the processes and criteria it selects. To provide a consistent assessment of concern and responsibility for regional SGCN (RSGCN), the region relies on the Northeast RSGCN list, reviewed by experts from every state every 5 years (before and after the SWAP revisions). The RSGCN process satisfies SWAP and Landscape Conservation Report recommendation 1.1 to use clear and consistent criteria to identify priority species (Association of Fish and Wildlife Agencies 2021). Some states may choose to adapt the RSGCN selection method and apply it at the state scale (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022).

In the interest of transparency and consistency with the NAAT guidelines (1E) and the Best Practices Report (Association of Fish and Wildlife Agencies 2012), SWAPs should specify the selection criteria and the methods used so that differences between state lists can be understood and explained. If thresholds specific to an established assessment source are selected, these choices should also be noted in the explanation of methods. For example, these could include a range of S-ranks (S1-S3) or use of uncertain S-ranks for selecting a subset of species from Natural Heritage Program data, or the categories of vulnerability assigned to species on the International Union for Conservation of Nature Red List (e.g., Critically Endangered (CR), Endangered (EN), and Vulnerable (VU)). Recent publications may be valuable for states in planning their selection process for fish (Faucheux et al. 2019) and plants (Alexander 2016; Frances 2017). Plant SGCN selection information can be found in the 2023 Northeast Regional Conservation Synthesis (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee in prep.)

Most states will use established species assessments (Table 1-1) as a starting point for selecting SGCN because they provide a ranking of species concern based on some of the fundamental considerations used to

select SGCN (Table 1-2). Most species found on the established assessment lists (Table 1-1) and meeting the state's criteria would be included as state SGCN, but after reviewing the fundamental considerations (Table 1-2) some species may not be included as state SGCN. Conversely, some species not found on the established assessment lists (Table 1-1) may be determined to be state SGCN after evaluating several fundamental considerations (Table 1-2). Extirpated and historic species are considered on a case-by-case basis and typically included as SGCN if recovery is deemed feasible. Species whose conservation status cannot be confidently assessed should not be included as SGCN; rather, they can be included in the SWAP as assessment priorities on a separate list. Assessment priority species are eligible for State Wildlife Grant funding to determine if the species should be designated SGCN (D. Blanton, USFWS, personal communication).

Table 1-1. The Northeast Lexicon recommends considering the species in these established assessments for inclusion as SGCN.

Established assessment	Description
Federal Legal Listing	Species federally listed as threatened or endangered *if* the species occurs or could occur within the state; some states may also consider candidate or petitioned species after positive 90-day finding
Regional Species of Greatest Conservation Need (RSGCN)	Species listed as Northeast RSGCN (2022) or proposed RSGCN *if* the species occurs or could occur within the state
State Legal Listing	Species with state regulatory protection, such as threatened or endangered
State Natural Heritage Program and NatureServe Rankings	Species with global ranks (G1-G3) and/or subnational (state) ranks (S1-S3)
Regional or Species Group Conservation Prioritization	Conservation prioritizations are available for some species groups through prominent organizations and planning systems (e.g. Partners in Flight, American Fisheries Society, and the Partnership for Amphibian and Reptile Conservation)
International Union for Conservation of Nature (IUCN) Red List	Species that are Critically Endangered (CR), Endangered (EN), or Vulnerable (VU)

Table 1-2. The Northeast Lexicon recognizes these fundamental considerations for assessing species' conservation need.

Factor for consideration	Description
Species Abundance and Trend	Population status and trends for a species, including extirpation status
Threat	The number, immediacy, extent, and/or reversibility of known threats to species populations
State Responsibility	The relative importance of a state's population to conservation of the species, compared to other states or countries in the species' range.
Habitat Trend	Changes in the extent or condition of habitat which may be closely related to threats (e.g., climate change, land use change associated with development, or insect pests which can change the composition of a forest)

Data Framework

Subsequent to SGCN selection, information to identify and describe the species, their habitats, their threats, and the quality of available data meet the needs of the eight Elements to be included in SWAPs (Table 1-3).

Many states provide the following information in the form of a standard report (or Species Account) exported from a database.

The Lexicon Steering Committee researched the choice of database key considering input from the USGS SGCN database managers, Terwilliger Consulting Incorporated, and several additional diversity representatives. The needs of the full taxonomic diversity were considered, especially groups with evolving taxonomy. The Global Biodiversity Information Facility (GBIF) Taxon Identifier and the Integrated Taxonomic Information System (ITIS) Taxonomic Serial Number (TSN) were determined to be the best choices for database keys because of their stability and comprehensiveness. Although ITIS may have some shortcomings for marine species, this key was chosen because it is already available through NatureServe Explorer and species can be looked up very quickly on the ITIS website (www.itis.gov) where valid names and known synonyms are clearly annotated. Data managers may wish to reference the ITIS Data model (https://www.itis.gov/pdf/ITIS_ConceptualModelEntityDefinition.pdf).

Table 1-3. Data fields outlining key information for each species. Bolded data fields, with asterisks, indicate the minimum set of data fields needed for the Northeast SWAP Database.

Data Name	Data Description	Data Format and example	NatureServe Explorer Data Field
Database Key*	Integrated Taxonomic Information System (ITIS) Taxonomic Serial Number (TSN)	e.g., 174169	Classification/Related ITIS Names: (TSN #)
NatureServe Unique Identifier	If the ITIS TSN cannot be provided please use the NatureServe Unique Identifier (ELEMENT_GLOBAL)	e.g., 2.105670	Classification/NatureServe Unique Identifier
Scientific Name*	Naming conventions should follow standards described below.	Genus, species, and subspecies or variety if appropriate e.g., *Glaucomys sabrinus*	Classification / Scientific Name
Taxonomic clarifications	Use abbreviations in the standards described below, or provide other taxonomic clarifications	e.g., pop. Great Lakes	
Common Name	Naming should follow standards when available (e.g., American Ornithologists' Union checklist for birds).	e.g., Northern Flying Squirrel	Classification / Other Common Names
Taxonomic synonyms*	Described below and intended to assist all data managers in matching current taxonomy with deprecated species names, particularly when the valid name of a listed species has changed, and to indicate the Plan treats two scientific names as the same species.	i.e., *Glaucomys sabrinus macrotis*	Classification / Related ITIS Names
Taxon/Subtaxon	Informal taxonomy used in the Northeast SWAP Database and RSGCN Database to support practical data queries. See Appendix B.	e.g., Birds/Shorebirds, Reptiles/Snakes	
References	Any published or gray literature sources that address species status and trend, habitat associations and requirements, threats, and/or conservation actions applicable to this species.	Citations in Conservation Biology format	References
Associated Habitat Class and Type*	Habitat Classes and Types are defined in Element 2.	*e.g. Open upland habitat/ Grassland*	*Ecology and Life History / Habitat / Habitat Type*

Habitat Modifiers	If the species is associated with particular sites within the habitat classification systems, these site conditions can be identified. (e.g. age classes of forests, river and stream sizes, substrates and features like: Boulder fields, springs, seeps, vernal pools, rocky outcrops, caves, manmade structures, cliffs, talus slopes, flat rocks in stream beds)	*See column 3 in table 2-1 and Appendix C*	*Ecology and Life History / Habitat / Habitat Comments*
Habitat Preferences	This is a narrative field to explain, in more detail, the habitat requirements or preferences of the species. Include information about habitat preferences unique to different life stages.	i.e., Northern flying squirrels prefer old-growth boreal forests that contain a heavy coniferous component, moist soils, and lots of downed woody debris.	Ecology and Life History / Habitat / Habitat Comments
Federal Listing	Current Federal Listing Status	LE = Endangered, LT = Threatened, LC = Candidate, LP = Petitioned with 30-day finding	Conservation Status / U.S. Endangered Species Act
State Listing or Regulatory Protection*	This documents the state listing of species. A narrative explanation of state abbreviations for states statuses should be provided.	State listing classes i.e., Endangered	
G-rank	Imported from NatureServe, included in Northeast SWAP Database, not needed to be transferred from a state to the Northeast SWAP Database.	G1, G2, etc.	Conservation Status/ Global Status
S-rank	The most up-to-date state ranks should be sourced from State Natural Heritage Programs or other in-state source.	i.e., S1, S2, S3, S4, S5, S1S2, S2S3, S3S4, S4S5, S1S3, S2S4, S3S5, SU, SX, SH, SNR, SNA	Conservation Status / State & Provincial Statuses
Threats impacting the species*	Threats should be listed and anticipated interactions between these threats should also be noted. See Element 3 for details about the Conservation Measures Partnership Threat Classification system, as amended.	i.e., 5.3.4 Biological Resource Use/ Logging and Wood Harvesting / unintentional effects large scale	NatureServe Global Conservation Status Factors / Threat Comments
Short-term Population Trend	Quantitative assessments (10 years or 3 generations (up to 100 yrs.) for taxa or 50 years for ecosystems) within the state	A = Decline of >90%; B = Decline of 80 - 90%; C = Decline of 70 - 80%; D = Decline of 50 - 70%; E = Decline of 30 - 50%; F = Decline of 10 - 30%; G = Relatively Stable (<=10% change); H = Increase of 10 - 25%; I = Increase of >25%; U = Unknown	NatureServe Global Conservation Status Factors / Short-term Trend

