

A Tale of Peter Cottontail and The Canopy

Cloaked in the smells and steam of a hot summer day, my eyes soar with admiration into the canopy of my Sprague Connecticut forest. I am blessed with land ownership and seek refuge here in the woods and embrace the privacy and solitude. There is a simple joy to glimpse the sky and sunlight through tall tree tops and hike unfettered along historic stonewalls and fern gullies. When I am out here to ramble, I often spook whitetails, hawks and jakes and I am always accompanied by twittering flocks of chickadees and downy woodpeckers. Occasionally our trail cameras capture photos of coyotes, bobcats, and even the elusive fisher. Of all the wildlife I have enjoyed out here, I have never seen a cottontail.

Chances are if you have ever seen a wild rabbit in South East Connecticut, it was in your yard, and you couldn't help be charmed by that ball of eyes and ears, fur and nerves, grazing on the border of grass and underbrush. Unfortunately, Connecticut is losing this natural resource to forest maturation. Too few private land owners are choosing to fell their grand forest stands for early succession habitat so needed by the New England cottontail, *sylvilagus transitionalis*. Therefore, breeding and forage habitat has become constricted, forcing this species into endangerment (Arbuthnot, M. 2008.) Our iconic Peter Cottontail has no more bunny trail.

New England Cottontail (NEC) habitat has a specific requirement for early succession forest growth and shrub land, which requires on-going forest management at a broader scale than is currently practiced in Connecticut. Although endearing to see in urban landscapes, the adaption of rabbits to suburbia and surviving in constrained and predator ridden patches of front lawn is detrimental to their proliferation as a species. Some studies indicate that up to 86% of suitable post colonial habitat has already been lost to forest maturation, suburban sprawl and other development. (Arbuthnot, M. 2008.) NEC has already been constricted to only five isolated

populations throughout New England which are threatened at increasing rates. (NHFGD_CCAA 10a1A.) In addition, NEC competes with the introduced species Eastern Cottontail (EC) (*sylvilagus floridanus*), which has barely discernible characteristics from NEC, but a more robust survival rate in the region. (Arbuthnot, M. 2008.)

This study addresses best forest management practice for the protection of declining New England cottontail. In 2015, the Connecticut Wildlife Action Plan identified over 50 target species for conservation, including NEC, many of which rely on management of early growth forest and that will also benefit from forest management (DEEP, 2017). The challenge of this study was two-fold. The first was to summarize factors impacting population decline and endangerment threat for New England cottontail. The second was to identify emerging science of habitat restoration, and how private land owners can make the most difference providing cottontail habitat, without feeling undue stress clearing old growth forest. The study covers alternatives to the unpopular practice of clear cutting, and examines the impact of invasive species management on NEC habitat (Cheeseman, et al. 2018). For NEC, niche competition with EC that may indicate a need for more selective canopy thinning (Cheeseman, et al. 2018), as well as NEC preference for >58 % canopy (Buffum, B. et al 2015). These factors may be more palatable to private land owners embracing forest management practices that promote NEC habitat restoration.

The most salient reason why cottontails are in peril is a high rate of predation and short life span that is dependent on seasonal vegetation. Although rabbits are notoriously prolific and can reproduce as early as their first season, research indicates that only 1 in 5 NEC survive the first year, and their lifespan is only 15 months (Arbuthnot, M. 2008). Due to a high susceptibility to predators, dense thickets and overhead cover are requirements not only for protection but also

for forage. NEC rarely travels more than 16 feet from cover, even to feed. NEC grazing is therefore dependent on food availability within the thicket, and the variety of plants eaten throughout the seasons directly relates to the seasonal state of greens and woody shrubs. Seasonal vegetation changes result in different forage options for NEC, for example they eat green grasses in the spring, and woody stems in winter. The thicket is home and hearth to NEC, and on parcels less than 6 acres, mortality rates double. (Arbuthnot, M. 2008).

