

Proposal for Funding
U. S. Fish and Wildlife Service's
State Wildlife Grants

Guidance and Technical Assistance
T-11-T-2

Report for Project Year
September 1, 2010–August 31, 2011

NJ Department of Environmental Protection

DIVISION OF FISH AND WILDLIFE

ENDANGERED AND NONGAME SPECIES PROGRAM

STATE: NEW JERSEY

PROJECT NO.: T-11-T-2

PROJECT TITLE: FISH AND WILDLIFE TECHNICAL GUIDANCE

STUDY TITLE: GUIDANCE AND TECHNICAL ASSISTANCE

PROJECT PERIOD: 9/1/2010 – 8/31/2011

OBJECTIVE:

To provide guidance on the projects, proposals, and management plans of others in order to minimize adverse effects and maximize beneficial effects to endangered, threatened, special concern and rare wildlife.

JOB 1: Environmental Review on Behalf of SGCN

OBJECTIVE: To provide review and comment on behalf of endangered and rare wildlife to water and land related proposals under the jurisdiction of other governmental agencies.

This job will provide review and comment upon such things as Environmental Impact Statements and Assessments, applications for State permits, proposals for State management actions affecting rare wildlife habitats, flood control and dredging projects, highway projects, proposed legislation, water supply projects, federal and interstate actions requiring endangered wildlife review, and county/local projects requiring endangered wildlife review, etc.

Key Findings:

- ENSP biologists reviewed the proposed management plan for Belleplain State Forest, outside the established internal review process due to its large size and complexity. The forest encompasses 20,000 acres, and the plan was based on a detailed forest inventory conducted on the ground over a two-year period. The plan laid out forest stand improvement (FSI) treatments that were specific to forest-type stands. ENSP staff reviewed and commented on all aspects, beginning with the forest management goals and objectives. Endangered and threatened wildlife (featuring barred owls, bald eagles, interior forest birds, and eastern tiger salamanders) were made integral to the forest management goals and the forest improvement prescriptions that will be adopted in the next segment.
- As state members of the Atlantic Flyway Council's Nongame Technical Section (NTC), ENSP biologists reviewed federal rule proposals from the USFWS Office of Migratory birds (Abatement, Raptor Propagation, Revised List of Migratory Birds), proposals for management plans (Secretive Marsh birds, Shorebirds, Vultures/gulls), and finalized the Peregrine Falcon allocation method and the 2011 allocation for the Atlantic Flyway. Review of proposed federal actions by this group has direct benefits (reduced time and effort by states and USFWS) and, more importantly, indirect benefits of collective consideration of regulatory actions at the flyway scale. In the coming year, a review of the NTC will be conducted and may lead to expansion of their charge to non-regulatory issues concerning SGCN.

