New England Cottontail

Sylvilagus transitionalis

Federal Listing	N/A
State Listing	E
Global Rank	
State Rank	S1
Regional Status	Very High

Photo by NHFG

Justification (Reason for Concern in NH)

Since 1960, the distribution and abundance of NEC has declined substantially throughout New England (Johnston 1972, Jackson 1973, Litvaitis 1993). See section 1.4. NEC was identified as a 'candidate' species for federal listing in 2006 by the USFWS. In September 2015 the USFWS determined NEC was not warranted for federal listing due to the conservation measures effectively being implemented for its recovery.

Distribution

Decline of NEC was estimated at ~14% of historic range in Litvaitis et al. 2006.   This included substantial decline within the occupied portions of NH, with only eastern cottontails and snowshoe hares found in the western portion of the state.   Probably the most important disturbance that influenced the abundance of NEC was the clearing of forests for agriculture by European settlers and subsequent abandonment of these lands (Ahn et al. 2002, Hall et al. 2002). Cleared lands were abruptly abandoned in the mid-1800s for more productive farms in the midwestern United States. Many of these tracts reverted to second-growth forests (Irland 1982), and NEC and other early-successional forest species reached unprecedented levels of abundance throughout the northeastern United States in the early 1900s (DeGraaf and Miller 1996, Foster et al. 2002, Litvaitis et al. 2005b). Litvaitis (1993) used information on the rate of farmland abandonment and developed a simple model of forest succession to estimate the approximate recruitment of early-successional habitats. Most of the abandoned lands matured into closed-canopy forests by 1960 and species dependent on these habitats quickly declined, including NEC. If populations of NEC stabilized at reduced densities reached in the 1960s, conservation actions probably would not be needed. However, early- successional habitats in the northeastern United States continue to decline (Brooks 2003) and remaining populations of NEC in New Hampshire and elsewhere are vulnerable to extinction (Litvaitis and Villafuerte 1996).
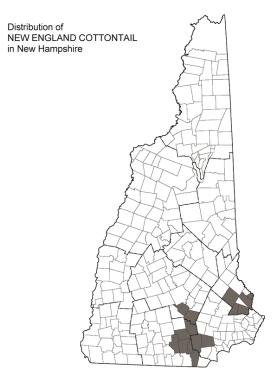
Habitat

New England cottontails (hereafter referred to as 'NEC') occupy a variety of habitats including native shrublands and regenerating forests associated with small-scale disturbances that result from beavers (*Castor canadensis*), local windstorms, and human land uses. Less frequent but larger-scale disturbances (including hurricanes and wild fires) also provide early-successional habitats, especially near the Atlantic coast (Lorimer and White 2003). Habitats of NEC are described by vegetation structure (especially height and density) rather than specific plant communities (Eabry 1968).
The most consistent characteristic of NEC habitat is dense understory cover (Fay and Chandler 1955, Eabry 1968, Linkkila 1971). Coniferous stems provide NEC with approximately 3 times the visual

obstruction of deciduous stems in winter (Litvaitis et al. 1985). NEC prefer sites with more than 50,000 stem-cover units/ha and are reluctant to venture more than 5 m from cover (Barbour and Litvaitis 1993). In regenerating stands or idle agricultural fields, NEC colonize after secondary succession has progressed and a woody understory is well developed (approximately 5 to 7 years). As the stand matures and young trees develop a closed canopy (approximately 20 to 25 years after disturbance), understory vegetation becomes sparse and the site is no longer suitable for NEC.

NH Wildlife Action Plan Habitats

● Shrublands

Distribution of
NEW ENGLAND COTTONTAIL
in New Hampshire

Distribution Map

Current Species and Habitat Condition in New Hampshire

Remaining populations of NEC in New Hampshire span a modest portion of the region that was occupied historically, including the Seacoast and Merrimack River Valley.

Population Management Status

Focus areas for management efforts were identified within the state as part of the Conservation Strategy for the New England Cottontail (Fuller and Tur 2012). Habitat management and population goals for the species were identified for each focus area, and targeted actions to accomplish these goals. Since 2009 over 950 acres have been managed for the species on public and private lands within the focus areas. In addition, a regional captive breeding program was initiated in 2011 and augmentation began in 2013.

