

**PENNSYLVANIA GAME COMMISSION
BUREAU OF WILDLIFE MANAGEMENT PROJECT
ANNUAL PROJECT REPORT**

PROJECT CODE NO.: 06718

TITLE: Allegheny Woodrat Research/Management

JOB CODE NO.: 71801

TITLE: Allegheny Woodrat Surveys

PERIOD COVERED: 1 January 2016 to 31 December 2016

COOPERATING AGENCIES: Pennsylvania Biological Survey Mammal Technical Committee, Pennsylvania Department of Conservation and Natural Resources, Indiana University of Pennsylvania, The American Chestnut Foundation.

WORK LOCATION: Statewide

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ABSTRACT: The Allegheny woodrat (*Neotoma magister*) is classified as a threatened species in Pennsylvania. Numerous islands and corridors of rock in eastern, central, and northwestern Pennsylvania that had supported woodrats are no longer occupied. A slow, continuous decline in the number of occupied sites continues, with several factors hypothesized to be playing a role: the raccoon roundworm (*Baylisascaris procyonis*) which is lethal to woodrats, loss of the consistent food source provided by the American chestnut (*Castanea dentate*), and the anthropogenically induced isolation that prevents genetic flow. In 2016, work focused on planting advanced-generation American chestnut seedlings (n=323 total across five counties) at those sites deemed as being important to surviving populations of woodrats. A long-term trapping effort was initiated in 2016 at two sites in Huntingdon County (a rock complex at the Thousand Steps area and Jacks Narrow complex within State Game Land 112 and Jacks Narrows) with a goal to track population trends at these two sites. Twenty traps deployed for 2 nights yielded a single subadult male at the Thousand Steps site. Four woodrats were captured at the Jacks Narrows site, with 3 being adult females and 1 subadult male. One of the adult females was previously banded by Indiana University of Pennsylvania researcher as a subadult, and was 3 years old at time of recapture. In addition, an Allegheny Woodrat Presence/Absence Survey Protocol was developed using camera-trapping methodology. In 2015, testing of camera traps as a new potential survey technique were deployed at three locations in metapopulation CRLR_01. All three sites were baited and trail cameras were installed within 10 - 15 feet. This technique produced multiple woodrat photos across each week, even at locations where no visible sign of active woodrats had been detected prior to camera-trapping. Following this initial testing phase, an appropriate level of effort was determined for detecting woodrat activity and in

2016 a camera trap survey protocol was developed. Staff implemented this protocol at three habitat locations within State Game Land 211 (Dauphin Co), each baited with American chestnuts obtained from the American Chestnut Foundation. While no fresh visual sign indicating activity were noted, all three sites recorded woodrats removing chestnuts. Finally, Pennsylvania Game Commission (PGC) Diversity Division staff led live-trapping efforts at Trough Creek State Park (Huntingdon Co.) and Bowers Mountain (Tuscarora State Forest, Perry Co.) in order assist New Jersey Fish and Wildlife staff in introducing genetic diversity to their northern New Jersey Palisades population to avoid the negative effects shown to occur in small, in-breeding populations such as is seen at the Palisades (Smyser et al 2012).

OBJECTIVES

1. Plant advanced-generation American chestnut seedlings at locations where few/none currently exist, allowing Allegheny woodrats to benefit from this tree as a potential food source once fruit is produced.
2. Complete the Allegheny Woodrat Presence/Absence Survey Protocol for agency adoption and monitor the results of implemented management guidelines.
3. Implement the Allegheny Woodrat Presence/Absence Survey Protocol using camera-trapping and continue to update the protocol as necessary based on its effectiveness in detecting woodrats.
4. Encourage the implementation of forest management guidelines for the Allegheny woodrat and work with managers to refine recommendations.
5. Correspond with other states within the Allegheny woodrat's range to monitor the species status range-wide.

METHODS

We continue to follow metapopulation definitions and conservation management areas defined by Butchkoski (2006). When time is dedicated to woodrat surveys, the locations to survey are chosen by prioritizing previously-surveyed sites, and emphasizing those sites that have the longest time since updating within active metapopulations, newly identified sites, and confirming lack of activity at sites recently considered extirpated. When live-trapping is required, we bait single door tomahawk traps with apples and peanut butter. Baited traps are placed at locations with any sign (historic or fresh) or near large rock overhangs and set at dusk, then checked at dawn.

