

Title: The effects of exotic shrubs on caterpillar abundance and breeding success of declining songbirds.

Author: Matt Tarr, Extension Professor of Wildlife, University of New Hampshire Cooperative Extension, matt.tarr@unh.edu, (603) 862-3594

Problem: Exotic shrubs (i.e., shrubs introduced to the US from another country) support very few species of native caterpillars because most caterpillars can only eat leaves from a few plant species with which they have evolved. Recent research in New Hampshire found that the number of caterpillars occurring in [shrublands](#) dominated by exotic shrubs (e.g., glossy buckthorn, autumn olive) is significantly lower than the number found in those dominated by native shrubs (e.g., viburnums, dogwoods). This is a concern, because many [Neotropical migrant songbirds](#) rely on caterpillars as the main food they feed to growing nestlings – when caterpillars aren't available, these birds often produce fewer young. As shrublands become less common in New England, many of the songbirds that require shrublands for breeding are also declining. The ability of these birds to maintain viable breeding populations requires that the remaining shrublands be as productive as possible. If exotic shrubs reduce the availability of caterpillars in shrubland habitats, these shrubs may be contributing to the decline of shrubland birds.

Significance: This study is being conducted because it is unclear to what extent, if any, reductions in caterpillar abundance due to exotic shrubs affects the health and breeding success of declining songbirds. To date, this aspect of exotic shrubs has received little research attention and it remains one of the most important unanswered questions related to bird health and conservation today. The results of this project will be immediately incorporated into habitat management and conservation recommendations to benefit declining songbirds. If exotic shrubs do contribute to lower productivity of songbirds then efforts to reduce the abundance of exotic shrubs in some shrubland habitats may be warranted to benefit these birds.

Study Objective: This study will measure caterpillar abundance and growth of nestling songbirds in three shrublands dominated by exotic shrubs and three shrublands dominated by native shrubs in 2012 – 2014. The purpose of this study is to determine if nestling songbird growth, and total number of young songbirds produced, is greater in shrublands dominated by native shrubs than in shrublands dominated by exotic shrubs, due to differences in caterpillar abundance on native and exotic shrubs.

Study Sites: This study will be conducted on shrub-dominated powerline rights-of-way (ROW) maintained by periodic mowing by the Public Service of New Hampshire (PSNH). Study sites will be located in southeastern NH in Rockingham and Strafford County. Powerline ROW represent some of the largest and best shrubland habitats available for declining songbirds in this part of NH and in many parts of New England. This study will provide new information about the ability of ROW to function as viable breeding habitat for shrubland songbirds and the results will be used to identify cost-effective methods for maintaining ROW vegetation that is most beneficial to these and other wildlife.

Study methods: Songbirds at each site will be marked with colored leg bands and followed with GPS units in order to map the territory of each pair of breeding birds. (The territory is the area that a male and female pair defends for nesting and feeding). Within each mapped territory, caterpillar and total arthropod (e.g., spiders, grasshoppers) abundance will be measured on native and exotic shrubs and in grassy vegetation throughout the breeding season (May-August). Video cameras will be placed at bird nests to determine the proportion of caterpillars vs. other arthropods that adults feed to nestlings in each habitat type. Nestling birds will be weighed every three days to determine their growth rate and weight at fledgling. This study will focus on common yellowthroats, one of the most abundant songbirds that breeds in shrubby ROW and one that uses caterpillars gleaned from shrub foliage as a main food they feed to nestlings. Although common yellowthroats are common, populations of this species in New England have been declining similar to other songbirds that require shrublands for breeding.

Expected Results: Caterpillar abundance is expected to be higher in powerline ROW dominated by native shrubs than in ROW dominated by exotic shrubs. This should result in greater nestling growth rates, greater weight of young at fledging (i.e., when they leave the nest on their own), and a greater overall number of young produced in ROW dominated by native shrubs.

Anticipated Outcomes: The results of this study will be communicated immediately and directly to the New Hampshire Fish and Game Department and to PSNH, the public utility company that manages the majority of powerline ROW in NH. Study results will also be immediately incorporated into management recommendations and outreach materials developed for public and private landowners in the Northeastern US by UNH Cooperative Extension. The results of this study are applicable to the conservation of any species of songbird that relies on caterpillars and occupies habitat that is susceptible to invasion by exotic plants.

Principal Researcher: This study will be conducted by [Matt Tarr](#), Associate Extension Professor – Wildlife Specialist for the University of New Hampshire Cooperative Extension. Matt will train and supervise a field crew of undergraduate and graduate field technicians who will assist with bird monitoring, insect sampling, and field data collection.

Study Partners: The project is supported by generous financial and technical contributions from the New Hampshire Fish and Game Department, Public Service of New Hampshire, and the American Wildlife Conservation Foundation.