Regulatory Protection (for explanations, see Appendix I)

● Federal Endangered Species Act - under consideration

Quality of Habitat

There are currently five known locations occupied by NEC in the Merrimack Valley (1) and Seacoast (4) regions of the state. These locations are not connected, and are comprised of 1 – >10 patches. Patches range from 2 – 20 acres in size and vary from year to year in occupancy. Smaller patches are dependent on the colonization of surplus rabbits from larger patches of habitat (Litvaitis and Villafuerte 1996). Currently there are no eastern cottontails documented as living sympatrically with NEC in the state, although eastern cottontails have been detected ~6km from known occupied NEC sites in the Merrimack Valley, and much closer in the Seacoast region separated by rivers and bays.

Habitat Protection Status

70% of habitat management projects implemented from 2008- 2014 were on conservation land including easement and fee owned parcels. Four out of the five occupied locations have protection of key habitat patches.

Habitat Management Status

Over 60 habitat management projects have been implemented to improve habitat for NEC in the state. An NEC Land Management Team comprised of partners from NRCS, NHFG, USFWS, and UNHCE meet 4-8 times a year to discuss potential projects, evaluate follow-up up action on previously managed parcels and identify funding. The team will continue to work towards the goals identified for the focus areas which currently include 2000 acres by 2030.

Threats to this Species or Habitat in NH

Threat rankings were calculated by groups of taxonomic or habitat experts using a multistep process (details in Chapter 4). Each threat was ranked for these factors: Spatial Extent, Severity, Immediacy, Certainty, and Reversibility (ability to address the threat). These combined scores produced one overall threat score. Only threats that received a "medium" or "high" score have accompanying text in this profile. Threats that have a low spatial extent, are unlikely to occur in the next ten years, or there is uncertainty in the data will be ranked lower due to these factors.

Habitat conversion due to development (Threat Rank: High)

Housing and commercial development permanently reduce available habitat and restoration potential.

The seacoast and Merrimack River valley are some of the most highly developed areas in NH. Some of the remaining large parcels are situated in commercial development zones, increasing the economic value of the land and challenges with implementing conservation.

Habitat degradation from less large scale timber harvesting and resulting patches of young forest (Threat Rank: High)

Natural forest maturation with associated land-use change.

Decline in successional habitat and associated species over the past 100 years (Litvaitis 1993).

Species impacts and mortality from subsidized or introduced predators (Threat Rank: Medium)

Predation is a natural source of mortality for rabbits. Increased predator density due to anthropogenic factors may alter the rate of mortality beyond what the local population can sustain. Lack of habitat also exacerbates the likelihood of predators.

Appendix A: Mammals

Oehler and Litvaitis (1996) study found coyotes and foxes increased in abundance as forest cover decreased and agricultural lands increased.

List of Lower Ranking Threats:

Mortality from various diseases (tularemia)

Species impacts from introduced or invasive animals (eastern cottontails)

Habitat degradation from a lack of natural disturbance including beaver flooding, hurricanes, and fire

Actions to benefit this Species or Habitat in NH

Create early-successional habitat networks in landscapes currently occupied by NEC.

Primary Threat Addressed: Habitat degradation from a lack of natural disturbance including beaver flooding, hurricanes, and fire

Specific Threat (IUCN Threat Levels): Natural system modifications

Objective:

General Strategy:
Collaborate with conservation partners, private landowners, municipalities, state and federal agencies to create or manage early-successional habitat in a reserve design that would support the persistence of NEC on the landscape. Management could include timber harvest, brontosaurus mowing, seeding and planting of native shrubs or prescribed burning.

Political Location:	Watershed Location:
Hillsborough County, Strafford County	Merrimack Watershed, Coastal Watershed

Monitor distribution and trend of NEC in New Hampshire.

Objective:

General Strategy:
Coordinate with the regional effort to develop a monitoring protocol to track the distribution and trend of NEC over time. This protocol will need further adaptation to work at a more local scale within the state.

Political Location: **Watershed Location:**

Monitor eastern cottontail distribution and determine status.

