

# NSRC Progress Report 2021

## Integrating Genetic and Ecological Data Using a New Circuit Theory Approach to Measure and Map Wildlife Connectivity across the Northeast

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### Project abstract

NSRC researchers will integrate ecological and genetic data using a new circuit theory approach to map connectivity for 10 managed species with high ecological, economic, and cultural importance: moose, deer, bear, bobcat, coyote, red fox, gray fox, fisher, marten, and turkey. The goal is to provide a precise and comprehensive depiction of wildlife connectivity across the region that can be used to support management decision-making at multiple spatial scales. Researchers will apply the approach to the Green Mountain National Forest with partners at the USDA Forest Service to evaluate effects of routine forest management activities on connectivity to improve strategic decision-making that maximizes benefits for species while considering other objectives. They will develop a decision-making tool for the Green Mountain National Forest that can be applied to other forest management issues in the region.

### Summary of progress in 2021

We worked with our project collaborators to organize and begin collection of genetic tissue samples for our target species. These samples will be used to develop genetic resistance surfaces that will be combined with maps of species distributions to visualize wildlife connectivity across the Northeast. We met with partners in the Vermont Fish and Wildlife Department, New Hampshire Fish and Game Department, Maine Department of Inland Fisheries and Wildlife, and the US Forest Service – GMNF, to develop sampling protocols. In collaboration with our state agency partners, we developed plans to communicate the need for samples to hunters and trappers across the region. Project information materials, sample collection instructions, and supplies were distributed to state and federal biologists and participating hunters/trappers. Permits for sample collection were also obtained from each state.

Sample collection began in Vermont with deer samples collected from hunters during the November rifle season (n=62 samples). Additional animals were collected by trappers in each state during the late fall trapping seasons, which will be collected in early 2022 by state agency personnel during their annual necropsy sessions. Our goal is to collect 100 geographically well-distributed samples per species (33 samples per species in each state).



*Tissue sample collection at the Vermont Fish and Wildlife Roxbury lab.*

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We also recruited a full-time graduate student on the project, who entered our Ph.D. graduate program in September.

## Problems or changes

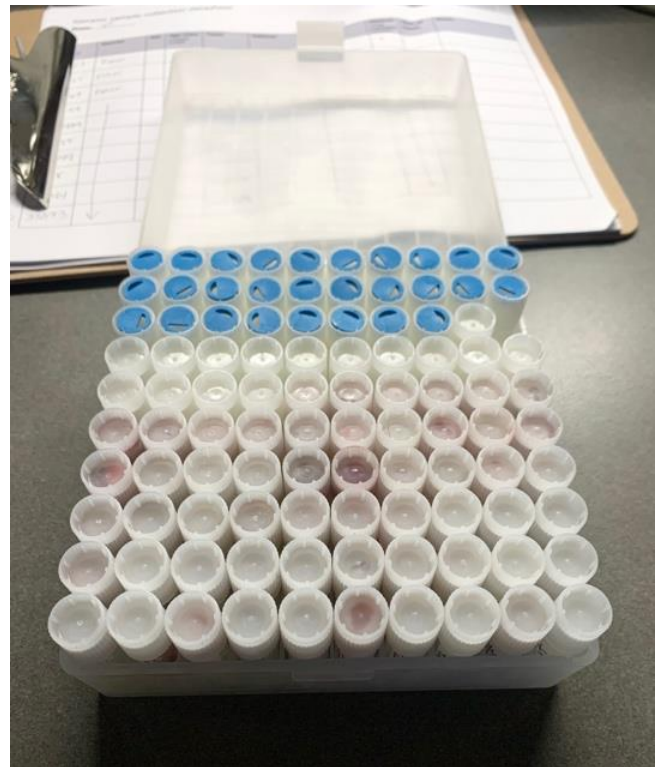
We did not encounter any significant problems in 2021. Our target species list changed slightly due to availability of samples and advice from project collaborators, and now includes raccoon and striped skunk, and excludes turkey from the analysis. Our genetic analyses will be more congruent when working with only mammal species. Our updated list now includes 11 species: bear, bobcat, coyote, deer, fisher, marten, moose, raccoon, red fox, gray fox, striped skunk.

## Plans for 2022

We will continue sample collection until all species targets are met, collecting samples from participating hunters and trappers, and state and federal agency personnel. We will begin DNA extraction and genetic analyses in the spring and summer as sample quotas are met for each species. Additionally, we will develop the necessary landcover layers that are required for connectivity analyses, including genetic resistance layers and species distribution maps. We will then begin running connectivity analyses for each species across the entire study region. Lastly, as connectivity analysis develop, we will coordinate with Green Mountain National Forest partners to integrate the results into management scenarios.

## Collaboration with the USFS

Our project collaborates with partners at the US Forest Service Green Mountain and Finger Lakes National Forests. We intend to use our connectivity analyses to inform decisions related to forest management scenarios in Green Mountain National Forest. We have met with our main collaborator and communicate updates regularly on our current progress. In 2022, we intend to work closely with partners to develop management scenarios and decision analysis tools.



*Tissue samples from Vermont white-tailed deer.*