- An ENSP biologist serves on the Delaware Bay Ecosystem Technical Committee of the Atlantic States Marine Fisheries Commission (ASMFC). In this reporting period, the technical committee reviewed, and put forward for adoption, an allocation method for horseshoe crab harvest that will drive the new Adaptive Resource Management (ARM) Model for Delaware Bay horseshoe crab stock. This model, funded by the National Fish and Wildlife Foundation and developed over the last three years, was designed to allow continued harvest and was constrained by the need to provide adequate horseshoe crab egg resources (i.e., adequate abundance of female crabs) for migratory shorebirds. In addition, NJ and DE provided a bay-wide report on horseshoe crab surface egg densities (2005-2010) to the ASMFC. These data, which now extend over a seven-year time period, should be helpful in informing the ARM Model.
- ENSP biologists provided an annual status update for red knot to the US Fish and Wildlife Service (candidate status review) and the Atlantic States Marine Fisheries Commission (Delaware Bay Ecosystem Technical Committee and Management Board review). Status and trend information informs listing and management actions, respectively, by these entities.
- ENSP biologists advised the USFWS on development of an Atlantic Flyway Shorebird Conservation Action Plan. As a result of a two-day meeting during this segment, a prospectus was developed for a five-day working meeting at the USFWS National Conservation Training Center in February, 2012.
- ENSP biologists reviewed five major projects proposed by utility companies that entailed the creation of new utility rights-of-way and/or the expansions of existing rights-of-way, and a proposal from the Dept. of Defense (Picatinny Arsenal) for the creation of an explosives cave. The scope and extent of these applications demanded a major time investment from ENSP staff to fully assess the potential impacts to threatened and endangered (T&E) species. ENSP advised the Division of Land Use Regulation and the applicants on concerns about habitat loss to T&E wildlife and, where appropriate, provided suggestions on how to avoid or mitigate these impacts. These major reviews were still counted as one review each (in Table 1), but like most long, linear projects, the rights-of-way projects required a lead review biologist and assistance from other biologists. The military project required on-going guidance and negotiations to protect state-listed species. These projects included:
 - PSE&G Roseland-Susquehanna Line
 - Tennessee Gas Pipeline, 300-series
 - Tennessee Gas Pipeline, Northeast Upgrade
 - Spectra Energy, Algonquin Line
 - Transcontinental Pipeline
 - Picatinny Arsenal – Safe Armaments Facility for Energetic Research (SAFER) Project
- Staff provided comments to the Coastal Regulation Program on marine mammal and sea turtle survey methodologies relating to the FERN wind farm’s construction and post construction phases. Staff reviewed and commented on marine mammal and sea turtle survey reports.
- Staff provided comments relating to shortnose sturgeon and freshwater mussels to the Division’s Office of Environmental Review on the Delaware River Deepening Project.
- Staff reviewed stream encroachment project applications that could potentially affect listed freshwater mussels and shortnose sturgeon. Projects reviewed included three trout habitat enhancement projects, Delaware River bridge scour projects, several bridge replacement projects in the Stony Brook, Mercer County, and a dam replacement project in the Paulins Kill.

Conclusions:

- Interstate/flyway organization, particularly when sanctioned by state agencies, have a high likelihood of producing near-term, population-scale benefit for SGCN via standardized methods, comparable trend and other data, prioritized conservation action and regional implementation.
- Within this reporting period over 22 different state, federal, and local agencies and non-profit organizations requested input and advice from ENSP on projects/activities related to SGCNs and their habitat, with 401 reviews completed by ENSP staff. As such, ENSP clearly serves an instrumental role in representing the needs of rare wildlife on behalf of the NJDEP.

Recommendations:

- This job should continue to be funded on an annual basis job since it allows ENSP to thoroughly consider impacts to endangered, threatened, special concern and nongame wildlife habitat in the course of permit and environmental review.

Table 1. Recipients of the Division of Fish and Wildlife, Endangered and Nongame Species Program’s review on behalf of endangered, threatened and special concern wildlife, with number of reviews conducted in this segment.

| 1. State: reviews | |
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| DEP Land Use Regulation Program (Freshwater Wetland Act, CAFRA, Waterfront Development, Stream Encroachment, Highlands Act, Pinelands Act) | 160 |
| Division of Watershed Management | 11 |
| Office of Program Coordination and Environmental Review | 23 |
| Office of Dredging and Sediment Technology | 4 |
| Office of Permit Information and Assistance | 0 |
| Division of Parks and Forestry | 5 |
| NJDEP Review of Activities Proposed for N&HR-Administered Lands and Waters | 54 |
| Division of Solid and Hazardous Waste Management | 0 |
| Site Remediation Program | 0 |
| Bureau of Wastewater Management | 0 |
| Bureau of Marine Water Monitoring | 0 |
| Office of Water Policy | 3 |
| Office of the Commissioner | 0 |
| New Jersey Department of Transportation | 6 |
| New Jersey Pinelands Commission | 2 |
| Office of Policy, Planning and Science | 1 |
| Bureau of Land Management | 10 |
| Division of Fish and Wildlife, Exotic and Nongame Permits Office: Scientific Collecting Permits | 42 |
| 2. U.S. Government: reviews | |
| U.S. Fish and Wildlife Service | 19 |
| Army Corps of Engineers | 5 |

