Federal Aid in Wildlife Restoration

W-78-R-1

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Connecting Habitat Across New Jersey (CHANJ) Assessments

Interim Report

for

September 1, 2017–September 30, 2018

NJ Department of Environmental Protection

DIVISION OF FISH AND WILDLIFE
ENDANGERED AND NONGAME SPECIES PROGRAM
P.O. BOX 420
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NEW JERSEY DIVISION OF
Fish and Wildlife

DEPARTMENT OF ENVIRONMENTAL PROTECTION NEW JERSEY

SPORT FISH & WILDLIFE RESTORATION

PERFORMANCE REPORT

STATE: New Jersey **PROJECT NUMBER:** W-78-R-1

PROJECT TYPE: Research and/or Management

PROJECT TITLE: Connecting Habitat Across New Jersey (CHANJ) Assessments

STUDY NUMBER AND TITLE: Mammals

PERIOD COVERED: September 1, 2017 to September 30, 2018

JOB NUMBER AND TITLE: Connecting Habitat Across New Jersey (CHANJ) Assessments
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OBJECTIVE (1): Assess functional connectivity at different scales across the landscape for at least five mammal species of differing movement capabilities by August 31, 2022.

OBJECTIVE (2): Develop Road Assessments for at least 20 road segments represented in the CHANJ mapping that bisect cores and corridors by August 31, 2022.

Key Findings:

- Work with The Nature Conservancy (TNC) to delineate the two pilot areas for Road Assessment work in northern New Jersey.
    - The ENSP CHANJ team worked with TNC to delineate two pilot areas for road assessment work in northern New Jersey, dubbed Bobcat Alley and High Mountain (Fig. 1).

- Conduct computerized GIS spatial analysis of road segments in pilot areas. This will help prioritize which segments would be best for full assessments.
    - The CHANJ team conducted GIS assessments of the CHANJ road segments that fall within Bobcat Alley and High Mountain. The assessments involved coding each road segment as to whether it (1) occurs in a CHANJ core or corridor, (2) intersects a stream, (3) has protected land on one or both sides, (4) level of road (as an index of size), and (5) presence of a bridge. The attributes helped inform the selection of road segments to assess the first year of the project.