Long-term Population Trend	Quantitative assessments (Over the past 200 years) within the state	*Same as Short-term Population Trend*	NatureServe Global Conservation Status Factors / Long-term Trend
Date SGCN status finalized	This is the date the species was reviewed. It might be 2023 for most species, and then if a minor revision occurs later, the date would be updated.	year	
Climate Vulnerability Score	Vulnerability assessment typically considers intrinsic properties of sensitivity and adaptive capacity along with the magnitude of climate change the species is exposed to (Foden et al. 2019). Definitions for categories are adapted from the NatureServe Climate Change Vulnerability Index (CCVI) v. 3.02 (Young et al. 2016): • More vulnerable: abundance and/or range extent likely to significantly decrease or disappear by 2050 • Less vulnerable: Abundance and/or range extent likely to decrease by 2050 • Potentially resilient: Abundance and/or range extent likely to be unchanged • Increasing: Abundance and/or range extent likely to increase • Insufficient evidence: available information is inadequate to project change	More Vulnerable, Less Vulnerable, Potentially Resilient, Potentially Increasing, or Insufficient Evidence	

SGCN Status Changes

In addition to the new list of SGCN in the SWAP, a record of changes to the SGCN list should be provided (e.g., species that have been removed from the SGCN list and which of the current SGCN are species added in the revision).

Taxonomic Standards

The Integrated Taxonomic Information System (ITIS) is a strong standard reference across all taxonomy, providing the current valid name along with any synonyms. (USGS & Smithsonian Institution n.d.). For additional reference, a list of taxa-specific authoritative references is provided on the NatureServe Explorer website at: https://explorer.natureserve.org/AboutTheData/Sources/Classification

Database Key. Each species (and subspecies) should be assigned the ITIS Taxonomic Serial Number (TSN). If the species does not have an assigned TSN in ITIS refer to the current Northeast RSGCN Database for a regional custom TSN, expected to be posted at www.neafwa.org under "Resources" in Fall 2022. (The Northeast RSGCN Database includes all NatureServe species known to occur in the Northeast regardless of status.) If the species does not occur in the Northeast RSGCN Database, and is a marine species, please refer to the World Register of Marine Species (WoRMS) and use the AphiaID. For non-marine species that cannot be found in the databases mentioned above, generate a unique database key by using the TSN for the genus and adding a unique alphabetical representing the species. For example, Bluestone Sculpin (Cottus sp. 1) is endemic to the Bluestone River system in VA and WV and is of high concern in those states. However, as it is not a formally described species, there is no ITIS record for the species. The appropriate modified TSN for this species would be 167229a (167229 is the TSN for the genus Cottus).

Subspecific taxa. Subspecies were included extensively in 2015 SWAPs in the Northeast, and 11 Northeast SGCN are federally listed as subspecies. As of January 2022, the Northeast RSGCN list includes 46 subspecies. Subspecies and varieties can be included in the scientific name field with the associated TSN in the database key field. Subspecies are recorded differently for animals and plants:

Animals are written as trinomials (e.g., *Coluber constrictor constrictor*) and, when the species and subspecies names are the same, the species name should be written out (e.g., *Coluber constrictor constrictor* not *Coluber c. constrictor*)

Plants include the abbreviation 'ssp.' between species and subspecies names (e.g. *Alnus incana ssp. rugosa*) and sometimes include the abbreviation 'var.' (e.g,. *Acer rubrum var. drummondii*)

Synonyms. Current valid names from ITIS should be used as the scientific name of record, and a second field (synonymous scientific name) should be used to provide recently used taxonomic conventions, particularly in cases where the species is federal- or state-listed under a deprecated name. Providing synonyms that may have been used in earlier SWAP versions will facilitate matching SGCN lists across states and across time and will help academic researchers and other conservation partners.

Taxonomic clarifications. Several conventions exist to acknowledge the continuing evolution of taxonomy. The following are expected to be used rarely but have been used in SWAPs in the past. Using the same abbreviations and punctuation helps to explain specific portions of a species' population or the states' understanding regarding newly defined species:

nov. (e.g., *sp. nov.*) is used for proposing a new name to a taxon

sp. # (e.g., *sp. 1*)is used for undescribed species

pop. (e.g., *pop.* Great Lakes) indicates a distinct portion of the total species range with unique conservation actions, threats, or status and trends.

nr. or aff. (e.g., *nr. pterisii*) aff. is Latin for "affini" and means close to or near the indicated species when the identification is certain (i.e. have enough evidence)

cf. (e.g., *cf. saylori*) - Latin for "conferre" and means to confer or compare the species to the given species but the identification is uncertain (i.e. not enough evidence)

Element 2: Habitats

Descriptions of habitats that support SGCN are required in SWAPs.

At the regional scale, habitats with many associated SGCN or threats are identified as shared regional priorities across all SWAPs. To identify these priorities, SGCN should be associated with the habitat types outlined in Table 2-1, as should the threats responsible for the degradation of these habitats.

Regional data explaining the spatial extent and condition of key habitats is provided by The Nature Conservancy in the 2023 Regional Conservation Status Assessment. Therefore, additional consistent data fields to address these characteristics are not included in the Lexicon.

A matrix of habitat modifiers used for RSGCN is provided in Appendix C. These modifiers include details like age class and fire return intervals for forests and substrate or gradient for rivers and streams. This system may be useful to define habitats more specifically in association with SGCN or threats. Species-specific habitat condition requirements could be added to species accounts as outlined in Element 1 and are especially recommended when such requirements are primary limiting factors for the species.

Required Element 2. Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in the 1st Element.

Suggested sub-Elements (NAAT 2004):

A. The Plan provides a reasonable explanation for the level of detail provided; if insufficient, the Plan identifies the types of future actions that will be taken to supply this information.

B. Key habitats and their relative conditions are described in enough detail such that the State can determine where (i.e., in which regions, watersheds, or landscapes within the State) and what conservation actions need to take place.

What's New in 2022?

Element 2 of the 2022 Lexicon is substantially revised, with a more limited scope, providing:

- a regionally consistent definition of habitat that expressed the SWAP perspective that habitats meet species' needs;
- a focus on supporting regional analysis of shared priorities, and eliminating other aspects of Element 2 that are not needed for regional consistency;
- a habitat classification system defined by a combination of physical and vegetation characteristics establishing consistency at a coarse level – the level at which regional analyses are performed and threat themes are summarized; and
- recommended habitat modifiers to clarify specific features of a habitat types.

Definitions

Habitat – A space that provides living (biotic) and non-living (abiotic) resources needed by a species to survive.