A new passive technique using camera traps has been developed to survey for Allegheny woodrats. This technique deploys a camera near optimal habitat and placing bait approximately 10-15 feet from the camera when possible. We used peanut butter suet as bait placed in suet cages or in PVC tubes attached to rock via a wire cable, except when we were able to partner with American Chestnut Foundation to provide supplemental food to a declining complex. We chose Covert brand cameras, selecting the Black 60 model as they do not emit red blinking lights when triggered and use black LED lights for illumination. Due to the rock background which

reflects light and the close set up required, a piece of painter's tape or electrical tape was placed over half the LED lights to prevent overexposure.

RESULTS

A total of 235 advanced-generation American chestnuts were planted during spring 2016 (Fig. 1, Table 1). Planting dates included 27 April (2 Trough Creek sites), 29 April (3 Lehigh Gorge sites), 2 May (2 State Game Land 51 sites), 4 May (4 Ohiopyle State Forest sites), 5 May (State Game Land 100-Spruce Run and State Game Land 321-Loop Run). In addition, 88 American chestnut seedlings were planted during the fall 2016. Planting for these occurred 7 November at 3 State Game Land 211 sites.

A long-term trapping effort was initiated in 2016 at 2 sites in Huntingdon County (a rock complex at the Thousand Steps area and Jacks Narrow complex within State Game Land 112 and Jacks Narrows) with a goal to track population trends at these 2 sites. Twenty traps were deployed for 2 nights at both and yielded a single subadult male at the Thousand Steps site. Four woodrats were captured at the Jacks Narrows site, with 3 being adult females and 1 subadult male. One of the adult females was previously banded by Indiana University of Pennsylvania researcher as a subadult, and was 3 years old at time of recapture.

With the exception of the New Jersey site at the Palisades which is heavily managed, woodrats extinctions have progressed southward from Connecticut. Two significant complexes (Lehigh gorge and Delaware Water gap) in the northeastern part of Pennsylvania became extirpated in the past decade, leaving our eastern-most, extant complex of rock habitat now in Dauphin County, at State Game Land 211. The most recent surveys at these sites, yielded little to no sign at most rock habitats, causing concern for this site. During this reporting period, this site was our highest priority site. We reached out and partnered with The American Chestnut Foundation, and were able to secure about 10,000 chestnut seeds to provide supplemental food to this site in late fall. We placed trail cameras at 3 locations inside 3 separate rock habitats for a deployment of 9 cameras (Fig. 2). Deployment occurred the same day we planted the 88 chestnut seedlings. While no fresh visual sign indicating activity were noted, all 3 sites recorded woodrats removing chestnuts and verifying they are still active.

Finally, Pennsylvania Game Commission Diversity Division staff led live-trapping efforts at Trough Creek State Park (Huntingdon County) and Bowers Mountain (Tuscarora State Forest, Perry County) in order assist New Jersey Fish and Wildlife staff in introducing genetic diversity to their northern New Jersey Palisades population to avoid the negative effects shown to occur in small, in-breeding populations such as is seen at the Palisades (Smyser et al 2012). A goal of 6 total woodrats are planned across 3 years, with a subadult male and female desired each year. Two subadult woodrats, 1 male and 1 female were trapped in July, eartagged, and driven to New Jersey. With assistance from a veterinarian, the woodrats had transmitters attached, were checked for *Baylisascaris* and other parasites, and released. Monitoring by New Jersey staff has documented that the individuals from this release established new territories and after a couple months the individuals were re-trapped and had collars removed. To date, 4 of the 6 woodrats have been supplied to New Jersey. A long-term mark and recapture efforts in New Jersey have coincided with several management techniques, but genetic heterozygosity was very low and capture results were steadily declining since 2004. Trap results in 2016 indicate that the

influx of new genes in the population may already be having a significant impact (Fig. 3).

RECOMMENDATIONS

1. At a minimum, continue to monitor 1 metapopulation each year.
2. Keep the Pennsylvania Game Commission Allegheny woodrat database current. Sample raccoon scats in terms of both scat prevalence and *Baylisascaris procyonis* egg prevalence therein.
3. Collect scat samples from both active and inactive woodrat habitat sites as they are camera-trapped to determine the prevalence of this parasite in woodrat habitat.
4. Continue to update the Allegheny Woodrat Presence or Absence Protocol as needed to maximize the success of capturing woodrats.
5. Upon completion of the Woodrat Management Plan, incorporate recommendations, definitions, etc., into the Pennsylvania Game Commission, Wildlife Diversity Division's objectives, Strategic Plan, Annual Report and Allegheny Woodrat Survey Manual.
6. Continue work with New Jersey Fish and Wildlife to reintroduce woodrats to their Palisades population in northern New Jersey.
7. As time permits, continue to monitor the success of American chestnut seedlings planted in 2016.