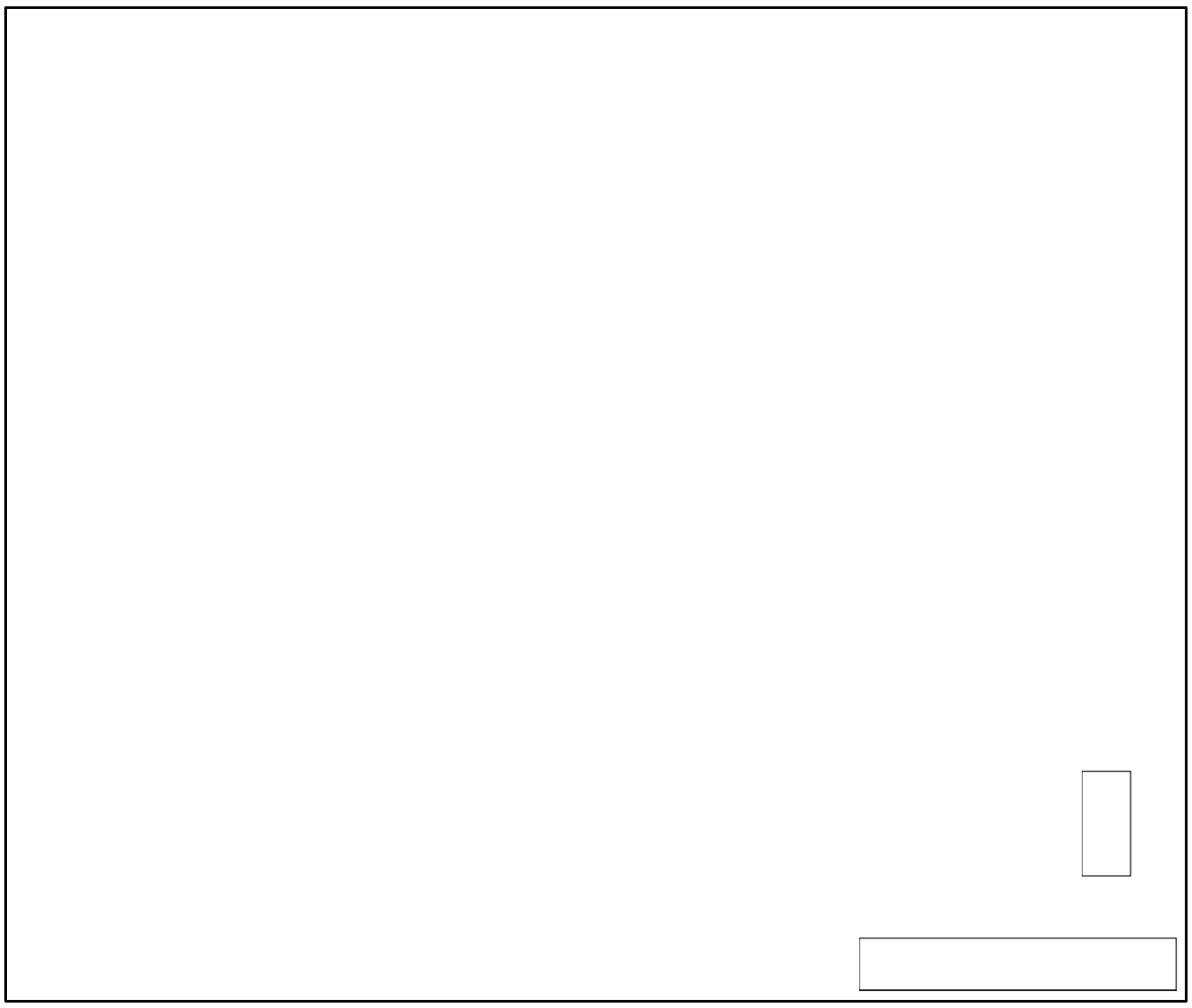


Figure 1. The two pilot areas, Bobcat Alley (red outline, to the west) and High Mountain (blue outline, to the east), selected for road assessments, in northern New Jersey overlaid on the CHANJ core and corridor mapping.

- Hold organizational meeting with TNC to review road segments they will assess, review roadkill survey protocol, and camera monitoring protocol.
    - The ENSP CHANJ team held four coordination meetings with TNC during this first work period to review project goals, identify and prioritize road segments for roadkill data collection and road assessments, and finalize protocols for camera monitoring and data collection.
    - For this first work period, a total of 178 road segments were selected for assessment and weekly roadkill surveillance starting in May 2018 (continuing through October/ November). Of these, 169 segments are in the Bobcat Alley pilot area and 9 are in the High Mountain pilot area (Fig. 2). The chosen road segments represent a range of characteristics – size, traffic volume, ownership, and landscape context; some fall within CHANJ-mapped core habitats and others within corridors.
    - Within (or proximate to) the chosen road segments, a subset of stream culverts were prioritized for camera monitoring in order to investigate wildlife usage of these structures. One of our coordination meetings included field reconnaissance of culverts to discuss site suitability, access considerations, camera setup, and other protocols. TNC subsequently

installed and maintained ten cameras during the work period (illustrated in Fig. 2), with plans to deploy ten additional cameras in November 2018.

- Field data forms, site visit logs, a volunteer time tracking system, a mobile-friendly data submission application ("NJ Wildlife Tracker"), and other supporting documents were developed between meetings.