Habitat Classification

The coarse habitat classification is based on NatureServe Biotics 5 and developed for the Northeast RSGCN Database (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022). This system provides the necessary consistency at the regional scale to summarize priority conservation themes while allowing states flexibility to define focal habitats contextually. The version presented below was

adapted slightly for the 2022 Lexicon to ensure that important habitats like vernal pools, mines & tunnels, caves & karst, and other subterranean were not lost by relying on modifiers that may not be used by all states. (Table 2-1). The classification system is based on experience with RSGCN in the Northeast and Midwest and allows regional themes to be summarized at two levels. Additionally, analysis of anthropogenic habitat use as a conservation opportunity is possible by filtering on the italicized habitat types, embedded within their related natural habitats.

Recommended Habitat Modifiers are a subset of the full set of modifiers developed to describe habitat requirements for RSGCN. The full set of modifiers is reproduced in Appendix C for ease of reference, but see (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022) for a complete discussion. States may find the habitat modifiers useful for communicating more specific species habitat requirements to habitat managers and partners. In particular, the "Features" associated with each Habitat Class can provide important information about niches within habitat types where species can be found during certain life stages. For example, amphibians in forests sometimes require 'logs & woody debris' to provide moist shelter in late summer.

Table 2-1. Habitat classification system derived from the Northeast RSGCN Database. Italicized habitat types are anthropogenic.

Habitat Class	Habitat Types	Recommended Habitat Modifiers (as applicable)
Forested Upland	Forests & Woodlands	Type; Age Class; Fire Dependent; Substrate;
	Agriculture: Plantations/Orchards	
	High Elevation Forests	
Open Upland	Grasslands	Substrate; Fire Dependent; For agriculture: Features (no-till vs. till)
	Shrublands	
	Glades, Barrens & Savannas	
	Agriculture: Cropland/Pastures	
	Alpine	
	Cliff & Talus	
Subterranean	Caves & Karst	Light Zone; Substrate; Soil Moisture Specialist
	Mines & Tunnels	
	Other Subterranean	
Developed	*Developed Areas*	*Density*
Riverine	Big Rivers	Major river basin; Size; Substrate;
	Rivers and Streams	
	Tidal Rivers & Streams	
Lacustrine	Great Lakes	Great Lake; Size; Trophic state
	Lakes & Ponds	
Land-Water Interface	Riparian & Floodplains	Substrate; Tree Density; Salinity; Tidal Zone
	Shorelines	
	Beaches & Dunes	
Palustrine	Non-Tidal Wetlands	Substrate (to include peat); Hydroperiod
	Tidal Wetlands & Flats	
	Vernal Pools	

Estuarine	Estuaries	Substrate; Emergent Vegetation Density; Floating Vegetation Density' Submerged Vegetation Density
Marine	Marine Nearshore	Substrate; Temperature Class;
	Marine Offshore & Oceanic	

Narrative definitions of classes and types are derived and adapted from [NatureServe Biotics 5](#):

1. Forested Upland – Terrestrial habitats characterized by woody vegetation at least 5 m tall with >25% tree canopy cover.
    a. Forests & Woodlands – forested upland that does not have the primary goal of producing products for people. (Trees can be thinned or logged, with wood products sold, as part of a forest management plan.)
    b. Agriculture: Plantations/Orchards – forested upland with the primary goal of producing products for people.
    c. High Elevation Forest – Forested upland generally above 1500 ft (500m) in elevation whose structure is influenced by shallow soils, increased precipitation, and severe weather.
2. Open Upland – Terrestrial habitats characterized by <25% tree cover
    a. Grasslands – habitat dominated by herbaceous vegetation with few, if any, trees
    b. Shrublands – habitat composed of shrubs (many-stemmed woody plants, generally less than 5 m tall)
    c. Glades, Barrens & Savannas – habitat composed of sparse, low, and open vegetation with some tree cover
    d. Agriculture – Cropland/Pastures – cultivated fields, pastures, and hayfields
    e. Alpine – Barren substrate or herbaceous and low shrubby vegetation above mountain timberline
    f. Cliff & Talus – Expanses of bedrock or broken rock generally lacking vascular plants, including vertical or nearly vertical rock outcrops
3. Subterranean – habitats below the soil surface
    a. Caves & Karst – naturally occurring air-filled spaces, ranging in size
    b. Mines & Tunnels – human created air-filled spaces below the natural land surface, whether open to daylight or not
    c. *Other Subterranean – all other habitat uses below the soil surface*
4. Developed – Terrestrial habitats that are dominated by residential, commercial or industrial land uses, including managed open spaces such as parks, gardens, athletic fields, airports, cemeteries and golf courses.
5. Riverine –
    a. Big Rivers – The largest channels, characterized by large perennial flows, large quantities of nutrients and organic matter, high turbidity, and fine sediments. [e.g., Connecticut, Hudson, Delaware, Susquehanna, Potomac, Ohio, St. Lawrence]
    b. Rivers & Streams – Perennial tributaries to big Rivers
    c. Tidal Rivers & Streams – lower reaches of flowing water with brackish water and tidal influence
6. Lacustrine – Perennial bodies of water
    a. Great Lakes – Lake Ontario, Lake Erie, Lake Champlain
    b. Lakes & Ponds – naturally occurring bodies of freshwater

7. Land-water interface – the zone where terrestrial and aquatic habitats meet and interact, with a boundary that shifts in space, over time, and under different weather conditions
    a. Riparian & Floodplains – a zone of habitats directly associated with stream sides that may be periodically flooded
    b. Shorelines – non-beach and dune habitat bordering large waterbodies where vegetation is limited by fluctuating water levels, waves and/or tides
    c. Beaches & Dunes – habitat dominated by sand deposits where wind, tides, and/or waves (current or historical) shape substrate; vegetation is often sparse or absent
8. Palustrine – areas where water either covers the soil or is present at or near the surface of the soil for at least some portion of the year
    a. Non-Tidal Wetlands – wet areas, with or without emergent vegetation.
    b. Tidal Wetlands & Flats – wetlands, with or without emergent vegetation, that are strongly influenced by tidal forces.
    c. Vernal Pools – small depressions in which surface water is present for an extended period of time in the spring but is absent by the end of the season in most years
9. Estuarine
    a. Estuaries – subtidal (continuously submerged) open brackish water, excluding river mouths.
10. Marine – (e.g., Atlantic Ocean)
    a. Marine Nearshore – coastal subtidal marine habitats, extending outward as far as wave action and light penetration to the bottom.
    b. Marine Offshore & Oceanic – pelagic and abyssal zones of open ocean waters

Element 3: Threats

This Element describes the problems adversely affecting species and their habitats. The NAAT 2004 guidelines include five informational components (inset).

Threats come from many different sources, and impacts can be observed at different spatial, temporal, and biological scales. Consequently, the risk of the impacts is wide-ranging, as are actions taken in response. The Northeast Lexicon adopts a comprehensive hierarchical system for classifying and naming threats. A selection of threat characteristics that are important in determining threat risk and appropriate responses facilitates threat and action prioritization.

What's New in 2022?

Element 3 of the 2022 Lexicon takes a similar approach to the 2013 Lexicon, including maintaining the same classification system. However, to acknowledge the role of Element 3 in explaining why species are in decline or habitats are degrading (Elements 1 & 2), and therefore, what to do about it (Element 4), the following changes have been made:

- Four "Needs" in the 2013 Lexicon capturing drivers of administrative actions were removed in favor of a closer adherence to the Conservation Measures Partnership classification systems and an acknowledgement that administrative actions did not require paired administrative threats.
- A third level to the threat classification system, adapted from Quebec's Ministry of Forests, Wildlife, and Parks was adopted to more precisely indicate aspects of threats that can be acted on.
- A revised set of threat characteristics was adopted. Reversibility and Likelihood were not included in 2022. These characteristics were difficult to rate consistently and proved not as useful for understanding threat themes at the regional scale. In part to identify threats that are being amplified by climate change, 'threat trend' is being added as a new characteristic.

Classification System

Foundational to the Northeast Lexicon is the Conservation Measures Partnership threat classification system (Salafsky et al. 2008). This system has been a standard since 2008, with subsequent modest adaptations. It is hierarchical, comprehensive, and intended to document *direct* threats to species and their habitats. It is used by many leading conservation groups

Required Element 3. Descriptions of problems which may adversely affect species identified in the 1st Element or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats.