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| Nuclear Regulatory Commission | 0 |
| National Marine Fisheries Service | 1 |
| National Park Service | 0 |
| Natural Resource Conservation Service | 3 |
| Environmental Protection Agency | 0 |
| Federal Energy Regulatory Commission | 0 |
| U.S. Military: Army, Navy, Air Force, Coast Guard | 5 |
| 3. Interstate Commissions, etc.: reviews | |
| Delaware River Basin Commission | 0 |
| Atlantic States Marine Fisheries Commission | 0 |
| Meadowlands Commission | 7 |
| Atlantic Flyway Council | 3 |
| US Fish & Wildlife Service, Atlantic Coast Joint Venture | 7 |
| Other officially recognized interstate committees and cooperatives | 0 |
| 4. County and Local Entities: reviews | |
| County Mosquito Commissions | 14 |
| County and Local Park Commissions | 0 |
| Watershed Associations | 0 |
| Local and Regional Environmental Commissions | 2 |
| 5. Private, Non-Profit Conservation Organizations: reviews | |
| National Fish and Wildlife Foundation | 0 |
| State and county Federations of Sportsmen's Clubs | 2 |
| The Nature Conservancy, Natural Lands Trusts, NJ Audubon, etc. | 12 |
| TOTAL | 401 |

JOB 2: Policy and Planning Technical Guidance on Behalf of SGCN

OBJECTIVE: To advise the New Jersey Department of Environmental Protection, the Governor’s Office, and others, with respect to State policies affecting endangered, threatened, special concern and rare wildlife and their habitats.

Key Findings:

- Continued working on Category One issues as related to listed aquatic obligate species. Attended several “internal stakeholders” meetings with the Division of Water Monitoring. Submitted a write-up on the ENSP’s efforts to develop a C1 site selection protocol for the DEP’s white paper entitled “An Evaluation of NJDEP C1 Antidegradation Designation Protocols.
- Provided input and guidance to the Department on the development of a list of “pre-approved” routes for enduro events on state-owned lands. Once finalized, enduro events can be carried out on these routes without going through the normal permit review process, although a special-use permit will still be required.
- ENSP biologists continued to provide recommendations on key policies and aid the Department in developing and revising regulations that resulted in increased protections for rare wildlife and their habitats.

Table 2. List of policy and planning activities in which the Division of Fish and Wildlife, Endangered and Nongame Species Program participated during this segment.

| | |
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| Advised DEP and others with regard to: | |
| Land use regulations, current and potential interpretation | <p>1. Staff continued to advise the Division of Land Use Regulation on how to define and map Critical Wildlife Habitat (habitat supporting non-listed endangered/threatened wildlife) as part of the Coastal Zone Management Rules.</p> <p>2. Staff provided technical guidance to the rule-writing team for revising the Coastal Zone Management Rules. Amendments that govern wind energy development in the coastal zone were proposed and adopted during this reporting period. We identified the most critical habitats for wildlife species most vulnerable to wind turbine development, and made recommendations to the DEP on how to avoid negative impacts in their wind energy development policies. We also wrote the technical manual on recommended protocols to avoid (and monitor) adverse impacts caused by wind energy development.</p> |
| State Plan implementation | Nothing to report in this segment. |
| Interpretation of Landscape Project mapping to regional planning | ENSP staff continued to work with the Division of Parks and Forestry staff on the development of a forest management plan for the state-owned and adjacent conservation properties referred to as the “Berkeley Triangle.” |
| Habitat prioritization, protection, acquisition, and management | 1. ENSP continued to recommend “high priority parcels” for acquisition consideration by DEP’s Green Acres program. These parcels were identified because of their importance as |