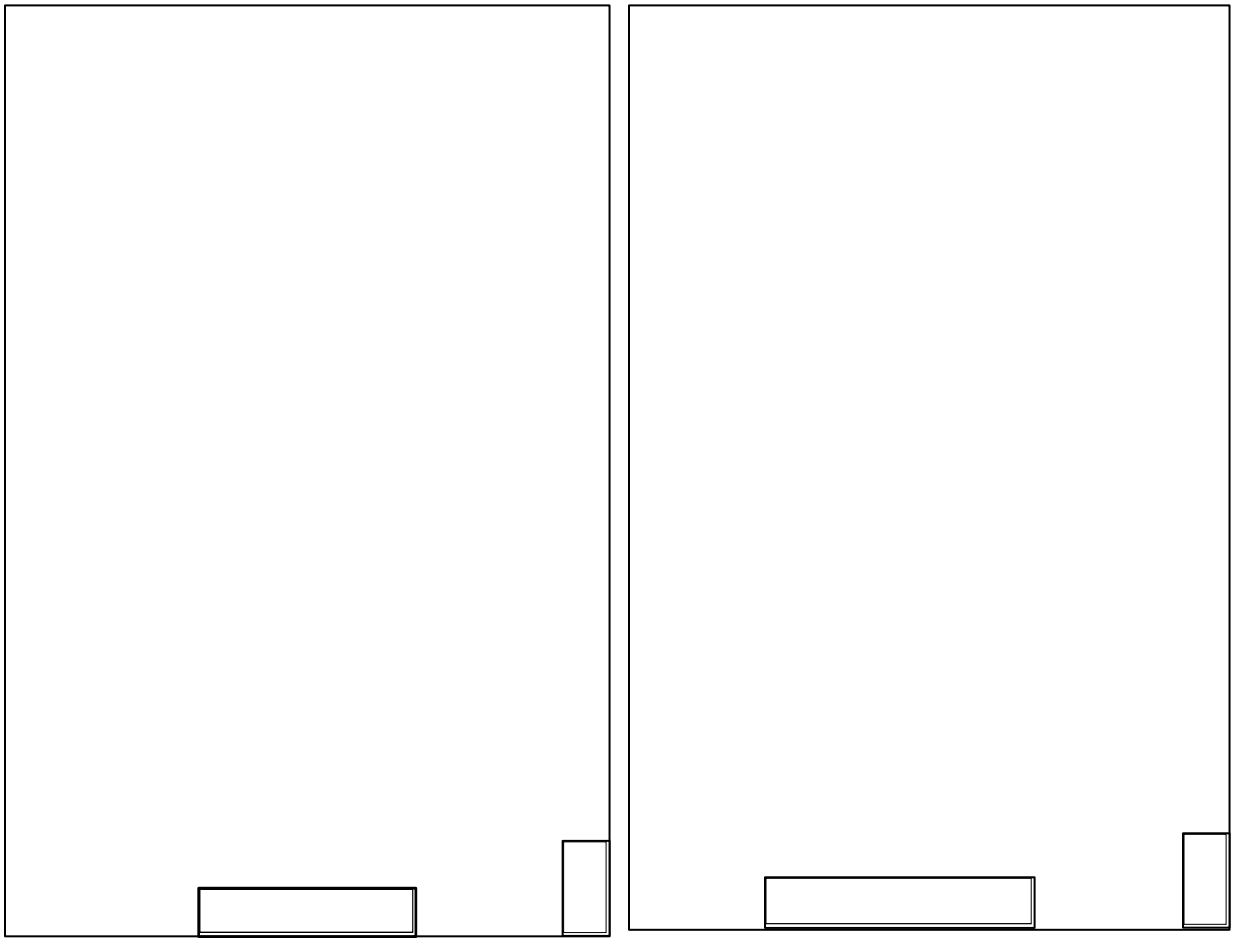


Figure 2. The two pilot areas, Bobcat Alley (red outline) and High Mountain (blue outline), with the road segments that were assessed (N = 178) (black lines), and the camera locations identified (N = 10) (yellow boxes).

- Hire a seasonal employee and have the individual get trained and start recruiting others to get training based on the NAACC training protocol. Hold an organizational meeting with seasonal coordinator to develop a prioritization schema for road segments to focus on across the state based on need and availability of volunteers in those areas.
    - ENSP contracted Montclair State University's (MSU) Passaic River Institute personnel – who have existing NAACC "Lead Observer" credentials and experience – to coordinate and perform up to 225 culvert assessments over three years, including data management, and recruitment and training of other surveyors. We held a meeting with the three key MSU personnel in April 2018 to discuss our project objectives, identify and prioritize areas to focus culvert inventories, and review the new NAACC terrestrial passage protocol and its online data reporting system. Broadly, we will aim for culvert inventories to take place within the

Bobcat Alley and High Mountain pilot areas (overlapping with TNC's road segment assessments), as well as an additional area of interest in the NJ Sourlands.

- An ENSP seasonal was enlisted to help part-time with the DNA portion of the project, and we will hold open the option of having a seasonal employee trained as a NAACC observer in future years if needed to stay on track with project goals.