LITERATURE CITED

- Butchkoski, C. M. 2006. Allegheny woodrat research and management. Annual job report. Pennsylvania Game Commission, Harrisburg, USA.
- Smyser, T. J., J. E. Duchamp, S. A. Johnson, J. L. Larkin, and O. E. Rhodes Jr. 2012. Consequences of metapopulation collapse: comparison of genetic attributes between two Allegheny woodrat metapopulations. *Conservation Genetics* 13:849-858.

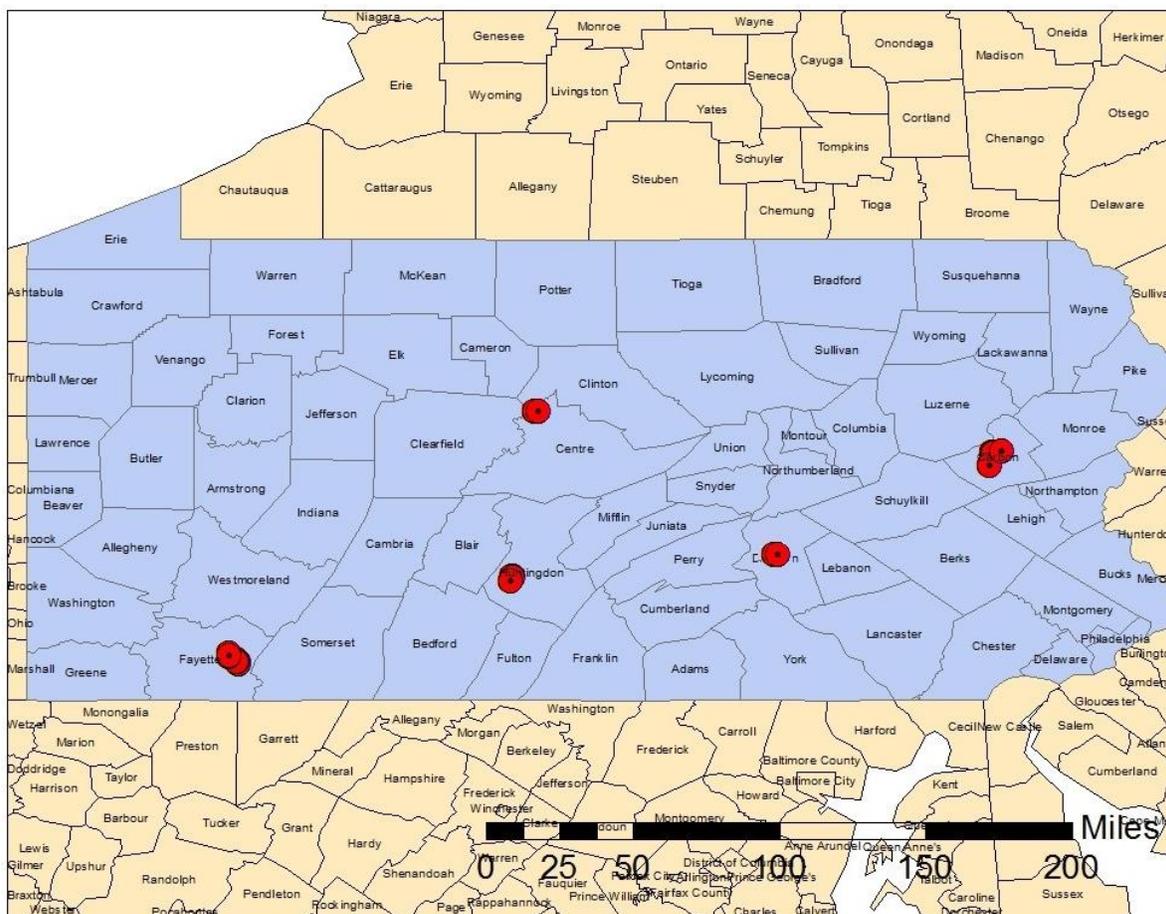


Figure 1. American chestnut seedling ($n = 323$) planting locations statewide during spring 2016. Sites included: Ohiopyle-Bike Trail North #1, 2, and 5, Ohiopyle-Bruner Run, State Game Land 51-Brown/Colt and Morgan Run (Fayette County); Trough Creek-Hess Hollow and Ice Mine (Huntingdon County); State Game Land 100-Spruce Run and State Game Land 321-Loop Run (Centre County); State Game Land 211-Ellendale Forge, Rock #1, and Rock #4 (Dauphin County); Lehigh Gorge-Bald Mountain, Black Creek, and Jim Thorpe #5 (Carbon County).