Suggested sub-Elements (NAAT 2004):

A. The Plan indicates sources of information (e.g., literature, databases, agencies, individuals) used to determine the problems or threats.

B. The threats/problems are described in sufficient detail to develop focused conservation actions.

C. The Plan considers threats/problems, regardless of their origins (local, State, regional, national and international), where relevant to the State's species and habitats.

D. If available information is insufficient to describe threats/problems, research and survey efforts are identified to obtain needed information.

E. The priority research and survey needs, and resulting products, are described sufficiently to allow for the development of research and survey projects after the Plan is approved.

including the International Union for the Conservation of Nature (IUCN), NatureServe, many U.S. states, and Quebec's Ministry of Forests, Wildlife, and Parks. It is considered a SWAP best practice to use a standardized threat classification system (AFWA 2012).

The top tier indicates the broadest categorization of threats. However, to accommodate NAAT guidelines 3D & 3E and acknowledge that in some cases the threat to a species or habitat is not well-understood, the Lexicon recommends using an additional category for Unknown Threats.

1. Residential & Commercial Development
2. Agriculture & Aquaculture
3. Energy Production & Mining
4. Transportation & Service Corridors
5. Biological Resource Use
6. Human Intrusions & Disturbance
7. Natural System Modifications
8. Invasive & Other Problematic Species and Genes
9. Pollution
10. Geological Events
11. Climate Change
12. Unknown Threats

In 2021, Quebec developed a systematic third tier for the CMP threat classification system (Ministere des Forets, de la Faune et des Parcs 2021). This additional level helps explain how threats are impacting species and habitats. Levels 1 & 2 of the threat classification explain what is causing species declines or habitat degradation. Level 3 provides a more precise entry and refined explanation of the threat impact, facilitating the identification of related actions to mitigate the threat. Thus, it also provides an important linkage to Elements 1, 2, & 4 and better addresses NAAT guideline 3B.

Data Framework

Although Element 3 does not require prioritization, understanding the impact of threats and their interactions can be helpful for prioritizing actions.

The threat characteristics (Table 3-1) can help highlight opportunities for species and habitat management or protection. For planning, funding, and reporting needs within a state and at the regional scale, the Lexicon recommends using spatial extent, severity, and immediacy, at a minimum.

Table 3-1. Threat Characteristics and categorical ratings, assessed at the state scale. Characteristics that are needed for the regional SWAP Database are indicated by blue-filled cells and an asterisk.

Threat Characteristic	*Low Impact*	*Moderate Impact*		*High Impact*
*Spatial Extent (Consider impact of threat within 10 years for taxa and 20 years for ecosystems; this is referred to as "threat scope" in NatureServe)	**Small**: (<10%) A small portion of the habitat or population is negatively impacted by the threat.	**Restricted:** (10-30%)	**Large:** (30-70%)	**Pervasive:** (>70%) A large portion of the habitat or population is negatively impacted by the threat.
*Severity (Consider impact of threat within the spatial extent	**Slight:** Degree of ecological change is	**Moderate:** (reduce population by 11-30%)	**Serious:** (reduce	**Extreme:** Likely to destroy or eliminate occurrence or

(above) over the next 10 years for taxa and 20 years for ecosystems)	minor (reduce population 1-10%)		population by 31-70%)	reduce the population by 71-100%.
*Immediacy (This characteristic assesses the time scale over which impacts of the threat will be observable.)	**Long-term:** Effects of the threat are expected in 10-100 years given known ecosystem interactions or compounding threats	**Near-term:** Effects of the threat are expected within the next 1 - 10 years		**Immediate:** Effects of the threat are immediately observable (current or existing)
Threat Trend (Is the impact of the threat lessening with time, stable, or increasing?)	**Past or lessening impact** (Legacy threats) (e.g., Development, dams, with habitat impacts that happened in the past)	**Stable and ongoing impact** (e.g., white nose syndrome, water pollutants, some invasive species)		**Intensifying impact** (e.g., climate change and renewable energy, some invasive species, a new disease)
Certainty (Is the impact of the threat, or response to the threat, well understood?)	**Low Certainty:** threat is poorly understood, data are insufficient, or the response to threat is poorly understood	**Moderate Certainty:** some information describing the threat and ecological responses to it is available, but many questions remain		**High Certainty:** Sufficient information about the threat and ecological responses to it is available

Three database-enabling threat characteristics in Table 3-1 can be used to prioritize actions by identifying the most pervasive, severe, and urgent threats. The Threat Impact Calculation Matrix (Table 3-2) used in the NatureServe Element Rank Estimator (https://www.natureserve.org/products/conservation-rank-calculator, v3.2 third tab "Factors Reference") can be auto calculated from the first two of these threat characteristics.

Table 3-2. Threat Impact Calculation Matrix. Severity and Spatial Extent (also referred to as Scope) can be used in the Threat Impact Calculation Matrix to prioritize threats consistently.

		Spatial Extent (Scope)				
		Pervasive	Large	Restricted	Small	Unknown
Severity	Extreme	Very High	High	Medium	Low	Medium
	Serious	High	High	Medium	Low	Medium
	Moderate	Medium	Medium	Low	Low	Low
	Slight	Low	Low	Low	Low	Low
	Unknown	Medium	Medium	Low	Low	

Element 4: Actions

Conservation actions go beyond habitat stewardship and species management. Efforts to support SGCN and their habitats also include actions to mitigate threats and address data gaps, build legal and governance structures, and educate stakeholders and staff.

Element 4 requires actions to be described and prioritized (inset). A complete description of each action would include who is responsible for the action, what will be done, with what benefits, when and where it will be done, how the desired results will be achieved, how progress will be measured, and why the action is being taken. However, because the scope of Wildlife Action Plans is comprehensive, it is impossible to provide this level of detail for all proposed actions.

Recommendation 4.4 of the 2021 SWAP & Landscape Report asks that SWAPs "Incorporate scalable goals/strategies and priority landscapes from other planning efforts." Improved methods for implementing proven conservation actions at larger scales are explained in *Pathways to Success: Taking Conservation to Scale in Complex Systems* (Salafsky et al. 2021). In this framework, a project is a set of actions taken to achieve agreed-upon outcomes. Salafsky and Margoluis (2021) approach the challenge of "scaling up" by proposing that "programs" or "initiatives" are sets of projects designed to achieve higher-level outcomes. For example, restoring regional landscape connectivity might be considered a regional program and restoring riparian buffers might be considered a state initiative. There may be several projects with different approaches and many activities to achieve the desired goals of restoring landscape connectivity and riparian buffers. The adoption of the CMP Action Classification facilitates these larger scale collaborative initiatives by providing a comprehensive system of conservation actions.

Required Element 4. Descriptions of conservation actions determined to be necessary to conserve the identified species and habitats and priorities for implementing such actions.

Suggested sub-Elements (NAAT 2004):

A. The plan identifies how conservation actions address identified threats to species of greatest conservation need and their habitats

B. The Plan describes conservation actions sufficiently to guide implementation of those actions through the development and execution of specific projects and programs.

C. The Plan links conservation actions to objectives and indicators that will facilitate monitoring and performance measurement of those conservation actions (outlined in Element #5)

D. The Plan describes conservation actions (where relevant to the State's species and habitats) that could be addressed by Federal agencies or regional, national or international partners and shared with other States.

E. If available information is insufficient to describe needed conservation actions, the Plan identifies research or survey needs for obtaining information to develop specific conservation actions.

F. The Plan identifies the relative priority of conservation actions.

What's New in 2022?

Element 4 of the 2022 Lexicon requires a new classification system (the 2013 system is no longer in use), and we have streamlined the action descriptors to emphasize opportunities for regional action analysis.

- The prior Wildlife TRACS classification system used in 2013 was replaced with the more comprehensive and stable system used by the Conservation Measures Partnership and enhanced by Quebec to include important details, particularly in the areas of habitat and species management.

- The list of action descriptions was compressed to represent the most important pieces of information, with a subset needed for the regional SWAP Database.

Definitions

Action – An activity implemented to achieve a conservation objective at a site or within a thematic scope.