- Solicit and compile results from roadkill survey, camera monitoring, culvert inventory.
  - TNC provided a spreadsheet and GIS shapefiles of all 178 road segments that were assessed in the Bobcat Alley and High Mountain pilot areas during the work period. A variety of connectivity-related attributes were recorded for each road segment (e.g., number of lanes, speed limit, potential barriers to wildlife movement, surrounding land uses, etc.), and observations of any wildlife on roads (dead or live, both within and outside of the established CHANJ segments) were documented and georeferenced using the NJ Wildlife Tracker mobile app during weekly transect surveys.

    Road segments were surveyed approximately 20 times each, resulting in 312 animal observations (266 in Bobcat Alley and 44 in High Mountain); 147 (47%) of which were found within CHANJ segments. The number of animal observations varied between segments, with 109 segments yielding no observations, and just one segment yielding greater than ten (average = 0.83 animals observed per segment). Most of the animals observed were mammals (189 = 60.6%), followed by reptiles/amphibians (86 = 27.6%), birds (35 = 11.2%), and 2 animals of unknown taxon.

    Segments vary widely in length and character, making it difficult to make direct comparisons between them, but because every animal occurrence is plotted via the NJ Wildlife Tracker app, we will have the ability to analyze the data for potential roadkill hotspots and factors contributing to wildlife presence on roadways.

  - TNC also provided locational details and preliminary results from the ten cameras monitoring culverts. Deer and raccoons have dominated the wildlife sightings thus far, with one weasel/mink and one bobcat (Fig. 3) also caught on camera.

Figure 3. A bobcat caught on camera near the mouth of a monitored stream culvert within the Bobcat Alley pilot area.

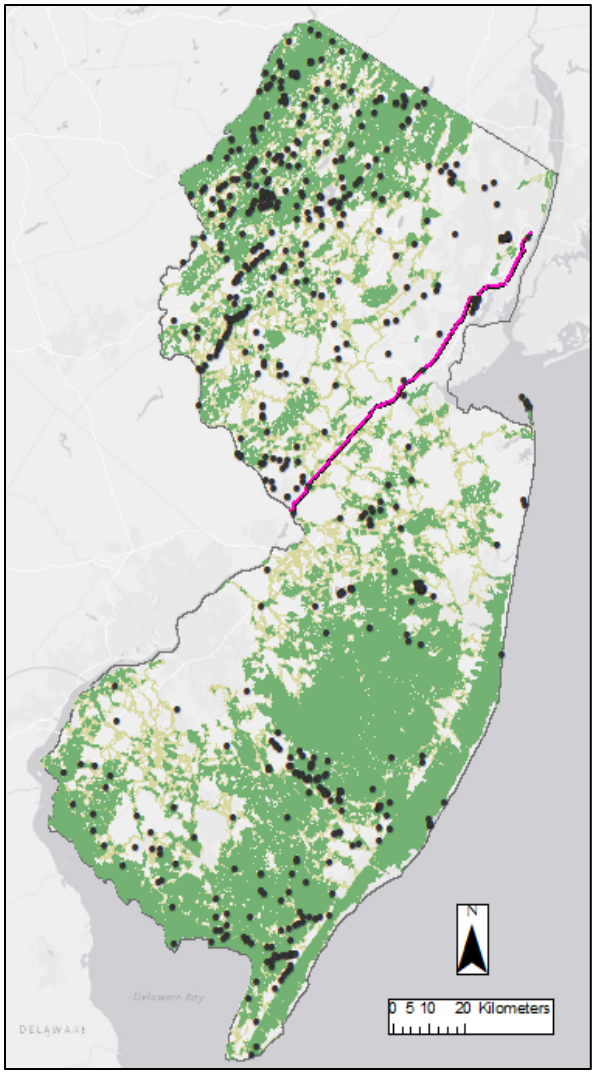
  - MSU provided an interim report on their NAACC culvert assessment efforts. They developed outreach materials advertising the project and soliciting interest, including a press release for the Passaic River Institute website, digital fliers for the CHANJ webpage and for display in MSU's Center for Environmental and Life Sciences, and a poster presentation at

the World Water Day celebration hosted by MSU. Together with outreach to several New Jersey Watershed Ambassadors (AmeriCorps), they built a roster of 16 interested volunteers – four of whom have begun the NAACC Lead Observer training.

The MSU team completed at least 30 culvert assessments during this first work period. Additional surveys were planned but could not be completed due to high streamflow conditions throughout much of the summer.