Table 1. Number of American chestnut seedlings planted by site.

Area (SGL/State Forest/State Park)	Site	County	Chestnuts Planted
Trough Creek SP	Hess Hollow	Huntingdon	19
Trough Creek SP	Ice Mine	Huntingdon	20
Lehigh Gorge SP	Bald Mountain	Carbon	28
Lehigh Gorge SP	Black Creek	Carbon	24
Lehigh Gorge SP	Jim Thorpe #5	Carbon	24
SGL 51	Brown/Colt	Fayette	12
SGL 51	Morgan Run	Fayette	12
Ohiopyle SF	Bike Trail North #1	Fayette	12
Ohiopyle SF	Bike Trail North #2	Fayette	12
Ohiopyle SF	Bike Trail North #5	Fayette	12
Ohiopyle SF	Bruner Run	Fayette	12
SGL 100	Spruce Run	Centre	24
SGL 321	Loop Run	Centre	24
SGL 211	Ellendale Forge	Dauphin	40
SGL 211	Rock #1	Dauphin	20
SGL 211	Rock #4	Dauphin	28

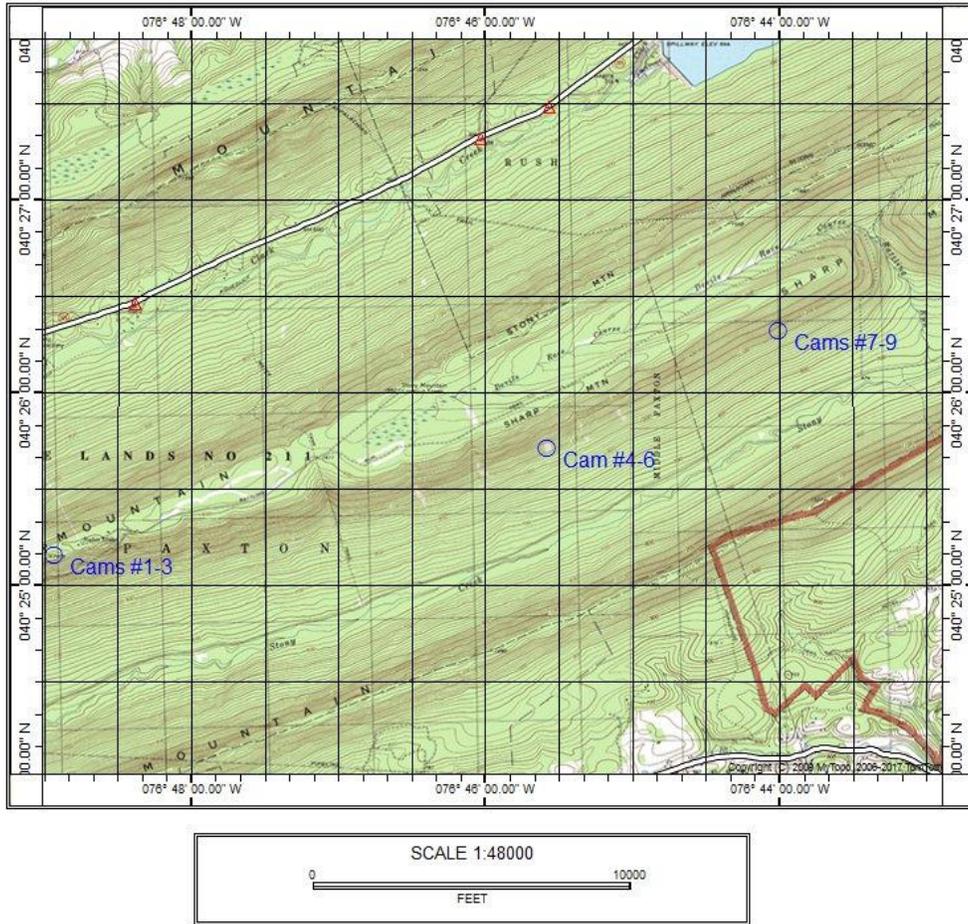


Figure 2. Camera-trapping locations ($n = 9$) at 3 sites along Sharp Mountain, State Game Land 211 (Dauphin County).