Action Classification System

The 2013 Northeast Lexicon essentially adopted the U.S. Fish and Wildlife Service Wildlife Tracking and Reporting Actions for the Conservation of Species (Wildlife TRACS) action classification system, with a few amended categories. Subsequently, since 2013, the Wildlife TRACS system has been completely revised as a grant reporting system for federal funding to measure conservation effort. TRACS retains the top-level headings but abandons a hierarchical structure shifting to focus on outcome measures for specific activities. In contrast, SWAPs provide strategies for effective conservation but do not necessarily detail project plans and outcome measures. Given the need to reconsider action classification systems, for 2022, the Lexicon adopts the more stable and comprehensive framework provided by the Conservation Measures Partnership.

At the highest level the Classification includes the following strategies organized within Level 0 (A, B, and C) and Level 1 (numbered) groups:

A. Target Restoration (Stress Reduction)
1. Land/Water Management (Habitat Actions)
2. Species Management
B. Behavioral Change (Threat Reduction)
3. Awareness Raising
4. Law Enforcement & Prosecution
5. Livelihood, Economic & Moral Incentives
C. Enabling Condition
6. Conservation Designation & Planning
7. Legal & Policy Frameworks
8. Research & Monitoring
9. Education & Training
10. Institutional Development

As currently adopted by the CMP, the approaches outlined under Behavioral Change and Enabling Condition are applicable to SWAPs, but the Level 2 approaches for Target Restoration (species and habitat management) should have more detail, and there is no adopted Level 3. Philippe Lamarre and colleagues at the Quebec Ministry of Forests, Wildlife, and Parks as well as the Canadian Wildlife Service, encountered similar challenges and developed revised Level 2 Approaches, along with a comprehensive set of Level 3 Actions and customized Level 4 Tactics to improve the way the classification works for state and provincial purposes. The Level 4 Tactics may need to be customized for each state, therefore the 2022 Lexicon adopts Levels 0-3 of the Quebec system. Nonetheless, many level 4 tactics will provide a logical and valuable level of detail in SWAPs. For example, for Piping Plovers SWAPs recommend:

- Strategy: Target Restoration (A), Land/Water management (A.1)
  - Approach: Site/Area Stewardship (A.1.1)
    - Action: Visitor Management (A.1.1.11)
      - Tactic: Fencing to limit pedestrian access (A.1.1.11.2).

Unfortunately, when the 2022 Northeast Lexicon was finalized in September 2022, the Quebec revision of the classification was still undergoing review with the Conservation Measures Partnership and some improvements to wording in the English translation are desired. The SWAP Coordinator Subcommittee of the Northeast Fish and Wildlife Diversity Technical Committee will participate in this review and adopt a version within a year. For the purposes of this document, the version available for review in September 2022 is used.

Data Framework

For the regional SWAP Database, all actions should include a name, objective, general strategy, and purpose. Additional descriptors can be selected, as appropriate, to describe actions in a Wildlife Action Plan providing a guide for information that would need to be prepared before action implementation. For action prioritization, the purpose (e.g., identifying target species or habitats and threats), benefits, costs, urgency, longevity of results, and likelihood of success are common factors that are helpful for deriving maximum conservation benefit given limited funding.

Table 4-1. State-level action descriptors. Blue-filled cells (fields with an asterisk) are needed for regional roll-up.

Lexicon Terminology	Content	Explanation
*Action category	Level 3 of the CMP Classification System, wherever possible	Every action should be classified according to the system to facilitate regional synthesis of common actions. States are welcome to use Level 4 if helpful.
*Action	Narrative unique to action	Unique action/species or action/habitat combination
*Objective	A concise statement of the objective of the action	An objective is a specific, measurable, achievable, relevant, and time-bound (S.M.A.R.T) statement that describes the desired short, medium, or long-term outcomes of a conservation action.
*Purpose	A narrative statement identifying Species or Habitats directly benefiting from the action, or threats being reduced by the action	Linking an action to a threat (Element 3) and to the resource that will benefit such as target species (Element 1) or habitats (Element 2) provides a clear explanation of the motivation for the action and begins to reveal the results chain linking the strategy to the threat and the expected ecosystem response to mitigating the threat.
*Partners	Partners can be kinds of land managers (e.g., farmers, private landowners) or specific agencies.	A land owner, organization, or agency responsible for managing the action and/or partners that should be consulted or engaged. For common partners, refer to the provided list of national and regional organizations for consistent names (Appendix D)
*Linked Species	Species linked by database key	Species intended to benefit from the action
*Linked Habitats	Habitats linked by Habitat Type	Habitats intended to benefit from the action
*Linked Threats	Threats linked at Level 3 (or higher level if necessary)	Threats addressed by the action to lessen impacts to species and habitats.
*Urgency	The urgency of the action should estimate the ideal timeframe for completing the action. Categories: • Initiate immediately • Initiate within 5 years • Initiate within 5-10 years	This is a relative estimate of the urgency of the action given the severity of the threats and the priority of the species or habitat

	• Can wait 10 years to initiate	
*Likelihood of Success	To what degree will the action address the threat or improve species' populations or habitats? Categories • Unlikely/Unknown <30% (not tested/implemented anywhere) • Likely 30-90% (e.g., Best Management Practices or sufficient information available) • Certain/Very Likely 90-100% (demonstrated by other projects)	
*Duration	How long will action take to complete (or need to persist)? • <2 years • 2-10 years • Regular maintenance (>10 years	
Likelihood of Implementation	Can the action be implemented: Categories • Unlikely/Unknown (<30%) • Likely (30-90%) • Certain/Very Likely (90-100%)	
Benefits	Depending on the action, benefits (direct or indirect) may be habitat improvements, species' responses, reductions in threat risk, or public or stakeholder benefits.	These answers will likely be suggested by defining what the action is and why it is being taken. However, efforts to prioritize actions will probably require specific benefits to be considered. Answering this question clearly may also help define the measures of project success. It may be helpful to explain the direct benefits and contrast them with the indirect benefits.
Estimated Costs	This should include total future costs in current dollar values, but not include any past expenses for infrastructure that will be used by proposed action. Categories: • Unknown • < $20,000 • $20,000 - $99,999 • $100,000 - $499,999 • > $500,000	If action descriptions are intended to be used for action prioritization, cost estimates, even very rough ones, may be helpful. Estimates are available from business plans, Joint Ventures, and Partners in Flight. For prioritization purposes, states may choose to calculate cost/acre treated or cost/species to compensate for the fact that multi-species projects may be more expensive than single species projects. A very detailed process for action prioritization is described and evaluated in "Optimal Allocation of Resources among Threatened Species: a Project Prioritization Protocol" (Joseph et al. 2009). States may add subcategories as needed but should avoid using the unknown category if possible.

Constraints/ Other factors	Describe constraints	For example: Agency Authority, Regulations or Administrative, Environmental (risks to other habitats/SGCN), or Funding resources, Staff capacity
Performance Metric	From Wildlife TRACS or other more specific sources	The performance metric is how success is measured and defined.
Location	Most states will use counties or watersheds which is consistent with Wildlife TRACS. However, some states are using TNC ecoregions or physiographic provinces.	Although County and Watershed are the most common spatial units being used by states for SWAPs and are the units endorsed by Wildlife TRACS, some actions will require more specific location information and others may be more appropriately tied to ecoregions or physiography. Aside from the habitat type, descriptions of where actions take place may include specific locations around the state, specific sites within a smaller locale, or any other geographical designation appropriate to the action. If the action requires monitoring, this description may complement the use of a standard protocol by defining the sampling strategy in a spatial context.

Element 5: Monitoring, Effectiveness, and Adaptive Management

Element 5 covers a range of measurement needs, with consistency across the Northeastern states potentially facilitating regional initiatives.

Increasing regional data sharing capacity and minimizing duplicity in developing monitoring plans is a core premise of how this Element is addressed in the Lexicon. Monitoring plans should be consistently detailed and shared within the region as much as possible. Three distinct purposes for monitoring (1-assessing project results, 2-measuring population status and trends, and 3-describing habitat quality) called for in Elements 1, 2, and 4 suggest unique formats. Status assessments of species or habitats are referred to as 'surveys': 'research' includes monitoring to understand links between species, their habitats, and threats impacting both; and assessing the results of 'actions' implies a more dynamic situation resulting from implementing a project to mitigate a threat, improve habitat, or otherwise support a Species of Greatest Conservation Need. Adaptive management is critical to ensuring efficiency and efficacy, but there is no need for regional consistency in adaptive management systems. States design the most efficient approach to meet their needs.