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| | <p>habitat for rare wildlife species.</p> <p>2. ENSP staff consulted with DFW staff to develop habitat management to benefit endangered species at Higbee Beach WMA, Ponderlodge (Villas) WMA, and Sparta Mountain WMA.</p> |
| Resource management and allocation | Nothing to report in this segment. |
| Habitat protection policy and regulation | ENSP staff continued to refine the criteria for recommending Category 1 waters (water bodies that receive the highest level of protection in state land use regulations) to DEP based on presence of obligate aquatic species. |
| Development of Best Management Practices for rare wildlife habitats | <p>1. ENSP staff updated the no-harm best management practices for utility rights-of-way.</p> <p>2. ENSP staff continued its work on developing Forestry Management Guidelines for Species of Conservation Concern in New Jersey.</p> |
| NJDEP Policy on Review of Activities Proposed for N&HR-Administered Lands and Waters | ENSP biologists met with staff from the NHR Office, the Division of Parks and Forestry, Office of Natural Lands Management, and DFW-Bureau of Land Management to discuss policies on N&HR-Administered lands. Specifically, we sought a standardized approach to designating motorized and non-motorized trails on lands under Parks & Forestry and Fish & Wildlife administration. The result was a pilot approach to designating a standardized trail system that would not require case-by-case activity review for regularly-held motorized events. The plan is to get multi-agency approval for several routes in advance, and do the same on other State lands where the public demand exists. |
| NJDEP Commissioner's Office | ENSP biologists provided the Commissioner's Office and the Division of Law with information relating to recommended changes to the State's lists of endangered and nongame wildlife. ENSP reviewed the proposals for listing and provided information supporting the State's position(s), and information to respond to comments on the proposed list changes. |

Conclusions:

- Staff efforts under this job have resulted in a more comprehensive approach to resource protection and management through interagency cooperation and partnership. As such, protections for SGCNs and their habitats have been improved.

Recommendations:

- ENSP staff should continue its involvement in departmental planning and maintain its role as advisors to the department on the management and protection of species of greatest conservation need.

JOB 3: Reducing, Minimizing and Mitigating the Effects of Roads on SGCN Wildlife

OBJECTIVE: To identify the major problems that roads present to wildlife in New Jersey and work with partners to develop practical approaches to address these problems.

Job 3A. Roads and Wildlife Working Group:

OBJECTIVE: To establish a group of state and federal agency representative that will work to identify the major problems that roads present to wildlife in New Jersey develop practical approaches to address these problems.

Key Findings:

- ENSP staff organized eight working group meetings with the core members of the “Roads and Wildlife Working Group”: ENSP, DLUR, USFWS, and DOT staff in attendance.
 - Representatives from Conserve Wildlife Foundation, Wetlands Institute, Drexel University, and Montclair State University were invited and gave talks at different working group meetings over the course of the year on various road/wildlife topics.
 - Experts from DLUR and DOT have spoken at different meetings to discuss land use and DOT regulations (e.g., flood hazard rules, guard rail specs) that should be considered when the working group is designing mitigation strategies.
 - The core working group discussed 11 potential projects where there could be road/wildlife conflicts in situations where: a) new roads were being constructed (N = 2), b) where road work was being done on an existing road (N = 4), or c) where there was no scheduled road work (N = 5). The working group discussed whether there were opportunities to incorporate crossing/barrier structures in these projects, and if so, what type of structures/barriers could be used, how they could be funded, and how to proceed with the planning.
- ENSP staff converted their “Google Group” website to “Google Site,” which has been maintained on an ongoing basis to house all information related to the working group, including road/wildlife literature, upcoming events (e.g., webinars and conferences), and existing and new mitigation projects in the state.
 - Six existing and two proposed wildlife crossing structures have been entered in the database.
 - The roads/wildlife conflict shapefile was integrated into Google Site. The shapefile, created by ENSP staff, highlights potential road and wildlife conflicts based on records of rare species on roads and the proximity of habitat features to roads. It is a tool intended for DOT project review staff to identify potential areas of road/wildlife conflict during the early review phases of projects.
- Working group members attended roads/wildlife conferences
 - One working group member attended and presented a talk on the multi-faceted approach being taken by the roads/wildlife working group to find solutions for reducing the impact of roads on wildlife at the Northeast Transportation and Wildlife Conference at University of Massachusetts.