A second reason for NEC decline is an overwhelming pressure from the formidable Eastern cottontail. Eastern cottontails were first introduced as an augmentation species for game hunters in Connecticut in 1930 and now EC stretches from Hudson Valley to northern Vermont. As with most introduced species there are always unwitting consequences to good intentions. Although EC and NEC do not physically compete for dominance, EC appears to more readily exploit the most early succession patches, lawns, and fields and more readily escapes predation. This is referred to as “scramble colonization”, when a species can monopolize a habitat by being the first to occupy it. Although more readily used in terms of colonial occupation by countries, the term is appropriate to how EC dominates resources in early succession forest. (Wiki-Scramble for Africa). Coupled with higher rates of young and lower mortality, EC simply outcompetes NEC for prime habitat (Arbuthnot, M. 2008).

The challenge for NEC management is how to balance their short life cycle and dependence on specific habitat with maximizing quality of early succession growth and allowing for NEC to outcompete EC in habitat exploitation. One study suggests that NEC benefits from higher canopy growth—between 60-80% coverage—with a mean average of 50% probability of occupancy at 55% canopy coverage (Buffum, B. 2015.) This particular study is problematic in that NEC may be exploiting more densely canopied silviculture forest out of necessity more than

preference. Silviculture in this reference is the development and management of forest to obtain a specific benefit to NEC, which is different than the forestry practice of planting and cultivating trees. The study also acknowledges that occupancy does not necessarily denote suitability of the species to the habitat. The importance of the study is that that it introduces more variety of forest management practices to private land owners than the primary recommendation of clear cutting. Selective thinning, shelterwood cuts, and silvaculture practices that target NEC occupation are new developments that may appeal to landowners with an interest in New England cottontail preservation. (Buffum, B. 2015.)

Of other concern for habitat management for NEC is the exploitation of invasive species for cover, where competition with EC is greatest. Studies suggest that when pressed with displacement, NEC exploits dense invasive stands of Japanese barberry, particularly in leaf off winter conditions (Cheeseman, et al. 2018). Although providing sanctuary where competition displacement is most intense, this exploitation may lead to tick infestation, malnutrition and higher rates of mortality over the hardest winter months. Thick stands of Japanese barberry may be novel in use but are insufficient forage for overwinter conditions. Due to this correlation, Cheeseman et al. (2018) suggest that in addition to selective cutting, cutting in areas where native low growth vegetation is most dense is the ideal condition to propagate. When feasible, seeding and planting of native shrubs should accompany selective canopy cuts in order to capitalize on NEC habitat suitability.

Decades long study on the necessity of clear cutting old stand forest has been turned on its head by habitat needs of the New England cottontail. Peter's bunny trail has taken an unexpected twist. Acres of early succession forest may be critical to dozens of endangered and threatened species, but it appears that NEC is not one of them. Non-native Eastern Cottontail is

most exploitive of early succession forest when scramble colonization is the predominant form of habitat control. The absence of canopy at the earliest stages of thicket re-growth allows EC to colonize while NEC is relegated to equally exploitive invasive barberry thicket in low sunlight conditions. The poor forage and overwinter conditions of NEC compound their population loss, while EC enjoys the most favorable conditions of early growth thicket with a wide variety of forage and cover.

Current research suggests that forest management practice begins with private land owners, who can capitalize on new silviculture techniques that allow for selective cutting of >12 acres at 58% canopy. Also, invasive barberry management should be monitored with discretion before eradication due to the probability of NEC refuge. This not only reduces financial burden on private land owners for clear cutting and invasive management practice, but speaks to an affinity all land owners have to preserve their mature, stately, and beautiful old growth stands. This new science may balance management of private land that is so critical to habitat restoration, while preserving an iconic species. This does not mean that clear cutting practice should be abandoned; rather, that selective cut is complimentary or an alternative to clear cuts and that both practices may meet the forest management needs of those considering habitat development.

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