What's New in 2022?

Building on the 2013 Lexicon, the 2022 Lexicon suggests change over time in the NatureServe Threat Impact Score as a measure of conservation effectiveness that could be used at multiple scales. This could be used in the absence of measures of species population response to conservation action.

The Lexicon Steering Committee discussed other expansions to better support regional assessment of conservation progress. We considered data fields that, if tracked consistently across states, could be used to measure progress toward some common conservation goals, such as riparian restoration. However, the committee concluded that the complexity of determining consistency for these measures is beyond the scope of the Lexicon.

Species and Habitat Monitoring

Region-wide use of standard protocols facilitates data-sharing and makes possible an assessment of population status and trend throughout the region. An updated list of standard protocols and cross-jurisdictional monitoring programs is available in the 2023 Northeast Regional Conservation Synthesis and

Required Element 5. Descriptions of the proposed plans for monitoring species identified in 1st Element and their habitats, for monitoring the effectiveness of the conservation actions proposed in the 4th Element, and for adapting these conservation actions to respond appropriately to new information or changing conditions.

Suggested components:

A. The Plan describes plans for monitoring species identified in Element 1, and their habitats.
B. The Plan describes how the outcomes of the conservation actions will be monitored.
C. If monitoring is not identified for a species or species group, the Plan explains why it is not appropriate, necessary or possible.
D. Monitoring is to be accomplished at one of several levels including individual species, guilds, or natural communities.
E. The monitoring utilizes or builds on existing monitoring and survey systems or explains how information will be obtained to determine the effectiveness of conservation actions.

the Northeast RSGCN Database (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee in prep. and Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022).

Effectiveness of Conservation Actions

Much work toward better monitoring and performance reporting has been done. (In particular, see "Monitoring the Conservation of Fish and Wildlife in the Northeast (Foundations of Success 2008).) Monitoring plans aiming to assess project results should follow Association of Fish and Wildlife Agencies guidance in "Measuring the Effectiveness of State Wildlife Grants" (Association of Fish and Wildlife Agencies 2011). Several effectiveness measures may be identified to assess intermediate results, especially for actions with anticipated long-term results.

Measures of success should be (Association of Fish and Wildlife Agencies 2011) (pg. 9):

- Linked – tied to key factors in the theory of change laid out in the results chain
- Measurable – in either quantitative or qualitative terms
- Precise – defined the same way by all agencies
- Consistent – unlikely to change over time
- Sensitive – changing proportionately in response to actual changes in the condition or item being measured
- Overarching – available to be measured at various points through the life of a project
- Achievable – not onerous for states or their partners to support.

While the goal of SWAPs is to recover or maintain populations of SGCN, it can be difficult to measure a response in the short term. Response times can be 5-10 years or more. In contrast, most grant reporting includes quantitative measure of the action taken (e.g., acres burned) within the grant period – an immediate measure of conservation, but not necessarily indicative of effectiveness.

An intermediate approach might be to reassess the threat impact calculation (see Element 3) to document reduced threats which would indicate actions with the desired effect. A strategic pathway illustrates the theory of change - the expectation that an action will reduce the impact of a threat resulting in the desired outcomes (Salafsky et al. 2021). This framework is premised on the definition of a theory of change linking the action with intermediate results, threat reduction, and the conservation target outcomes.

References

Articles are available on the NE SWAP Coordinators SharePoint, under the 2022 Northeast Lexicon Project Folder.

Albright W et al. 2021. Connectivity and Climate Change Toolkit. Page 56. Association of Fish and Wildlife Agencies, Washington, DC.

Alexander J. 2016. The Utah Native Plant Society Rare Plant List: Version 2. Calochortiana **3**:248.

Association of Fish and Wildlife Agencies. 2011. Measuring the Effectiveness of State Wildlife Grants: Final Report. Association of Fish and Wildlife Agencies.

Association of Fish and Wildlife Agencies. 2012. Best Practices for State Wildlife Action Plans -- Voluntary Guidance to States for Revision and Implementation. Page 80. Association of Fish and Wildlife Agencies, Washington, DC.

Association of Fish and Wildlife Agencies. 2021. Leading At-risk Fish and Wildlife Conservation: A Framework to Enhance Landscape-Scale and Cross-Boundary Conservation through Coordinated State Wildlife Action Plans. Page 29. A report from the AFWA State Wildlife Action Plan and Landscape Conservation Work Group to the AFWA Wildlife Diversity Conservation and Funding Committee, Washington, DC.

Association of Fish and Wildlife Agencies. 2022. Voluntary Guidance for States to Incorporate Climate Change Adaptation in State Wildlife Action Plans and Other Management Plans. Association of Fish and Wildlife Agencies, Washington, DC.

Carter SK, Maxted SS, Bergeson TLE, Helmers DP, Scott L, Radeloff VC. 2019. Assessing vulnerability and threat from housing development to Conservation Opportunity Areas in State Wildlife Action Plans across the United States. Landscape and Urban Planning **185**:237–245.

Faucheux NMH, Craig CA, Bonner TH. 2019. Rapid Assessment for Identifying Species of Greatest Conservation Need: Towards a Unified Approach. Fisheries **44**:488–497.

Foden WB et al. 2019. Climate change vulnerability assessment of species. WIREs Climate Change **10**:e551.

Foundations of Success. 2008. Monitoring the Conservation of Fish and Wildlife in the Northeast. Page 50. A Report on the Monitoring and Performance Reporting Framework for the Northeast Association of Fish and Wildlife Agencies. Foundations of Success.

Frances A. 2017. Prioritization and Conservation Status of Rare Plants in the North Atlantic. Page 28. Final Report. NatureServe, Washington, DC.

Joseph LN, Maloney RF, Possingham HP. 2009. Optimal allocation of resources among threatened species: a project prioritization protocol. Conservation biology **23**:328–338.

Ministere des Forets, de la Faune et des Parcs. 2021. Standardized Classification of Threats to Biodiversity – Definitions for Quebec's Conservation Data Centre (CDC) v. 1.0. Page 35. Gouvernement du Quebec, Quebec.

National Advisory Acceptance Team. 2004. Review Reference Guide for Members.

Pub. L. No. 106-553. 2000. Page 114 Stat. 2762A-118–124 Appendix B–H.R. 5548. Available from https://www.govinfo.gov/content/pkg/PLAW-106publ553/pdf/PLAW-106publ553.pdf (accessed June 22, 2022).

Salafsky N et al. 2008. A Standard Lexicon for Biodiversity Conservation: Unified Classifications of Threats and Actions. Conservation Biology **22**:897–911.

Salafsky N, Margoluis R, Foundations of Success. 2021. Pathways to Success: Taking Conservation to Scale in Complex Systems. Island Press, Washington.

Terwilliger Consulting Inc., Northeast Fish and Wildlife Diversity Technical Committee. 2022. Northeast Regional Species of Greatest Conservation Need: September 2022 Update. Prepared by Terwilliger Consulting, Inc. for the Northeast Fish and Wildlife Diversity Technical Committee of the Northeast Associaiton of Fish and Wildlife Agencies, Washington, DC.

Terwilliger Consulting Inc., Northeast Fish and Wildlife Diversity Technical Committee. in prep. 2023 Northeast Regional Conservation Synthesis. A report submitted to the Northeast Fish and Wildlife Diversity Technical Committee of the Northeast Association of Fish and Wildlife Agencies, Washington, DC.

U.S. Department of the Interior, U.S. Department of Agriculture, U.S. Department of Commerce, Council on Environmental Quality. 2021. Conserving and Restoring America the Beautiful. Available from https://www.doi.gov/sites/doi.gov/files/report-conserving-and-restoring-america-the-beautiful-2021.pdf.