- Delineate broad scale delineation of areas for first phase of gene flow analysis and identify and contact partners who can help with DNA sample collection for target species
    - In collaboration with the National Genomics Center for Wildlife and Fish Conservation the CHANJ team divided the state into North and South regions based on the Rte. 1 corridor running through the center of the state. Genetic variability will be compared between the two regions for each of the selected terrestrial mammal species in the first phase of the analysis.
    - The team recruited 62 volunteers from across the state to help with the DNA sample collection. The volunteers represent individuals from CHANJ partner organizations, Division of Fish & Wildlife staff, trappers, wildlife rehabilitators, APHIS staff, and interested citizens. Each volunteer was given a sampling kit for clipping, preserving, and documenting each sample collected, as well as an instruction sheet and safety vest. The goal was set to collect at least 20 samples from each of the native terrestrial mammal species in the North and in the South regions, for a total of at least 40 samples collected per species across the state.

- Send DNA samples to lab and collaborate with lab regarding analysis, interpretation of results and next steps for scale if warranted.
    - A total of 683 samples across 22 species were collected from carcasses (mostly harvested or roadkills) and a few from scats during the reporting period (Fig. 4). The samples were all retrieved from the volunteers, mapped in GIS, documented in a database, and sent to the National Genomics Center for Wildlife and Fish Conservation. Regular updates were sent to the volunteers regarding collection progress across the state and further direction for sample collection.
    - Given the sample numbers and distribution of the first set of data, the lab is moving forward with genotyping the white-tailed deer, raccoon, and opossum samples (Fig. 5) at the broad north-south scale of analysis to start. Red fox and grey squirrel may be added in the near future as well. The species represent different varied movement capabilities and population dynamics.



Species	North	South
Beaver	9	10
Black Bear	70	0
Eastern Chipmunk	20	1
Coyote	13	5
Eastern Cottontail	15	34
Flying Squirrel	3	0
Gray Fox	1	0
Eastern Gray Squirrel	41	39
Groundhog	22	13
Mink	4	4
Mole	2	0
Muskrat	7	7
Opossum	39	25
Northern River Otter	18	42
Porcupine	3	0
Raccoon	39	35
Red Fox	34	27
Shrew	2	0
Striped Skunk	11	4
Weasel	2	0
White-footed mouse	3	4
White-tailed deer	30	45
Total	388	295

Figure 4. The CHANJ core and corridor map (left) displaying the locations of DNA samples (black dots) collected from native terrestrial mammal species across New Jersey. The North – South dividing line (pink) runs along the Rte. 1 corridor in central New Jersey and served as the starting point for the genetics analyses and as a guide for sample collection. The numbers of samples for each species are displayed in table (right) along with whether the sample was collected North or South of the dividing line.