Primary Threat Addressed: Species impacts from introduced or invasive animals (eastern cottontails)

Specific Threat (IUCN Threat Levels): Invasive & other problematic species, genes & diseases

Objective:

General Strategy:

Currently there are no known sympatric populations of the eastern cottontail and NEC in NH. Monitor the range of eastern cottontail to determine if they are moving into focus areas where habitat management is occurring. Determine number and distribution of eastern cottontail in the occupied landscape. Evaluate the feasibility to trap and remove eastern cottontail from suitable habitat in areas currently not occupied with NEC.

Political Location:	**Watershed Location:**
Hillsborough County, Strafford County	Merrimack Watershed, Coastal Watershed

Coordinate with utility companies to manage rights-of-way

Primary Threat Addressed: Habitat degradation from a lack of natural disturbance including beaver flooding, hurricanes, and fire

Specific Threat (IUCN Threat Levels): Natural system modifications

Objective:

General Strategy:

Utility rights-of-way have the potential to facilitate cottontail movement among patches (Fenderson et al. 2014). Altering the management prescription of mowing all vegetation within the boundary every 3-4 years to a selective removal of tree species could enhance the available habitat and ensure its persistence on the landscape annually.

Political Location:	**Watershed Location:**
Hillsborough County, Strafford County	Merrimack Watershed, Coastal Watershed

Conserve core areas for long-term persistence of the species.

Primary Threat Addressed: Habitat conversion due to development

Specific Threat (IUCN Threat Levels): Residential & commercial development

Objective:

General Strategy:

Since the habitat for the species in NH is primarily ephemeral in nature, it is important to have large core patches protected within the species range. Protection will provide security and long-term management authority to ensure high quality habitat is present.

Political Location:	**Watershed Location:**
Hillsborough County, Strafford County	Merrimack Watershed, Coastal Watershed

Captive breeding and augmentation of NEC.

Primary Threat Addressed: Habitat degradation from a lack of natural disturbance including beaver flooding, hurricanes, and fire

Specific Threat (IUCN Threat Levels): Natural system modifications

Objective:

General Strategy:
Continue to support and participate in regional captive breeding program. Evaluate expansion of facilities at Great Bay National Wildlife Refuge to increase capacity. Augment the population in declining patches and provide rapid colonization of new habitat patches. Monitor released NEC with radio telemetry to determine survival and effectiveness of release methods.

Political Location:	**Watershed Location:**
Hillsborough County, Strafford County	Merrimack Watershed, Coastal Watershed

Monitor habitat suitability in focus areas.

Objective:

General Strategy:
Employ long-term monitoring in conservation focus areas for New England cottontail to track habitat suitability over time and alert manager of potential deficiencies. A habitat suitability index has recently been developed by Warren et al (in draft) that could also be used to assist managers in evaluating sites for release of captive bred rabbits.

Political Location: **Watershed Location:**

Monitor survival of NEC at restoration sites.

Primary Threat Addressed: Species impacts and mortality from subsidized or introduced predators

Specific Threat (IUCN Threat Levels): Invasive & other problematic species, genes & diseases

Objective:

General Strategy:
Monitor survival of rabbits with radio telemetry at various locations to determine threshold for significant impact of predators.   In addition to rabbit survival, DNA analysis of pellets could be used to monitor rate of reproduction.

Political Location: **Watershed Location:**

References, Data Sources and Authors

Data Sources

Information on current distribution of NEC came from a recent range-wide survey of the historic range of NEC (Litvaitis et al. 2006). In addition, annual surveys are conducted by NHFG to monitor extant patches within the state, and provide more detailed patch occupancy within an area. Sources of information include databases, expert review and consultation.

Data Quality

Surveys are conducted following protocols developed by UNH (Brubaker et al. 2014) to improve the rate of detection and minimize false negatives. Survey information in any one year is insufficient for the entire state, but covers all areas with reasonable effort every 2-3 years.

There has been sufficient research on patch-specific habitat features. This information would be complemented by additional efforts to understand landscape elements that influence metapopulation survival (Litvaitis and Villafuerte 1996). There is still some uncertainty of the health of the Merrimack Focus area population specifically.

2015 Authors:

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