USFWS, AFWA. 2017, December 5. Guidance for Wildlife Action Plan Review and Revision.

USGS, Smithsonian Institution. (n.d.). Integrated Taxonomic Information System: Biological Names. Washington, DC. Available from itis.gov.

Young BE, Byers E, Hammerson G, Frances A, Oliver L, Treher A. 2016. Guidelines for Using the NatureServe Climate Change Vulnerability Index; Release 3.02. Page 65. NatureServe, Arlington, VA.

Appendix A: External resources related to the Lexicon

The Conservation Measures Partnership

(https://www.conservationmeasures.org/)

The Conservation Measures Partnership (CMP) is a community of conservation-oriented NGOs, government agencies, funders, and private businesses that work collectively to guide conservation around the world. As stewards of the Conservation Standards, we seek better ways to design, manage, and measure the impacts of conservation action.

Northeast SWAP and RSGCN Databases

The databases are available, and the NE RSGCN will be updated by December 2022, on the Northeast Association of Fish and Wildlife Agency website: https://www.neafwa.org/swap-database.html or on the Northeast Fish and Wildlife Diversity Technical Committee Website at https://www.northeastwildlifediversity.org/

Conservation Evidence

(https://www.conservationevidence.com/)

"We summarize the documented evidence for the effectiveness of conservation actions. This resource is designed to support anyone making decisions about how to maintain and restore biodiversity."

Wildlife TRACS

(https://tracs.fws.gov/login)

Wildlife TRACS is the system for tracking federal grants for conservation through the USFWS.

Forest Action Plans

2020 Summary Report (Northeast/Midwest)

https://www.fs.usda.gov/detail/r9/communityforests/?cid=FSEPRD1000829

Conservation Words that Work

The Wildlife Management Institute and Responsive Management: Conservation Words That Work: Determining How to Engage the American Public Through the Language of Conservation

Additional valuable references not cited above:

Element 1

Stephenson PJ, Stengel C. 2020. An inventory of biodiversity data sources for conservation monitoring. PLOS ONE **15**:e0242923. Public Library of Science.

Element 4

Buxton RT, Avery-Gomm S, Lin H-Y, Smith PA, Cooke SJ, Bennett JR. 2020. Half of resources in threatened species conservation plans are allocated to research and monitoring. Nature Communications **11**:4668.

Morgan JJ, Rhoden CM, White B, Riley SP. 2019. A state assessment of private lands wildlife conservation in the United States. Wildlife Society Bulletin **43**:328–337.

Element 5

Guerrero AM, Wilson KA. 2017. Using a social–ecological framework to inform the implementation of conservation plans. Conservation Biology **31**:290–301.

Keeley ATH, Beier P, Creech T, Jones K, Jongman RH, Stonecipher G, Tabor GM. 2019. Thirty years of connectivity conservation planning: an assessment of factors influencing plan implementation. Environmental Research Letters **14**:103001. IOP Publishing.

Appendix B: Informal Taxonomy

Taxon and Subtaxon, informal taxonomy used in Northeast SWAP Database (Donovan Drummey, pers. comm.)

Taxon	Subtaxon
Amphibian	Frogs and Toads
Amphibian	Salamanders
Bird	Landbirds
Bird	Raptors
Bird	Shorebirds
Bird	Upland Game Birds
Bird	Waterbirds
Bird	Waterfowl
Crustacean	Amphipods, Copepods, and Isopods
Crustacean	Crayfishes
Crustacean	Fairy, Clam, and Tadpole Shrimp
Fish	Diadromous Fish
Fish	Freshwater Fish
Fish	Marine Fish
Freshwater Invertebrate	Bryozoans
Freshwater Invertebrate	Corals and Anemones
Freshwater Invertebrate	Flatworms
Freshwater Invertebrate	Hydrozoans and Jellyfish
Freshwater Invertebrate	Sponges
Freshwater Invertebrate	Worms, Leeches, and other Annelids
Fungi	Fungi
Insect:Coleoptera	Fireflies
Insect:Coleoptera	Ladybird Beetles
Insect:Coleoptera	Other Beetles
Insect:Coleoptera	Tiger Beetles
Insect:Diptera	Hover Flies
Insect:Diptera	Other Flies
Insect:EPT	Caddisflies
Insect:EPT	Mayflies
Insect:EPT	Stoneflies
Insect:Hymenoptera	Ants
Insect:Hymenoptera	Bumble Bees
Insect:Hymenoptera	Sawflies, Horntails, and Allies
Insect:Hymenoptera	Solitary Bees
Insect:Hymenoptera	Wasps
Insect:Lepidoptera	Butterflies and Skippers
Insect:Lepidoptera	Moths
Insect:Odonata	Dragonflies and Damselflies
Insect:Other	Grasshoppers, Katydids, and Crickets
Insect:Other	Other Insects
Mammal	Bats
Mammal	Marine Mammals
Mammal	Other Mammals
Mammal	Rabbits and Hares
Mammal	Small Mammals:Moles and Shrews
Mammal	Small Mammals:Rodentia
Mammal	Ungulates

Marine Invertebrate	Brachiopods
Marine Invertebrate	Bryozoans
Marine Invertebrate	Cephalopods
Marine Invertebrate	Chitons
Marine Invertebrate	Corals and Anemones
Marine Invertebrate	Horseshoe Crabs
Marine Invertebrate	Hydrozoans and Jellyfish
Marine Invertebrate	Marine Bivalves
Marine Invertebrate	Marine Crustaceans
Marine Invertebrate	Marine Snails
Marine Invertebrate	Sea Cucumbers
Marine Invertebrate	Sea Urchins
Marine Invertebrate	Sponges
Marine Invertebrate	Starfish and Brittle Stars
Marine Invertebrate	Tunicates
Marine Invertebrate	Worms, Leeches, and other Annelids
Mollusc	Freshwater Bivalves
Mollusc	Freshwater Snails
Mollusc	Terrestrial Snails
Plant	Angiosperms
Plant	Clubmosses
Plant	Ferns and Allies
Plant	Gymnosperms
Plant	Horsetails
Plant	Hornworts
Plant	Liverworts
Plant	Mosses
Reptile	Crocodilians
Reptile	Lizards
Reptile	Sea Turtles
Reptile	Snakes
Reptile	Turtles
Terrestrial Invertebrate	Diplurans, Springtails, and Proturans
Terrestrial Invertebrate	Millepedes and Centipedes
Terrestrial Invertebrate	Scorpions and Pseudoscorpions
Terrestrial Invertebrate	Spiders and Harvestmen
Terrestrial Invertebrate	Ticks and Mites
Terrestrial Invertebrate	Worms, Leeches, and other Annelids

Appendix C: Habitat Modifiers

The modifiers from the Northeast RSGCN Database, presented below, may be useful in providing greater detail for habitats described in SWAPs (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022).

'Unknown' indicates the species is data deficient in terms of its habitat preferences, 'NA' indicates the modifier does not apply to the species. 'Features', at the bottom of each list, is provided as a set of check boxes. Most modifiers are customized for the habitat class, but all habitat classes have 'Features' and 'Substrate' with selections customized for each habitat type. Some modifiers may be useful in developing a 3rd level in the habitat classification system defined above (as in forest type: deciduous, coniferous, mixed), but others are more useful in specifying the exact habitat condition requirements for a SGCN.