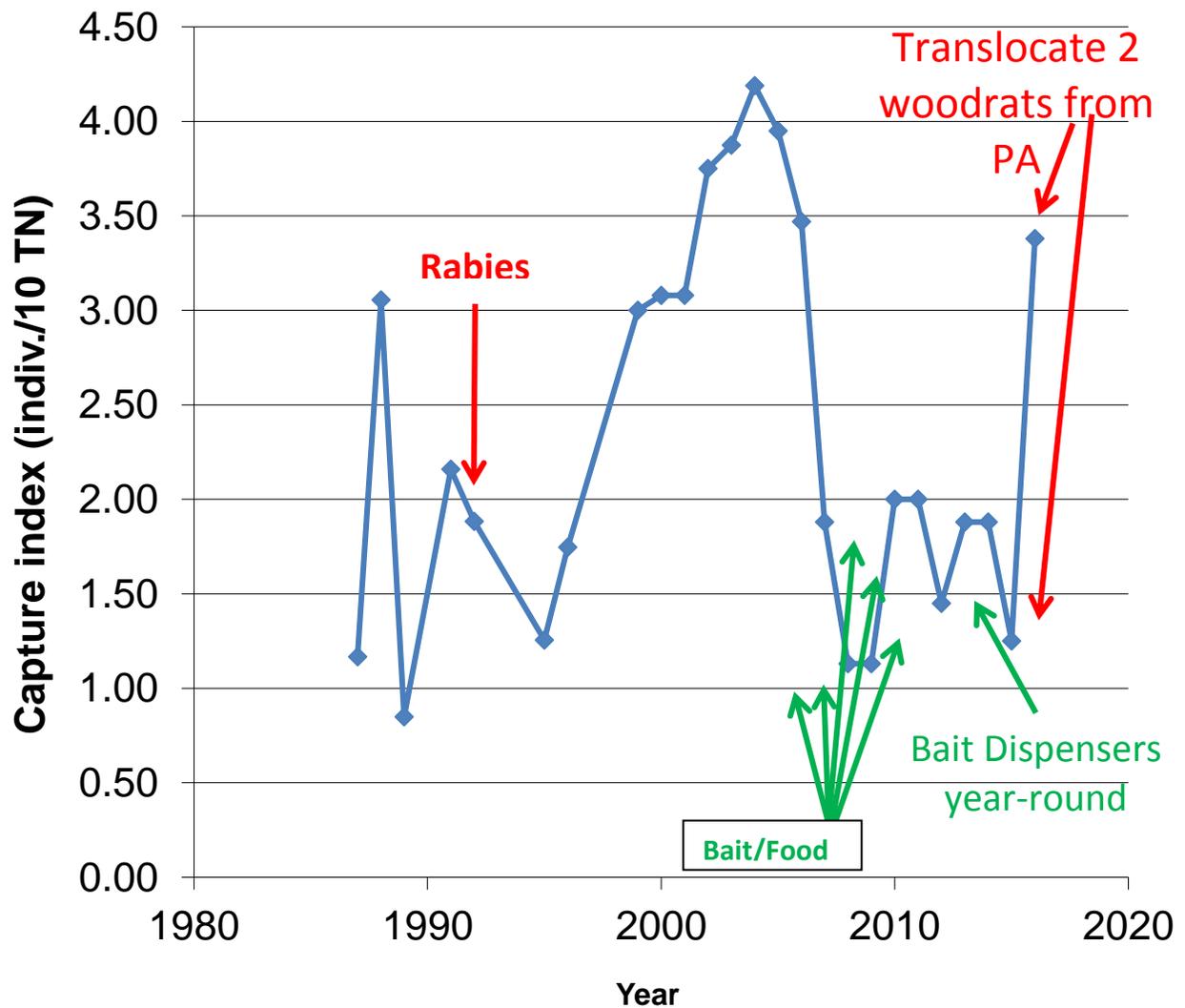


Figure 3. Individuals captured in October per 10 trapnights effort from 1980s at the Palisades, the last extant site in New Jersey. While a decline in raccoon abundance due to rabies elicited a population response, supplemental food and treating raccoons with antihelminthic bait have had minimal to no detectable benefits. Four Pennsylvania subadult woodrats released to date, with two being released in 2015 and 2 in 2016.