- Several working group members participated in a Pinelands Science Policy Forum devoted to the discussion of policy options for addressing the ecological impact of roads within the Pinelands, though many tools discussed could be applied outside the Pinelands as well.
- Several working group members attended the International Conference on Ecology and Transportation in Seattle, WA, and reported the highlights back to the working group.
- Progress on populating the database of existing and proposed road crossing/barrier structures has been slow.
 - The group concluded that the database entry form needs to be modified to be more “user friendly” so that users can more readily enter new data and access previous entries.
 - DOT staff is having trouble accessing the data entry spreadsheet because of internet browser incompatibility issues.

Conclusions:

- Regularly scheduled monthly working group meetings are sufficient.
- Agency representation within the core working group is adequate to cover the current range of issues we have needed to discuss to move projects forward.
- Invited guest speakers are important to be able to address specialty topics/issues that arise and to reach out to other organizations within the state that are also working on reducing road/wildlife conflicts.
- DOT review staff lack adequate GIS knowledge to effectively use the conflict shapefile located on Google Site resulting in a lack of early review of road project work. ENSP has been working on providing GIS training opportunities for DOT review staff.
- Attendance of working group members at roads conferences led to good networking opportunities, and allowed members to learn how biologists and planners from NJ, other states, and other countries are mitigating the impacts of roads on wildlife. There has been inadequate representation of NJDOT staff at the conferences.

Recommendations:

- Need more DOT working group members to attend conferences.
- Continue to work with DOT on GIS training and use of the road/wildlife conflict shapefile.
- The working group should continue to explore mitigation efforts that have been effective both within and outside of NJ.
- The working group should continue to explore all proactive and reactive opportunities to implement mitigation strategies in areas known to have road/wildlife conflicts, explore funding sources for these projects, investigate specific mitigation strategies across species groups, and work toward having a couple of projects implemented on the ground.
- Continue to maintain and update Google website as a communication and information resource for the working group.
- Continue to meet on an approximately monthly basis and invite speakers when appropriate.
- Continue to work with DOT to resolve internet browser issues so that the database of existing and new road crossing/barrier structures can be accessed and fully populated by members of the working group.

Job 3B. Amphibian Crossing Project:

OBJECTIVE: To identify amphibian crossing hotspots and develop methods to reduce the mortality associated with these hotspots.

Key Findings:

- ENSP partner the Conserve Wildlife Foundation of New Jersey coordinated the 2011 Amphibian Crossing Project. Two CWF biologists, one ENSP biologist, and 80 volunteers participated in amphibian rescue surveys at five high-priority road crossing locations in northern NJ during peak migration. Four of the five sites were new rescue survey locations this year, having been identified as hot-spots through previous years' scouting surveys. These required cooperation from new townships. More than 3,000 amphibians were observed during the survey.
- Road mortality of Ambystomid salamanders and wood frogs (the target species for this job) was reduced to an average 6.6% of those recorded at rescue sites. We found that spring peepers were nearly twice as likely to be killed on the road (on average) because their small size limited their visibility to rescuers.
- Because of differences in snowpack and local weather, early spring 2011 turned out to be a difficult season for predicting major migration nights across northern NJ. At one site, migration happened intermittently across several nights and during mid-night hours an efforts to aid amphibian crossing were only marginally successful.
- During this reporting period this project was expanded into the Sourland Mountains region of central NJ, where 10 student volunteers from Raritan Valley Community College identified 10 new amphibian road crossing locations.

Conclusions:

- Municipalities and local road departments are receptive to amphibian rescue surveys at road crossing hot-spots as long as safety concerns are addressed. As participation grows, permission from new municipalities seems easier to obtain.
- The success of rescue surveys is dependent on specific ground and weather conditions; as such, the migration events are inherently difficult to predict and steward. Road permeability projects and traffic detours are needed to protect these migration sites more thoroughly and long-term.
- Two high-priority amphibian crossing sites, both of which are bordered by state land, were selected by the Roads and Wildlife Working Group to serves as ecopassage pilot projects. The working group will pursue funding to retrofit sections of these roads with under-the-road culverts and roadside amphibian barriers to safely cross amphibians under the road.