Here are some examples of habitat modifiers that might be assigned to SGCN:

- Hellbender (Riverine)
  - Size: Medium River
  - Associated Upland Habitat: forested
  - Gradient: high
  - Oxygen content: high
  - Substrate: slabrock, gravel
- Red Knot (Land-Water Interface)
  - Life Stage: feeding, migratory stopover
  - Salinity: marine, brackish
  - Substrate: soft
  - Tidal Zone: intertidal/supratidal
  - Features: beach, sand flats and emergent shoals
- Persius Duskywing (Open Upland)
  - Tree Density: sparse
  - Substrate: Sand
  - Soil Moisture: Xeric
  - Fire Regime: 0-5 yr

Forested Upland Habitat Class [Forests; Agriculture: Plantations/Orchards; High Elevation Forests]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Type [deciduous, coniferous, mixed, unknown, NA]
C. Age Class [young forest, mature forest, old growth, not a specialist, unknown, NA]
D. Substrate [clay, silt, sand, organic, rocky, unknown, NA]
E. Soil Moisture Specialist [xeric, mesic, hydric, not a moisture specialist, unknown, NA]
F. Understory Vegetation Density [absent (0%), sparse (1-10%), low (10-25%), moderate (25-60%), high (60-100%), not specialist, unknown, NA]
G. Midstory Vegetation Density [absent (0%), sparse (1-10%), low (10-25%), moderate (25-60%), high (60-100%), not specialist, unknown, NA]
H. Overstory Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]

I. Fire Dependent [checkbox]
J. Features / Formations [snags, logs & woody debris, surface litter, outcrops & epikarst, edge habitat, interior habitat, burrows, rights-of-way, artificial structures, abandoned buildings, occupied buildings]

Open Upland Habitat Class [Grasslands; Shrublands; Glades, Barrens & Savannas; Agricultural: Cropland/Pastures; Alpine; Cliff & Talus]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Substrate [clay, silt, sand, organic, rocky, unknown, NA]
C. Soil Moisture Specialist [xeric, mesic, hydric, not a moisture specialist, unknown, NA]
D. Fire Dependent [checkbox]
E. Grass/Forb Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
F. Shrub Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
G. Tree Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
H. Features / Formations [balds, snags, logs & woody debris, surface litter, outcrops & epikarst, burrows, rights-of-way, airports / airfields, no till agriculture, till agriculture, artificial structures, abandoned buildings, occupied buildings]

Subterranean Habitat Class [Subterranean Areas]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Zone [entry, twilight, dark, multiple, unknown, NA]
C. Soil Moisture Specialist [xeric, mesic, hydric, not a moisture specialist, unknown, NA]
D. Substrate [clay, silt, sand, organic, rocky, unknown, NA]
E. Features / Formations [surface litter, mines/tunnels, caves, cave pools, cave streams, wells, cave springs/seeps, logs & woody debris, active quarry / pit, inactive quarry / pit]

Developed Habitat Class [Developed Areas]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Density [high, moderate, low, multiple, unknown, NA]
C. Features / Formations [abandoned buildings, occupied buildings, urban/suburban gardens, artificial structures, drainage features, managed open space, bridges, airports & airfields, burrows, snags]

Riverine Habitat Class [Big Rivers; Rivers & Streams; Tidal Rivers & Streams]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Major River Basin [Connecticut, Hudson, Delaware, Susquehanna, Potomac, Ohio, St. Lawrence, NA]
C. Size [headwater, streams, small-medium rivers, large rivers-mainstems, Big Rivers, multiple, unknown, NA]
D. Associated Upland Habitat [forest, grassland, shrubland, developed, multiple, unknown, NA]
E. Temperature Class [warm (>21° C), cold (<21° C), not specialized, unknown, NA]
F. Oxygen Level [low, mixed, high, not specialized, unknown, NA]
G. pH [alkaline, mixed, acidic, not specialized, unknown, NA]
H. Substrate [clay, silt, sand, gravel, cobble, boulder/slabrock, bedrock, organic, multiple, unknown, NA]

I. Emergent Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
J. Floating Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
K. Submerged Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
L. Gradient [low, moderate, high/steep, not specialized, unknown, NA]
M. Features / Formations [headwaters, logs & woody debris, surface litter, riffles, pools, slackwater, oxbow, benthic, gravel & sand bars, aerial, artificial structures, burrows]

Lacustrine Habitat Class [Great Lakes; Lakes & Ponds]
A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Great Lake [Erie, Ontario, Champlain, unknown, NA]
C. Size [pond, lake, Great Lake, not size specialist, unknown, NA]
D. Associated Upland Habitat [forest, grassland, shrubland, developed, multiple, unknown, NA]
E. Temperature Class [warm, cold, not specialized, unknown, NA]
F. Substrate [clay, silt, sand, gravel, cobble, boulder/slabrock, bedrock, organic, multiple, unknown, NA]
G. Emergent Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
H. Floating Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
I. Submerged Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
J. Trophic State [eutrophic, mesotrophic, oligotrophic, not specialized, unknown, NA]
K. Features / Formations [salt ponds, logs & woody debris, surface litter, low fetch, deep water, benthic, impoundments & reservoirs, reefs & live rock, gravel & sand bars, artificial structures, aerial, burrows]

Palustrine Habitat Class [Non-Tidal Wetlands, Tidal Wetlands & Flats]
A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Substrate [hard, mixed, soft, multiple, unknown, NA]
C. Temperature Class [warm, cold, not a temperature specialist, unknown, NA]
D. Fire Dependent [checkbox]
E. Hydroperiod [ephemeral, seasonal, semipermanent, permanent, tidal, multiple, unknown, NA]
F. Emergent Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
G. Floating Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
H. Submerged Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
I. Grass/Forb Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
J. Shrub Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
K. Tree Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
L. Features / Formations [vernal pools, springs/seeps, tidal freshwater marsh, logs & woody debris, wrack, surface litter, reefs & live rock, ditched & drained, diked/impounded, artificial wetlands & drainage, aerial, burrows, shoals, shellfish beds, artificial structures, tidal pools]

Land-Water Interface Habitat Class [Shorelines; Beaches & Dunes; Riparian & Floodplains]
A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Salinity [freshwater, brackish, marine, unknown, NA]
C. Tidal Zone [supratidal, intertidal, subtidal, multiple, unknown, NA]

D. Substrate [sand, clay, organic, rocky, unknown, NA]
E. Emergent Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
F. Floating Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
G. Submerged Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
H. Grass/Forb Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
I. Shrub Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
J. Tree Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
K. Features / Formations [tidal pools, rocky shore, cliffs/bluffs, overwash fans/flats, wrack, burrows, sand & mud flats, artificial structures, snags]

Estuarine Habitat Class [Estuaries]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Substrate [hard, mixed, soft, multiple, unknown, NA]
C. Emergent Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
D. Floating Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
E. Submerged Vegetation Density [absent, sparse, low, moderate, high, not specialist, unknown, NA]
F. Features / Formations [shoals, gravel & sand bars, shellfish beds, reefs & live rock, tidal pools, artificial structures, benthic, aerial, burrows]

Marine Habitat Class [Marine Nearshore; Marine Offshore & Oceanic]

A. Life Stage [breeding, rearing / development of young, feeding, wintering or hibernation, migration stopover]
B. Substrate [hard, mixed, soft, multiple, unknown, NA]
C. Temperature Class [warm, cold, not a temperature specialist, unknown, NA]
D. Features / Formations [SAV, Ocean Banks, shellfish beds, reefs & live rock, Sargasso Sea, artificial structures, deep water, benthic, aerial, gravel & sand bars, burrows]

Appendix D: Common partners, names and abbreviations

List of Common National and Regional Conservation Partners, full names and acronyms.

Federal and National

ACJV	Atlantic Coast Joint Venture
AFS	American Fisheries Society
AFSI	Atlantic Flyway Shorebird Initiative
AFWA	Association of Fish and Wildlife Agencies
DoD	Department of Defense
NRCS	National Resource Conservation Service
NOAA	National Oceanic and Atmospheric Administration
DOE	Department of Energy
DOI	Department of the Interior
DOT	Department of Transportation
EBTJV	Eastern Brook Trout Joint Venture
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
NFWF	National Fish and Wildlife Foundation
NWF	National Wildlife Federation
TNC	The Nature Conservancy
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
USNPS	United States National Park Service
Xerces	Xerces Society

Regional

GLRI	Great Lakes Restoration Initiative
MAFMC	Mid-Atlantic Fisheries Management Council
MAFWA	Midwest Association of Fish and Wildlife Agencies
MAISC	Mid-Atlantic Invasive Species Council
NEAFWA	Northeast Association of Fish and Wildlife Agencies
NECASC	Northeast Climate Adaptation Science Center
NEFWDTC	Northeast Fish and Wildlife Diversity Technical Committee
NEPARC	Northeast Partners in Amphibian and Reptile Conservation
RCN	Regional Conservation Needs
SCI	Staying Connected Initiative