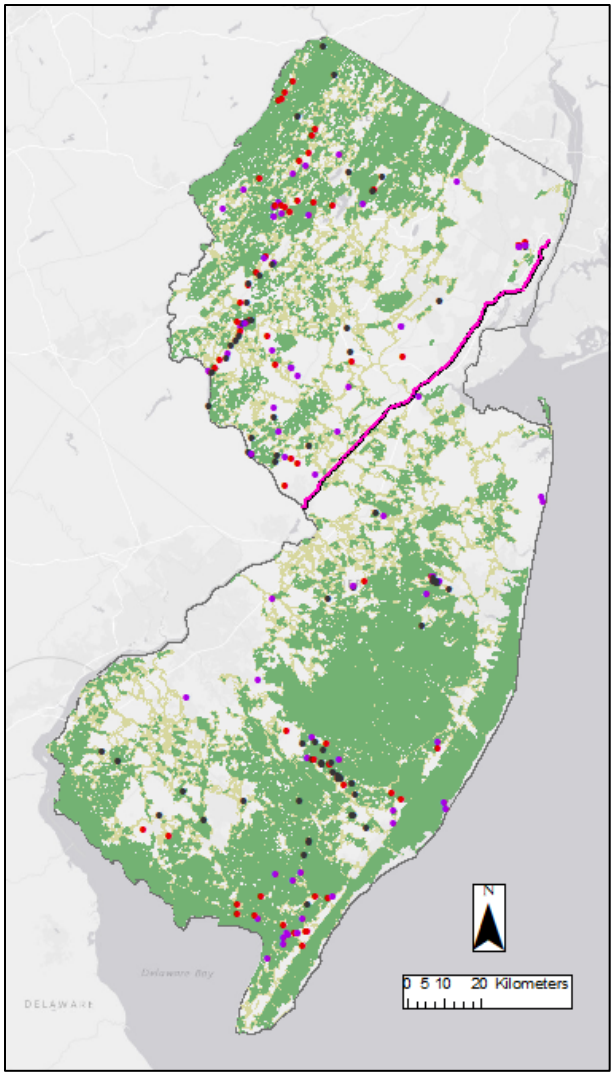


Figure 5. The CHANJ core and corridor map displaying the locations of DNA samples collected from white-tailed deer (black), opossum (red) and raccoon (purple) across New Jersey. The North – South dividing line (pink) is also displayed.

- Identify 2-3 corridors to evaluate movement through and develop and implement plan for conducting survey work.
    - This first work period began setting the groundwork for evaluating wildlife movement through particular corridors. Bobcat Alley and High Mountain are our two main pilot areas within which we plan to conduct each of the various assessment and surveillance elements of this project. The road, culvert and camera surveys and mapping done during this first work period will guide us in focusing further efforts in more informed places, where we can use all of the tools at our disposal to investigate if and how animals are making use of corridors. (These tools will also include a scent-detection dog starting in 2019.) We have identified the potential for graduate students to help with this as well, particularly in the NJ Sourlands area where connections to other habitat cores are few and fragile.

- Develop a plan for incorporating Road Assessment results into CHANJ products.

    - The CHANJ team plans to compile the road assessment data along with available functional connectivity data into Road Segment Assessments that will have be linked to the CHANJ mapping ultimately. During this reporting period, that plan was not implemented because we are still in the early stages of data collection.

- Solicit and compile results from movement analysis
    - As mentioned, the first work period began setting the groundwork for evaluating wildlife movement, but there is nothing yet to report.

Conclusions:

- The ENSP CHANJ team and TNC delineated two pilot areas within which to conduct road assessments in CHANJ-mapped areas in northern New Jersey, and the CHANJ-mapped road segments within those areas were analyzed using GIS to help identify which segments to prioritize for the assessments.

- Project partnerships are now established with TNC (for road assessment surveys) and MSU (for NAACC culvert assessments), and protocols are finalized for data collection and submission. Both groups are serving a large portion of our manpower and match for this project.

- Road assessment, culvert assessment, and camera surveys are well underway to evaluate wildlife interaction with barriers and their use of CHANJ-mapped corridors. NAACC capacity is growing with MSU's outreach efforts, which we expect will result in an increasing number of culvert surveys completed in the next work period and in years to come.

- Road segment and roadkill data collected during this work period will be further analyzed to determine potential roadkill hotspots and factors contributing to wildlife presence on roadways.

- The ENSP CHANJ team successfully recruited over 60 volunteers across the state to help with collection of DNA samples for the gene flow/functional connectivity component of this project.

- The volunteers collected close to 700 samples during the reporting period across over 20 species, with adequate sample size and distribution for the lab to run preliminary analyses on 3-5 species representing different movement capabilities and population dynamics. All of the samples collected during the reporting period have been documented and sent to the lab.

- The CHANJ team and the genetics lab have identified a broad North-South delineation to begin analyzing genetic variability and gene flow for the selected species.

Recommendations:

- Regroup with TNC to develop a plan for the next work period, including placement of additional cameras at culverts and any revisions to the road segment assessment protocols and/or locations.

- Meet with MSU culvert inventory coordinators to develop a plan for the next work period, including refinement of priority locations and goals for the number of surveys to complete.

- Continue to recruit volunteers to collect DNA samples from terrestrial mammals across the state, and continue to provide updates on the study to the volunteers as well as refined guidance regarding sampling needs (e.g. species and locations).

- Continue to collaborate with the National Genomics Center for Wildlife and Fish Conservation on the genetic analyses, potential barriers to test, and sampling needs.

- Continue to look for collaboration opportunities with other mammalian projects taking place across the state that are collecting DNA or movement data.

- Identify 2-3 corridors to evaluate wildlife movement through, and begin efforts to monitor them in the next work period.