Recommendations:

- A few potential amphibian crossing hot-spots in the Sourlands were mapped this year and should be surveyed more extensively in 2012.
- Rescue surveys should be carried out annually at high-priority amphibian crossing sites until culverts are in place or traffic detours are established, at which time follow-up monitoring should commence.
- Engineering plans, cost estimates, and funding are needed to implement road ecopassage projects.

Job 3C. Crossing Structures Pilot Project:

OBJECTIVE: To investigate the potential of installing under-the-road culverts in a few test locations to serve as a means for wildlife to safely cross under the road.

Key Findings:

- We identified four projects and implementation began on one of these projects:
 - During the review of a wetlands permit, an ecopassage need was identified along a section of roadway in Bedminster Township, Somerset County. Graduate students from Montclair State University performed a 1-month pitfall trap study along 150 meters of road that documented 613 crossing attempts by 13 species of reptile and amphibian. The Roads and Wildlife Working Group (see Job 3A) informed culvert and barrier fencing design and final plans were submitted to the NJDEP by the project applicant for approval. We expect the project to receive full approval in 2012. Once installation is complete, Montclair will perform follow-up monitoring.
 - A runway mitigation project on the Warren Grove Gunnery Range in the Pinelands National Reserve is currently under construction and is expected to be complete in 2012. ENSP partnered with Drexel University and the New Jersey Air National Guard, and received input from the Roads and Wildlife Working Group to design tunnel and fencing structures to prevent Northern pine snake mortality on a new runway construction that bisects pine snake habitat. Telemetry data demonstrate the movement of pine snakes throughout the area where the runway is being built. The mitigation effort will be monitored by students from Drexel University.
 - Two amphibian crossing projects (See Job 3b)
- The Shades of Death road crossing project (located in Warren County, NJ) is no longer being pursued due to logistical difficulties with the site's topography, land ownership issues, and lack of funding opportunities.

Conclusions:

- The Roads and Wildlife Working Group initiated mitigation projects through environmental review of permit applications, communication between working group members, and the identification of road crossing hotspots. On-going projects are related to both existing roadways with known high mortality rates and new construction through areas with known habitat and occurrence of rare wildlife species.
- Both pre- and post- construction monitoring are planned at the pilot project sites.
- The projects are being documented and all information related to designs, permitting decisions, structure materials, and costs are being posted on the Google Site and in the road crossing/barrier structure database.

Recommendations:

- Complete the construction, documentation, and monitoring of the existing pilot projects.
- Continue to identify pilot project sites through the working group and proceed through the process of implementing those projects.
- Work with state regulators to facilitate road mitigation projects.

Job 3D. Crossing Structures BMP:

OBJECTIVE: Develop a list of best management practices for the design, placement, and installation of crossing structures for wildlife.

Key Findings:

- The roads and wildlife working group assembled existing BMP manuals that incorporate the latest research and tools on mitigation efforts.
- The roads and wildlife working group invited various speakers from The Wetlands Institute, Drexel University, and Conserve Wildlife Foundation of NJ who have each employed different mitigation crossing and fencing designs to benefit target reptile species, including northern diamondback terrapin and northern pine snake. Through these presentations, the working group is developing a better understanding of which crossing and barrier structures are most effective in reducing the impacts of roads on wildlife.
- Existing BMP guidelines were incorporated into pilot projects described in Job 3C.
 - Design and engineering for pilot projects were captured in road crossing/barrier structure database.
- No BMP guidance document for roads crossing or barrier structures was developed during this reporting period.

Conclusions:

- Sufficient data on BMPs has been collected for inclusion into a draft NJ BMP guidance document. The document itself has not yet been drafted.
- The working group benefited from the experiences of invited speakers and their recommendations and experiences using different crossing and fencing designs.

Recommendations:

- Assemble information from existing BMP manuals and incorporate novel crossing structure and fencing designs.
- Several new BMP manuals have been released by leading agencies in the field of roads and wildlife in the past year. These guidelines should be incorporated into NJ's BMP document.
- Work with the roads and wildlife working group to edit the document.
- Implement the guidelines and edit/modify as necessary.

Job 3E. Road Mortality Hotspot Detection:

OBJECTIVE: To partner with the Department of Transportation to collect dead-on-road wildlife observations that can be used for research and planning purposes.

Key Findings:

- Guidance has been provided to DOT maintenance about a method for collecting geo-referenced data on "dead-on-road" wildlife location data. Using a hand-held GPS device DOT maintenance crews could collect such data. The roads and wildlife working group provided vendor information to DOT along with a proposed data transfer protocol.
- The hand-held GPS devices have not yet been purchased by DOT due to other priorities taking precedence over the collection of dead-on-road wildlife data.
- A wildlife ID guide developed by ENSP for DOT maintenance crews has been finalized, but is not yet being used by DOT crews.
- The proposed digital cameras for the DOT maintenance crews have not yet been purchased. These cameras were intended to be used along with the hand-held GPS devices to aid in the

identification of the dead-on-road wildlife. These cameras will not be purchased until after the DOT Maintenance Division moves forward with purchasing the GPS devices, which are integral to this effort.

- Research into the online data submittal applications for reporting dead-on-road wildlife observations in other states has been initiated. ENSP is considering moving forward with its own online interface for submitting dead-on-road wildlife observations.

Conclusions:

- The purchase of GPS-capable hand-held devices by DOT has not taken place yet so a data transfer protocol, the use of the wildlife ID guide, and digital camera use as a pilot project has not occurred.
- ENSP is exploring the option of developing a NJ dead-on-road wildlife online submittal application to collect information obtained in the future by DOT as well as the general public.

Recommendations:

- Continue to communicate with the DOT Maintenance Division so that the roads and wildlife working group knows when hand-held GPS devices have been purchased and when we can move forward with integrating wildlife mortality data collection procedures into their system.
- Purchase digital cameras if DOT agrees it would be feasible for maintenance crews.
- Continue to explore the option of developing a NJ dead-on-road wildlife online submittal application and proceed with its development if feasible.

Job 3F. Connectivity Mapping:

OBJECTIVE: Develop a map that identifies the key habitat corridors that link existing state lands together and serve a critical roll in connecting these large “secured areas” together for wildlife in New Jersey.

Key Findings:

- ENSP staff researched the procedures and GIS tools used by other states in the development of their statewide connectivity maps. Staff also conducted a pilot project with bobcats and northern pine snakes that explores the methodologies and tools. The mapping approach involves selecting focal species, developing habitat maps and corridor models for each focal species, then combining focal species corridors to generate a draft statewide linkage map.
 - Other states have had the most success developing and implementing statewide connectivity mapping and associated guidelines by having stakeholders (with a capacity to implement connectivity solutions on the ground) participate in the development of the mapping from the beginning.
 - ENSP staff presented the approach and tools, and pilot project results at the NE Transportation and Wildlife Conference at the University of Massachusetts and received positive feedback from conference attendees.
- ENSP staff developed a work plan for forming a habitat connectivity working group comprised of representatives from agencies/organizations/institutions with the ability to implement connectivity actions on the ground. The working group will research, prepare, and coordinate the connectivity mapping analyses, validation, and implementation actions.

- ENSP presented the approach and general work plan to the Endangered and Nongame Species Advisory Committee and to DEP Assistant Commissioners to gain support for going forward with assembling a full working group.
- ENSP staff purchased and tested equipment and tools that will be needed to validate the connectivity mapping.
 - ENSP staff purchased a number of remotely triggered cameras and worked to train the wildlife detection dog on additional species. Both of these are “tools” that will be deployed for the validation of the connectivity mapping.
- ENSP, with the help of the Roads and Wildlife Working group (Job 3A), put time into developing a culvert inventory datasheet, protocol, and database to help identify crossing structures that could be retrofitted or need to be replaced to function effectively. Once this is completed, a procedure will be in place for when a draft of the connectivity mapping is complete and work can immediately begin on evaluating road segments that are crossed by a “mapped” corridor from the connectivity map.

Conclusions:

- Development of the statewide connectivity mapping has not yet begun until a stakeholder working group is formed.
- ENSAC and the Assistant Commissioners within DEP were very supportive of the connectivity mapping proposal and suggested ENSP develop and submit a formal work plan.
- ENSP staff are preparing and testing the tools that will be needed for future phases of the connectivity mapping project including validation procedures and a culvert inventory protocol.

Recommendations:

- Finalize and submit the formal statewide connectivity mapping work plan to DEP’s Natural and Historic Resources Assistant Commissioner and follow her guidance for proceeding.
 - Form the stakeholder working group and proceed with the actions in the work plan including: determining a methodology, constructing the habitat connectivity map based on the agreed upon methodology, developing and implementing the validation plan, and developing connectivity guidelines for key habitat corridors.
- Continue to prepare and test the tools needed for the validation work.
- Finalize the culvert inventory datasheet and protocol.

NEW JOB 4: Mitigating Bat Mortality at Wind Farms

OBJECTIVE: To decrease bat mortality associated with wind farms in coastal areas.

Key Findings:

- ENSP conducted a conference call with DEP staff, BlueArc Management (the developers that are responsible for the Atlantic County Utilities Authority [ACUA] wind farm) and WEST, Inc. (a consultant) in September of 2010. The purpose of the discussion was to put forth the idea of changing the cut-in speed or to feather the blades of the turbines to reduce mortality to bats. During the meeting, BlueArc and WEST both expressed concern that the mortality estimates provided by New Jersey Audubon (NJAS) in an interim report were calculated in such a manner as to overestimate the number of bats being killed. WEST stated their intention to write their own report, based on the raw data presented in NJAS’s interim report.

- In February, 2011, WEST provided their report, which used calculations that resulted in much smaller numbers of estimated bat mortality. As opposed to the NJAS reported, which calculated that 46 bats/turbine/year were killed, WEST's report stated a range of 3.99-13.03 bats/MW/year. The range was due to the calculation of a rate for each year data was collected, while NJAS combined data. NJAS also reported by "turbine," while WEST reported by "megawatt" (MW). The turbines at ACUA are 1.5 MW, so to compare the two reports one just needs to adjust the NJAS number to 30.6 bats/MW/year. This number is still more than double the highest estimate of WEST, so clearly there are some differences in the organizations' methodology.
- ENSP staff consulted with leading experts in this emerging field to understand why the estimates were so different. Since the study of bat mortality is still new, there is no single methodology that researchers have agreed is the best one. However, our consultations concluded that the NJAS method tends to overestimate and the WEST methodology tends to underestimate bat mortality.
- BlueArc's position is that they do not want to make any changes until the NJAS final report is released. This was supposed to happen during this segment, but for various reasons it has not yet been completed. It is expected to be finalized in late 2011. One of the reasons for the delay is that NJAS has decided to use yet another estimator to calculate mortality. Once this report is complete, talks with BlueArc can resume and bat mortality studies can begin.

Conclusions:

- The reason for this project's delays is in part due to the fact that bats were not addressed in the permit conditions for the project. At the time the permit was issued, it was not known that bats were highly vulnerable to turbines during their migration period (particularly their fall migration). Because of that, anything that BlueArc agrees to change to mitigate bat mortality is strictly voluntary. ENSP is encouraged that they are willing to discuss changes, but is not sure that they will agree to the study ENSP is proposing.

Recommendations:

- Continue encouraging NJAS to finalize their report. Once that is completed, meet with BlueArc again to encourage them to try changing the cut-in speed or feathering blades so that ENSP can measure whether these techniques reduce bat mortality at this site.
- Ensure that all future large-scale wind turbine projects on land include a permit condition to protect bats. This can be accomplished by making a condition regulating cut-in speeds, blade feathering or temporary shutdowns that is contingent on post-construction studies showing that bat mortality is an issue at the site.